COME RES

Advancing Renewable Energy Communities

Deliverable 2.1

ASSESSMENT REPORT ON TECHNICAL, LEGAL, INSTITUTIONAL AND POLICY CONDITIONS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 953040. The sole responsibility for the content of this document lies with the COME RES project and does not necessarily reflect the opinion of the European Union.

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SUMMARY

WP: 2	Name of the WP: Starting conditions, potentials, barriers and drivers for the uptake of RES based community energy		
Dissemination level:	Public	Due delivery date:	28 February 2021
Type:	Report	Actual delivery date:	26 February 2021
Lead beneficiary:	CICERO – Center for International Climate Research		
Contributing beneficiaries:	FUB, VITO, BBH, RESCoop.eu, ECOAZIONI, ENEA, LEIF, TU/e, KAPE, INEGI, ECORYS		
Lead authors:	Lead authors: Karina Standal and Stine Aakre		
Contributing authors:	Irene Alonso (ECORYS); Isabel Azevedo (INEGI); Massimo Bastiani (Ecoazioni); Nicoletta del Bufalo (ECORYS); Martina Caliano (ENEA); Sarah Delvaux (VITO); Rosaria Di Nucci (FUB); Dörte Fouquet (BBH); Vincenzo Gatta (FUB); Xenia Gimenez (ACER); Gaidis Klāvs (IPE); Michael Krug (FUB); Ivars Kudreņickis (IPE); Erik Laes (TU/e); Kristin Linnerud (CICERO); Elena De Luca (ENEA), Pouyan Maleki (ECORYS); Erika Meynaerts (VITO); Piotr Nowakowski (KAPE); Maria Grazia Oteri (ENEA); Stavroula Pappa (REScoop.eu); Roland Schumann (ACER); Dirk Vansintjan (REScoop.eu); Virna Venerucci (Ecoazioni); Ryszard Wnuk (KAPE); Aija Zučika (LEIF); Solveig Aamodt (CICERO)		

Document history				
Version	Submitted for review by	Date	Reviewed/approved by	Date
V0	Karina Standal, CICERO	18.02.2021	Kristin Linnerud, CICERO	19.02.2021
V1	Stine Aakre, CICERO	19.02.2021	Pouyan Maleki, ECORYS Rosaria Di Nucci FUB-FFU	22.02.2021 24.02.2021
V2	Karina Standal, CICERO	26.02.2021	Rosaria Di Nucci FUB-FFU	26.02.2021

ABOUT COME RES

COME RES - Community Energy for the uptake of renewables in the electricity sector. Connecting long-term visions with short-term actions aims at facilitating the market uptake of renewable energy sources (RES) in the electricity sector. Specifically, the project focuses on advancing renewable energy communities (RECs) as per the EU's recast Renewable Energy Directive (REDII). COME RES takes a multi- and transdisciplinary approach to support the development of RECs in nine European countries; Belgium, Germany, Italy, Latvia, the Netherlands, Norway, Poland, Portugal, and Spain.

ISSUES ADRESSED AND MAJOR STEPS

COME RES covers diverse socio-technical systems including community PV, wind (onshore), storage and integrated community solutions, investigated in nine European countries. The project has a specific focus on a number of target regions in these countries, where community energy has the potential to be further developed and model regions where community energy is in a more advanced stage of development. COME RES analyses political, administrative, legal, socioeconomic, spatial and environmental characteristics, and the reasons for the slow deployment of RECs in selected target regions. COME RES synchronises project activities with the transposition and implementation of the Clean Energy Package and its provisions for RECs in policy labs. Policy lessons with validity across Europe will be drawn and recommendations proposed.

ABSTRACT

The Renewable Energy Directive of the EU has represented a key driver for the uptake of renewable energy resources for electricity in Europe. However, there are several countries and regions within the EU where the uptake of renewables for electricity have been comparatively low so far. Current technological innovation provides opportunities for decentralised RES systems of production and energy storage that enable the rise of new collective forms of energy citizenship. The “Clean Energy for all Europeans” package puts consumers at the heart of EU energy policies; the recast of the Renewable Energy Directive (RED II) includes new provisions for RES community energy empowering them to participate in the energy market. There is a need to re-align national and regional policy frameworks and support schemes with RED II.

The purpose of this Deliverable is to provide a comprehensive understanding of the current conditions for the uptake of renewable based community energy in selected target regions in Belgium, Germany, Italy, Latvia, the Netherlands, Norway, Poland, Portugal and Spain. Our focus on renewable community energy follows the definitions of RED II (Art. 2 (16)) where energy communities are characterised by open and active participation and control from natural persons, small or medium enterprises and local authorities, and where the primary purpose is 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.

This Deliverable provides first a specification of key definitions and concepts related to RES community energy. Next, we present findings from a mapping and assessment of starting conditions for RES community energy in the COME RES target regions. Through document analysis and complementary expert interviews, we have explored starting conditions along technical, legal, policy and social dimensions. On the legal and policy level, we find that several of the COME RES countries have made good progress in transposing and implementing the provisions in RED II that apply to renewable energy communities. However, we also identify areas where more work is needed in all nine countries, including the provision and implementation of enabling frameworks to promote the development of renewable energy communities. Further, we find that regulations and support schemes for RES community energy (as defined in RED II) are not in place. In the contexts where there are other potential support schemes for renewables the transaction costs of finding information and regulatory procedures are high. In terms of social conditions, the experience of earlier forms of community energy varies greatly and the target regions have very different historical and local context as a starting point. Further, we find that, although most of the target region populations are generally positive to renewable energy sources, there is a notable protest against onshore wind, which influences the policy agenda and public opinion. Renewable community energy may be an important pathway to increase social acceptability of renewables. Yet, renewable community energy engaging in wind energy projects may also risk negative reactions bestowed on larger onshore wind installations.

This Deliverable reveal that the progress towards transposing RED II and considering renewable community energy in climate and energy policies have started. However, our findings indicate that the starting conditions for RES community energy in the COME RES target regions are challenging due to lack of quantitative (and often qualitative) policy targets and support schemes. In addition, the regulations at play are often complicated. Based on the findings we highlight points of action to support design of future policies to improve starting conditions for renewable community energy.

ACKNOWLEDGEMENTS

The authors would like to express their acknowledgements to the reviewers for their thorough revision and helpful suggestions. We would also like to thank Astrid Stavseng, Anton Eliston and Viktor Nossen from our COME RES partner the Norwegian Water Resources and Energy Directorate for insightful feedback.

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GLOSSARY AND ABBREVIATIONS

Abbreviation	Description
CEC	Citizen Energy Community (see definition Table 2)
EU	European Union
FIT	Feed-in Tariff
FIP	Feed-in Premium
IEMD	Integrated Electricity Market Directive
MS	Member States of the EU
NECP	Integrated National Energy and Climate Plan
NVE	Norwegian Water Resources and Energy Directive
Prosumer	End-user that consume and produce energy and are integrated in the grid system and sell excess produced electricity within this system
PV	photovoltaic system, also known as PV system or solar power system
RED	Renewable Energy Directive
REC	Renewable Energy Community (see definition Table 2)
RES	Renewable Energy Sources
RES - E	Renewable energy sources for electricity
RES community energy	For this study defined to comprise of Renewable Energy Communities (REC) and RES-E based Citizen Energy Communities (CEC)
TGC	Tradable Green Certificates

1. Introduction

The Renewable Energy Directive (2009/28/EC) (RED) of the European Union (EU), with the legally binding European and national targets, has been a key driver for the uptake of Renewable Energy Sources (RES) for electricity (RES-E) in Europe and beyond. However, there are several countries and regions within the EU where the deployment rates for RES-E have been comparatively low so far. One reason for this can be attributed to a lack of socio-political or community acceptance. Research has shown that community ownership of renewable energy projects can be a main driver for local acceptance (Slee 2015; Cowell and Devine-Wright 2018, Leiren et al. 2020; Linnerud et al. 2018).

Current technological innovation and opportunities for decentralised RES systems for production and energy storage enable the rise of new collective forms of energy citizenship. The “Clean Energy for all Europeans” package puts consumers at the heart of EU energy policies (European Commission 2019). Furthermore, the recast Renewable Energy Directive (2018/2001/EU) (RED II) includes new provisions for RES community energy empowering them to participate in the energy market. The transposition of RED II into national law shall be completed by 30 June 2021. There is a need to re-align national and regional policy frameworks and support schemes with RED II. The focus of this Deliverable is on RES community energy as defined and presented in RED II (Art. 2 (16)) and Electricity Market Directive (IEMD). Such forms of community energy presuppose open, voluntary participation of citizens, small or medium enterprises and or local authorities in the proximity. Further, such forms of community energy should be based on democratic principles where control and decision-making are distributed among the members and where the main objective is to provide social, environmental or economic benefits for the members of the local community (as opposed to profits).[1]

In line with the objectives indicated in the COME RES project the purpose of this Deliverable is to provide a comprehensive understanding of the current conditions for the uptake of RES based community energy in selected target regions in Belgium, Germany, Italy, Latvia, the Netherlands, Norway, Poland, Portugal and Spain. Conditions are referred to here as a specific context or factors that must be present for RES based community energy initiatives to become reality. We have carried out a mapping and assessment of starting conditions along technical, legal, policy and social dimensions in the selected target regions. The mapping and assessment, carried out by the partners, are based on policy and regulation documents, available statistics, and existing research literature in the field. The data is also supported by

[1] In this report we use the term RES community energy, which we define to comprise of Renewable Energy Communities (REC) that is the focus of RED II, article 22 and RES-E based Citizen Energy Communities (CEC) that is the focus of the Electricity Market Directive (IEMD), article 16. For further explanation, please see Section 2 on key definitions and concepts.

complementary expert interviews. The target regions and chosen technological focus is illustrated in Table 1 below:

Table 1. COME RES target and model regions and selected technology focus

Country	Target regions	Model regions
Flanders – Belgium	Limburg (Genk), West-Flanders (Zwevegem) (integrated solutions)	East-Flanders (Gent/Eeklo), Antwerp (Antwerp South), Flemish-Brabant (Leuven) (integrated solutions)
Germany	Thuringia (wind, integrated solutions)	Schleswig-Holstein (wind, integrated solutions)
Italy	Apulia (PV/wind)	Piedmont (PV/hydro)
Latvia	Due to the small size of the country, and the lack of RECs Latvia as a whole will serve as a target region	Municipality of Marupe (only community PV)
The Netherlands	North-Brabant (integrated solutions)	Zeeland (wind), Rijsenhout, Etten-Leur, Woerden (PV/storage), Loenen (integrated solutions, virtual power plant)
Norway	Due to the size of the country and lack of RECs, Norway as a whole is target region (hydro, wind, PV, integrated solutions)	Island and farming communities
Poland	Warmian-Masurian (PV)	Lower Silesia (integrated solutions), Pomerania (integrated solutions), Virtual Green Power Plant Ochotnica (PV)
Portugal	Norte (PV, integrated solutions)	Municipality of Lisbon
Spain	Balearic and Canary Islands (PV)	Cataluña / C. Valenciana (PV)

This Deliverable focuses on target regions that have experienced a comparatively slow deployment of RES community energy. For these target regions we identify possible legal, policy, regulatory and social acceptance gaps and provide research-based policy recommendations that address these gaps. In Latvia and Norway, in place of specific regions the country as a whole is defined as a target region due to the lack of RES community energy development so far.

This Deliverable constitutes Task 2.1 in WP2 in the COME RES project, and the analysis of the starting conditions represents the foundation for the continued work in order to develop business models, financing

instruments and a best practice inventory, as well as stakeholder dialogues, policy recommendations and provide feedback in the other WPs.

1.1 Outline of the Deliverable

In section 2 we provide a specification of key definitions and concepts related to RES community energy.

Section 3 provides findings from our study of starting conditions for RES community energy in the target regions. We map and assess the starting conditions along the following dimensions: technical, legal and policy frameworks, regulations, support schemes, and social conditions. All these conditions influence peoples' acceptance of RES community energy in the target regions. The assessment of technical conditions provides a summary of the local geographical conditions, infrastructure accessibility, land use restrictions and electricity system of the target regions. The technical potential for RES community energy that may be unlocked in the target regions will be covered in a forthcoming deliverable from the COME RES project.

The assessment of legal and policy frameworks pays particular attention to how the transposition to RED II is being handled and implemented in the countries where the target regions are situated. This section also presents the targets for RES and RES community energy in the target regions, and how these targets are integrated in the national energy and climate plans (NECPs) submitted by the Member States (MS).

The assessment of regulations and support schemes provides a summary of the regulatory framework and economic incentives (e.g., Tradable Green Certificates (TGC), Feed-in tariffs (FIT), etc.) that enable or limit the potential for establishing RES community energy in the target regions. The main focus is on the target region level, but in many cases the national authorities will determine these conditions. Our assessment of RES community energy development and social acceptance of RES community energy and selected technologies in the target regions are drawn from a review of existing studies. This section also includes a mapping of relevant institutions, including both private sector and civil society organisations, that actively promote or oppose RES community energy and RES in the public debate. The mapping and assessment work is supported by complementary interviews with experts working in relevant institutions in the partner countries.

Section 4 presents a summary of the results and discusses how these can guide the design of future policies to improve starting conditions for renewable community energy. Furthermore, we highlight areas that need further research and suggest action points to support further development of RES community energy in the target regions.

The appendices to this Deliverable provide full and detailed background reports of the target regions, as well as an overview of interviews and glossary and abbreviations.

2. Key definitions and concepts

This Deliverable follows the definitions of renewable energy communities (RECs) and citizen energy communities (CECs) established at the EU level by the recast Renewable Energy Directive (2018/2001/EU) (RED II) and the Integrated Electricity Market Directive (2019/944/EU) (IEMD), respectively, which focuses on communities' capacity to generate, consume, store and sell renewable energy (RED II, Article 22; IEMD, Article 16). In line with these Directives, we understand community energy as those initiatives where natural persons, local authorities (including municipalities), or SMEs participate directly in producing, selling or distributing renewable energy, either on their own or acting in partnership with others (RED II, Article 2, IEMD, Article 2). In general, we use the term RES community energy in this Deliverable, which includes both RECs and RES-E based CECs.

RED II defines a REC as a legal entity which, in agreement with applicable national laws, 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 owned and developed by that community. According to article 2(16)(b) and (c) of RED II, the shareholders or members of a REC could be natural persons, SMEs or local authorities, including municipalities and the primary purpose of a REC is to provide environmental, economic or social community benefits for its members or the local areas where it operates rather than financial profits. RECs are then characterised primarily through open, voluntary participation of natural persons, local authorities or SMEs, local ownership and control, and orientation towards community benefits. RECs can – to a certain extent – be regarded as a subset of CECs defined in the IEMD.

Figure 1 below illustrates the relations between community energy, citizen energy communities, and renewable energy communities.

Figure 1. Community energy, citizen energy communities and renewable energy communities.

Community energy covers projects where communities (of place or interest) exhibit a high degree of ownership and control of the energy project as well as benefiting collectively from the outcomes, either energy-saving or revenue generation (Seyfang et al. 2013, Walker and Devine-Wright 2008).

The notion of community energy differs from that of self-consumer (or prosumer) also embedded in RED II (Article 2(14)). The distinguishing features of the notion of community energy vis-à-vis that of prosumer are: the type of agency involved, the size of projects, and their purpose. Finally, while the main objective of prosumers[2] is to produce energy and/or financial (or other) benefits for themselves, a community energy project is expected to provide 'environmental, economic or social community benefits for its members or the local areas where it operates, rather than financial profits' (RED II, Article 2(16)).

The main, although not exclusive, focus of COME RES will be on RECs as defined in RED II. This will embrace collective self-consumption like tenant electricity projects and community renewable energy as far as rooted in local communities. COME RES considers collective self-consumption mainly as a potential activity of a REC, among other potential activities (generating, storing, and selling energy).

In Table 2 below, we provide formal definitions of RECs, CECs, and self-consumer *as per* RED II (Article 2) and IEMD (Article 2).

[2] In some contexts, prosumers are also required to be integrated in the grid system and sell excess produced electricity within this system to be legally defined as prosumers (Standal et al. 2019).

Table 2. Definitions of RECs, CECs, renewables self-consumer and jointly acting renewables self-consumer.

Term	Definition
Renewable energy community *RED II, Article 2(16)*	"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; (c) the primary purpose of which is 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"
Citizen energy community *IEMD, Article 2(11)*	"A legal entity that: (a) is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises; (b) has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; (c) 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 shareholder"
Renewables self-consumer *RED II, Article 2(14)*	"A final customer operating within its premises located within confined boundaries or, where permitted by a Member State, within other premises, who generates renewable electricity for its own consumption, and who may store or sell self-generated renewable electricity, provided that, for a non-household renewables self-consumer, those activities do not constitute its primary commercial or professional activity"
Jointly acting renewables self-consumer *RED II, Article 2(15)*	"A group of at least two jointly acting renewables self-consumers in accordance with point 2(14) who are located in the same building or multi-apartment block."

In Table 3 below, we briefly discuss relevant terms of the definition of RECs contained in RED II Article 2(16).

Table 3. A discussion of key terms in the definition of RECs in RED II (Article 2(16)).

Term	Description
Legal entity *Reference: RED II, Article 2(16)a*	RECs must be a legal entity. Recital 71 of the RED II states that Member States have the discretion to choose the form of legal entity: *"The specific characteristics of local renewable energy communities in terms of size, ownership structure and the number of projects can hamper their competition on an equal footing with large-scale players, namely competitors with larger projects or portfolios. Therefore, it should be possible for Member States to choose any form of entity for renewable energy communities, provided that such an entity may, acting in its own name, exercise rights and be subject to obligations."*
Open and voluntary participation *Reference: RED II, Article 2(16)a*	Recital 71 of the RED II states that participation in RECs "*should be open to all potential local members based on objective, transparent and non-discriminatory criteria".* Voluntary participation should be understood as ensuring shareholders or members of RECs the right to leave the REC (REScoop.eu 2020: 21).
Autonomy *Reference: RED II, Article 2(16)a*	Recital 71 of the RED II states that "*To avoid abuse and to ensure broad participation, renewable energy communities 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."* REScoop.eu (2020: 31) provides an elaboration of how autonomy should be interpreted: "autonomy is meant to ensure that the [REC] is owned and controlled jointly by its members, rather than by a single member or a small group of members. Specifically, autonomy supports democratic internal decision making so that all members are adequately represented (regardless of their amount of investment). Autonomy is also about guaranteeing economic and financial autonomy, meaning that business partnerships with traditional market actors should not undermine the community's decision-making independence."
Effective control *Reference: RED II, Article 2(16)a*	Besides Article 2(16)a, effective control is not further discussed in RED II, and it is up to Member States to define how effective control is to be understood (REScoop.eu 2020: 25). REScoop.eu (2020: 25) notes that "control refers generally to a situation in which a particular member or shareholder within a legal entity (company, natural person, or local authority) wields significant influence over the management or decision-making situation, based on their voting power or shares held. In other words, a company is 'controlled' if there is a group of shareholders that bring together enough shares (e.g. a majority, or a significant minority) to give that group a decisive voice in managing the company".

Term	Description
Proximity *Reference: RED II, Article 2(16)a*	According to RED II, effective control must be held by "*shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity*". Member States have the discretion to adapt and define the concept according to national and regional contexts (PROSEU 2020: 2). REScoop.eu (2020: 26) notes that the term "should be generally understood as the geographical scope in which the members or shareholders that effectively control the REC should be located (e.g. reside). Emphasis is given to geographical proximity because of its substantial added value in generating local acceptance of renewable energy projects."
Eligibility to participate in RECs *Reference: RED II, Article 2(16)b*	RED II states that natural persons, SMEs or local authorities, including municipalities are entitled to participate in RECs. SMEs are further defined in Article 2(8) of the RED II: "*SME' means a micro, small or medium-sized enterprise as defined in Article 2 of the Annex to Commission Recommendation 2003/361/EC",* where the category of SMEs *"is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million."*[3] Thus, RED II puts restrictions on the size of companies eligible to participate in RECs. In addition, REScoop.eu (2020: 23) notes that Article 22(1) of the RED II gives Member States the discretion to limit the participation of companies that are already active in the energy sector.
Environmental, economic or social community benefits *Reference: RED II, Article 2(16)c*	RED II states that the primary purpose of RECs is *"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"*. RECs must have a non-commercial purpose (see REScoop.eu 2020: 19-21 for a discussion). RED II does not provide further specification of environmental, economic and social community benefits. REScoop.eu (2020: 20) provides examples of environmental (e.g. increased local production of RES), economic (e.g. local development) and social community benefits (e.g. energy democracy).

While not part of the definition of a REC (RED II, Article 2(16)), in terms of activities, RED II (Article 22(1) and Article 22(2)) establishes the rights of both consumers and of RECs:

> RED II Article 22(1):
> *Member States shall ensure that final customers, in particular household customers, are entitled to participate in a renewable energy community while maintaining their rights or obligations as final customers, and without being subject to unjustified or discriminatory conditions or procedures that would prevent their participation in a renewable energy community, provided that for private undertakings, their participation does not constitute their primary commercial or professional activity.*

[3] Commission Recommendation 2003/361/EC of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (OJ L 124, 20.5.2003, p. 36).

RED II Article 22(2):

Member States shall ensure that renewable energy communities are entitled to:

(a) produce, consume, store and sell renewable energy, including through renewables power purchase agreements;

(b) share, within the renewable energy community, renewable energy that is produced by the production units owned by that renewable energy community, subject to the other requirements laid down in this Article and to maintaining the rights and obligations of the renewable energy community members as customers;

(c) access all suitable energy markets both directly or through aggregation in a non-discriminatory manner.

Additionally, Article 22 in RED II requires that Member States "carry out an assessment of the existing barriers and potential of development" of RECs (Article 22(3)), that Member States "provide an enabling framework to promote and facilitate the development" of RECs (Article 22(4)), that "the main elements of the enabling framework…and of its implementation" be part of the updates of Member States' NECPs and progress reports (Article 22(5)), and that Member States "take into account the specificities of renewable energy communities when designing **support schemes** in order to allow them to compete for support on an equal footing with other market participants" (Article 22(7)). Member States may moreover provide for RECs "to be open to cross-border participation" (Article 22(6)).

Support schemes are further defined in RED II (Article 2(5)): "any instrument, scheme or mechanism applied by a Member State, or a group of Member States, that promotes the use of energy from renewable sources by reducing the cost of that energy, increasing the price at which it can be sold, or increasing, by means of a renewable energy obligation or otherwise, the volume of such energy purchased, including but not restricted to, investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes including those using green certificates, and direct price support schemes including feed-in tariffs and sliding or fixed premium payments".

Recital 70 in RED II highlights the importance of ensuring that RECs can compete on an equal footing with other market participants: "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 the participation of local citizens in renewable energy projects and therefore increase acceptance of renewable energy".

Article 22(4) requires that Member States provide an enabling framework to promote and facilitate the development of RECs. In Table 4 below, the minimum requirements of the enabling framework are listed.

Table 4. Minimum requirements for an enabling framework for RECs.

Term	Description
Enabling framework RED II, Article 22(4)	"Member States shall provide an enabling framework to promote and facilitate the development of renewable energy communities. That framework shall ensure, inter alia, that: (a) unjustified regulatory and administrative barriers to renewable energy communities are removed; (b) renewable energy communities that supply energy or provide aggregation or other commercial energy services are subject to the provisions relevant for such activities; (c) the relevant distribution system operator cooperates with renewable energy communities to facilitate energy transfers within renewable energy communities; (d) renewable energy communities are subject to fair, proportionate and transparent procedures, including registration and licensing procedures, and cost-reflective network charges, as well as relevant charges, levies and taxes, ensuring that they contribute, in an adequate, fair and balanced way, to the overall cost sharing of the system in line with a transparent cost-benefit analysis of distributed energy sources developed by the national competent authorities; (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; (f) the participation in the renewable energy communities is accessible to all consumers, including those in low-income or vulnerable households; (g) tools to facilitate access to finance and information are available; (h) regulatory and capacity-building support is provided to public authorities in enabling and setting up renewable energy communities, and in helping authorities to participate directly; (i) rules to secure the equal and non-discriminatory treatment of consumers that participate in the renewable energy community are in place."

The main differences and similarities between RECs and CECs are summarised in table 5 below.

Table 5. Differences and similarities between Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs).

	Renewable Energy Communities (REC)	Citizen Energy Community (CEC)
Legal foundation	Renewable Energy Directive (Art. 2, Art. 22)	Internal Electricity Market Directive (Art. 2, Art. 16)
Sub-sector	Electricity, heating/cooling, transport	Electricity only
Technology	Only RES based technologies	Technology-open (fossil and RES based)
Legal form	Any	Any
Membership	Open, voluntary (→only natural persons, local authorities and SMEs whose participation does not constitute their primary economic activity. Participation accessible to all consumers including low-income and vulnerable households)	Open, voluntary (→any actor, as long as members/shareholders engaged in large scale commercial activity and for which the energy sector constitutes a primary area of economic activity do not exercise any decision-making power)
Control	Effective control by shareholders/members located in the proximity of the RE projects owned and developed by the legal entity	Effective control by natural persons, local authorities or small enterprises
Primary purpose	Social, economic and environmental benefits for members/shareholders or the local area in which the entity operates	
Activities	Generation, distribution, consumption, storage, sale, aggregation, supply and sharing of renewable energy, energy-related services (commercial)	Generation, distribution, supply, consumption, aggregation, energy storage, energy efficiency services, charging services for EV, other energy-related services
Enabling framework, support schemes	MS to provide enabling framework to promote and facilitate the development of REC ● Remove unjustified regulatory/administrative barriers ● Fair, proportionate and transparent procedures ● Non-discriminatory treatment ● Tools to facilitate access to finance and information; ● Regulatory and capacity-building support to public authorities in enabling and setting up RECs ● Equal/non-discriminatory treatment of consumers that participate in a REC ● MS to take into account specificities of RECs when designing RES support schemes	MS to provide an enabling regulatory framework for CEC ● Participation is open and voluntary ● Members/shareholders entitled to leave ● Members/shareholders do not lose their rights and obligations as household or active customers. ● DSOs cooperate with CECs to facilitate electricity transfers within the community ● Non-discriminatory, fair, proportionate and transparent treatment ● Transparent, non-discriminatory and cost-reflective network charges

3. Findings from the mapping and assessment of starting conditions

This section summarises the mapping and assessment of the technical conditions, legal and policy frameworks, regulatory procedures, support schemes, and social conditions conducted by the COME RES partners. The complete reports for each target region are provided in Appendix 1 of this Deliverable.
The aim is to provide a background understanding of the starting conditions for RES community in the target regions. Which can form the basis for points of action in supporting the development of RECs. The mapping and assessment work is supported by complementary interviews with experts working in relevant institutions in the partner countries.

3.1 Technical conditions

To understand the technical conditions for renewable energy communities, we have mapped the geographical conditions, infrastructure accessibility, land use restrictions and electricity context of the target regions. However, this study does not provide full information on technical potentials as this aspect will be covered in future work in the COME RES project and in a forthcoming Deliverable (August 2021).

The main characteristics of the target region are shown in Table 6 below:

Table 6. Geographical conditions, infrastructure accessibility, land use restrictions and electricity context of the target regions

Target region	Apulia (IT) 2018	Balearic and Canary Islands (ES)	Latvia (LV)	Limburg and West Flanders (BE) 2018	North-Brabant (NL)	Norway (NO)	Norte (PT)	Thuringia (DE) 2017	Warmia-Mazuria (PL)
Area total in km²	19 541	12 485	64 589	5 566	5 082	385 180	21 286	16 202	24 173
Agriculture land	12 496	1 658	22 999	1 991	2389	11 205	6 593	8 433	13 150
Forest land	-	6 863	30 938	530	835	121 043	12 628	5 409	7 929
Inland water	832	575	2 669	233	176	20 184	220	194	1 378
Mountainous	288	-	-	-	-	23 993	-	-	-
Grassland or peat	-	-	2 158	1 151	-	17 315	-	-	-
Population total	4 008 296	3 268 999	1 907 675	2 025 637	2 562 955	5 374 807	3 572 583	2 133 378	1 422 737
Urban population			1 306 115			4 229 849	3 235 511		842 096
Rural Population			601 560			*968 576*	337 072		580 641
Infrastructure accessibility	Well accessible	Well accessible	Generally, well accessible, but forest and rural areas may be difficult	Well accessible	Well accessible	Generally, well accessible, but forest, mountain and rural coastal areas may be difficult	Well accessible	Generally, well accessible, but forest areas may be difficult	
Land use restrictions	Yes. Natural protection areas. Spatial planning regulations also apply planned productive areas suitable for energy installations.	Yes. Natural protection areas. Spatial planning regulations also apply planned productive areas suitable for energy installations.	Yes. Natural protection areas. For wind spatial planning regulations also apply set-back distances	Yes. For wind spatial planning, safety and environmental regulations apply	Yes. Natural protection areas and military zones	Yes. Natural protection areas	Yes. Natural protection areas	Yes. High share of natural protection areas. For wind spatial planning regulations also apply including set-back distances, 0,3 % of the total territory is reserved for wind energy.	Yes. Natural protection areas

3.1.1 Target region characteristics

The characteristics of the target regions vary greatly. To the South, the regions of Puglia, Balearic and Canary Islands experience dry and hot summers. In the North, Norway's climatic conditions range from continental to sub-arctic. In general, the Gulf stream ensures that the Norwegian coast enjoys a milder climate, while it can get very cold with heavy snowfall in some of the inland and Northern parts during winter. These climatic conditions influence the suitability for different RES technologies. The southern regions of Puglia, Norte and the Balearic and Canary Islands experience high rates of sun radiation. The average wind speed in the Balearic Islands also provides potential for wind power (Curto and Trapanese, 2018). Poland is often presented not only as reliant on coal but also as working hard to safeguard the interests of the coal sector (Szulecki 2017). Yet, in 2015, Poland had the seventh largest installed wind energy capacity in Europe. Studies also show that the technical conditions for solar PV in Poland are favourable (Olchowik et al., 2006; Pietruszko and Gradzki, 2003). In Norway, wind and hydro are available energy resources that provide an efficient energy mix. Even solar may be a viable alternative in a Northern country like Norway (Midtgard et al., 2010).

As shown in table 6, the target regions vary according to population density and landscape relevant for establishing renewable energy installations, including RES community energy. The population size and density may indicate the demand for RES community energy. For example, the increased use of electric vehicles in city areas may result in the need for an expensive and debated upgrade of the distribution grid. RES community energy can postpone or reduce such investments as community energy can help balance supply and demand locally (and thus reduce peak loads). Furthermore, RES community energy can provide important input to small-scale industry and thus delay or reduce expensive grid expansion. It is also important to note that the integration of distributed solutions in the national electricity networks is beneficial to provide reliable supply and maintain a cost efficient and reliable energy system.

3.1.2 Target region accessibility and land use restrictions

Accessibility and available land may also be a concern in some of the target regions. As shown in table 1, the majority of the target regions are well-accessible in terms of road, railway, airport and harbour infrastructure. However, the establishment of wind power on land in low-developed areas such as forests, mountains and coastal areas in Norway, Latvia and Thuringia may require extensive large infrastructure interventions, and thus potentially spur conflicts over environmental and landscape preservation. Previous studies (e,g, Leiren et al. 2020; Linnerud et al. 2018) have shown that onshore wind in sparsely populated or pristine nature areas, where large infrastructure interventions are required for transport and maintenance equipment, has sparked massive protest. This is further discussed in section 3.4.

Most of the target regions also have land use restrictions and regulations that put limitations on land use such as natural protection areas or areas for military purposes. Puglia, Thuringia, Balearic and Canary Islands also have spatial planning regulations that have designated specific areas where energy installations are permitted or recommended. Furthermore, there seems to be a general propensity for more restrictions concerning wind power on land (see table 2). This aspect will be further discussed in relation to the regulatory framework in section 3.3.

3.1.3 Target region electricity context

A major contributing factor to the technical starting conditions for RES community energy for RES-E is the local electricity system context. The available resources such as hydro, wind or sun are a prerequisite for economic and technical viability of potential RES community energy. The target regions Norway, Flanders, Norte, Puglia, Thuringia all have high shares of RES from either hydro, wind or solar photovoltaic technology (PV) or a combination of these. Norway is almost completely self-sufficient with hydropower-based electricity. Latvia also has a high share of RES, mainly from biomass, and a small share of wind. PV has just recently entered into the picture in Latvia, but there are policy plans in place for a significant increase of wind and solar in the electricity production, as well as RES increase (biomass, heat pumps, solar thermal energy) in the heating and cooling sector.

The regions of Balearic Islands, Noord Brabant and Warmian-Masurian stand out with low levels of RES in their electricity generation. These regions are also dependent on electricity import to meet the energy demand. The Balearic Islands have small shares of wind and PV and the Warmian-Masurian region have a small share of PV, wind, hydro and biomass in the energy mix. Both target regions have plans to increase the amount of RES. The main local energy resource of the Noord Brabant region is a coal and biomass mix.

The Netherlands' energy mix is mainly based in the large gas reserves of Groningen that is to be discontinued in 2030, which implies a significant turn in Dutch energy policy and new opportunities for RES.

In the Flanders region, RES community also provides a significant part of the electricity supply. In 2016, the two largest Flemish renewable energy cooperatives represented about 4% of the installed capacity for onshore wind in Flanders (Bauwens, Gotchev and Holstenkamp, 2016). Further, 64 % of the PV generation in Flanders in 2018 came from small-scale PV installations (below 20 MW).

In addition to local resources and characteristics of the local electricity generation, each target region has specific contextual factors that frame energy demand needs. Energy demand is particularly prone to seasonal fluctuations. In the warmer regions of Puglia, Norte and Balearic and Canary Islands there is energy demand for cooling during the summer months, which may also increase due to higher temperatures from climate change. This is exacerbated by tourism, which partly coincides with the warmer season. In

Norway, heating during the winter season constitutes the main bulk of electricity consumption, especially for households. This makes PV for heating less relevant for Norway because it receives less sun radiation during the cold winter months (though PV for RES-E is relevant for cooling and other electricity demand in summer).

In the Warmian-Masurian region the reliability of the grid supply is lower than the national average due to a poorly developed network. Also, in Apuliathere is a need for developing the grid distribution system as a high percentage of electricity is lost under transmission (most of the energy produced in Apuliais exported to other regions). Norway and Latvia's distribution systems are characterised by high reliability. However, in Norway, specific areas (often rural areas and island communities) experience more power outages, especially during extreme weather events (Wethal 2020). Moreover, the locally installed power capacity is not always adequate to attract new or scale up existing local industry (Interview #NO1-2). Expansion or improvement of the distribution net is costly and is paid by the end-user. In the Netherlands (North-Brabant) and Belgium (Flanders), electricity distribution is very reliable, but the distribution system needs significant investments in additional capacity in view of the ambitious goals for RE development set for 2030. Similarly, in Portugal, while distribution systems are reliable under the current conditions, additional investments will be needed to ensure the achievement of the RE decentralised generation targets.

A major challenge in Germany is the lack of sufficient grid capacity to transport wind-based electricity from the northern and eastern regions with high wind energy densities to the southern parts of Germany that have lower wind energy densities, but high energy demand from large industrial centres a shutdown of nuclear and coal fired power plants. The target region Thuringia is more affected by grid expansion than other federal states, not least because of its location in the heart of Germany. This results in opportunities, but also challenges. The planned construction of the transmission lines has raised strong opposition by citizens, but also the state government and other stakeholders (Schnelle and Voigt, 2012).

An electricity system in the target region that is capable of integrating RES community energy into the grid system (as prosumers) and ensure communities' capacity to generate, consume, store and sell renewable energy (according to RED II, Article 22; IEMD, Article 16) is also an important condition for viable RES community energy development. The integration of distributed solutions in the national electricity networks is beneficial to provide reliable supply and maintain a cost efficient and reliable energy system. Most of the regions have capacity to integrate RES community energy into the grid system though additional investments may be needed to integrate a high share of RES.

3.2 Legal and Policy Frameworks for RES and RES community energy

This section summarises the progress in transposing and implementing the provisions in RED II that apply to RECs in Belgium (Flanders[4]), Germany, Spain, Italy, Latvia, the Netherlands, Norway, Poland and Portugal (section 3.2.1) and the targets, objectives, policies and measures for RES development and RES community energy in the integrated national energy and climate plans (NECPs) submitted by these countries (section 3.2.2). In sections 3.2.1 and 3.2.2, we refer to the national level, unless otherwise stated. Section 3.2.3 provides a brief summary of targets for RES and RES community energy in the target regions.

3.2.1 Progress in transposing and implementing RED II

The analysis in this section is based on information collected by the COME RES partners and reflects the transposition status as of December 2020. Partners were asked to assess the extent to which, in each country: 1) legal definitions of RECs exist; 2) the definition of RECs is in compliance with RED II; 3) final customers, in particular household customers, are entitled to participate in a REC; 4) RECs are legally entitled to produce, consume, store and sell renewable energy and share renewable energy that is produced by the REC; 5) the national or regional government(s) have carried out an assessment of the existing barriers and potential of development of REC; 6) the government provides an enabling framework to promote and facilitate the development of REC; and, 7) the government takes into account specificities of REC when designing support schemes to allow communities to compete for support on an equal footing with other market participants. The deadline for transposition into national law by Member States is 30 June 2021.

The COME RES partners were asked to qualitatively assess the extent to which the above-mentioned elements of the RED II that apply to RECs have been transposed and implemented nationally using a traffic light rating system. Green colour indicates that the provision in question has been transposed and implemented nationally, yellow colour indicates that some progress has been made nationally in transposing and implementing the provision, while red colour indicates that no progress has been made.

We find that all nine countries have made some progress in adapting their legislation to the relevant requirements of the RED II, or existing legislation is already adapted to some extent. However, there is variation across countries. Amongst the EU Member States, Italy has made the most progress in transposing and implementing the provisions of RED II that apply to RECs. In Germany, ownership of renewable energy installations by individuals or communities has a long tradition, and the country can be regarded as one of the pioneers regarding community ownership of RE plants (see section 3.4.1 and the appendix to this deliverable). Regardless of these achievements, the Federal Government has made

4 Due to the regional government structure in Belgium, different legal and policy frameworks for RES and RES community energy are being developed in the different regions. Here, we consider the frameworks in the Flemish region, in which the COME RES target region in Belgium is located.

comparatively little progress so far concerning the transposition of the RED II and its provisions for RECs. Norway has a long history of publicly owned RES-E production, and community owned small-scale RES-E production has increased in recent years (see section 3.4.1 and the appendix to this deliverable). Nevertheless, much work remains with regard to transposing and implementing the requirements of RED II. Since Norway is not a member of the EU, but only the European Economic Area (EEA), EU directives do not automatically apply to Norway, but rather depend on individual procedures and negotiations between the EU and the EEA/European Free Trade Association (EFTA). RED II is still under review by the EEA/EFTA.

Italy and Belgium (Flanders) are the only countries to have either fully or partly addressed all the seven requirements. The Netherlands, Spain and Portugal have also generally made good progress, but all three have RED II provisions which have yet to be transposed and implemented. In Latvia, the preliminary drafts of amendments to relevant laws in principle contain the definitions and rights of RES energy communities, however many details (which have to be regulated by governmental regulations) are unspecified.

There is also variation with regard to transposing and implementing the different RED II requirements we have considered. All nine countries do, to some extent, ensure that final customers are entitled to participate in RECs, and a green colour coding has been assigned to five countries. At this stage, none of the nine COME RES countries have developed an enabling framework to promote and facilitate the development of RECs that satisfy the minimum requirements listed in RED II Article 22(4). In Latvia and Norway an enabling framework is currently not in place. Also, none of the nine countries have sufficiently taken into account the specificities of RECs when designing support schemes, although some progress is indicated in Belgium (Flanders), Germany, Italy, the Netherlands and Poland.

Legal definition of RECs in the COME RES countries

In Spain, Italy and Portugal, RECs are legally defined. In Spain, RECs are defined by the Royal Decree-law 23/2020 of 23 June 2020, approving energy related and other measures to revitalize the economy (GoS 2020). In Italy, RECs are defined in law L. 28/02/2020 n. 8 (GoI 2020), which converted the Italian Government decree no 162/2019 (so-called 'Milleproroghe') into national law. In Portugal, RECs are legally defined in the Decree Law 162/2019 (GoP 2019).

In Belgium (Flanders), Latvia and the Netherlands, definitions of RECs exist in draft legislation, and a yellow colour has therefore been assigned. In Flanders, a draft Flemish Energy Decree (GoF 2020) concerning the transposition of RED II (and IEMD) was circulated on 30 October 2020. Currently the Flemish Regional Parliament is debating the decree. It is not clear when a decision can be expected. The decree contains a definition of RECs (and CECs). In Latvia, the legal framework for RES energy communities is under development by the Ministry of Economics. As per December 2020, a preliminary draft exists which will be subject to public consultation. The legal definition of RECs will be contained in an amendment to the Law

on Energy. The amendment was published in January 2021 for the first round of public consultations. An amendment of the Electricity Market Law will contain definitions such as “electricity energy community”, “electricity sharing” and “electricity sharing agreement”. Most likely, the amendments will enter into force no earlier than 2022. In the current legislation in the Netherlands RECs are not yet explicitly recognised as a specific legal entity active on the energy market, even though a lot of community energy initiatives (mostly energy cooperatives) are already active (582 energy cooperatives were active at the end of 2019, with an estimated 85.000 members). However, an overarching definition of an ‘energy community’ (encompassing both RECs and CECs) will be contained in the new Energy Law (Energiewet), which is currently under review (Dutch Government 2020).

A legal definition of RECs is currently not in place in Germany, Poland and Norway. In Germany, the definition of “citizen energy companies” in the Renewable Energy Sources Act shows certain parallels to RECs. However, the respective provisions were already introduced in 2017 without having RED II in mind. In Poland, the role of RECs in national legislation and in national and/or regional policies is just beginning to take form. A legal definition is expected in the middle of 2021. Definitions of “energy clusters” and “energy cooperatives” exist the in current legislation, but there are only a few examples of successful implementations.

*Flanders

Figure 2. Traffic light summary of the extent to which legal definitions of RECs exist in the COME RES countries

Is the definition of RECs in the COME RES countries in compliance with RED II?

RECs are formally defined in Article 2(16) in RED II 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; (c) the primary purpose of which is 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.”

In Spain and Italy, existing legal definitions of RECs are fully compliant with the definition provided in Article 2(16) in RED II.

In Spain, article 4 in the Royal Decree-law 23/2020 (GoS 2020) defines RECs as legal entities based on open and voluntary participation, autonomous and effectively controlled by partners or members who are located in the vicinity of the renewable energy projects that are owned by the said legal entities. Partners or members are individuals, SMEs or local authorities, including municipalities, and the primary purpose is to provide environmental, economic or social benefits to their partners or members or to the local areas where they operate, rather than financial gains.

In Italy, law L. 28/02/2020 n. 8 (GoI 2020) provides a general framework for RECs. Individuals, SMEs and local authorities can participate in RECs on a territorial basis. The eligible plants are not to exceed 200 kW. Following the Milleproroghe decree, a series of national regulations were established to implement the legal framework for energy communities. These regulations are transitory pending the transposition of REDII that will take place definitively in June 2021.

In Belgium (Flanders), the Netherlands, Portugal and Latvia existing definitions of RECs are partly in line with the definition provided in RED II.

In Belgium (Flanders), the definition of RECs contained in the draft Flemish Energy Decree shows a high degree of similarity to the formal definitions of RECs (and CECs) contained in RED II (and the IEMD). Although most of the elements incorporated in the two Directives will be transposed by the decree, they will still need to be made explicit by the Minister of Energy and regulated by the Flemish Regulator of the Electricity and Gas market (VREG). Regarding the compliance of the definition of RECs with RED II, the draft decree refers to ownership of 'activa', as opposed to ownership of the RES project. According to the federation of Flemish RES coops, the draft decree lacks a good definition of the notion of 'ownership of the installations'. This might allow pure financing of projects by non-cooperative developers. Moreover, the Flemish REScoops advocate for an evaluation of the compliance of energy communities with the decree, which should be made public with the possibility to object. Finally, the Flemish RES coops note that the definition contained in the draft decree allows for an interpretation of the definition of an energy community which differs from the recitals in RED II, as the decree is interpreted to allow for the possibility of setting up an energy community without citizens, whereas the Recitals explicitly state that the aim is to include them.

In the Netherlands, the current proposal in the draft of the new Energy Law is that an energy community will be defined as a "*legal entity that carries out activities in the energy market for the benefit of its members or shareholders and whose main purpose is to provide environmental or economic or social benefits to its members or shareholders or to the local areas where it operates, and not to make a profit*" (concept article 1.1). In the conditions of the energy community it is stated that a) participation in the energy community is

open and voluntary; b) the members or shareholders have the right to leave the energy community, and c) effective control of the energy community rests with members or shareholders who are natural persons, small businesses or local authorities. For energy communities that develop renewable energy projects (i.e. RECs), condition c) is modified in the sense that "*the actual control over the energy community rests with those members or shareholders of the legal person who are located in the vicinity of the renewable energy projects*". However, the actual meaning of the 'vicinity condition' is not further specified.

In Portugal, RECs are defined as a collective person, profit or non-profit, based on the open and voluntary adhesion of their members, partners and/or shareholders. REC shareholders and members may include natural persons, SMEs and/or local authorities (GoP 2019). However, shareholding and membership is not limited to these groups. Decree Law 162/2019, which entered into force in January 2020, partially transposes RED II, establishing a legal framework applicable to self-consumption of RES and to RES energy communities.

In Latvia, the preliminary draft amendment does not provide a limitation for legal forms of RECs. After the amendment enters into force, the Cabinet of Ministers Regulation will be adopted to define the essential components of the Energy Community Establishing Agreement and the procedure to change it, the rules defining the relationship among members of the energy community, between the energy community and other participants of the market, etc. After checking the compatibility of the entity's Establishing Agreement with the conditions provided by this governmental regulation, the legal entity can be registered as a REC. The preliminary draft provides the same membership for both REC and CEC – the members can be natural persons, non-governmental organisations (societies and foundations), municipalities and municipal institutions and SMEs. Thus, in addition to the categories defined REDII Article 2(16), the members or shareholders of REC can be also non-governmental societies and associations. The "proximity" in this draft is stated as the term "territorially bound", details on it to ensure flexibility might be provided by the governmental regulation. The control by REC members and stakeholders concerns both ownership rights and the rights to use the assets of the company, as well as rights or agreements that provide decisive impact on the enterprise's institutions composition, voting or decisions.

In Germany, Poland and Norway a legal definition of RECs complying with the provisions of RED II is currently not in place.

In Germany, the purpose of RECs as defined in Art. 2,16 item c) has no explicit equivalent in German law. Furthermore, the definition of "citizens' energy companies" has a very limited scope of application (wind energy) and there is no equivalent for the other RES, nor for the heating/cooling sector. The scope of eligible actors forming a citizen energy company is broader than in the case of a REC as defined by RED II. The rights and possible activities of RECs specified in Art. 22,1/2 are not explicitly defined in German

law. Energy sharing remains for the time being only a testing ground. It is still not possible for members of RECs to also use collectively the jointly generated electricity as required under European law.

In Poland, “energy clusters” are civil law agreements between different entities including local governments, which aim at becoming energy efficient regions through a more effective use of local renewable energy sources. “Energy clusters” cover the area of one county or five municipalities. The concept of “energy clusters” was introduced for the first time in 2016 in the Amendment to the Polish Act on Renewable Energy Sources of 20 February 2015 (the RES Act). According to the 2019 RES Act’s definition, an “energy cooperative” is an administrative unit whose legal personality is stipulated in the Cooperative Law. The entity generates electricity, biogas or heat from renewables and balances the demand for electricity, biogas or heat only for the benefit of the cooperative and its members. The maximum number of participants is 1,000, it can operate within a rural commune or a rural and urban commune. Its goal is to ensure energy security for its members who work with each other in the spirit of solidarity. However, the lack of executive regulations prevents functioning of energy cooperatives. An extension of existing forms of energy clusters, energy cooperatives and prosumers is expected in the middle of 2021.

*Flanders

Figure 3. Traffic light summary of the extent to which legal definitions of RECs in the COME RES countries comply with RED II

Are final customers, in particular household customers, entitled to participate in a REC?

While not part of the definition of a REC (RED II, Article 2(16)), in terms of activities, RED II (Article 22(1)) requires that “Member States shall ensure that final customers, in particular household customers, are entitled to participate in a renewable energy community while maintaining their rights or obligations as final customers, and without being subject to unjustified or discriminatory conditions or procedures that would prevent their participation in a renewable energy community, provided that for private undertakings, their participation does not constitute their primary commercial or professional activity.”

A green colour rating has been assigned to Belgium (Flanders), Italy, Latvia, the Netherlands and Portugal, while a yellow rating has been assigned to the remaining countries covered in this study.

In Belgium (Flanders), the draft Flemish Energy Decree (GoF 2020) allows for the possibility that final customers, in particular household customers, participate in RECs. In Italy, these rights are defined in Law

28/02/2020 n. 8 (GoI 2020). In Latvia, final customers, including household customers, are entitled to participate in RECs, as stated by the draft amendment to the Law on Energy. In the Netherlands, final customers, including household customers, are entitled to participate in energy communities (including RECs) as foreseen in the draft of the new Energy Law (under concept article 2.4). In Portugal, according to Decree Law 162/2019 (GoP 2019), members and/or partners of RECs can be individual or collective persons, public or private, not excluding household customers.

In Germany, Spain, Poland and Norway, a yellow colour has been assigned, as the provisions concerning customers' rights are partially addressed.

In Germany, final customers are entitled to participate in "citizens' energy companies". These show certain parallels to RECs (see section on legal definition of RECs). In Spain, final customers, in particular household customers, are not yet formally entitled to participate in RECs. However, according to the working document 'Guide for the development of instruments to promote local energy communities' (IDAE 2019), they may participate in principle. In Poland, a new legal framework for collective prosumers is currently being developed in the draft amendment to the RES Act of 8 August 2020. The draft is under consultations. In Norway, final customers are entitled to become energy producers (prosuming) as households, farms or housing cooperatives. But there are limitations concerning this right.

*Flanders

Figure 4. Traffic light summary of the extent to which final customers, in particular household customers, are entitled to participate in RECs.

Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?

While not part of the definition of a REC (RED II, Article 2(16)), in terms of activities, RED II (Article 22(2)) establishes the rights of RECs: "Member States shall ensure that renewable energy communities are entitled to: (a) produce, consume, store and sell renewable energy, including through renewables power purchase agreements; (b) share, within the renewable energy community, renewable energy that is produced by the production units owned by that renewable energy community, subject to the other requirements laid down in this Article and to maintaining the rights and obligations of the renewable energy community members as customers."

A green status has been assigned regarding the status of transposition and implementation of this provision in RED II in Belgium (Flanders), and in Italy, the Netherlands and Portugal.

In Belgium (Flanders), the rights of RECs to produce, consume, store and sell RES and share, within the REC, RES produced by the REC, are established by the draft Flemish Energy Decree (GoF 2020). In Italy, these rights are established by law L. 28/02/2020 n. 8 (GoI 2020). In the Netherlands, the government strives to establish frameworks for the electricity market that encourage fair competition between market parties and that do not discriminate against any one party, including parties that offer renewable energy, demand response and storage, including through aggregation. A supply licence must be requested to supply small consumers. The Netherlands Authority for Consumers and Markets (ACM) monitors these licences. Sharing renewable electricity is made possible on a yearly basis by the collective net metering scheme. In Portugal, the rights are established in Decree Law 162/2019. However, rights for activities other than self-consumption and the treatment of potential surpluses is only established for electricity.

A yellow status has been assigned in Latvia, Spain and Poland, indicating that the above-mentioned requirement is partly addressed nationally.

In Latvia, these entitlements exist in principle in draft legal amendments. However detailed regulations are not yet elaborated.

In Spain, this entitlement is not yet in place formally in national legislation. However, according to the Working document ‘Guide for the development of instruments to promote local energy communities’ (IDAE 2019), RECs are in principle entitled to produce, consume, store and sell RES and share, within the REC, RES that is produced by the REC. In Poland, provisions such as energy generation, consumption and storage (net-metering scheme) apply to individual prosumers and to energy cooperatives according to the RES Act. However, the lack of executive regulations prevents functioning of energy cooperatives.

In Germany and Norway, a red status has been assigned regarding the progress of establishing the rights of RECs as described above.

In Germany, RECs have not been explicitly defined yet. “Citizens’ energy companies” may produce and sell electricity and are eligible for certain privileges under the wind auctions. Further rights/activities have not been explicitly defined. Energy sharing is practically not possible and legally not explicitly defined. In Norway, RECs have not been defined yet, and they are not legally entitled to produce, consume, store and sell RES.

*Flanders

Figure 5. Traffic light summary of the extent to which RECs are legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC

Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?

Article 22(3) in RED II requires that Member States "carry out an assessment of the existing barriers and potential of development" of RECs.

Concerning the progress of addressing this requirement nationally, a green colour has been assigned to Italy and Poland.

In Italy, the Senate Commission on Industry, Trade and Tourism launched a public consultation to acquire information and assessments from interested parties (Senato 2019). The consultation lasted from 1 to 31 October 2018. In Poland, the national government is currently carrying out such an assessment (in the project "KlastER - Development of distributed energy in energy clusters (2019-2021)). In the framework of the project different business models and solutions supporting development of dispersed energy will be analysed and assessed.

A yellow colour has been assigned to Belgium, Spain and Portugal.

In Belgium (Flanders), REScoop.eu has participated in a meeting with the Flemish Energy Agency together with several stakeholders. VITO has also conducted a study on behalf of the Flemish Energy Agency in which the barriers (but not the potential) were assessed (Delnooz et al. 2020). However, to our knowledge, the government has not carried out a thorough assessment of the existing barriers and potential of development of RECs. In Spain, the national government has to some extent conducted an assessment of existing barriers and potential of development of RECs (IDAE 2019). At the target region level (Balearic and Canary Islands), no assessments have been made at this stage. In Portugal, the Directorate-General for Energy and Geology (DGEG) is responsible for assessing the obstacles and potential of RECs, within two years of the entry into force of the Decree Law 162/2019 (GoP 2019). The law entered into force in January 2020.

A red colour has been assigned to Germany, Latvia, the Netherlands and Norway.

Germany's NECP acknowledges the potential of RECs in the energy transition. However, neither the federal nor the state governments have carried out any systematic assessment of the existing barriers and potential of development of REC. We do not have any information about whether such assessments are planned. In Latvia, no assessment has been conducted. In Latvia, the government plans to use the assessments and findings from within EU co-financed projects (e.g. Co2mmunity). In the Netherlands, it is unknown whether the national government is carrying out such an assessment. No assessment is planned on a regional level. In Norway, neither the national nor the local governments have carried out any assessment of the existing barriers and potential of development of REC. We do not have any information about whether such assessments are planned.

*Flanders

Figure 6. Traffic light summary of the extent to which governments have carried out an assessment of the existing barriers and potential of development of REC

Does the government provide an enabling framework to promote and facilitate the development of REC?

Article 22(4) in RED II requires that Member States provide an enabling framework to promote and facilitate the development of RECs. The minimum requirements for an enabling framework are described in further detail in Section 2 of this Deliverable.

None of the countries covered in this assessment have fully complied with the above-mentioned requirement.

In Belgium (Flanders), it was foreseen in the Governmental Agreement (2019) that an enabling framework that facilitates energy communities and takes away administrative burdens and juridical barriers would be in place by the end of 2020. The framework would inform, sensitise and unburden initiators and participants of energy communities. The enabling framework is not contained in the draft Flemish Energy Decree (GoF 2020), but will be part of a Ministerial decision.

In Germany, the federal government provides punctual support to “citizens’ energy companies” in the field of wind energy. It does not - or only implicitly at best - provide individual elements of an enabling framework in line with RED II, Art. 22(4). Most of the provisions of Art.22 (4) still need to be transposed and implemented. Several state governments provide financial or capacity development support for community energy initiatives (e.g. Schleswig-Holstein, North Rhine Westphalia), which may be considered as elements of an enabling framework.

In Spain, in principle the enabling framework has been politically agreed upon. However, there is still no concrete legislation at the national or regional level to enable and drive the establishment of RECs.

In Italy, elements of an enabling framework are contained in the decree of 16 September 2020 (D.M. 16 September 2020) issued by the Ministry for the Economic Development (MiSE) and in the resolution of 4 August 2020 (318/2020/R/eel) by the Regulatory Authority for Energy, Networks and the Environment (ARERA). The minimum requirements for an enabling framework (points a) to e) in RED II Article 22(4)) are met, however points f) to i) in RED II Article 22(4) could be improved in the Italian regulation.

In the Netherlands, in the Climate Agreement (2019) it was foreseen that by the end of 2020 an enabling framework would be in place. It would have to facilitate energy communities and take away administrative burdens and juridical barriers. This enabling framework is not taken up in the draft new Energy Law (Energiewet). It will probably be implemented by Ministerial decision.

In Poland, the Government is currently working on providing the enabling framework for the development of RECs in the draft amendment to the RES Act of 8 August 2020.

In Portugal, once the assessment of barriers and potential of RECs in Portugal is concluded, the Directorate-General for Energy and Geology (DGEG) must propose measures to facilitate and promote the development of RECs. The enabling framework is required by national legislation (GoP 2019), but it is not in place yet.

In Latvia, the components of the enabling framework are not yet assessed and elaborated.

In Norway, the national government, through Enova, provides very limited economic support for household or commercial prosumers. RECs may apply under the same support scheme as commercial actors. There is no enabling framework (in line with RED II, Art. 22(4)) in place for RECs.

*Flanders

Figure 7. Traffic light summary of the extent to which governments provide an enabling framework to promote and facilitate the development of RECs

Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?

Article 22(7) in RED II requires that Member States "take into account the specificities of renewable energy communities when designing support schemes in order to allow them to compete for support on an equal footing with other market participants".

None of the countries covered in this assessment have fully complied with the above-mentioned requirement.

In Belgium (Flanders), the framework is not yet designed, pending an analysis by the Flemish Regulator of the Electricity and Gas market (VREG). The framework will be subject to a Ministerial decision and regulation by regulator VREG.

In Germany, only in the case of onshore wind energy does the government take into account specificities of "citizens' energy companies" by providing certain privileges to such entities in the context of auctions/tenders. These companies show only certain parallels to RECs (see above).

In Italy, a main barrier to the development of energy communities is the size of the planned geographical extension. The 42-bis of the Decreto Milleproroghe mandates that areas of relevance to the establishment of RECs are limited to points underlying the same low / medium voltage substation. Small municipalities, for example of 'internal areas', can meet some difficulties to start initiatives on its territory. Considering the possibility of aggregating multiple RECs such as organisational structures within the same legal entity, would help enable projects at local level (ENEA 2020).

In the Netherlands, the framework is not yet designed, pending an analysis. The overall government perspective in the new Energy Law is that regulations will be based on the activities to be performed in the energy market (e.g. investing in production capacity, managing distribution networks, providing flexibility to

the markets, etc.) and not on the identity of the specific actors that engage in these activities. According to this perspective, energy communities will be allowed to participate in different activities on an equal footing with other market actors (i.e. they have to comply to the same standards and regulations), with some exceptions (e.g. for selling electricity to members no supply license will be needed). There are development funds available for energy communities provided by the Dutch government and some provinces (not in Noord-Brabant). As of yet, it is unclear what further enabling measures will be taken.

In Poland, the framework is not yet designed. There were some attempts to incorporate “energy clusters” into energy auctions and other forms of support, but this has not been successfully implemented yet.

A red status has been assigned to Spain, Portugal, Latvia and Norway.

In Spain, no action has taken place yet in this regard. In Portugal, there are currently no support schemes in place that ensure a level playing field for RECs. In Latvia, no provisions are in place, however they might be anticipated (in the form of RES technologies investment co-financing). In Norway, Enova provides very limited economic support for household or commercial prosumers. RECs may apply under the same support scheme as commercial actors.

*Flanders

Figure 8. Traffic light summary of the extent to which governments take/have taken into account the specificities of RECs when designing support schemes

Table 7 below summarises the progress made in transposing and implementing the provisions that pertain to RECs in RED II.

Table 7. Summary of the progress made in transposing and implementing the provisions that apply to RECs in RED II in Belgium (Flanders), Germany, Spain, Italy, Latvia, the Netherlands, Poland, Portugal and Norway.

	BE*	DE	ES	IT	LV	NL	PL	PT	NO
Is there a legal definition of RECs?									
Is the definition of RECs in compliance with RED II?									
Are final customers, in particular household customers, entitled to participate in a REC?									
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?									
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?									
Does the government provide an enabling framework to promote and facilitate the development of REC?									
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?									

*Flanders

3.2.2 Integrated National Energy and Climate Plans

Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action (the Governance Regulation) requires that each Member State adopts a 10-year integrated national energy and climate plan (NECP) for the period 2021 to 2030, mapping out how they will contribute to reaching the EU's energy and climate targets for 2030. Final NECPs were to be submitted to the European Commission by 31 December 2019.

Annex I in the Governance Regulation provides a general framework for preparing Member States' NECPs. The binding template details the elements to be included in the NECPs. There are in particular two sections of relevance to RES development:

- Section 2.1.2 objectives and targets for renewable energy
- Section 3.1.2 policies and measures for renewable energy

Both sections contain elements of direct relevance to the development of RES community energy (see also Roberts and Gauthier 2019)[5]. **Section 2.1.2(v)** of the NECPs should, where applicable, specify "other national trajectories and objectives, including those that are long term or sectoral (e.g. share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, renewable energy communities and renewables self-consumers, energy recovered from the sludge acquired through the treatment of wastewater)". **Section 3.1.2(v)** of the NECPs should contain "[s]pecific measures to introduce one or more contact points, streamline administrative procedures, provide information and training, and facilitate the uptake of power purchase agreements. [A] summary of the policies and measures under the enabling framework Member States have to put in place pursuant to Article 21(6) and Article 22(5) of Directive (EU) 2018/2001 to promote and facilitate the development of self-consumption and renewable energy communities".

In the following sections, we summarise the coverage of RES development and RES community energy in the final NECPs submitted by Belgium, Germany, Italy, Latvia, the Netherlands, Poland, Portugal and Spain. We draw on information provided by the COME RES partners, and on the English translations of the final NECPs, which are available at the Commission's website[6]. We also draw on information from the Commission's communication assessing the final NECPs (EC 2020a), and the more detailed Staff Working

[5] In addition to the sections on RES development, there are also other dimensions of relevance to the development of RES community energy, notably CECs (Roberts and Gauthier 2019): In the internal energy market dimension, the NECPs should, where applicable, specify "national objectives with regard to ensuring that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters" (section 2.4.3(iii)) and should contain "[p]olicies and measures to protect consumers, especially vulnerable and, where applicable, energy poor consumers, and to improve the competitiveness and contestability of the retail energy market." (section 3.4.3(iv)). In the energy efficiency dimension, NECPs should, where applicable, contain "a description of policies and measures to promote the role of local renewable energy communities in contributing to the implementation of policies and measures" to achieve energy efficiency objectives and targets (section 3.2(v)).

[6] Available at https://ec.europa.eu/energy/topics/energy-strategy/national-energy-climate-plans_en#final-necps.

Documents which contain assessments of each individual NECP. Norway, which is not an EU member, has not submitted a NECP.[7]

Targets and objectives for RES development and RES community energy

The final NECPs submitted by Belgium, Germany, Italy, Latvia, the Netherlands, Poland, Portugal and Spain all contain targets and objectives for RES development. Table 8 below summarises current shares of RES in gross final consumption[8], and targets for 2030.

Table 8. Shares of energy from RES in gross final consumption and NECP 2030 targets in Belgium, Germany, Spain, Italy, Latvia, the Netherlands, Norway, Poland and Portugal.

	BE	DE	ES	IT	LV	NL	NO	PL	PT
Current share of RES in gross final consumption	9.9%	17.4%	18.4%	18.2%	41%	8.8%	74.6%	12.2%	30.6%
2030 target	17.5%	30%	42%	30%	50%	27%	N/A	21-23%	47%

Except for the case of the Belgian and Polish NECPs, the Commission's Staff Working Documents have rated the 2030 targets for the share of RES in gross final consumption as sufficiently ambitious to ensure the level of collective ambition needed to reach the EU-wide target of 32% in 2030. The Belgian and Polish RES targets for 2030 are considered unambitious, as they are below the indicative share that results from applying the formula specified in the Governance Regulation. For both Member States, the indicative share is 25%. The German, Italian, Latvian and Dutch[9] final NECPs contain RES targets for 2030 that are the same as, or slightly higher than, the indicative shares that result from applying the formula specified in the Governance Regulation. Spain's NECP contains a RES target of 42% in 2030, which is significantly higher than the indicative share of 32%, and is thereby considered ambitious. The Commission notes, however, in its Staff Working Document that the target in the NECP is not consistent with the 35% target set in the Spanish draft law on climate change and energy transition. Also, Portugal's target of 47% is higher than its indicative share of 42%.

[7] The Governance Regulation is currently under review by the EEA/EFTA. Norway has submitted a National Climate Plan, related to the Decision of the EEA Joint Committee (269/2019 of 25 October 2019), but a plan outlining targets, objectives, policies and measures for RES and RES community energy has not been submitted.

[8] Data for the year 2019 from Eurostat, available at: https://ec.europa.eu/eurostat/databrowser/view/t2020_31/default/table?lang=en

[9] Netherland's NECP indicates a national contribution to the 2030 EU renewable energy target of 27-32% of national gross final energy consumption, with a target of at least 27%.

The sectoral focus of the COME RES project is on RES electricity. All eight final NECPs contain trajectories for RES shares in the electricity sector that indicate a growth in RES. In many of the NECPs, further development of offshore and onshore wind energy and PV are key to reaching the RES shares in 2030. Key developments in the electricity sector are summarised in Table 9 below.

Table 9. Indicative trajectories for RES in the electricity sector and technology-specific development

Member State	Description
Belgium	In 2017, 18.2% of the electricity generated came from RES. An increase will be achieved mainly through offshore wind (federal level), onshore wind (Flanders and Wallonia) and PV energy (in all three regions). In the Flemish region, green electricity is projected to increase from 9.7 GWh in 2020 to 12.8 GWh in 2030. PV energy is expected to increase from around 3.2 TWh to 6.2 TWh between 2020 and 2030, while onshore wind is projected to increase from 2.7 TWh to 5.0 TWh.
Germany	Estimates that the RES share is expectedto increase to 65% in 2030, up from a current forecast share of 43% in 2020. The contribution from onshore wind is projected to increase from 104.67 TWh (9 Mtoe) in 2020 to 139.56 TWh (12 Mtoe) in 2030, offshore wind from 1 Mtoe in 2020 to 69.78 TWh (6 Mtoe) in 2030, and PV from 46.56 TWh (4 Mtoe) in 2020 to 93.04 (8 Mtoe) in 2030.
Italy	The RES share is projected increase from 34% in 2017 to almost 55% in 2030. The increase is primarily due to a significant growth in the penetration of PV and wind energy. PV is projected to become the main source of RES electricity (increasing from close to 19.7 GW of installed capacity in 2017 to 52.0 GW of installed capacity in 2030), while onshore and offshore wind power capacity is projected to increase from around 9.8 GW in 2017 to around 19.3 GW in 2030.
Latvia	Aims to increase the RES share to more than 60% in 2030, up from 54% in 2017. The increase will be ensured by increasing the installed capacity of wind and PV. The NECP does not provide specific trajectories for the different RES technologies.
the Netherlands	The RES share is expected to increase to around 73%, up from approximately 14.9% in 2018, and it is expected to be achieved from a growth in offshore and onshore wind and PV. By 2030, offshore wind is expected to generate around 49 TWh. Onshore wind and PV (>15 kW) is expected to generate 35 TWh. In addition, small-scale generation of RES (e.g. PV) is expected to contribute around 10 TWh.
Poland	The share of RES is expected to increase from 13.4% in 2015 to close to 31.8% in 2030. In the period 2020-2030, the NECP estimates an increase in gross electricity production especially from offshore wind (from 0 to 14.5 TWh), PV (from 2.0 to 6.8 TWh), biomass (9.6 to 11.6 TWh) and biogas installations (1.5 to 3.9 TWh).
Portugal	Estimates that the share of RES will increase from 60% in 2020 to 80% in 2030. Further developing the potential of wind energy and PV will be important for reaching this target. Between 2020 and 2030, the installed capacity of onshore and offshore wind is expected to increase from 5.4 GW to 9.3 GW. The installed capacity of solar PV is expected to increase from 2.0 GW to 9.0 GW. Hydro power installed capacity is expected to contribute 7 GW in 2020, and to reach 8.2-8.7 GW in 2030.
Spain	Estimates that the share of RES will reach 74% in 2030. Estimates significant increases in the installed capacity of wind energy and solar photovoltaic. Wind energy (offshore and onshore) is expected to increase from approximately 22.9 GW in 2015 to around 50.3 GW in 2030. Solar PV is expected to increase from around 4.9 GW in 2015 to 39.2 GW in 2030.

The Governance Regulation states that Member States may provide details on other national trajectories and objectives, including for RES community energy, *where applicable*. Section 2.1.2(v) in the NECPs of Belgium, Germany, Latvia, the Netherlands[10], Portugal[11] and Spain[12] do not contain any targets nor trajectories for RES community energy. The Italian NECP emphasises Italy's investment in the development of self-generation systems and the development of energy communities, noting that a study is currently underway that will contribute towards a better definition of achievable targets and the most appropriate policies. The Polish NECP contains a goal of further developing RES-based micro-installations (notably prosumer installations) in the electricity sector in the period 2020-2030.

Policies and measures for RES development and RES community energy

While all eight NECPs contain targets for RES development, the plans are less clear in terms of describing the policies and measures to reach those targets. Moreover, in several cases it is noted that additional policies and measures may be needed to reach the 2030 RES targets.

Belgium's NECP provides a description of plans and policies, but the Commission (EC 2020b) notes that a lack of detail (e.g. regarding time frames, quantified impacts) makes it difficult to difficult to assess whether the policies and measures are consistent with the RES targets. In Germany's NECP, details on the expected impact are not provided for each measure, and the Commission (EC 2020c) notes that the described policies and measures in the electricity sector appear insufficient to reach the RES targets, taking into consideration the difficulties experienced with grid expansion and permitting procedures for wind energy. Additional policies and measures may also be needed to reach the Italian RES targets (EC 2020d). The described measures and policies in Latvia's NECP are general and often lacking in detail (EC 2020e). Moreover, in some cases the described measures appear to be a continuation of existing measures, which may be insufficient to reach the targets for 2030 (EC 2020e). In the electricity sector, the described policies and measures are considered sufficient to reach the RES target (EC 2020e). The same also holds with regard to the described measures in the electricity sector in the Dutch NECP (EC 2020f). The Dutch NECP provides an overview of main policies and measures, but in many cases lacks details (e.g. on the budget and intended impact) (EC 2020f). Both the Netherlands and Belgium lag behind in reaching their 2020 RES targets. Regarding the Polish NECP, the Commission expresses doubts as to whether the 2020 target will be met, although the described policies and measures are expected to substantially increase the share of renewables (EC 2020g). Poland's NECP notes that the 23% target for 2030 cannot be reached unless

[10] The Dutch NECP does not specify any trajectory or objective for RES community energy under section 2.1.2 (v). However, the introductory section of the NECP does refer to the goal in the 2019 Climate Agreement of 50% local ownership (citizens and businesses) of onshore RES projects by 2030.
[11] The Portuguese NECP does not specify any trajectory or objective for RES community energy under section 2.1.2 (v). However, reference is made in several places of the NECP to the role of decentralised electricity production by RES energy communities. Moreover, the trajectories for the electricity sector indicate in increase in decentralised PV from 0.5 GW in 2020 to 2.0 GW in 2030. See also the Appendix of this Deliverable for further discussion.
12 Spain's NECP section 2.1.2 (v) does, however, acknowledge the importance of RES community energy in the energy transition.

additional EU funds are granted. The Commission notes that the described policies and measures sometimes lack detail, and in the electricity sector they are considered insufficient to fully reach the target (EC 2020g). The Portuguese NECP provides a description of the policies and measures to achieve its targets, but the Commission notes that many of them are generic and difficult to assess (EC 2020h). Spain's NECP contains a detailed description of the policies and measures that underpin its national RES contribution (EC 2020i).

Whereas none of the NECPs contain specific targets for RECs, the majority of them provides information on relevant policies and measures to promote the development of RES community energy. The level of detail provided, however, varies. The Commission (2020b-i) recommended that all eight final NECPs provide more detail on the enabling frameworks for RES self-consumption and RECs than that contained in the draft NECPs. While the Commission considers that the Spanish and Portuguese final NECPs fully address this recommendation, it notes that Latvia's final NECP does not. The Belgian, German, Italian, Dutch and Polish final NECPs either largely or partially address the recommendation to provide additional detail on the enabling frameworks.

In the section on policies and measures, the Latvian final NECP contains a sub-section on public involvement in energy production which describes the current situation, main challenges and key actions and activities. The potential role of the public in meeting RES targets and goals is acknowledged, as are the potential benefits to society and the nation's economy. Regarding key actions and activities to promote the development of RES community energy, the NECP states that Latvia aims to extend the number of citizens involved in electricity production and to create more favourable conditions for self-consumers. However, as noted by the Commission, the NECP is less clear on how Latvia intends to achieve these aims. There is no information regarding an enabling framework for RECs, although the importance of establishing such a framework is recognised.

Portugal's final NECP provides a detailed description of how it intends to promote RES community energy, including reinforcing the Electronic Production Units Registration System and implementing an electronic information portal on distributed production, self-generation and energy communities. The plan further states that Portugal intends to promote programs to support the establishment of RES community energy in partnership with municipalities. The measure aims to provide technical support and support with regard to obtaining funding. Support will be provided through public entities, in partnership with local partners.

Spain's final NECP proposes to facilitate the participation of citizens, SMEs and local authorities in the energy transition by: i) developing a legislative framework in compliance with RED II and IEMD, taking into account existing actors that could set themselves up as local energy communities (e.g. cooperatives); ii) simplifying administrative procedures by establishing a one-stop shop; iii) promoting demonstration projects, identifying viable business models and enabling them to be developed on a large scale; iv) establishing training and capacity-building programs; and v) analysis of the creation within the IDAE of an

office to promote and support local community energy (including designing and implementing specific lines of guarantees and/or financing, providing technical assistance, promoting the joint acquisition of equipment and services, and identifying and disseminating best practice).

The final NECPs of Germany and Italy are considered by the Commission (EC 2020c; d) to have largely addressed the recommendation to provide further details on the enabling frameworks for RES self-consumption and RECs.

Regarding Germany's NECP, the Commission (EC 2020c) notes in the Staff Working Document that it "underlines the role of energy communities and outlines the legal framework, which is already well established in Germany." Regarding RECs specifically, Germany's NECP acknowledges the potential of RECs in the energy transition, noting that Germany has created a regulatory framework for RECs that supports their development. Reportedly, the regulatory framework ensures that participation in RECs is open to end consumers in a non-discriminatory manner, and the non-discriminatory access of RECs to existing support schemes. In addition, the plan describes how RES community energy has been given special privileges in calls for funding in the area of onshore wind energy. According to the NECP, the Federal Government is currently assessing whether changes to the existing regulatory framework are required for the implementation of Article 22 of RED II. As remarked in section 3.2.1, no legal definition of RECs exists in Germany, and Germany lags behind several other Member States with regard to transposing and implementing the provisions in RED II that apply to RECs.

Italy's NECP describes measures to promote local energy communities, self-consumption and administrative simplification. Regarding RECs specifically, the Italian NECP acknowledges the role of RECs in the energy transition, noting that they can help support the economies of the smaller regions and also enable production and consumption of RES locally. RECs will be promoted economically "by means of direct support mechanisms for production, including by more than one plant (similarly to the general production support mechanisms) and for locally consumed energy" (GoI 2019: 143). RECs will moreover be promoted through information, both on the locally available resources and on the opportunities offered by support mechanisms. The NECP further states that the development of standard tools for establishing and managing RECs will be assessed, and that experiences from existing RES community energy projects will be reviewed to assess the possibility of developing facilitation and support measures.

The final NECPs of Belgium, the Netherlands and Poland are considered by the Commission to have partially addressed the Commission's recommendation to provide further details on the enabling frameworks for renewable self-consumption and RECs.

Regarding the Belgian final NECP, the Commission (EC 2020b) notes that the plan is lacking in detail on measures and policies to promote renewable self-consumption and RECs. In section 3.1.2(v), the Belgian NECP refers to an objective of streamlining administrative procedures, but does not provide detail on enabling frameworks for renewable self-consumption and RECs in the Flemish region.

The Dutch final NECP describes policies and measures to promote the development of renewable self-consumption and RECs (energy cooperatives), including fiscal measures, but does not otherwise provide detail regarding enabling frameworks.

Regarding RECs specifically, the Commission (EC 2020g) notes that Poland's final NECP acknowledges their importance in the energy transition, and lists the legislative measures in place to support their development (Renewable Energy Sources Act 2016, 2017, 2019), but that details on how these measures will support further development is lacking.

3.2.3 Targets for RES development and RES community energy in the target regions

Table 10 below summarises targets for RES development and RES community energy in the target regions.

Table 10. RES and RES community energy targets in the target regions

Target region	Targets for RES development	Targets for RES community energy
Flanders (BE)	In its Governmental agreement of 2019 the Flemish Government states that it aims to increase the RES production substantially, to an installed capacity of 2,5 GW for onshore wind and 6,7 GW for PV. The main policies to achieve these targets are described in more detail in the Target Region Summary Report for Flanders in Annex 1 of this Deliverable.	No quantitative targets. The Flemish Local Energy and Climate Plan (2020) states that by 2030: 1) there should be 1 extra cooperative/participative RES project per 500 inhabitants, with a total of 216 MW installed capacity which means 12.000 extra projects; 2) public buildings, properties and infrastructure will be made available to cooperatives for solar, wind and energy-efficiency projects. The municipality will buy the green electricity and the citizen cooperative will install, finance, monitor and control the installations. After 20 years, the installations become property of the municipality. The same applies to school roofs, cultural buildings, care institutions, buildings of local associations, etc. The Local Energy and Climate Plan reiterates the Governmental agreement (2019), which states that 1) the diverse authorities will be empowered to produce RES on their properties and – when possible – make participation possible; 2) the active role in the transition of citizens, local authorities, and enterprises will be supported and facilitated. In addition, the Local Energy and Climate Plan mentions that the participation of citizens can be an element of evaluation in tenders of local authorities for sustainable energy projects, and that local authorities can also participate or facilitate energy communities (e.g. energy sharing in neighbourhoods, stimulate participation of local companies and business parks).
Thuringia (DE)	The Thuringian Climate Act of 2019 specifies a number of climate and energy policy goals. By 2040, the total primary energy demand is expected to be covered by a mix of locally available RES. GHG emissions shall be reduced by 60 to 70% by 2030, by	No quantitative targets. The Thuringian Integrated Energy and Climate Strategy of 2019 includes several provisions and measures for citizen/community energy. Awarding state-owned land for the use of RES projects to project developers in a tender process should be designed in such a way that Thuringian citizens and institutions are given preference. To improve financing options for RES projects, the state

Target region	Targets for RES development	Targets for RES community energy
	70 to 80% by 2040 and by up to 95% by 2050 compared to 1990. GHG neutrality is to be achieved in the second half of the century. 1% of the total state area shall be made available for the development of wind energy (present share: 0.3%). The Act also sets the goal of a climate-neutral building stock by 2050. In 2030, 25% of the heating requirements in renovated buildings are to be covered by renewable energies. The state administration shall be climate-neutral from 2030. In 2019, the state government adopted an Integrated Energy and Climate Protection Strategy, which underpins the energy and climate goals of the Climate Act and derives measures that shall help achieve these goals.	government intends to discuss alternative financing models (including citizens' funds, profit sharing, bonds, energy-saving contracting, low-interest loans, guarantees) in cooperation with Thuringia's financial sector. Special attention will be paid to involving citizens in financing municipal projects in order to increase the acceptance of RES projects. The state government is also committed to offer attractive loans even for municipalities in budgetary difficulties and to reduce bureaucratic hurdles for citizen energy projects to a necessary minimum. Furthermore, it wants to support social innovations that contribute to GHG emission reductions including cooperative energy production.
Apulia (IT)	No specific targets.	No quantitative targets. The Resolution of the Regional Council n. 1346 of 7 August 2020 contains the final approval of the implementation of guidelines for the already existent Regional Law n. 45 of 9 August 2019 “Promotion of the institution of the energy communities”. The qualification of energy community requires the achievement of a minimum annual target (60% for Apulia) on the share of energy produced for self-consumption. The financial support and incentives are given by the National Decree 16 September 2020.
Whole country (LV)	RES share of at least 50% by 2030 in final energy consumption. RES share in electricity of at least 60% by 2030. RES share of 57.6% by 2030 in the heating and cooling sector.	No quantitative targets**.** The NECP acknowledges the importance of extending the range of persons involved in energy production, including RECs as well as households as renewables self-consumers, and that it is essential to provide an appropriate framework that promotes such activities. RECs are stated as the beneficiaries of the potential future state aid programs (e.g., co-financing of investment).
North-Brabant (NL)	The region supports the national 2019 Climate Agreement. The provincial Board has adopted an ‘Energy Agenda 2030’ (Energy Agenda) in which it is stated that by 2050 Noord-Brabant will use 100% RES (for all sectors, including industry and transport) and realise a 90% reduction of CO_2-emissions (compared to 1990). To achieve this a substantial change (50% RES and 50% reduction of CO_2-emissions) is already necessary and agreed upon in 2030. In 2020 a new Board was formed which is currently translating the ‘Energy Agenda’ into a new Executional Agenda for the next 3 years.	No specific targets. The role of energy communities is mentioned in the Energy Agenda but there are no formal provincial supporting schemes (i.e. a local energy community can sometimes get a subsidy for a project, but there is no general policy to support the energy community movement as a whole).

Target region	Targets for RES development	Targets for RES community energy
Whole country (NO)	No specific quantitative targets after 2020. RED II and the Governance Regulation are currently under review by the EEA/EFTA.	No specific targets.
Warmia-Masuria (PL)	No specific targets.	No specific targets.
Região Norte (PT)	No specific targets.	No specific targets.
Balearic and Canary Islands (ES)	Balearic Islands: The Balearic Law 10/2019, of February 22, on climate change and energy transition contains an objective that all energy will be from RES by 2050. Canary Islands: No specific targets.	Balearic Islands: No specific quantitative targets. Article 49 in the Balearic Law 10/2019 states that the public administration will encourage local participation in RES installations and promote empowering citizens, local RECs and other civil society entities to promote their participation in the development and management of RES. It is compulsory for projects above 5MW to open themselves to investment from neighbours. The Government of the Balearic Islands will create a land exchange where their owners can make land available for the development of RES energy projects. The regulatory development of this law will regulate its criteria and requirements. Canary Islands: No specific quantitative targets. The draft Law on Climate Change and Energy Transition contains an article on self-consumption of electricity (article 44), where it is stated that the public administrations will promote RES-E self-consumption.

3.3 Regulations and support schemes

In order to facilitate for the development of more sustainable energy systems there is a need for long-range national energy policies and regulatory framework that are conducive and stabilising (Meyer, 2007). For example, early institutionalisation of renewable energy has contributed to the growth in wind power investments in Germany (Breukers and Wolsink, 2007). Further economic incentives such as FIT schemes have proved successful for increasing investment in PV in several European countries (Standal et al., 2018; Inderberg et al. 2016).

The way regulations and support schemes are designed also matters to how they may increase key dimensions such as social acceptance. In Germany Feed-in schemes with guaranteed renumeration for twenty years have provided long term security in planning and boosted investment also in citizen energy projects in wind and PV because of low market risk for community actors (Krug and Di Nucci, 2020. As a result, many residents are involved in wind projects in Germany. In the UK and the Netherlands, they argue, the support schemes have been designed so that most of the revenue accrues to external companies, which have partly contributed to lower local acceptance.

Our mapping and assessment show that the regulatory conditions and support schemes for establishing RES community energy vary greatly across the target regions. What most regions have in common is that there are no specific regulations for RES communities in place, so the establishment of RES community energy is regulated under energy, environmental and plan and building laws, as well as regional planning. Pending the transposition of RED II and IEMD target regions such as Limburg and West-Flanders anticipate specific regulations with privileges and requirements.

3.3.1 Target region regulatory frameworks for RES and RES community energy

Currently, the size of energy installations and type of technology is decisive for the regulations that apply. As mentioned under the section on technical conditions, spatial planning regulations or planning at regional or municipal level define restrictions on land use in many contexts such as the target regions Latvia, Limburg and West-Flanders, Puglia, Thuringia, and Warmian-Mazurian. All target regions have in common the consideration for the environment through the protection of nature or landscape areas, requirements for Environmental Impact Assessments (when installations are exceeding a certain size). Several countries have also regulated set-back distances for onshore wind in plan and building acts (Linnerud et al. 2019). Whether licensing is required for RES community energy projects depends on the technology and size of the installations. For the Netherlands, Belgium (Flanders), Norway, Portugal and Germany there are licensing requirements (depending on the size of the installations) pertaining to onshore wind energy. Permits are often determined according to requirements for environmental protection and installations over a certain threshold require an Environmental Impact Assessment. According to EIA procedures, which are

regulated by European and national legislation, broad information and consultation of the public in such processes is required.

Norway and Poland have specific legal acts for energy. For Poland the 'Renewable Energy Sources Act' defines the rules and conditions for conducting activity in the field of electricity generation from renewable energy sources and agricultural biogas as well as mechanisms and instruments supporting this activity. The act defines terms such as: renewable energy prosumer, micro-installation, small installation, energy cluster and energy cooperative. The main formal requirements, the fulfilment of which may be necessary to implement RES investments, include compliance with environmental protection, local spatial plans and concession for the generation, transmission and/or distribution of energy. The Norwegian 'Energy Act' regulates land-use for energy installations over a certain size. Decisions on power generation installations below 1MW are made by municipalities, while national level authorities make land-use decisions related to energy installations that exceed 1 MW. For large-scale hydropower in Norway there are specific laws that also apply with regard to ownership rights and regulation of river flow and transfer water. In the Netherlands, to simplify procedures, the current legislation is being revised to incorporate existing laws on electricity, environmental management and consideration in the new 'Environment and Planning Act' (Omgevingswet). The new Act will result in fewer regulations and will reduce the burden of conducting studies reducing the transaction costs involved in establishing RES community energy. At the same time, decisions on projects and activities can be made better and more quickly. Moreover, the Act is more in line with European regulations and allows more room for private initiatives.

As mentioned previously, in Puglia, Thuringia, Balearic and Canary Islands the spatial planning regulations designates specific areas where energy installations are permitted or recommended. Faced with ambitious renewable energy targets, governments may opt for more central planning in the believe that local planning processes will not generate sufficient sites for wind power. Cowell (2007) argues that although a centralised planning culture may indeed stabilise the regulatory conditions for large-scale wind investment in the short term, it may face several vulnerabilities in the long term. In Norway, the National Framework for wind proposed several as potential areas for onshore wind development. Many of these areas were found in pristine nature areas and the opposition against the framework was significant. The framework was dropped. A new feature in Norway is that onshore wind plants will be at the decision of municipalities and not national authorities.[13] In Thuringia, only 0.3% of the total territory is reserved for the use of wind energy as a majority of the land area is excluded due to natural protection and set-back distance regulations.

3.3.2 Target region support schemes relevant for RES community energy

[13] Nå skal kommunene styre vindkraften – for hvem og hvor? • Kommunal Rapport (kommunal-rapport.no)

Identifying support schemes relevant for RES community energy across the target regions and selected technological focus is challenging task. For this reason, we have chosen to mainly look at the technologies wind, solar PV, hydro and small-scale installations.

Our mapping and assessment reveal that there are no specific support schemes in place that focus or address the specifics of RECs as defined in RED II. The general trend in Member States and Norway has been support schemes to incentivise renewable electricity production financed through the power market and not through state support. All target regions have had national renewable electricity support schemes in place, but these have been or are being phased out. In Poland, an auction scheme was introduced in 2016 to replace the Tradable Green Certificate (TGC) scheme. From 2016 onwards RES installations can only take part in the auction scheme in Poland, but it is possible to move from the TGC scheme to the auctions scheme during so called "migration auctions". In Flanders owners of installations producing electricity based on renewable energy sources (wind, solar, biomass, etc.) are eligible for TGC. However, for some categories of installations the certificate system has been phased out. For example, wind turbines between 10 kWe and 300 kWe and PV installations between 40 kWp and 2 MWp are not eligible for TGC, but can apply for an investment subsidy through a call system for small and medium-sized wind turbines.[14] PV installations below 10 kWp that have been inspected after 13 June 2015 are not eligible for TGC. From 2021 onwards till the end of 2024, households can apply for a grant for PV installations below 6 kWp in existing dwellings.[15]

One dominating trend among the target regions Norte, Thuringia, and Warmian-Mazuarian is the use of auctions and tendering. As an example, since 2017, the remuneration for electricity from RES installations in Germany are usually determined through auctions/tenders organised by the Federal Grid Agency. This means that regular, technology-specific tenders are organized at the federal (i.e. national) level and not on the state level. Tenders are organized several times a year and pre-qualification criteria, bidding and pricing rules usually vary depending on the technology.[16] Such tendering systems may favour large players in the electricity sector at the expense of small actors including, cooperatives and other community energy organisations (Grashof 2019). Depending on the design of these support schemes, the cash inflows to investment projects will be subject to fluctuations in electricity and subsidy prices. Furthermore, as renewable electricity technologies mature, there is a possibility that the current support scheme will be terminated or revised in ways that make it less generous or more in line with market mechanism (Boomsma and Linnerud, 2015)

[14] https://www.energiesparen.be/call-groene-stroom

[15] https://www.fluvius.be/sites/fluvius/files/2020-12/a1-0012-21-zonnepanelen-huishoudelijke-premie-2021-informatieblad-fluvius.pdf

[16] The results of the auction are published at https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/Ausschreibungen/Ausschreibungen_node.html

Installations up to 500 kW operate under FIT scheme and installations ranging from 500 to 1000 kW under Feed-in-Premium regime (FIP). Italy, Poland and Portugal have implemented FIT schemes for prosumers (see Standal et al. 2018 for more information on Italy), though the scheme for Portugal has ended. In Poland FIT and FIP schemes are dedicated to RES installations producing electricity only from different types of biogas and hydro. Latvia had a FIT scheme for renewable electricity production until 2011, but economic incentives for supporting citizen investment in RES energy production and local scale are not on the agenda yet.

Several target regions also provide tax schemes to incentivise the increase of citizen investment in energy production. As an example, in Norway a relevant support mechanism is the 'plus customer scheme'. A 'plus customer' is defined as an end-user that consumes and produces energy 'behind the meter, from which the power put into the grid does not exceed 100 kW at any time. Participants of the 'plus-customer' scheme may use self-consumed electricity free of charge and are exempt from grid tariffs concerning electricity production and consumption. The plus-customers can also sell their excess production to an electricity supplier without a trading license. There is however some concern among district system operators and interest organisation that the exemption grid tariffs result in other consumers paying the price (interview #3-5). Their recommendation is that other tax incentives are better suited. Apart from the exemption from grid tariff for plus-customers, household prosumers can get a refund of part of their investment costs (up to 2700 Euro) through the state enterprise Enova. Enova's platform provides simplified and standardised information on household energy investments and procedures for getting support. This support scheme is scheduled to end July 2021. Enova does not operate with support for the category RES community energy, but private entities can apply for support alongside commercial actors. This is an important impediment for the RES community energy potential since such an application requires a level of professionalism not open to all private initiatives. Further, the projects must guarantee that they will be implemented regardless of whether they receive Enova support, which induces a high burden of responsibility on non-commercial actors. Some municipalities and DSOs have their own short-term support schemes, but information is not as easily accessible and standardised as Enova's.

The target region Noord-Brabant has well-developed and available support schemes for RES-E in terms of tax reductions, auctioning and other incentive schemes. In Noord-Brabant citizens can get a return of paid VAT for solar panels. Previously, the 'zip code catchment area' (PostCodeRoos) scheme facilitates the recruitment of participants in local RES communities because they are entitled to a refund of the energy tax. A condition is that these participants are connected to the network via a small-scale consumer connection (max. 3 x 8 Amps). The Zip code catchment area is determined by the place (zip code) where the electricity generation facility is located.

Our general finding concerning the regulations and support schemes is that they do not take RES community into account but relate to household prosumers or commercial electricity prosumers. Further, this means that citizens, small and medium enterprises or local authorities that want to initiate RES

community energy initiatives need to invest considerable time to understand what regulations apply and where one might seek support (if support schemes are available). Earlier studies of prosumers have indicated that the transaction costs for citizens are a significant barrier for increased household energy production (Inderberg et al. 2020; Standal, Talevi and Westskog 2019). As first step to increase RES community energy would be to address the specifics of RES community energy in designing policy and regulatory frameworks. Providing economic incentive schemes such as FIT have also proved to be effective in increasing the number of prosumers and develop a market for small-scale PV (Standal et al., 2018; Inderberg 2016). In terms of reducing transaction costs, initiatives for law revisions as in the Netherlands, and the potential to further develop platforms such as Enova in Norway, which provides objective and simplified information, thus constitute an important step to improve starting conditions for RES community energy.

3.4 Social conditions

Social dimensions are an important, and at times overlooked, aspect of the conditions for transition to RES energy systems. People are concerned about how renewable energy developments affect nature, landscapes, the local economy and their health. Individual characteristics, such as age, sex, income, education, values, beliefs and economic interests determines how potential impacts are perceived and valued. Further, community contexts also has influence over how potential impacts are perceived and valued. Below we discuss how these social conditions shape peoples' acceptance of RES community energy in the target regions. We have used existing studies and surveys conducted in the target region, or higher regional or national level as basis for the assessment.

Social acceptance is a multifaceted concept that may be defined as "a favourable or positive response (including attitude, intention, behaviour and, where appropriate, use) relating to a proposed or in situ technology or socio-technical system by members of a given social unit (country or region, community or town and household, organisation)" (Upham et al. 2015, p. 103). Wüstenhagen et al. (2007) distinguishes between socio-political acceptance (general support for technologies and policies) and market acceptance (involving consumer, investor, and intra-firm acceptance at meso-level). Further, they add community acceptance, which relate to acceptance of siting decisions and renewable energy projects by local stakeholders, in particular residents and local authorities.

Community acceptance is mainly influenced by factors such as distributional justice (costs and benefits), procedural justice (fair and participative decision-making process) and trust (in information and the intentions of investors and other actors) (IEA 2013; Sovacool and Ratan 2012; Wüstenhagen et al. 2007; Zoellner et al. 2008). However, the boundaries of different dimensions of acceptance are blurred and inter-dependent (Sovacool, 2009). As highlighted earlier literature suggests that community ownership of renewable energy projects can be a main driver for local acceptance (Slee 2015; Cowell and Devine-Wright

2018, Linnerud et al. 2018) and local benefits are associated with higher degrees of support for wind energy development (e.g. Toke et al. 2008; Zoellner et al. 2008).

In the next section we focus on contextual factors and experience with RES community energy, as well as general attitudes towards relevant RES technology in the target regions.

3.4.1 RES community energy development in the target regions

The target regions vary concerning the experience and development of RES community energy. From a historical perspective the target regions or partner countries also have different contexts concerning community organisations and activities in general. Some target regions have a history of energy cooperatives that may be seen as predecessors to REC and CEC as defined in RED II and IEMD. This is especially the case for Nord-Brabant, and Germany where energy cooperatives have become quite common and are part of mobilising the energy transition locally and nationally. The Spain and the target region Apuliaalso have experience with energy cooperatives. Latvia, Norway and Poland have experience with prosumption through neighbourhood cooperation, agricultural farms, businesses and households. These experiences may also serve as a leveller towards advancing RES community energy.

It is also important to note that some target regions, such as Norway and Puglia, have a long history of community owned and driven small-scale off-grid energy production. This was however phased out with developments of centralised electricity distribution. To this day several landowners and farmers in Norway continue with local small-scale hydropower production, which is distributed to the central grid. In the Valencia region in Spain energy cooperatives have been present since the 1880s. Most of them were born as hydroelectric plants serving power for villages which have grown up to small cities. This has resulted in common ownership of the plants and its energy utilisation. Further, these cooperatives are important actors in promoting RES. The energy cooperative in Valencia presents a relevant legal and administrative forms for new community energy.

In target regions and communities that have traditions for forms of community energy one challenge is how to establish and organise RECs (in line with RED II) in ways that do not break with existing practices (not to lose valuable experience). This would be particularly important in contexts where existing forms of community energy has high legitimacy and social acceptance. In the Norwegian context there is little momentum in the population concerning new forms of energy systems as the country is self-sufficient with hydropower (Jensen and Aamodt 2020). Further, municipal and county ownership concerning hydropower and distribution system operators are prevalent. Foreign ownership (which has been the case for some onshore wind plants) is seen as a depletion of national control and public ownership of natural resources. However, small-scale hydropower that have provided income to local landowners and farmers might be an important driver for RES community energy as securing livelihoods are central to avoid depopulation as

well as securing energy input needed for local growth when expansion of the central grid is too costly. Further, the high prevalence of municipally owned hydropower and distribution operator companies ensures that economic gains of power production, distribution and sale are distributed back into local communities. These may be a driver for RES community development in Norway; however, it is more likely that it reduces the motivation as status quo is satisfactory (see also Linnerud et al., 2019 on status quo bias).

For regions that do not have experience with community energy, one challenge may be to overcome historical and contextual factors that delegitimise RES community energy development. As an example, the low diffusion of community wind farms in Thuringia, compared to other parts of Germany, might be partly explained by reluctance of the population to invest in community owned companies and cooperatives due to historical reasons and the socialist heritage. Often, the owners of the land are not local farmers, local residents or municipalities. Income from land lease payments partially is generated by landowners, who do not reside in the local area. Local and regional value creation from wind turbines in Thuringia has therefore been limited so far. Overall, the transition from the FIT/FIP system to competitive bidding and auctioning tends to favour large players and has resulted in a decline of the number of newly established REC initiatives and energy cooperatives (DRGV, 2020).

3.4.2 Social acceptance of RES in the target regions

To understand social acceptance of RES community energy and selected RES in the target regions we have used previous studies and population surveys for either the target regions (when available) or concerning nearby regions or the country population as a whole. The general literature on social acceptance of RES in Europe is mainly focused on wind (e.g. Leiren et al. 2020; Linnerud et al., 2018; Toke et al., 2008; Zoellner et al., 2008) and relates to factors such as environmental, landscape and health impacts, as well as community benefits and need for transparent processes. The current literature on hydropower highlights several of the same aspects concerning wind, such as environmental impact and community benefits and need for transparent processes (e.g. Mayeda and Boyd, 2020; Tabi and Wüstenhagen, 2017; Friedl and Reichl, 2016). The literature on solar PV acceptance has a stronger focus on market acceptance and individuals' motivation for investment in PV technology and barriers such as gender relations, social capital and transaction costs (e.g. Inderberg et al., 2020; Hai, 2019; Standal, Talevi and Westskog, 2019; Jung et al., 2016). This section therefore predominantly refers to onshore wind. We have not explored social acceptance of integrated solutions.

Our review of existing studies shows that the general perception of the selected RES in the target region or the general country populations are mostly positive. In Flanders, Nord Brabant, the Balearic Islands, Apuliaand Warmian-Mazurian the vast majority are positive towards both wind and PV technologies. Further, in Nord Brabant and in Flanders, surveys show that around a third of the population are interested in participating in an energy cooperative or being actively involved if a wind turbine is installed in their neighbourhood (Motivaction, 2017; Flemish Energy Agency, 2014). In Norway and Thuringia, the attitudes

toward onshore wind are less positive than in the other target regions. In Norway, the support for onshore wind is still higher than the resistance, but there is a sharp decline compared to 2019 among all voters and age groups (Aasen et al. forthcoming; Aasen et al. 2019). The common reason given for not supporting onshore wind among all target regions are concerns for landscape and environmental impacts. For some target regions such as Thuringia and in Flanders, presence of onshore wind power in the locality is associated with a more negative outlook on wind, whereas the opposite is the case for Warmian-Mazurian.

Though the support for RES is higher than the resistance in the target regions there is a notable presence of protest movements against onshore wind projects in all target regions apart from Portugal, Apulia and the Balearic Islands. Our mapping of organisations and actors that promote or oppose RES in the target regions show that the protest movement consist predominantly of civil society groups contesting impact on wildlife, human health and degrading of landscape. In Norway also influential environmental NGOs that support efforts towards climate mitigation and adaptation in general have joined the suit against onshore wind. Norway, Apulia and Thuringia have also experienced local conflicts over wind (and PV plants in Puglia) due to landscape changes. Aspects concerning decreasing property values or unfair distribution of costs and benefits have also been voiced in Norway and Thuringia. Though the protest movements against onshore wind does not reflect the general public perception, they do influence the starting conditions of RES community energy as they are at times highly visible in the public agenda (Jensen and Aamodt 2018). In Norway and Thuringia, the protest movement has been influential in changing the policy and regulatory agenda. In Norway, the protest and conflict over the National Framework for Wind resulted in the government abandoning the framework and transfer of decision-making power from central government to municipalities. Since January 2021, wind energy installations in forests are no longer possible in east Thuringia due to strong protests. RES community energy also risks being labelled together with large-scale wind power plants (Interview #NO2).

As stated previously, experience with community energy can be an important social condition conducive for RES community development. Nord-Brabant, Thuringia Limburg and West-Flanders have federations of energy cooperatives such as Energy Together (Netherlands) REScoop (Belgium) and Alliance for Citizen Energy (Germany) that mobilise the population for a low-carbon transition and new energy systems. However, several target regions do not share this experience and our mapping of actors that actively promote RES shows that they are predominantly branch organisations and associations of municipalities and power producers. They thus provide a quite different narrative than the civil society protest movements. In addition, they exert their influence more at policy level and not in the public debate. Some environmental NGOs work to advance specific RES technologies and take a positive position towards RES community energy such as Friends of the Earth (though in Norway they are active against onshore wind). The support of environmental NGOs may be important in bringing RES community energy on the public agenda (in countries and regions where it is not) to gain public support and awareness.

4. Summary of results and further work

This Deliverable provides a backbone to the work in the COME RES project as the analysis of the starting conditions for RES community energy in the target regions (with low deployment) represents the foundation for the continued work in order to develop business models, financing instruments, best practice inventory, as well as stakeholder dialogues, policy recommendations in the other WPs.

Our assessment of technical, legal, policy, regulatory and social conditions show that the starting framework conditions for RES community energy in the target regions are challenging. Our analysis of the transposing and implementation of the provisions in RED II indicates important progress. Yet, the process is far from complete. The regulatory framework and relevant support schemes are not designed with RES community energy in mind. Further, the social and historical context also influence the starting conditions.

Table 11 below summarises the starting conditions and penetration levels of community energy in the COME RES countries, as evaluated by the COME RES partners.

Table 11. Starting conditions and penetration levels of community energy in the COME RES countries per February 2021

		BE *	DE	IT	LV	NL	NO	PL	PT	SP
Market deployment of community energy	Community wind	++	+++	+	-	+++	-	-	-	+/-
	Community PV	+++	+++	++	+	+++	-	+	+	+
	Community electricity storage	-	+	-	-	+	+	-	-	-
	Integrated/hybrid solutions	-	+	++	-	+	-/+	-	-	-
Community energy legal forms	Cooperatives	++	+++	+	-	+++	-	+	+	++
	Limited partnerships or limited companies or hybrid forms		+++	+ +	-	+++	-	-	-	+
	Civil law partnership	++	+++	+	-	-	-	+	-	-
	Other legal forms	+	+	+	+	-	-	-	-	-
Legal framework	Legal framework for RECs acc. to Art. 22 RED II in place	+	+	++	+	+	-	+	++	+
Support schemes, other support for REC	Political target for RECs	-	-	++	-	++	-	+	-	++
	Consideration of RECs in national support schemes	-	++ wind	++	+	++	-	+	+	+
	Other dedicated support for REC	-	+		-	++	+	+	+	+
	Enabling framework (pursuant to RED II)	+	+	++	-	+	-	+	+	+
	Consideration in Final NECP	+	++	+	+	++	-	++	++	++

*Flanders

Legend: +++ well developed, large experience; ++ partly developed, medium experience; + developing, selective experience, elements in place; - not developed, no experience

4.1 Transposition and implementation of RED II

In Section 3.2.1 of this Deliverable, we assessed the extent to which the nine COME RES countries had transposed and implemented seven specific provisions in RED II that apply to RECs. All nine COME RES countries have made some progress in adapting their legislation to the relevant requirements of the RED II, or existing legislation is already adapted to some extent. However, there is variation across countries. Of the EU Member States, Italy has come farthest. Italy and Belgium (Flanders) are the only two countries to have either fully or partially implemented and transposed all the seven requirements assessed. The Netherlands, Spain and Portugal have also generally made good progress, but all three have RED II requirements in which no progress is observed.

Despite its long-standing tradition of community energy, Germany has made the least progress of the EU Member States in transposing and implementing the provisions in RED II that apply to RECs. In Germany, the definition of “citizen energy companies” in the Renewable Energy Sources Act shows certain parallels to RECs. However, the respective provisions were introduced without having RED II in mind. The primary purpose of RECs (as defined in RED II Article 2(16)c) has no explicit equivalent in German law, nor are the rights and possible activities of RECs (as defined in RED II Article 22(1/2)) explicitly defined. The definition of “citizens' energy companies” has a very limited scope of application (wind energy) and the scope of eligible actors is broader than in the case of a REC as defined by RED II. At the federal level, most of the minimum requirements for an enabling framework (as defined in RED II Article 22(4)) have yet to be transposed and implemented.

Limited progress is also observed in Latvia and Norway. In Latvia, preliminary draft legal amendments in principle contain the definitions and rights of RECs. However, many details, which have to be regulated by governmental regulations, are unspecified to date. The EU directives do not automatically apply in Norway but depend on individual procedures and negotiations between the EU and the EEA/EFTA. RED II is still under review by the EEA/EFTA. In Norway and Germany, current legislation does not contain a definition of RECs. Also in Poland, the role of RECs in national legislation and in national and/or regional policies is just beginning to take form, and no definition of RECs currently exists in national legislation. Current legislation only regulates the rights and activities of concepts such as “energy clusters” and “energy cooperatives”.

4.2 Moving from RED II to RES community development

Further action is needed in all nine COME RES countries to promote and facilitate the development of RECs in the energy transition. Such action, in turn, could help ensure that national and regional RES targets are met.

Although the importance of RECs and RES community energy in the energy transition is recognised in several COME RES countries' NECPs, and several plans describe policies and measures to promote their development, none of the final plans contain quantitative trajectories or objectives for REC development under section 2.1.2(v). Section 2.1.2(v) of the Italian NECP notes that a study is underway that will contribute towards a better definition of achievable targets, and Spain's NECP acknowledges the importance of RES community energy but without specifying trajectories or targets. Reference is made to targets for RES community energy in the Dutch and Portuguese NECPs, although not under section 2.1.2(v). None of the COME RES target regions have quantitative targets for RECs. Establishing clearly defined targets and objectives nationally and at the target region level could help signal political commitment to the development of RECs and help guide the development of enabling frameworks (including policies and measures) so that the targets or objectives can be met (Roberts and Gauthier 2019). Clearly defined targets could moreover help monitor the progress in developing RES community energy going forward (Petrick et al. 2019). Targets could for instance be expressed as shares of the national or regional RES targets, in addition to non-energy targets such as the number of RECs and members (PROSEU 2021).

Further action is also needed with regard to implementing policies and measures to promote the development of RECs. Our analysis of the progress in transposing and implementing the provisions in RED II that apply to RECs reveal that, whereas several countries have made good progress in defining RECs and their formal rights pursuant to RED II, much less advancement is observed with regard to policies and measures to promote the development of RECs. At this stage, none of the nine COME RES countries have fully taken into account the specificities of RECs in support schemes, to allow them to compete for support on an equal footing (RED II article 22(7)). Moreover, none of the countries have developed an enabling framework to promote and facilitate the development of RECs that satisfy the minimum requirements listed in RED II Article 22(4). Article 22(3) in RED II requires that Member States carry out an assessment of the existing barriers and potential of development of RECs. With the exception of Poland and Italy, none of the COME RES countries have fully complied with this requirement to date. Carrying out an assessment of existing barriers would help guide decision-makers in removing unjustified regulatory and administrative barriers (Frieden et al. 2020; RESCoop.eu 2020). One of the minimum requirements for an enabling framework for RECs is the removal of unjustified regulatory and administrative barriers (RED II Article 22(4), item a).

Our mapping and assessment reveal that support schemes currently in place aim at promoting RES-E (financed through the power market) and are not being specific to RECs. In this regard, the specific barriers

to the implementation of energy community initiatives are not fully tackled by existing schemes and regulations. There seems also to be support for arguing that there are considerable transaction costs involved in understanding relevant regulations and support schemes, as there are great regional and national variation, and the regulations and procedures are complicated.

Social conditions also affect the development of RES projects, including a lack of community acceptance (e.g. Leiren et al. 2020; Linnerud et al. 2018). Existing literature finds that community ownership of RES projects can be a main driver for local acceptance (e.g. Slee 2015; Cowell and Devine-Wright 2018, Linnerud et al. 2018). Enabling local ownership and institutionalising participation in project planning may contribute to community acceptance and involvement of multiple interests (environmental, economic and landscape) that are relevant at the local level of implementation (Breukers and Wolsink, 2007). This aspect is also acknowledged in RED II (recital 70). RES community energy can therefore play an important part in increasing the share of RES in the European energy balance and to ensuring that countries and regions reach their targets.

Our assessment finds that there is generally a positive attitude towards RES in the target regions, but there is a notable presence of movements against onshore wind and public support is also declining in some regions. Further, we find that the actors who promote RES often represent the commercial and professional sector. In contrast, the actors opposing (mainly onshore wind) work in quite different contexts and scales. The protesters are more visible in the public agenda influencing public opinion, whereas the promoters often work towards influencing the policy agenda and economic framework conditions.

Although promoting the development of RES community energy can help increase the probability of RES development getting accepted locally, it is not necessarily the case that the development of RES community energy will be opposition-free. Community RES installations can face severe public opposition, as for instance observed in Thuringia, where local resistance towards wind energy developments, including community/citizen projects, has been growing steadily.

The historical context also influences the social conditions for RES community energy. In target regions and communities that have traditions for forms of community energy one challenge is how to establish and organise RECs (in line with RED II) in ways that do not break with existing practices to not lose valuable experience. This would be particularly important in contexts where existing forms of community energy has high legitimacy and social acceptance. Further, RECs may be less suitable, or at least, attractive in certain regions such as Norway. The stringent requirements of members exerting equal control and exclusion of profits as objective may deter actors who have important resources and experience, but have a notable commercial interest, that could help evolve RES community energy when there is less momentum for change in the status quo.

Based on the findings in this Deliverable, we propose the following action points in the COME RES countries and target regions:

ACTION POINTS

- Further work in adapting the national legislation to the relevant requirements of the recast Renewable Energy Directive that apply to renewable energy communities is needed in all nine COME RES countries.
- Establishing clearly defined targets and objectives for renewable energy communities nationally and at the target region level could help promote their development.
- Further work is needed with regard to implementing policies and measures to promote the development of renewable energy communities. This includes establishing enabling frameworks and adapting support schemes to the specificities of renewable energy communities.
- In order not to lose valuable experience, care should be taken in establishing and organising renewable energy communities in ways that do not break with existing practices and experiences with community energy.

4.3 Future research

The findings of this Deliverable also bring up issues that need further attention and research to extend our understanding of RES community energy in the energy transition.

Our findings show that there is a general lack of regulations and support schemes directed towards RES community energy and that general RES regulations and support schemes are complicated for citizens, small and medium enterprises and local authorities to engage with. There is a need to develop a better understanding of 'what works and under what conditions' with regard to regulations and support schemes that have experience with energy cooperatives or other forms of energy systems that are relevant for RECs. This Deliverable indicate that Germany, Netherlands and the Flanders regions may provide illustrative case studies in this regard. Further, there is a need to extend this analysis also to regulations and support schemes that dis-incentivise or discriminate RES community. This will be the focus of a forthcoming Deliverable from the COME RES project, which looks more in-depth on drivers and barriers in selected contexts.

Going in-depth on the historical context as a starting condition for RES community energy has been outside the scope of this Deliverable. Further research is needed to understand how experiences with community

energy shape policy prioritisation, regulatory framework and community acceptance and thus influence feasibility of RECs.

Another important topic not covered here, but in forthcoming COME RES Deliverables is the economic framework conditions and potential business models for RES community energy. This aspect is not only important with regard to providing adequate starting conditions RES community energy and fuelling the transition towards RES, but it also relates to how we may achieve a socially inclusive energy transition. As has been noted in other studies (Inderberg et al., 2020; Standal, Talevi and Westskog 2019; Standal et al., 2018) focusing on an energy transition where households and citizens contribute through household energy production may increase the social inequality between those who have means for such investments and the energy poor. Ensuring 'energy justice' through making RES community energy financially doable is thus important for equality as well as a low-carbon energy transition.

Last but not least, the research field concerning RES community energy need to develop deeper understanding into cultural, identity and gender dimensions that shape both preferences, as well as equitable access to participation and decision-making into such transition processes (Standal and Feenstra, forthcoming). Again, this relates to energy justice and ensuring a socially inclusive energy transition.

We hope this Deliverable provides useful background into the future research agenda on RES community energy.

5. References

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Appendix 1. Background reports on Target Regions

Apulia

Technical, Geographical and Infrastructural conditions

Basic facts

Located in southern Italy, (Fig. 1) the Region of Apulia is one of the most densely populated regions in Italy (Tab. 1). Furthermore, its territory is Characterised by an elevated level of urbanisation, with 62.3% of the residents distributed over 49 municipalities with more than 20,000 inhabitants and a population density (205 inhabitants per km^2) above the national average (199.4 inhabitants per km^2) (ISTAT, 2020).

Figure 1. Map of the Apulia Region [source: googlemaps]

Table 1. Basic Facts for Apulia Region (sources: ISTAT 2020, 2014)

Area, in km^2		**Population, number on 01.01.2020**	
Total	19,541km^2	**Total**	4,008,296
Land		*Urban*	
agriculture land	12,496 km^2	*Rural*	
forest land	-		
inland water	Lakes 125 km^2 - Rivers 707 km		
Mountainous	288km^2		

With regard to the new technologies and RES, in Apulia there are a number of local units of companies and research excellences higher than in other regions of Southern Italy, which actually remains less developed in terms of economic growth with respect to the whole country (De Luca et al., 2020).

The Energy/Electricity context

Apuliaproduces more electricity than that required to satisfy its own domestic consumption, almost 210%. The net efficient power of the installed fossil fuel plants amounts to 7,099.4 MW representing approximately 56.9% of the net power available in the Region (Legambiente, 2018). The energy mix from fossil fuels accounts for: coal 55%, gas 33% and oil 12%. A third of electricity capacity generated by coal-fired power plants in Italy is concentrated in Puglia, which produces14% of the total power generation capacity of Italy (Tot 282TWh). Two coal-fired power plants are located in Brindisi. These plants will stop the use of coal by 2025 and re-conversion to natural gas and /or RES is ongoing.

Renewable Energy Sources (RES) play a leading role in the regional energy landscape, finding widespread use for the generation of both electricity and heat, thanks to the 43,737 plants spread across all the municipalities. Solar photovoltaic (PV) is the most widespread technology in numerical terms, with 97.9% of the plants, followed by wind power with 1.9% and hydroelectric plants and biomass-fed ones. The net efficient power of the RES plants installed amounts to 5,389 MW, representing approximately 43% of the net power available in the region. Among this, PV is the technology with the highest installed power of 2,622.7 MW (48.7%), followed by wind power with 2,433.3 MW (45.2%) and by bioenergy plants with 329.7 MW (6.1%).

Total net electricity production in Apuliais 33,726 GWh/year of which 23,786.2 GWh/year from fossil fuel power plants, equal to 70.5% of total. The electricity generation from RES amounts to 9,940 GWh/year, equal to 29.5% of the total. The greatest contribution comes from wind energy with 4,743.1 GWh/year followed by solar energy with 3,395.4GWh/year which together cover about 81.9% of the total RES electricity generation; the remaining production is generated by bioenergy with 1,797.5Gwh/year (18.1%). New plants, like the wind off-shore located in Manfredonia, are planned to increase the RES development.

Infrastructure and Accessibility

The high concentration of power generation finds a technical limitation in Apulia in the distribution network that is not adequate for the increasing loads poured into it and it is busy with high transits exiting the regional borders. In 2010, energy losses amounted to 1,974.8 GWh. The absolute value is almost equal to the total wind energy produced in the region in the same year.

Apulia has energy generation levels that are largely in excess of internal demand. The energy generated mainly from fossil fuel plants serves in part to satisfy the local demand, but it is largely transported over great distances, beyond regional borders, to support areas with a deficit. Consequently, the losses on the

transmission network are considerable and still inadequate today with respect to the growing flows in transit and to the spread of distributed generation.

The increase in the share of energy needs to be covered by distributed generation through the creation of construction of an intelligent distribution system, this solution is encouraged but not yet realised. A strategic network of infrastructures favors the accessibility to the regional territories characterised by an increasingly efficient intermodality between road, rail, port and airport connections.

Restrictions on Land Use

In Puglia, restrictions on land use mainly depend on the presence of protected natural areas. These extend for a total of 245,154.33 hectares, of which 75.8% represented by national parks and 8.3% by natural areas and marine nature reserves. The provinces with the highest percentage of protected territory are Foggia and Bari, with 51.5% and 27.7% of the total of 245,154.33 hectares, respectively. In detail, Apulia has 2 national parks (the Gargano National Park118,144 ha, and the Alta Murgia National Park 67,739ha), 3 marine protected, 11 regional parks, 17 state reserves and 7 regional reserves. These natural areas also represent the most touristic areas in the region.

In general, the areas to be considered critical in the process of selecting possible locations for plants installation are:

- National and Regional Protected Areas in accordance with Law No 394/91 and Regional Law No 19/97;
- 'Oasi di protezione' (Oases of protection) under Regional Law NO 27/98;
- 'Aree soggette a vincolo paesaggistico' (Areas under landscape constraints) in accordance with Regional Thematic Urban Plan / Landscape and Environmental Heritage;
- Site of community interest (SIC) and Special Protection Areas (SPA) under Directive 92/43/CEE (the so-called 'habitat' Directive) and Directive 79/409/CEE (so-called ' birds' Directive) and falling within the European ecological network 'Natura 2000';
- Wetlands and Important Birds Areas – IBA (identified by Birdlife International).

Projects falling in critical areas referred to under letter *a.*, although advised against, are subject to Environmental Impact Assessment (EIA) procedure. For all projects falling within the European ecological network, referred to under letter *d*., in accordance with art. 6 of D.P.R. n. 120/2003,the subjection to Impact Assessment is compulsory. Moreover, the following project conditions have to be met:

- where a specific habitat of Community interest is present within the site, a loss of more than 10% of the total surface of the habitat is not allowed (Directive 92/43/CEE);
- if a habitat or species of Community interest (Directives 92/43/CEE e 79/409/CEE) are present within the area interested by the proposed plant installation, no reduction of the habitat surface or impact on the species is allowed.

Projects of new RES plants falling within areas referred to under letter *b*., *c*., *d*. and *e*. are subject to Environmental Impact Assessment (EIA) procedure. EIA is a structured process for considering the implications, for people and their environment, of proposed actions while there is still an opportunity to modify (or even, if appropriate, abandon) the proposals. It is applied at all levels of decision-making, from policies to specific projects.

Apulia has been the subject of major investments aimed at creating PV and wind parks that have had a significant impact on landscapes. This, in addition to generating considerable territorial opposition, led to the definition in 2015 of the Landscape Plan of the Apulia Region (PPTR), one of the first regional plans to define guidelines and constraints for the implementation of RES. The PPTR pursues, in particular, the promotion and the realisation of a self-sustainable and durable socio-economic development and a conscious use of the regional territory, also through the preservation and recovery of the aspects and of the peculiar characters of the social, cultural and environmental identity, the protection of biodiversity, the realization of new integrated landscape values, coherent and responding to criteria of quality and sustainability. The PPTR proposes to encourage the concentration of wind and photovoltaic plants and biomass power plants in the planned productive areas, the plan also directs actions and projects towards self-consumption policies, addressed to municipalities and individual users.

Legal and Policy Framework and Institutions

Policy Targets for RES development and RES community energy

Policy target for RES and energy community are established at national level by a series of measures provided by specific regulation issued by central administration. At local level, the regional administration provides rules and guidelines to implement RES and energy communities in their territories. Table 2 synthesises the main regulations present in Italy relevant to community energy at national and regional level. The purposes of each regulation are described below.

Within the NECP (National Energy and Climate Plan), national targets are set for 2030 on RES level (30% of Total consumption, 21.6% for mobility consumption), energy efficiency (-43% vs PRIMES scenario 2007) and reduction of CO_2 emissions (-33% vs 2005) (MiSE, 2020). Moreover, a specific goal of the NECP is to make citizens and SMEs the protagonists and beneficiaries of the energy transformation through the creation of self-consumption initiatives and energy communities.

Unlike other European countries, in Italy there has been a lack of an organic regulatory framework for collective actions for energy like Renewable Energy Communities (RECs) and, in general, to off-grid forms of energy production and self-consumption. In order to overcome this, the Italian government anticipated the application of the European regulation on REC with respect to the transposition of the Directive (EU)

2018/2001 (the so called RED II), by inserting a specific article in the Omnibus Decree Law 162/19 (so called "Milleproroghe" decree) subsequently modified in Law 28/02/2020 n. 8. Actually, the Article 42bis regulates the establishment of energy communities' initiatives.

In fact, thanks to the advance with which Italy has regulated the transposition of the RED II Directive, making it possible to share the electricity produced by RES, consumers of electricity will be able to join together to create configurations of collective self-consumption initiatives and energy communities. Previously, a regulatory limit assumed that energy produced by a RES plant was self-consumed by the user at which the plant was installed. So, the establishment of collective actions for self-consumption were allowed (e.g., activated by citizens living in the same building or condominium or RES community energy in line with RED II). The eligible plants are not to exceed 200 kW and must enter into operation after the 1 March 2020. Following the Milleproroghe decree, a series of national regulations were established to implement the legal framework for energy communities.

The "Rilancio" Decree, 9 May 2020 n. 34, raises up to 110% (Superbonus) tax deductions in the field of energy efficiency interventions and new installations of RES (see section on Regulatory Procedures and Incentive Schemes). On September 16th, 2020, the Ministry for the Economic Development (MiSE) has issued the decree which defines incentives for collective self-consumption and energy communities opening interesting opportunities for households and territories(see section on Regulatory Procedures and Incentive Schemes) providing specific incentives. The regulatory Authority for Energy, Networks and the Environment (ARERA), by the Resolution 4 August, 2020 318/2020/R/eel, has established the criteria for regulating the economic items (i.e. energy costs, energy prices, taxes and duties) related with self-consumption or sharing within the RECs.

These regulations are transitory pending the transposition of REDII that will take place definitely in June 2021.

Italy presents some issues that can be also partially regulated at regional administrative level. In this context the Piedmont Region published the Regional Law n. 12 of 3 August 2018, "Promozione dell'istituzione delle comunità energetiche" ("Promotion of the institution of the energy communities"). In this framework some relevant energy communities' initiatives were spread in the region that is a considered pioneer in term of implementation of RECs. There are a few examples of energy communities but the participation of citizens and of individuals is still under-represented because municipalities and SMEs are more involved in the existent projects.

After the establishment of National regulation in 2020, other Regions published their regulatory framework for energy communities which covers some specific local issues while remaining within the context

established by National legislation. In some cases, some definitions are in contrast with the current national regulation such as for Piedmont in which the regional regulation does not place limits on proximity.

The Apulia Region published the Resolution of the Regional Council n. 1346 of 7August 2020 the final approval of the implementation of guidelines for the already existent Regional Law n. 45 of 9 August 2019 “Promotion of the institution of the energy communities”.

The qualification of energy community requires the achievement of a minimum annual target (70% for Piedmont and 60% for Puglia) on the share of energy produced for self-consumption. The financial support and incentives are given by the National Decree 16 September 2020.

Following Piedmont and Apulia, the Liguria region has also approved a law for the promotion of energy communities. The Regional Lawn. 13 of 6 July 2020 aims at promoting self-consumption and distributed generation through the creation of groups consisting of public and private entities and at aggregating them for production, consumption and storage of energy.

Recently also the Calabria Region published its resolution for RECs the Regional law n.25 of 10 November 2020 that promotes the establishment of renewable energy communities, for the production, exchange, storage and sale of renewable energy for the purposes of self-consumption and for the reduction of energy and social poverty, as well as for the creation of forms of efficiency and reduction of energy withdrawals from the grid.

Other Regions - Sardinia, Emilia Romagna e Lombardia- are currently implementing a regional legal framework to implement energy communities.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

In the following Table 2, there are identified some existing gaps at national level in the transposition of RED II, particularly concerning the legal and enabling frameworks for RECs.

Table 2. Legal gap analysis to identify gaps in the transposition of RED II concerning legal and enabling frameworks for RECs in Italy

	+	+/-	-	comments
Is there a legal definition of RECs?				Yes, in national law L. 28/02/2020 n. 8
Is the definition of RECs in compliance with RED II?				Yes, in national law L. 28/02/2020 n. 8. REDII will definitively be transposed in June 2021
Are final customers, in particular household customers, entitled to participate in a REC?				The regulatory (policy and market) framework in Italy and the organisation of the privately owned multi-occupancy and multi-propriety buildings have been amongst the biggest barriers to participation of prosumers in energy communities. For this reasons, existing energy communities have been initiated by municipalities with the participation of industry and non-residential private building owners, creating the necessary critical mass to test the system and trial innovation in policy and regulations. Now, the involvement of the public administration concerns more the theme of the 'trust', than of the feasibility, by creating an environment encouraging citizen participation which is actually regulated with specific rules.
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				Yes, it is, integrated in the national law L. 28/02/2020 n. 8
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				Public consultations The Senate Industry, Trade and Tourism Commission has launched a public consultation - from 1 to 31 October 2018 - to acquire information and assessments from interested parties (Senato, 2019).
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				D.M. 16 September 2020 Resolution 4 August 2020 318/2020/R/eel The minimum requirements for an enabling framework (i.e. points a) to e) in RED II Article 22(4)) are met. However, the following points could be improved in the Italian regulation:

	+	+/-	-	comments
				- the participation in the renewable energy communities is accessible to all consumers, including those in low-income or vulnerable households; - 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 renewable energy communities, and in helping authorities to participate directly; - rules to secure the equal and non-discriminatory treatment of consumers that participate in REC.
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				It is emerged that in the Italian context, a main barrier to the development of energy communities is the size of the planned geographical extension. The 42-bis of the Decreto Milleproroghe mandates that area interested by REC is limited to points underlying the same low / medium voltage substation. Small municipalities, for example of 'internal areas', can meet some difficulties to start initiatives on its territory. Considering the possibility of aggregating multiple RECs such as organizational structures within the same legal entity would favour the start of important projects at local level (ENEA,2020).

Mapping Relevant Institutions with jurisdiction on RES community energy

Within national institutions with jurisdiction of relevance to the establishment of RES community energy in Puglia, the Government advises on the possibility to implement RECs, the MiSE gives the extent of incentives, the ARERA establishes the energy costs. Moreover the “Gestore dei Servizi Elettrici” (GSE) examines and approves the applications to constitute a REC.

Moreover, at local level, the administrative regional authority Apulia Region provides the guidelines to accomplish the institution of RECs in compliance with national legal framework and a permanent Technical board is established to favour the technical-institutional dialogue. The Board is chaired by the Director of the Economic Development Department or his delegate and composed of Director of the Energy and Digital Infrastructure Section or his delegate, delegated by the Sections managers competent regional authorities or their delegates, by representatives of the energy communities.
Other members of the board are the mayors of the municipalities where the energy communities are based and the most representative associations in the environmental, energy and renewable sectors.
The stakeholders involved in various capacities may be invited to the Board for consultative purposes.

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

The regulations for spatial planning already existent for RES are effective for new plant in the framework of RECs. The regional law L.R. 31/08 prohibits wind installation in SCI, SPA, IBA, Ramsar and Regional protected areas and a buffer zone of 200m must be respected, while other RES plants must be assessed by EIA (see 1.4); 5 km from IBA. In particular, in the areas connecting protected territories, not recognised as SCI or SPA but identified by the regional regulation Regional Territorial Landscape Plan (PPTR) Resolution of the Regional Government 1/10, new installations are prohibited. The Region has compiled a list of non-suitable areas for RES. The regulation for localisation of RES plants follows the restriction already indicated in the section on restrictions on land use. In particular, the Resolution of Regional Government. 827 del 08/06/07 establishes the Regional Environmental Energy Plan (PEAR)”, which contains strategic guidelines and objectives in the energy field over a ten-year time horizon. The L.R. 24/09/2012 contains the guidelines for the implementation of PEAR, while an update of the PEAR, related to the RES sector, was approved with DGR n.1181 of 27 May 2015.

Licensing and other Regulatory Requirements for RES community energy

In Puglia, at regional level the implementing guidelines of the L.R. n. 45/2019 establish:

- the criteria for the adoption of a memorandum of understanding by the municipalities that intend to propose or proceed with the establishment of an energy community;
- the criteria for drawing up the energy balance of energy communities;

- the criteria and characteristics of the strategic document of the energy communities, containing the identification of the actions that they intend to undertake for the reduction of energy consumption from non-renewable sources and the energy efficiency parameters;
- the criteria and procedures for the regional financial support, in the initial implementation of energy communities;
- the methods of setting up and functioning of a permanent Technical Board.

The minimum technical requirements for the establishment of an energy community are:

- the total annual electricity consumption of at least 0.02 GWh (referred to the last two years);
- at least half of the minimum share of 60% of energy produced intended for self-consumption must consist of energy produced locally by RES;
- subjects who produce electricity for self-consumption (individual or collective) must be owners of plants powered by RES of total power not exceeding 200 kW.

Regarding the legal subjects of REC:

- the members are natural persons, SMEs, local authorities, including municipalities. The members of the same energy community must belong to a territorially contiguous 'area';
- the main objective of REC is to provide environmental, economic or social benefits to its members or to the local areas where the community operates, rather than financial profits. The participation in REC cannot constitute the main commercial and industrial activity;
- RECs are open to all consumers, whose withdrawal points and the entry points of the plants are located on low voltage electrical networks to the same medium voltage/low transformer substation (art.42 BIS legislative decree 162/2019 as converted into Law no. 8 of 28/2/2020);
- The member of REC: retain their rights as final customers, including the right to choose their seller and can leave the association at any time. Their relations are regulated by means of a private contract that uniquely identifies a responsible for the distribution of energy shared;
- the economic matters are regulated by ARERA.

The configurations applicable for the REC are:

- one-to-many: a single generation plant used by all members of the community. The generation plant must be installed on the same portion of the electricity grid to which the members belong.
- The electricity distribution network within the Community or sections of it, may be private or public, depending on the technical, legislative and economic feasibility of the same.
- many-to-many: multiple generation plants distributed within the community.

Public and private entities can promote and/or join an existing energy community, as promoters, developers, energy producers, administrators of the energy community, managers of the community electricity grid, aggregators and energy traders.

Incentive schemes for RES community energy

Following the mentioned regulations, GSE provides the application scheme, the contract scheme and the Technical Rules containing the precise calculation criteria that may be necessary to get the incentives. It also set up a specific interoperable portal that manages the registry of all production plants with RES, for the purpose of accessing incentive service of shared electricity, as well as for the technical and economic management of the service.

Through Resolution 318/2020/R/eel ARERA defined, the transitional regulation model to be applied to the collective self-consumption initiatives and to the REC. To enable the benefits brought to the grid by these new entities in the electricity system to be quantified and to adopt a cost-reflective approach, the Resolution introduces the following definitions:

- fed electricity: the electricity injected into grid net of the conventional coefficients of losses.
- withdrawn electricity: the electricity withdrawn from the network by each user participating in the scheme.
- shared electricity: it is, in each hour, the minimum between the sum of the electricity actually fed and the sum of the electricity withdrawn.

The regulation model could have two different configurations:

- real: a physical self-consumption scheme, which uses a private grid between the generation plant and the users, with a single access point (POD - Point Of Delivery) to the public grid;
- virtual: a 'Virtual' self-consumption scheme which uses the public grid to exchange of energy between generation and consumption units.

Specific incentives were provided by D.M. 16 September 2020 for collective self-consumption initiatives and RECs at national level.In particular for the shared energy:

- 100 €/MWh for production plants that are part of a collective self-consumption configuration (e.g. condominium);
- 110 € /MWh for production plants that are part of a renewable energy community.

These incentives could be summed, under specific conditions, with the Superbonus provided by D.L. n. 34 of 9 May 2020 which establish tax deductions up to 110% for energy efficiency interventions and new installations of RES. In particular, building renovations which permit an increase of two energy classes are incentivised.

Moreover, collective self-consumption and REC initiatives benefit of 10 €/MWh and 8 €/MWh, respectively, as a refunding system charges contribution for the enhancement of shared electricity according to a logic of the cost reflective use of the grid. The energy fed into the grid will be paid at the "Hourly Zone Price",

which could be assumed to be around 50 €/MWh (due to the lockdown, the average in the first months of 2020 has dropped to 35 €/ MWh but is realigning of 2019) (RSE, 2020).

Social Conditions

Ownership structures and state of the art of community energy development

To date, two RECs have been launched in Puglia: the first has been developing in the municipality of Roseto Valfortore (FG) in collaboration with the company Friendly Power srl and the second in the municipality of Biccari (FG) through a partnership between the municipality of Biccari and the energy cooperative "ènostra".

The case of Roseto Valfortore (FG)

Roseto Valfortore is a rural municipality (1,054 inhabitants), characterised by high wind speed and force. Furthermore, among the municipalities of Puglia, it has seen the greatest development of wind power occurred through the investments of international large energy and financial groups, often in collaboration with small or medium national companies.

The path for the establishment of a REC began in April 2019, when the municipality of Roseto Valfortore launched a tender for the implementation of the project. This initiative has been done some months ahead of the issuance of the Regional Guidelines for Implementation of Law No. 45/2019 on promoting the establishment of energy communities. The REC of Roseto Valfortore was considered a case study to examine operationally the activation modes of a REC in the region, during the preparation phase of the Law.

The company Friendly Power srl was assigned the task and has drawn up the feasibility study and has started the implementation phase. The technological part has been developed by Creta Energie Speciali srl, a spin-off of the University of Calabria. The implementation of the initiative will be carried out for successive steps. As soon as a significant number of adhesions have been reached, a special purpose company the Roseto Comunità Energetica srl will be established to install at its own expense the first PV systems (about 750 kWp) on residential buildings or productive sites billing the self-consumed energy at a price below the market price according to a contract signed with the customer. Moreover, some technological innovations will be planned. Thanks to smart meters and a special app that can be consulted from smartphones, community members will be able to check and optimize their consumption at any time. With the installation of storage systems and the implementation of the nanogrid, it will be possible to share the amount of energy produced both among the members of the community and with consumers who do not have their own system, bringing to 75% the share of average self-consumption of the community. At a later stage, a 3 MWp wind farm will be built, for the production of 7,500 MWh per year, which will contribute to meeting the needs of the entire community, bringing to 95% the share of average self-consumption, while any excess can be sold outside the energy community. Finally, with the power cloud service, the

consumption of energy drawn from the grid will be voided and the average self-consumption rate will be raised to 100%.

The case of Biccari (FG)

A REC will be established in the Municipality of Biccari (FG), a city located among hilly landscape rich in woods and natural areas (2,696 inhabitants). The Municipality has already started a collaboration with the energy cooperative 'ènostra' including citizens and local SMEs for the establishment of a REC based on PV. The process of realization of the REC has started with a resolution of the municipality that has launched a collaboration between the administration and 'ènostra'.

The Municipality of Biccari has long been engaged in the search for new models and innovative solutions to promote environmental, social inclusion and economic benefits for citizens. Through the active participation of local community, it is intended to achieve a series of objectives: the resolution of some technical and bureaucratic issues, the modelling of energy withdrawals and inputs in order to maximise the instantaneous self-consumption of energy produced by the PV system and consequently optimize the economic benefits for the community members. The implementation of this REC will be characterised by different phases. A feasibility study to identify the site for the PV installation, to define the layout of secondary cabins within which to develop the project and to maximize the match between production and instantaneous self-consumption. In the second phase the accession of new members will be collected through declarations of interest, the actual consumption data will be analysed, the PV system will be designed, and a refinement of rules and regulations will be carried out. Then the PV plant will be built, tested and commissioned. The last step will be the activation of the REC and the training course to enable locals to manage the energy community, once fully operational, and to optimize the use of energy by members.

Social Acceptance of RES community energy and selected technologies

Energy Communities represent a new approach for regional and local energy planning. These initiatives are not for profit but rather represent the possibility of allocating any profits to meet the needs identified by the community (as established by RED II), as they operate in the energy market with the aim of satisfying environmental, economic and social requirements.

To facilitate regional and municipal institutions in managing this new approach it is necessary to reduce the risks of possible protests and/or opposition, optimising decision-making processes and building a shared narrative of this opportunity in which technology can facilitate relations between people and create mechanisms for growth, employment and sustainable development. This process can be activated through the planning of informative and dialogue initiatives to inform SMEs and encourage citizen participation (De Luca et al. 2020). Specifically, for energy communities, there have not been, any conflicts and/or protest attitudes on the part of local communities reported by media or local newspapers in Puglia. In general, in

Apulia as well as in many other Italian regions, the rate of public acceptance across RES has been measured to be significantly high. At the same time, however, in the territories with high levels of public acceptance, it has been observed that when one's local community is directly impacted by the construction of a RES plant, a lack of local community acceptance may raise and contribute to the failure of many promising RES projects. A variety of factors that contribute to forming social acceptance - including trust in public authorities, distribution of quality information, public involvement, and economic benefits - are important in shaping the acceptance of RES projects (Segreto M. et al., 2020). Apulia is the region with the largest installed wind power capacity in Italy. Nonetheless, the high concentration of onshore wind farms on the territory has posed serious problems over the time. The majority of people living nearby onshore wind farms seem to suffer from the change of "their" landscape (Caporale D. et al., 2015) a similar situation also occurred for large PV power plants.

While on a global scale the public opinion declares a clear preference for wind and PV energy, in several local communities there is a strong opposition or open conflicts against the construction of new energy plants. This condition has created a sort of loop effect among the population, given that the process of perception and evaluation of a RES project, is always dependent on previous experience and issues. Apulia is among the Italian regions most affected by forms of opposition in the energy field with 11 conflicts, ranking third after Lazio (21 conflicts) and Campania (17 conflicts) (CDCA, 2020). This condition is often associated with the crisis of the fiduciary relationship between citizens and institutions is underlined, which risks irreversibly invalidating any attempt to mediate the relationship between actors and different interests. Dissent takes form where energy choices, over the years, have caused unforeseen or undesirable consequences in soil consumption or landscape transformations, or even in the unfulfilled hope of local communities to see potential added value. Conflicts have developed where the benefits for large new energy plants (if not in overall environmental terms) have been perceived by local communities to not fulfil expectations for new jobs, economic and social benefits for the community, etc. (Corrias et al., 2019). This is an important aspect to understand the apparent contradictions between general public support for renewable energy innovation and the difficult realization of specific projects (Wustenhagen et al., 2007).

In order to remove some of the conflicts to the use of solar energy, the ApuliaRegion has intervened with the guidelines of its Landscape Plan, moving towards an integrated use of RES (ApuliaRegion, 2016). Projects should seek to develop synergies with other uses and functions. PV and solar thermal energy should be integrated in buildings, shelters, lighting systems, noise barriers, becoming an integral part of the new urban vocabulary. It is necessary to direct stakeholders towards the use of the best PV technologies, which allow the achievement of the right compromise between investment, surface occupation, impacts and efficiency.

The main conflicts in Apulia have arisen around wind energy and large PV plants. As early as the year 2015 the National Institute for Environmental Protection and Research (ISPRA) analysed the perceptions and

opinions of the populations of some municipalities in the province of Foggia (Troia, Faeto, Orsara di Puglia, Sant'Agata di Puglia), geographically located in the area of the Sub-Appennino Dauno in Apulia, regarding the impact of wind technology on that territory, characterised by a significant presence of installations (ISPRA, 2015). All the plants have been realised during the different phases in which the history of the diffusion of wind power is articulated in Puglia, from the first localizations in Sant'Agata (1997), Orsara and Faeto (2001), up to the spread of the last years. In recent years, the situation in the municipalities has not substantially changed, except for Faeto, where, other wind turbines have been installed, bringing the installed power to 82.9 MW. In the ISPRA research, which was carried out through interviews, three categories of STKs were classified, mapped and contacted: 1) local witnesses from 'civil society' (landowners, representatives of groups, associations, etc., common citizens interested or with specific experience); 2) local political-administrative witnesses (local administrators, political representatives); 3) experts in the field and managers/plant operators. These categories of STKs also correspond to the main actors promoting and/or protesting against the plants. As far as type 1 is concerned, the choice has fallen on representatives of territorial committees, of important associations, and on subjects mentioned in the local press or who have been reported by the witnesses previously consulted as people involved. Type 2 consists of mayors, some aldermen or former aldermen, and local political representatives in the municipalities where the facilities were developed. As for Type 3, the various industrial players who developed and promoted the implementation of the turbines were considered.

Opinions on wind power plants are generally positive as an alternative form of energy, while judgments regarding their impact on those territories are different and there is a certain contrast of thought between administrators, more compliant especially in municipalities with a high percentage of wind power, and the citizenship that shows more critical. Among the representatives of the civil population there are also differences related both to the more or less specialised knowledge of the sector and to the scope of interests of which each one is the main bearer. In general, protests arise when energy plants occupy large portions of territory, with a high impact on the landscape, better acceptance occurs instead, for example, in the case of solar when the roofs of buildings are used.

Mapping of institutions and actors that promote or protest RES community energy and selected technologies

Because the abovementioned motivations (see section above) there are no institutions and actors that promote protests against RECs.

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Balearic and Canary Islands

Technical, Geographical and Infrastructural conditions

Basic facts

One of the Spanish target regions are the Balearic Islands. The Balearic Islands are an archipelago, consisting of four islands: Mallorca, Menorca, Ibiza, and Formentera. The Balearic Islands are located to the East of Spain, in the Western Mediterranean. The following map depicts the geographical location of the Balearic Islands, which together form one of Spain's seventeen Autonomous Communities.

Figure 1. Map of the Balearic Islands.

The city of Palma in the largest Island, Mallorca, is the capital of the region.

Table 1. Basic Facts Balearic Islands

Area, in km²		**Population, number on 01.01.2020**	
Total	4,992 km2	**Total**	1,115,999
Land	4,992 km2	*Urban*	*1,002,000*
agriculture land	358km2	*Rural*	112,000
forest land	1863km2		
inland water	575km2		
Mountainous	N/a		

There is also a population density of 220/km2 and is therefore one of the more densely populated regions in Spain. The islands also host over 13 million tourists per year in 2019. The Balearic Islands are also one of the wealthiest regions in Spain, with a GDP per Capita of 24,870.

One of the Spanish target regions are the Canary Islands, which are an archipelago located in the Atlantic Ocean that forms a Spanish autonomous community with historical nationality status. It is also one of the

outermost regions of the European Union. In terms of space, it consists of eight islands, five islets, eight rocks and the sea.

Figure 2. Map of the Canary Islands.

At present, the Canary Islands is the only autonomous community in Spain that has two capitals: Santa Cruz de Tenerife and Las Palmas de Gran Canaria, since the Statute of Autonomy of the Canary Islands was created in 1982[1]. In 2019, the Canary Islands had a population of 2,153,389 inhabitants[2] and a density of 287.39 inhabitants per km^2, being the eighth most populous autonomous community. The population of the archipelago is mostly concentrated in the two capital islands: around 43% on the island of Tenerife and 40% on the island of Gran Canaria.

Ordered from west to east, the Canary Islands are El Hierro, La Palma, La Gomera, Tenerife, Gran Canaria, Fuerteventura, Lanzarote and La Graciosa, the first seven having their own administration and the last being administratively attached to the island of Lanzarote. In addition, to the north of Lanzarote are the islets of Montaña Clara, Alegranza, Roque del Este and Roque del Oeste, which, together with the island of La Graciosa, belong to the Chinijo Archipelago. To the northeast of Fuerteventura is the islet of Lobos.

Table 2. Basic Facts Canary Islands

Area, in km^2		**Population, number on 01.01.2020**	
Total	7,493 km^2 (8 islands) (2,893 sq mi)	**Total**	2,153,000
Land	7,493 km^2	*Urban*	
Agriculture land	1,300 km^2	*Rural*	
Forest land	5,000 km^2		
Inland water	N/A		
Mountainous	<50%		

[1] See Real Decreto de 30 de noviembre de 1833 in wikisource
[2] https://en.wikipedia.org/wiki/Canary_Islands

The Energy/Electricity context of the Balearic Islands

The energy situation of the Islands is Characterised by very low levels of renewable generation, high energy dependence and significant energy demand fluctuations due to mass tourism throughout the warmer seasons of the year (which are largely concentrated in the months between March and September). Naturally, the demand for energy dramatically increases during these months.

There exists a HVDC Submarine Cable connection from mainland Spain, located in Movedre near Valencia, to Santa Ponsa close to Palma de Mallorca. Subsequently, the electricity is transmitted to the other islands from the island of Mallorca. Furthermore, the Grid in the Balearic Islands is owned by Red Electrica de Espana, who is the sole transmission agent and systems operator for the Spanish Electricity System. The distribution of electric power is provided by 66Kv and 15Kv grids.

In terms of the structure of the demand for primary energy by energy vectors, the Gross energy consumption is formed by the sum of the sources, or vectors, that participate in the energy mix. In the case of the Balearic Islands they are: solid fuels (coal and Petroleum coke); liquid hydrocarbons (gasoline, diesel, fuel); natural gases, and renewable energy and waste, which are the only domestic production. The following tables and figures show the participation of each of these vectors in the evolution of the demand:

Table 3. Evolution of energy consumption in the Balearic Islands[3]

	2014	2015	2016	2017	D% 17/16
Coals and coke oil	545.204	487.392	590.574	654.387	11%
Residues	92.677	105.288	98.557	101.783	3%
Biomassa	16.089	11.470	13.395	7.697	-43%
Liquefied petroleum gases	74.035	64.156	65.462	68.581	5%
light oil	1.338.751	1.375.914	1.450.402	1.535.018	6%
heavy oil	114.489	108.898	167.970	155.201	-8%
Solar and wind energy	11.045	10.991	10.575	10.655	1%
Imported electricity	111.648	114.841	107.553	101.437	-6%
Natural Gas and Piped Gas	342.966	432.058	319.772	347.936	9%
Gross consumption	2.646.904	2.711.007	2.824.260	2.982.695	6%

Energy unit used: toe (equivalent tonne of oil: 10,000,000 kcal).

[3] http://www.caib.es/sites/energia/ca/l/taules_estadastiques_excel/2017/

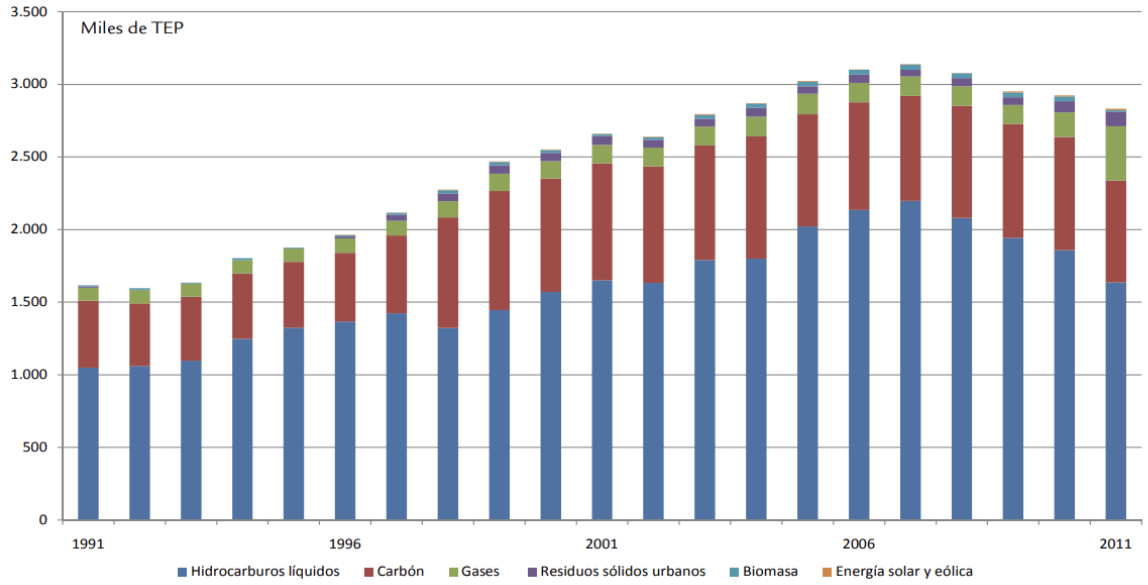

Figure 3. Structure of the demand for primary energy by energy vectors 1991-2011[4]

Figure 4. Installed Electric Power: 1 January 2019[5]

[4] http://www.caib.es/sacmicrofront/archivopub.do?ctrl=MCRST5325ZI190898&id=190898
[5] https://demanda.ree.es/visiona/baleares/baleares/total

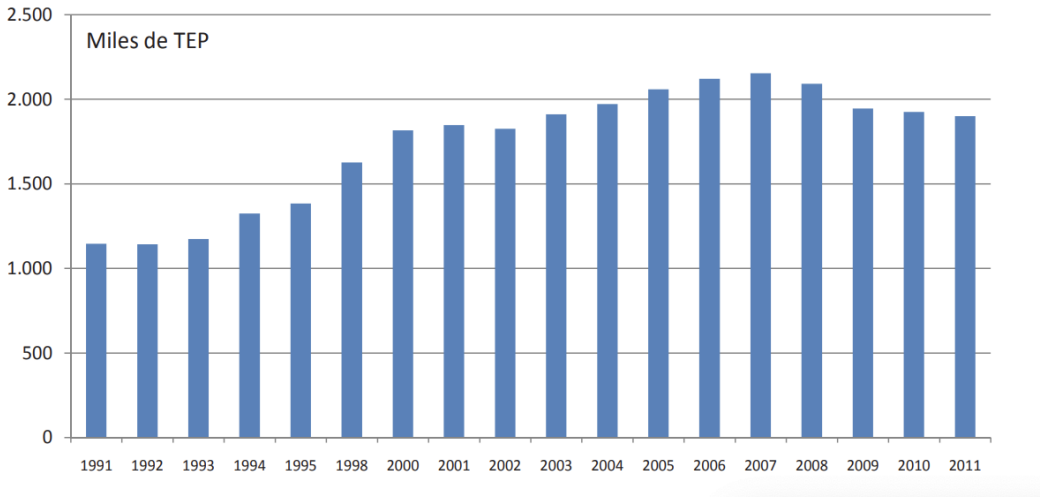

Figure 5. Evolution of final energy demand 1991-2011[6]

Figure 6. Electrical Demand Coverage: 1 January 2019[7]

It must be noted that coal has suffered major changes in 2020 have closed most of the coal power plans in the Islands, however official statistics are not yet available.

For what concerns the Renewable Energy production, the Balearic Islands current **wind energy** generation is the second lowest of region in Spain, after Extremadura. The current amount installed is 3.68 MW[8] generated by four wind turbines in the Es Milá wind park on the island of Menorca. This provides for 0.02% of the market share and total energy used in the Balearic Islands. The wind park was created in 2004, however has since not experienced any form of expansion or growth.

In terms of **Solar Photovoltaic**, the Islands also rank very low for generation compared to the rest of Spain. Nevertheless, the Balearic Islands community has started a project that is strongly committed to solar energy, where by 2022, the electricity mix will increase by 7.5%, going from 2.5% to 10% renewable energy.

[6] http://www.caib.es/sacmicrofront/archivopub.do?ctrl=MCRST5325ZI190898&id=190898
[7] https://demanda.ree.es/visiona/baleares/baleares/total
[8] https://www.aeeolica.org/en/map/baleares

A total of 55 projects of photovoltaic solar energy installations - which add up to a total power of 326 Megawatts - have been selected for execution in the 1st call of the 'Program for the promotion of photovoltaic solar energy in the Balearic Islands' (SOLBAL) managed by Institute for Energy Diversification and Saving (IDAE). The resolution of this call also boosts the generation distributed in the islands since most of the projects have a power of less than 10 MW. Additionally, to this, a second call to promote photovoltaic in the Balearic Islands was approved in late 2020, which could further boost RE penetration to close to 15%. Self-consumption has also experienced a substantial growth in recent years and is close to 20MW.

The Energy/Electricity context of the Canary Islands

There are 6 main electrical systems: Tenerife, Gran Canaria, La Gomera, El Hierro, La Palma and Lanzarote-Fuerteventura-La Graciosa (there is a 20kV cable liaising Lanzarote and Fuerteventura, there is a 6kV cable liaising La Graciosa island). The total electrical energy demand was 9.336,1 (up by 0,2% compared to 2018)[9].

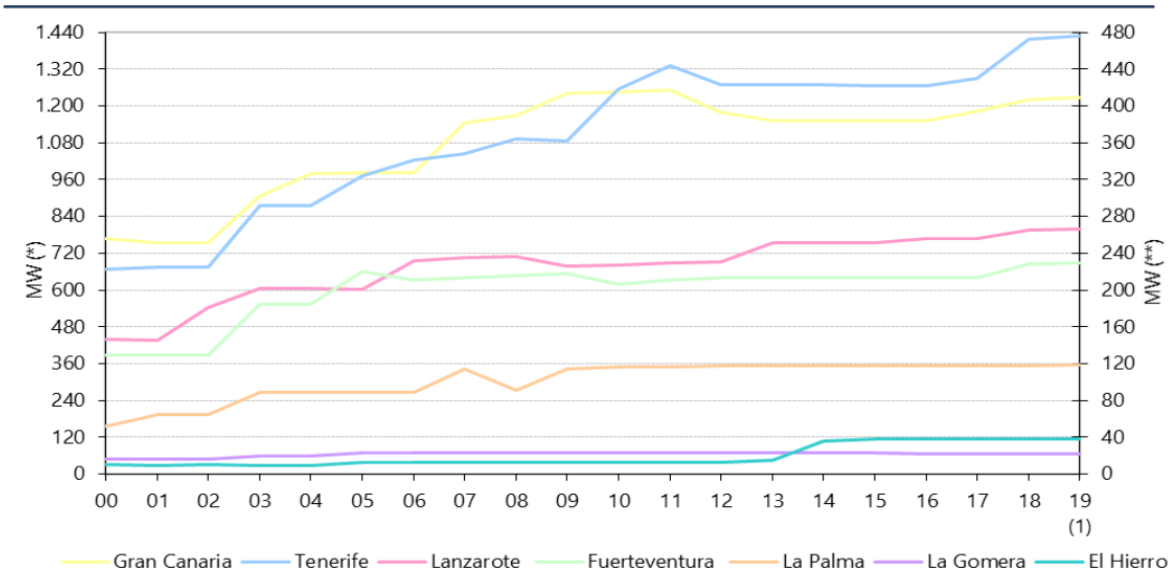

Figure 7. Evolution of installed electric power in the Canary Islands: 2019[10]

[9] Anuario del sector eléctrico-2019, edited in October 2020 by Consejería de Transición Ecológica, Lucha contra el Cambio Climático y Planificación Territorial http://www.gobiernodecanarias.org/istac/jaxi-istac/menu.do?uripub=urn:uuid:131cf873-66a9-408d-8cfa-537d6be05067

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Installed renewable energy capacity in the Canary Islands: 2019

Table 4. PV and wind - installed capacity (Canary Islands, 2019)[11]

Island	Installed power [MW]	Of which Renewables [%]	PV [MW}	Wind [MW]
Gran Canaria	1.220,6	16,1	37,1	159,3
Tenerife	1.417,2	21,6	107,6	195,7
Lanzarote & La Graciosa	264,1	12,0	7,4	22,3
Fuerteventura	227,6	17,8	11,9	28,7
La Palma	117,1	10,1	5,3	7,0
La Gomera	27,6	1,7	0,1	0,4
El Hierro	37,7	60,5	0,1	0,0

The graph below shows the comparative wind and photovoltaic production 2017 - 2020 (GWh) (Period January – August).[12]

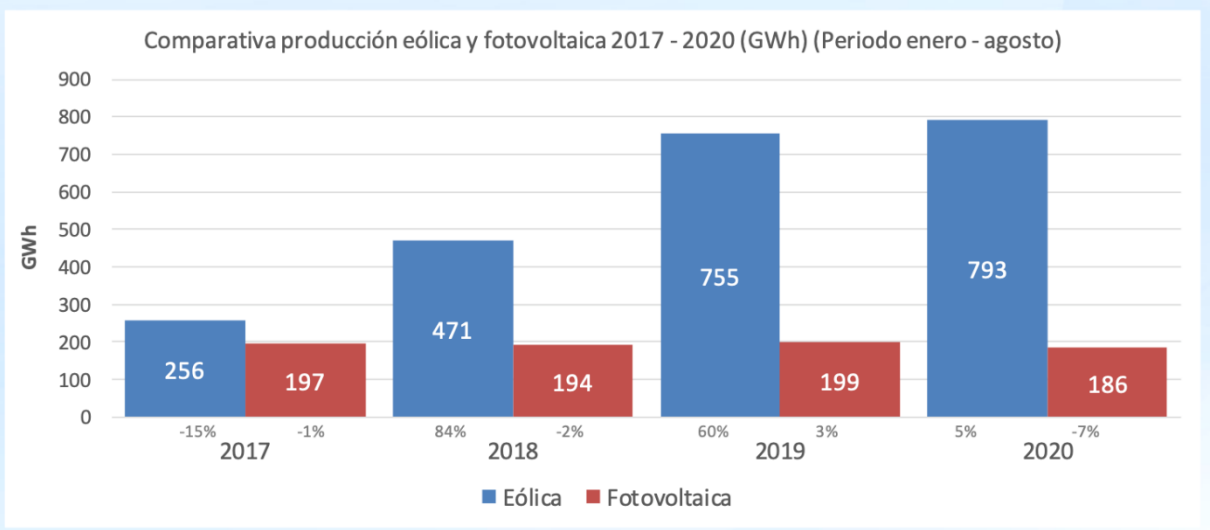

Figure 8. Comparative wind and photovoltaic production 2017-2020 (GWh) (period January-August).

[11] Anuario del sector eléctrico-2019, edited in October 2020 by Consejería de Transición Ecológica, Lucha contra el Cambio Climático y Planificación Territorial

[12] Red Electrica de Espana: Comité Técnico de Seguimiento de la Operación del Sistema Eléctrico Canario 29 de septiembre de 2020:

Table 5. Evolution of energy demand in Canary Islands: 1995-2019[13]

Año	Centrales térmicas		Refinería y cogeneración		Renovables		Total	
	GWh	Δ (%)	GWh	Δ (%)	GWh	Δ (%)	GWh	Δ (%)
1995	4.356,1		614,6		64,7		**5.035,4**	
1996	4.574,6	5,0%	628,8	2,3%	73,1	13,0%	**5.276,5**	4,8%
1997	4.942,3	8,0%	631,1	0,4%	78,9	7,9%	**5.652,3**	7,1%
1998	5.260,9	6,4%	633,8	0,4%	118,3	49,9%	**6.013,0**	6,4%
1999	5.569,2	5,9%	632,2	-0,3%	225,2	90,4%	**6.426,6**	6,9%
2000	6.107,8	9,7%	528,9	-16,3%	244,6	8,6%	**6.881,3**	7,1%
2001	6.516,2	6,7%	485,6	-8,2%	342,8	40,1%	**7.344,6**	6,7%
2002	6.829,7	4,8%	493,2	1,6%	360,8	5,3%	**7.683,7**	4,6%
2003	7.470,9	9,4%	407,4	-17,4%	357,0	-1,1%	**8.235,3**	7,2%
2004	8.040,1	7,6%	384,4	-5,6%	340,0	-4,8%	**8.764,5**	6,4%
2005	8.444,7	5,0%	320,1	-16,7%	332,3	-2,3%	**9.097,1**	3,8%
2006	8.885,9	5,2%	273,1	-14,7%	333,7	0,4%	**9.492,7**	4,3%
2007	9.123,9	2,7%	260,3	-4,7%	395,6	18,5%	**9.779,8**	3,0%
2008	9.170,5	0,5%	276,1	6,1%	665,8	68,3%	**10.112,4**	3,4%
2009	8.789,7	-4,2%	302,5	9,6%	533,6	-19,9%	**9.625,8**	-4,8%
2010	8.694,9	-1,1%	183,9	-39,2%	534,6	0,2%	**9.413,4**	-2,2%
2011	8.642,1	-0,6%	129,5	-29,6%	596,5	11,6%	**9.368,1**	-0,5%
2012	8.578,0	-0,7%	195,4	50,9%	625,9	4,9%	**9.399,3**	0,3%
2013	8.320,5	-3,0%	99,4	-49,1%	658,8	5,3%	**9.078,7**	-3,4%
2014 (1)	8.295,5	-0,3%	34,1	-65,6%	681,2	3,4%	**9.010,9**	-0,7%
2015 (1)	8.410,6	1,4%	4,8	-85,9%	698,7	2,6%	**9.114,2**	1,1%
2016 (1)	8.517,4	1,3%	0,9	-81,8%	717,1	2,6%	**9.235,3**	1,3%
2017 (1)	8.690,8	2,0%	0,003	-99,7%	739,7	3,1%	**9.430,5**	2,1%
2018 (1)	8.352,9	-3,9%	0,26	9587,6%	960,7	29,9%	**9.313,8**	-1,2%
2019 (1)	7.855,5	-6,0%	0,0	-100,0%	1.480,6	54,1%	**9.336,1**	0,2%

Infrastructure and Accessibility of the Balearic Islands

The regions are very well accessible by both air and maritime routes. There are over 100 daily maritime transport journeys between Mallorca (the main island) connecting both to the Islands as well as to the mainland. The Islands are also very well connected to both the mainland and the rest of Europe by air. Each of the islands (except for Formentera) have a thriving airport with national and international connection, although Mallorca is by far the largest recipient of tourists. In 2019, 13.5 million air travel passengers travelled to Mallorca, 3.7 to Ibiza and 1.6 million in Menorca. In total, including domestic travel, the Airports sent and received 29 million travellers in 2019.

[13] Anuario del sector eléctrico-2019, edited in October 2020 by Consejería de Transición Ecológica, Lucha contra el Cambio Climático y Planificación Territorial http://www.gobiernodecanarias.org/istac/jaxi-istac/menu.do?uripub=urn:uuid:131cf873-66a9-408d-8cfa-537d6be05067

Infrastructure and Accessibility of the Canary Islands

All the islands are communicated with good airplane and maritime connections, given the remote nature of the islands.

In terms of air transport, the two largest islands (Tenerife and Gran Canaria) in particular have excellent air connections with both the Spanish peninsula and the rest of Europe. For example, Gran Canaria Airport received 13,200,000 passengers in 2019.[14] and Tenerife even has two major airports in the north and the south. As for the smaller islands, although these are also having some connections with the mainland and Europe, most flights departing from these islands go through the major two islands.

In terms of maritime transport, the Canary Islands are not as well connected as the Balearic Islands due the significantly greater distance between this archipelago to the mainland (over 1,600km). The vast majority of this transport is cargo and goods, rather than passenger travel.

Restrictions on Land Use in the Balearic Islands

In the Balearic Islands, there are a total of 10 protected areas/parks.[15] whereby the development of RES are prohibited. Protected natural areas are the land and marine areas of the Balearic Islands declared as such in the manner provided for in Law 5/2005, of May 26, for the conservation of areas of environmental relevance (LECO), taking into account their representativeness, singularity, fragility or interest of its elements or natural systems. These are shown in the map below:

[14] https://en.wikipedia.org/wiki/Gran_Canaria_Airport#cite_note-2
[15] https://www.caib.es/sites/espaisnaturalsprotegits/es/definicion_y_figuras-21475/

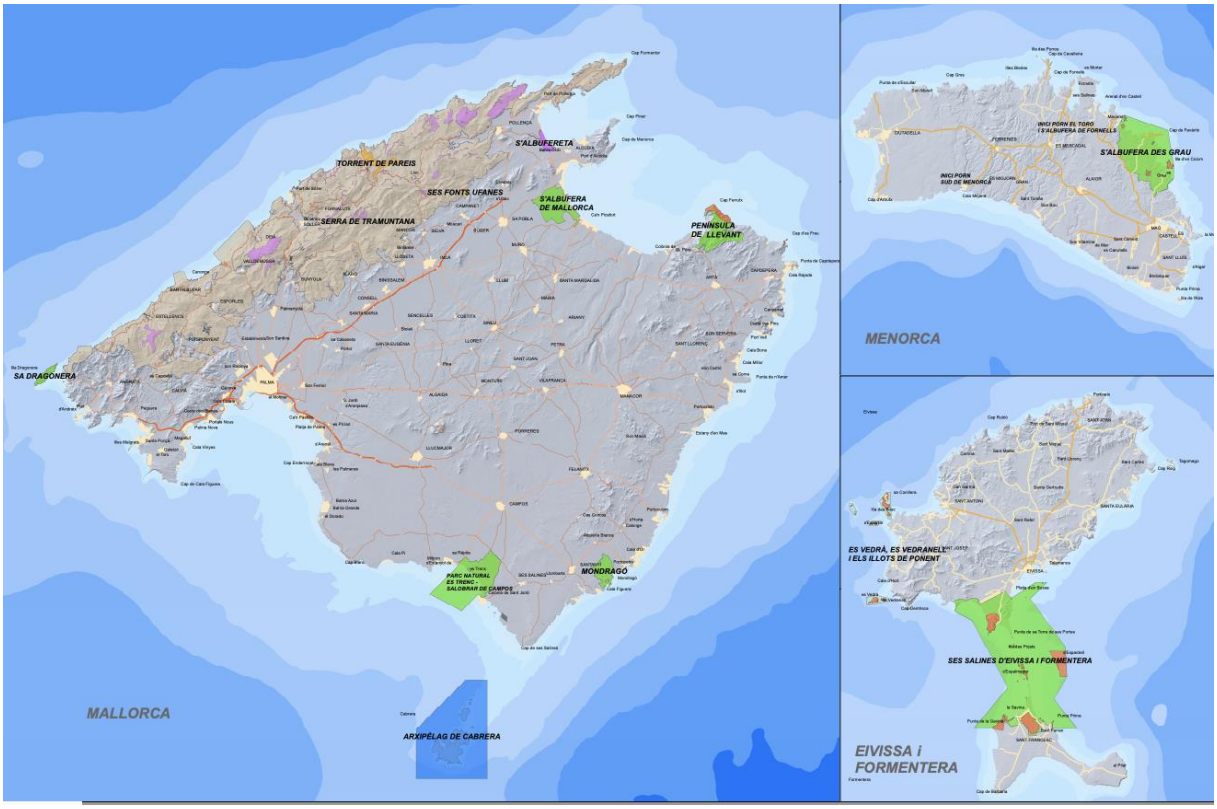

Figure 9. Map of the Balearic Islands showing restrictions on land use

In addition to protected areas, there's specific spatial planning for energy that sets out the areas where RES are permitted and which aren't. The decree is called 'Plan Director Sectorial Energético' and was approved in 2015.

Restrictions on Land Use in the Canary Islands

The planning system in the Canary Islands tends to be one of the main obstacles to the implementation of renewable energy generation facilities in the territory. Specifically, so that the renewable penetration objectives established in the PNIEC can be met, it is essential that the use, at least partially, of agricultural land is enabled since it is usually more suitable from a technical point of view for the implementation of these installations.

Specifically, the key provision here is that, in Article 62 on complementary uses, activities and constructions, it is sated that in the case of the production of renewable energies, to the maximum usable surface. The surface of the greenhouse crop will not be counted, nor that occupied by other buildings or renewable energy facilities installed on them, and where appropriate. It may not exceed 15% of the area actually exploited, nor 10% of the area of agricultural exploitation.

Legal and Policy Framework and Institutions

Policy Targets for RES development and RES community energy

European level measures

National Integrated Energy and Climate Plan (PNIEC)

The Spanish 'Integrated National Energy and Climate Plan 2021-2030' (NECP) contains the main priorities of the climate and energy policy for the next 10 years. The specific measures relating to the establishment and promotion of energy communities in the NECP are the following:

Measure 1.13. Local energy communities

- The appropriate legislative framework will be developed to define these legal entities and to promote their development, in particular to comply with Article 22 of Directive 2018/2001 and Article 16 of Directive 2019/944.
- The development of the legislative framework must take into account the roles and cases of existing actors or groups that could set themselves up as local energy communities, such as cooperatives, industrial parks, technology parks, residents' associations or port areas.
- Elimination of barriers by establishing a one-stop shop that makes it possible to guide the applicant, acting as a facilitator of administrative procedures, as well as promoting the simplification of procedures in processes linked to local energy community projects.
- Promotion of demonstration projects of local energy communities that cover the widest possible range of cases, identifying and enabling viable business models for the different types of projects, enabling them to be developed on a large scale.
- Training and capacity-building programmes for local energy communities to enable them to obtain the human and technical resources required to identify, process, execute and manage the projects, as well as to mobilise the necessary investments.
- Analysis of the creation within the IDAE of an office to promote and support local energy communities that, among other mechanisms, will design and implement specific lines of guarantees and/or financing; provide technical assistance; promote the joint acquisition of equipment and services; and identify and disseminate best practice.

Measure 1.6. Framework for the development of thermal renewable energies - network promotion

- Development of renewable energy communities linked to climate control networks, including technical training at the municipal level.

Measure 1.13 Revision and simplification of administrative procedures

- The legislative barriers or gaps that hinder the participation of local energy communities in the system must be reviewed.

Measure 1.2. Demand management, storage and flexibility

- Promote citizen participation in demand management.

Measure 1.4. Development of self-consumption with renewables and distributed generation

- Declaring that collective consumption is starting point for local energy communities.

Measure 1.14. Promotion of the proactive role of citizens in decarbonization

- With goals as empower citizenship, to promote their participation in energy transition or promote the mobilization of funds available by citizens to help finance renewable energy transition or to manage their own energy

Measure 1.19. Generation of knowledge, dissemination and awareness

- To promote the proactive participation of all actors in the energy transition.

Measure 2.15. Communication and information on energy efficiency

- Measures to promote communication and information dissemination to transform the energy consumption habits.

Measure 4.4 Integration of the electricity market

- It is necessary to move forward with a favourable framework for adequate access to consumption data by consumers, such as the promotion of own consumption and local energy communities

Measure 5.8. Social innovation for the climate

- One of the objectives remains to support innovation in social and urban projects.

National level measures

Royal Decree 244/2019, of April 5, which regulates the administrative, technical and economic conditions of the self-consumption of electrical energy.

- Enables several consumers within the same community (residents' association, a neighbourhood, an industrial park, etc.) to benefit collectively from the same nearby generation facilities, located within the community, which means that they can take advantage of the generation capacity and, therefore, of the investment.

Royal Decree 23/2020, of June 23, which approves measures in the field of energy and in other areas for economic reactivation, by modifying several articles of Law 24/2013, of December 26, of the Electricity Sector.

- In its Article 4: renewable energy communities are defined as "The renewable energy communities, which are legal entities based on open and voluntary participation, autonomous and effectively controlled by partners or members who are located in the vicinity of the renewable energy projects that are owned by said legal entities and that these have developed, whose partners or members are individuals, SMEs or local authorities, including municipalities and whose primary purpose is to provide environmental, economic or social benefits to their partners or members or to the local areas where they operate, rather than financial gains'.

Long-Term Decarbonization Strategy (ELP) 2050

- Chapter 7.1. Explaining the 'The role of citizenship: This reflects the importance of having the involvement of society to promote a stable transformation of energy system and the economy.

This transformation will lead to a climate-neutral Spain by 2050, positioned citizenship in the centre of the energy system.

- It is necessary to regulate the pan-European electricity system, interconnected, with mutual influence and with a common internal market between the Member States and, at the same time, allow the development of markets at very small scale of local communities and self-consumption with the possibility of storage and provision of services to system in local markets, ensuring supply at all times at efficient prices.
- Additionally, the renewable energy communities have a broad meaning in agricultural sectors, using renewable resources indigenous both for the production of renewable electricity and renewable fuels.

Recovery Plan, Transformation and Resilience 2020

- Under policy lever 1, "Urban and rural agenda and fight against depopulation", line of action 2, "Plan for the rehabilitation of housing and urban regeneration", includes an energy transition plan for targeted for Spain. This aims which aims to promote RECs the rehabilitation and regeneration and support for sustainable and affordable energy in municipalities <5,000 inhabitants, as a lever for generating employment and attracting activity.

Working document 'Guide for the development of instruments to promote local energy communities' (IDAE, 2019)

- The objective of the IDAE in making this guide was to design instruments that stimulate the energy market at the urban level, through a more active participation of citizens and local companies that contribute to the energy transition process.

Aid for the investment of renewables thermal and electrical FEDER

- Local Energy Communities are considered as beneficiaries.

Public consultation on energy communities (Nov-Dec 2020)

- Purpose is to collect, directly or through its representative organisations, the view of the collectives and stakeholders, administrations and potentially actors involved the development of Local Energy Communities, on the approach to the transposition of European guidelines to the Spanish legal system through a specific Regulation by the identification of priorities and key challenges, as well as potential measures to overcome them.

Regional level measures in the Balearic Islands

Balearic Law 10/2019, of February 22, on climate change and energy transition

The overall objective of this law is to ensure that the Balearic Islands to source all of its energy from renewables by 2050.

This Law has an ambitious content in the fight against climate change and sets the path to make the transition of the Balearic Islands towards clean energy effective. The measures and objectives determined

by the Law have been designed in the medium and long term and achieving them requires public and private efforts, as well as the involvement of the entire society. The model change promoted by the application of this Law entails the assumption of the measures require public, business, social and private spheres to be involved, so that it is effectively possible to achieve the objectives. It has also led to the creation of the IBE – the Balearic Energy Agency, which is the operative agency in charge of putting in place of these measures.

Article 49 Local participation in renewable generation facilities

1. The public administrations of the Balearic Islands will encourage local participation in renewable energy installations and promote empowering citizens, local renewable energy communities and other civil society entities to promote their participation in the development and management of renewable energy systems

   6. compulsory for projects above 5MW to open themselves to investment from neighbours

7. The Government of the Balearic Islands will create a land exchange where their owners can make them available for the development of renewable energy projects. The regulatory development of this law will regulate its criteria and requirements.

Regional level measures in the Canary Islands

Draft Canary law: Law on Climate Change and Energy Transition

This law is in the process of being approved. A public consultation has been held where proposals from all sectors of the Canary Islands. In general, the text supposes that, above all, a true process of education, training and awareness to the entire population about the truth of the ecological crisis and the need to move towards a new lifestyle, as well as towards forms of production and consumption responsible. The draft law includes:

Article 44. Self-consumption of electrical energy.

1. The public administrations of the Canary Islands will promote the self-consumption of electrical energy through renewable energy sources, in all their individual and collective modalities, such as communities energetic.

2. With the aim of increasing the implementation of self-consumption facilities, the Administration Public of the Autonomous Community of the Canary Islands will collaborate with the subjects of the electricity sector for their promotion and development.

3. The owners of generation facilities in any of the modes of self-consumption of electrical energy will provide information on its facilities and on the production of its facilities.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

Table 6. Legal gap analysis to identify gaps in the transposition of RED II concerning legal and enabling frameworks for RECs (traffic-light system)

	+	+/-	-	Comments
Is there a legal definition of RECs?				
Is the definition of RECs in compliance with RED II?				Royal Decree 23/2020, of June 23
Are final customers, in particular household customers, entitled to participate in a REC?				Not yet, but in principle yes (see the guide IDAE[16])
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				Not yet, but in principle yes (see the guide IDAE[17])
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				The national government has done this to a limited extent, this has not yet been done at the regional level
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				In principle the enabling framework has been politically agreed upon but there is still no concrete legislation at the national or regional level to enable and drive the establishment of RECs
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				No action has taken place yet in this regard

Mapping Relevant Institutions with jurisdiction on RES community energy

At the **central state/national level,** the Spanish Ministry for Ecological and Demographical Challenge Transition is in charge of proposing and executing government policies in relation to energy. Among other functions, it is responsible for adopting the necessary measures to secure the supply of electricity and the economic and financial sustainability of the electric system. The establishment of the National Energy Plan and of an economic regime for those facilities entitled to regulated remuneration is also part of its functions.

Additionally, the Institute for Diversification and Saving of Energy (IDAE) is the operative agency of the Ministry of the Ecological Transition. Its main aim is to contribute to achieving the objectives of Spain in improving energy efficiency, renewable energy and other low carbon technologies.

[16]https://www.idae.es/sites/default/files/documentos/publicaciones_idae/guia_para-desarrollo-instrumentos-fomento_comunidades_energeticas_locales_20032019_0.pdf
[17]https://www.idae.es/sites/default/files/documentos/publicaciones_idae/guia_para-desarrollo-instrumentos-fomento_comunidades_energeticas_locales_20032019_0.pdf

Broadly speaking, the autonomous communities are in charge of developing basic regional-level legislation. They also grant the necessary authorizations when the electric infrastructure solely affects their territory unless such authorizations are expressly reserved for the Ministry of Ecological Transition.

Within the Balearic region, there is a Directorate General (DG) of Energy and Climate Change, which is the most competent institution in this regard. More specifically, in this DG, the Department of Energy Efficiency and Renewable Energies is focus competent body when it comes to topics relating to renewable energy communities in the region. The Balearic Energy Agency (IBE) provides technical and infrastructure driving force for energy in islands.

Within the Canary region, there is a Directorate General of Energy and, which is the most competent institution with this regard. More specifically, in this Directorate General, the Department of Energy Efficiency and Renewable Energies is focus on topics relating to renewable energy communities. On top of this, the Canarias Energy Agency also provides technical and infrastructure support to the activities of this DG.

In addition to the regional level, **every island in both the Balearic and Canary Islands** has its own island council that is in charge of spatial planning and is the one in charge of approving projects above 20ha, as well as defining the priority areas to develop RE.

At the **municipal level**, town councils are in charge of granting the necessary works and activity licenses for the installation of the facilities. Environmental and town planning regulations (which are mainly developed at autonomous community and town council levels) also have to be taken into consideration when developing a renewable energy project.

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

No legislation yet at the national level

Decree 33/2015 for the definitive approval of the modification of the Energy Sectorial Director Plan of the Islands Balearics.

- The new planning establishes the renewable energy installation standards based on their characteristics so that each installation is developed without affecting the territory and landscape.
- It includes a normative map of territorial suitability to host renewable energy installations that delimits exclusion zones and zones of low, medium or high suitability, depending on the existing environmental limitations.
- The ultimate objective of this new planning is to increase the production of electrical energy from renewable sources in the Balearic Islands to meet the regional, state and European forecasts in terms of renewable energy and the reduction of CO_2 emissions and thus contribute to the mitigation of the climate change.

No legislation yet at the regional level in the Canary Islands.

Licensing and other Regulatory Requirements for RES community energy

National level measures

Generally speaking, the environmental impact assessment (EIA) of the projects is a part of the administrative licensing process and is necessary in order to get the administrative license necessary to build the RES installations. EIAs are part of the permitting process when the project is released for public hearing. The administrative license is normally processed once the access and connection permits are obtained. In practice, the EIA process takes at least six or seven months.

Regional level measures of the Balearic Islands

Balearic Law 10/2019, of February 22, on climate change and energy transition

Article 50 - Establishment of surface rights

Regional public administrations may constitute a surface right on assets of their ownership in favour of cooperatives energy companies or renewable energy communities legally constituted for the development of energy generation projects renewables or energy storage (Note that this has not yet happened/been applied in practice).

The surface right for this purpose can only be granted through a public tender reserved for this type of entity, and will have to necessarily establish in the bases:

a) The exact determination of the goods on which the surface right is constituted.

b) The maximum duration of the concession and, where appropriate, the appropriate extensions, up to the maximum provided in the regulations of
c) applicable public heritage.
d) The annual fee to be paid or the collaboration mechanism for the use of the generated energy, if applicable.
e) The minimum capacity of renewable generation or storage to be installed and its basic characteristics.
f) The maximum period of start-up of these facilities.
g) The collaboration and control mechanisms to be exercised by the granting public administration.
h) The way in which the reversion will be executed in favor of the granting public administration once the concession period has expired or
i) resolved this.

Regional level measures of the Canary Islands

Draft Canary law: Law on Climate Change and Energy Transition

This law is in the process of being approved. A public consultation has been held where proposals from all sectors of the Canary Islands. In general, the text supposes that, above all, a true process of education, training and awareness to the entire population about the truth of the ecological crisis and the need to move towards a new lifestyle, as well as towards forms of production and consumption responsible. The draft law includes:

Article 44. Self-consumption of electrical energy.

1. The public administrations of the Canary Islands will promote the self-consumption of electrical energy through renewable energy sources, in all their individual and collective modalities, such as communities energetic.
2. With the aim of increasing the implementation of self-consumption facilities, the Administration Public of the Autonomous Community of the Canary Islands will collaborate with the subjects of the electricity sector for their promotion and development.
3. The owners of generation facilities in any of the modes of self-consumption of electrical energy will provide information on its facilities and on the production of its facilities.

Incentive Schemes for RES community energy

On the national level, renewable energy incentives are established at the central state level (economic incentives, priority of access, and priority of dispatch). In Spain, the Ministry for Ecological Transition is the body with exclusive competence to determine the economic regime for those facilities entitled to regulated remuneration, such as renewable energies installations.

Under the Spanish incentive scheme, which is regulated by the Royal Decree-Law 413/2014, renewable power generators: (a) sell the electricity they generate into the Spanish wholesale market and receive market price for such sales; and (b) receive additional regulated payments during their respective regulatory lives (e.g., 20 years for wind farms and 30 years for solar photovoltaic facilities, starting on the commissioning operation date).

Renewable energy generators receive the regulated payments for the (i) investment and (ii) operation – in addition to the market price: (i) Remuneration for the investment is intended to compensate for investment costs in renewable installed capacity that cannot be recovered through the market price. This remuneration is based on the investment costs that an efficient and well-managed company cannot recover from the market (based on technology-dependent standards). The set of standard parameters includes a standard value of initial investment. (ii) Remuneration for the operation is intended to compensate for the difference between operating costs and operating income. This is also determined by reference to technology-dependent standards, including a standard value of operating costs.

The present system adopted to implement RES is based on an auction procedure. The results and main conditions of auctions from previous years are publicly stated (although note that projects in the Baleares are not included until 2019). In December 2019, a public auction was held for RES in the Balearic Islands. 55 photovoltaic energy projects with a total power of 326 MW were agreed in the first renewable energy auction in the Balearic Islands. 46 selected projects with a total capacity of 206 MW will be built in Mallorca, while Menorca will host six projects, or 61.8 MW of capacity in total. The smaller islands of Ibiza and Formentera will have 6.2 MW and 1.93 MW respectively from three projects in total.

On the regional level in the Balearic Islands[18], the Balearic Islands presents the following subsidies for solar panels:

- IBI (Real Estate Tax) discounts
- ICIO bonuses (Tax on Constructions, Installations and Works)
- Regional aid
- IRPF (Personal income Tax) reduction

Subsidies are a factor that influences the profitability of photovoltaic installations. Depending on the aid offered by each municipality, the amortization time of the investment made will be longer or shorter. These subsidies for the installation of solar panels in the Balearic Islands are, primarily, IBI and ICIO bonuses. Although, it is also worth highlighting the regional aid.

[18] https://www.otovo.es/blog/autoconsumo/energia-placas-solares-autoconsumo-baleares/

Furthermore, the Balearic City Council, with a 50% co-financing together with the 2014-2020 ERDF Operational Plan, promotes aid for the installation of 3 kWp peak power solar panels. This has the aim of promoting self-consumption, both for individuals and communities of owners. The last call for aid established by the Balearic government presented a maximum of 50% bonus for photovoltaic installations, the maximum allowed being € 1.80 / Wp. The expected call for the 2021 grants is about to go out and the conditions are to be confirmed.

On the regional level in the Canary Islands, there are several municipal schemes concerning dicounts in real estate tax for households with PV or thermal panels (Bonificación del IBI). These exist in all islands except in La Palma and El Hierro. This is regulated by the Canarian ORDER 4170 of October 30, 2020, which approves the regulatory bases that must govern the calls for granting subsidies for self-consumption installations of renewable energy in the residential sector. According to Article 7, the amount of the subsidy will be: a) Solar thermal: 700 euros for individual installations with natural circulation and 400 euros per useful m for installations with forced circulation, up to 700 euros per powered house. b) Isolated photovoltaic solar, at 4 euros per watt of nominal power, up to a maximum of 10,000 euros per home. c) Solar photovoltaic for self-consumption connected to the grid, at 0.75 euros per watt of nominal power, up to a maximum of 2,250 euros per home. In the case of the installation of batteries, the subsidy will be increased to 1.5 euros watt of nominal power, up to a maximum of 4,500 euros. In collective self-consumption, these limits will be assigned for each dwelling, according to the investment actually made by the beneficiary in the generating installation, with respect to the total installed power.

Social Conditions

Ownership structures and state of the art of community energy development

At the moment in Spain, no current ownership structures are clearly established for energy communities. However, the Spanish Agency for Diversification and Energy Saving has developed a guide which presents various different structures based on experienced from across Europe and these present options for the pursuit of energy communities in Spain[19].

Social Acceptance of RES community energy and selected technologies in the Balearic Islands

Concerning energy communities specifically, there has been no research on the social acceptance of these. Nevertheless, there has some research on the acceptance of the RES technologies in the Balearic Islands by the Environmental Technologies Park of Mallorca in 2017.[20]

[19] https://www.idae.es/sites/default/files/documentos/publicaciones_idae/guia_para-desarrollo-instrumentos-fomento_comunidades_energeticas_locales_20032019_0.pdf
[20] http://www.tirme.com/ct/upload/424pdf_file12_09_34.pdf

In terms of **wind energy,** perhaps one of the most significant reasons and obstacles for the lack of development of wind energy, is due to the fact that there are exists no specific wind energy or renewable energy associations in the islands. This significantly contributes to the lack of information and promotion of wind energy in the islands. Despite this, the study reveals that the local populations in the region are largely in favour of wind energy and concerned with the lack of its existence in the Islands. More specifically, the general wind energy acceptance in the in the Islands is 71% (2017). Furthermore, in the individual islands, Menorca has the highest acceptance with 72%, followed by Ibiza 69%, Mallorca 66% and Formentera 62%.

In terms of **solar photovoltaic,** the survey above also found that that overall, 86% were in favour of this type of energy in 2017. This figure is highest in the Islands of Palma (87%) and Menorca (87%) and is lowest in Formentera (80%). Thus, strongly demonstrating that there is a very high social acceptance of solar PV in the region.

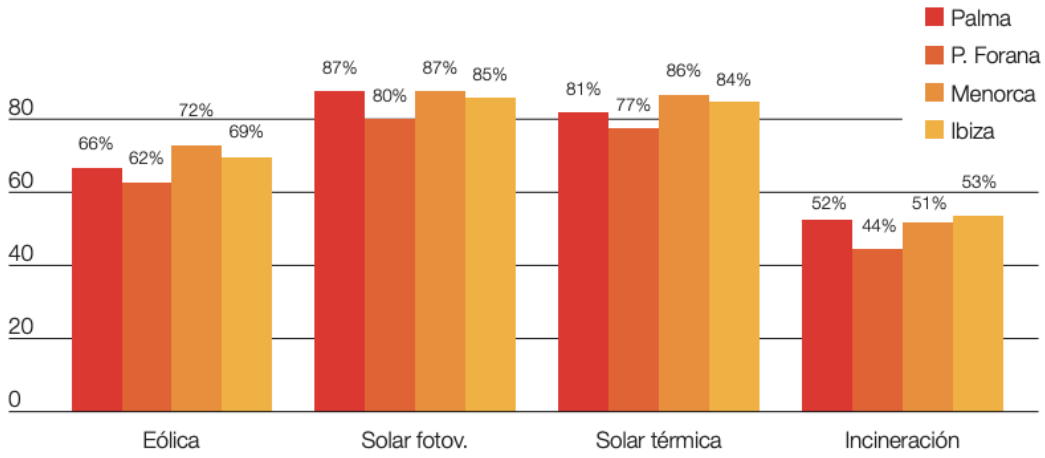

Figure 10. Social acceptance of RES technologies in the Balearic Islands

Social Acceptance of RES community energy and selected technologies in the Canary Islands

Concerning energy communities specifically, there has been no precise research on the social acceptance of these in the Canary Islands. Furthermore, there has not been any specific research on the social acceptance of solar PV facilities in the islands. Nevertheless, there has been some research on the acceptance of RES technologies in the Canary Islands. For example, during the H2020 WinWind project[21], it was demonstrated in case study on Gran Canaria, that wind energy has very high social acceptance (something that stakeholders believed to be true across many of the islands), as it is become a source of energy for intensive activities such as agriculture, in a region where there are scarce economic and financial resources.

[21] https://winwind-project.eu/fileadmin/user_upload/Resources/Deliverables/Del_4.3.pdf

Institutions and actors that promote or protest RES community energy and selected technologies in Balearic and Canary Islands

BALEARIC ISLANDS ENERGY INSTITUTE
These are the regional energy agency and thereby the operative and technical arm of the DG Energy/Climate in the Balearic autonomous community. They are very much in favour of RES and REC.

CANARIAS TECHNOLOGICAL AND RENEWABLE ENERGY INSTITUTE

This is research centre that since 1990 has been carrying out its work in the fields of research and development of technologies for the use of energy sources renewables, implementation of new technologies and the environment. They are based in Tenerife, play a big role in shaping public policy in the region on renewables, and are in favour of REC.

DIRECTORATE GENERAL FOR ENERGY AND CLIMATE CHANGE - BALEARIC ISLANDS
In Balearic Islands, this is the regional ministry for energy and climate change of the autonomous community. It has a strong degree of competences and is in favour of RES and REC.

DIRECTORATE GENERAL ENERGY – CANARY ISLANDS

In Canary Islands, this is the regional ministry for energy and climate change of the autonomous community. It has a strong degree of competences and is in favour of RES and REC.

INSTITUTE FOR ENERGY DIVERSIFICATION AND SAVING - MINISTRY FOR ECOLOGICAL TRANSITION SPAIN
The Institute for Diversification and Saving of Energy (IDAE) is an agency of the Ministry of Industry, Energy and Tourism through the Ministry of Energy and contributes to achieving the Spanish objectives improving energy efficiency, renewable energy and other low carbon technologies is the strategic framework of its activity. IDAE is practically much responsible for designing the technical elements of legislation concerning RES and REC. They are very much in favour of REC and are proactively and extensively seeking to promote REC.

SPANISH PHOTOVOLTAIC INDUSTRY ASSOCIATION
They represent the interests of market and industry actors in the PV sector, have a significant amount of influence in both the private and public (i.e. regional and national) policy. They are in favour of RES and strongly in favour of REC.

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Latvia

Technical, Geographical and Infrastructural conditions

Basic facts

Table 1. Basic Facts Latvia

Area, in km^2		**Population, number on 01.01.2020**	
Total	64 589	**Total**	1 907 675
Land		Urban	1 306 115 (68.5%)
agriculture land	22 999	Rural	601 560 (31.5%)
forest land	30 938	**Population density, inhabitants per km2**	
inland water	2669	Total	29.5
peat land	2 158	Only rural	9.3

From July 2021 the new administrative territorial division will come into force and the number of local municipalities will be decreased down to 42 ones (from currently existing 119) – 7 cities and 35 counties. There are five planning regions (PR) in Latvia – Kurzeme PR, Latgale PR, Riga PR, Vidzeme PR and Zemgale PR. The planning regions are not the regional governments but fulfils the regional planning function and promotes regional development.

Latvia is situated on the edge of the Eastern European Plain near the Baltic Sea. Latvia is a typical lowland country, and its terrain is characterised by flat, low areas and hilly elevations. There are more than 3 000 lakes and 12 000 rivers in Latvia. Latvia has a mild and humid **climate.** In general, Latvia is characterised by high cyclonic activity. Over the 1981-2010 climate normal period, the **annual average air temperature** is from +5.2 till +5.3ºC in Alūksne and Vidzeme Uplands to +7.3 till 7.4ºC in the coastal territories of the Baltic Sea. Air temperature has a seasonal nature – February being the coldest month with average air temperature -3.7ºC and July being the warmest with +17.4ºC. The average annual value of **precipitation** sum in the period of climatic norm (1981-2010) is 709 mm. The highest monthly precipitation (> 80 mm per month) is typical for the summer period.

The average annual total amount of **solar radiation** is 3500-4000 MJ/m2, of which 600-650 MJ/m2 the Earth's surface receives in June and about 30 MJ/m2 in December. About 52% of the total solar radiation is direct radiation and 48% is diffuse radiation. The average annual **wind speed** is about 5 m/s on the Baltic Sea coast, while in the continental part of the country it is about 3-4 m/s. The spread of wind speed in the

territory of Latvia is characterised by a pronounced seasonality. The highest average wind speeds are recorded in November and January (4-6 m/s in the coastal area, and 3 m/s inland).

The Energy/Electricity Context

The main primary energy resources are biomass (local) and natural gas and oil products (both imported). The total primary energy consumption during last decade is rather stable. At the same time important shifts in consumed resources has occurred. Compared to 2010, it has increased primary consumption of solid biomass (per 37%) as well as biogas (the dominating number of biogas plants have been installed in agriculture sector).

Solid biomass is the most important local energy source. The forests cover more than 50% of Latvia's territory. Latvia is wood fuel exporter (e.g., in 2019 wood fuel production in Latvia has constituted 102 PJ, net export 39 PJ).

Biogas is also considered as the relevant local resource. Latvia's National Energy and Climate Plan 2030 (hereinafter - NECP2030, 2020) envisages to promote biogas upgrade up to biomethane quality and its consumption in transport or injection in natural gas supply network (if technically applicable).
However, although ***peat*** is an important local resource in Latvia, its consumption in the energy sector is negligible - currently peat is extracted for horticulture purposes and mainly exported. At the same time exhausted peat extraction sites could be considered as the area for wind park siting – the first such project of total 90 MW capacity is planned (currently EIA procedure is on-going) by the *Latflora Ltd.* at Kaigu bog.
Primary consumption of ***natural gas*** shows decline trend (per ~ 25% compared to 2010). In its turn, as ***oil products*** are dominantly consumed in transportation sector, no significant change has been observed in their consumption.

Regarding end-use sectors, the important trend is decrease of energy consumption in households which in a great extent is caused by the implementation of energy efficiency measures. In 2019, compared to 2010, the consumption in household sector has decreased per around 15%, both total consumption and electricity consumption.

Table 2. Primary and Final Energy Consumption (by sectors), PJ. Electricity Consumption, GWh

Primary Energy Consumption		Final Energy Consumption		Electricity consumption	
	2019		**2019**		**2019**
Solid biomass	62.2	Transport	54.1	Transport	116
Biogas	3.4	*road*	*45.2*		
Liquid biomass	1.6	*rail*	*2.2*		
RES Electricity (wind, hydro, solar)	8.1	*international air*	*6.6*		
		others	*0.2*		
Peat (local)	0.07	Households	49.7	Households	1649
Electricity (import)	4	Commercial and public services	23.8	Commercial and public services	2848
Natural gas	46.3	Industry (inc.Construction)	38.3	Industry (inc.Construction)	1846
Oil product	66.6	Agriculture, forestry, fishery	8.8	Agriculture, forestry, fishery	191
Coal and coke	1.6				
Other	2.7				
TOTAL	**196.7**		**174.7**		**6652**

Data source: Central Statistical Bureau of Latvia. The presented data includes also the non-energy use.

The Electricity Context

The RES electricity capacity during the last decade has increased per ~ 13% (Table 3). The most increase is in solid biomass and biogas capacities. Wind capacity has doubled but is still low. The installation of solar PV capacities has just started.

The average annual amount of net imported electricity during last decade is 1227 GWh, or around one sixth of total gross power supply. The import of electricity is mainly determined by economic reasons. The Latvian electricity market has been fully liberalised since 2015. Since 2013, electricity trading has also taken place within the framework of Nord Pool.

Table 3. Use of resources for electricity production in Latvia, year 2019

	Electrical capacity, MW		Gross Power Production, 2019, GWh
Resource	**2010**	**2019**	
Wind	30	78	152
Large hydro, above 10 MW (the Daugava HPPs cascade)	1550	1558	2047 Average long-term net production 2700
Small hydro	26	28	60
Solar PV		3	3
Solid biomass	5	97	575
Biogas	11	61	353
TOTAL RES	**1622**	**1825**	**3190**
Natural gas		1111	3246
Electricity net import			1118

Data source: Central Statistical Bureau of Latvia.

Capacities development, as projected by the NECP 2030

Power production. Latvia is planning to increase installed capacity of wind and solar PV:

- The Latvia NECP2030 envisages high development of **new wind capacities,** particularly offshore. Off-shore wind would decrease the necessity for large scale on-shore wind parks development, the pre-study for off-shore wind park is initialised as the cooperation project of Latvia and Estonia state power companies. Currently several large-scale onshore wind parks projects are undergoing or have finished EIA procedure (see the map in the Annex),
- The NECP2030 envisages the measures to enable **ground-mounted solar PV** parks, among them to create spatial planning terms and determine potential areas for their siting, to amend the general construction regulations regarding the terms of their construction,
- In its turn, the increase biomass and biogas capacities for production of electricity is not envisaged.

Heating and cooling. Latvia is planning to increase the share of RES in it by modernising the installed capacities of biomass use equipment, increasing the capacity of installed heat pumps and cold pumps, as well as increasing the use of solar energy in production of thermal energy.

Power Grid. The Latvian power system is a middle stage of the power system of the Baltic countries. In 2025, it is scheduled a synchronisation of Latvian, Estonian and Lithuanian electrical networks with the continental Europe. The Latvia power transmission network is rated as close to optimal with a potential for development. The transmission network total installed capacity is 9020.5 MVA.

There are no grid overloads in Latvia power system, so any producer of electricity has guaranteed access to the power system without restrictions.

In previous years, there have been no situations when it would have been necessary to disconnect any electricity users or regions due to insufficient generating capacity or insufficient interconnectors capacity in Latvia. Still, Latvia's Transmission System Operator considers (TSO 2019 Annual Report, 2020) that to ensure the safe operation of Latvia's power system also in future the development of production and balancing capacities in Latvia will be necessary.

At present, the Latvia's power transmission system allows for connecting up to 800 MW of additional new renewable energy capacity (NECP2030, 2020).

Practically all dwellings are connected to power grid[1]. By the end of 2022 all power meters will be replaced by smart meters. More than 60% of consumers objects already have installed smart meter.

Infrastructure and Accessibility

Latvia has good density of road infrastructure. Thus, sites of potential projects can normally be reached using the existing road network. Access to sites in forest areas is more difficult. In general, technical conditions of roads, particularly, municipal (local) roads are still a challenge. Historically Latvia railroad system was built to connect inner regions of Russia (USSR) with Latvia harbours, thus, rail road has limited coverage. To provide international logistics, three main harbours (Riga, Ventspils and Liepaja) and Riga international airport operate[2].

Restrictions on Land Use

Natural protected areas form the main type of restriction. The total area of particularly protected nature areas in Latvia is 11723 km2, split in several types and restrictions (RAIM, 2020).

Also, one of Latvia's characteristics is the large number of farmsteads/country homes. This limits the areas in which wind turbines and wind parks might be sited considering the regulations on spatial planning and set-back distances (see Table 6) from buildings.

[1] The Survey on energy consumption in households, done by Central Statistical Bureau of Latvia in 2015, indicates that 99.8% of Latvia dwellings has connection to power grid

[2] Linnerud K, Aakre S. and Leiren M.D. (2020). A literature review of social acceptance of wind energy development, and an overview of the technical, socioeconomic and regulatory starting conditions in the wind energy scarce target regions. WinWind project.

Policy Targets for RES development and RES community energy

GHG emissions reduction policy targets. In 28th January 2020, the Cabinet of Ministers has approved the Latvia national Strategy to Reach Climate Neutrality by 2050 (http://polsis.mk.gov.lv/documents/6641), as the intermediate targets are stated GHG emissions reduction (without LULUCF sector) per 65% in 2030 and per 85% in 2040 compared to 1990.[3]

Policy Targets for RES development. National Energy and Climate Plan 2021-2030 provides the following Latvia's contribution to the common Renewable Energy (RE) target for the EU[4] – to ensure the share of RE in Latvia's final energy consumption of at least 50% by 2030. For the period until 2030 Latvia is planning to increase the share RE in electricity to reach at least 60%. In its turn, in the heating& cooling sector Latvia is planning to ensure the annual average increase of the share of RE by at least 0.55% per year, thus, to reach the RE share of 57.6% in 2030[5].

Table 4. Latvia's targets for Renewable Energy and their performance indicators, in %

	2018 (actual)	2020	2022	2025	2027	2030
Share of renewable energy (RE) in the final energy consumption	40.3	40	41.8	44.3	46.5	50
Indicative share of RE in production of electricity	53.5	59.8				> 60
Indicative share of RE in production of thermal energy and cooling energy	55.9	53.4	55.2	56.1	56.7	57.6

Source: NECP 2030. Targets for renewable energy in transport are not included in the Table[6].

Policy Targets for RES community energy

NECP 2030 provides for development of RECs. However, there are no quantified targets for RES community energy development stated. The Section No 4.8 "Policies and Measures: Public involvement in energy production" of the NECP2030 lies stress on that it must be extended the range of persons, including RECs as well as households as renewables self-consumers, involved in production of electricity and it is essential to provide an appropriate framework for the regulation that promotes such activities. RECs are

[3] In absolute values the GHG emissions (without LULUCF) in 2030 have not be higher than 9.2 Mt CO^2 eq., as stated by the NECP 2030.
[4] At EU level, a common binding 2030 target for all Member States for RE is established by the Directive 2018/2001/EU – at least 32% share of RE in the Union's gross final energy consumption.
[5] A separate target in the electricity sector has not been set in the EU legislation. The annual increase of the RE share in Latvia's heating in cooling sector is defined as provided by the Article 23(2) (c) of the Directive 2018/2001/EU.
[6] In the transport sector, Latvia is planning an increase in the share of RES by at least 7% in 2030 securing this by the use of advanced biofuels and biogas and by promoting the use of electricity in transport.

stated as the beneficiaries of the potential future state aid programmes (e.g., co-financing of investment). It is underlined that the development of RE communities contributes to improving the quality of the environment and stimulates the local economy; the public and business able to cut their own costs by producing energy for themselves.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

The legal framework is under development by the Ministry of Economics. The current status (in December 2020) is the preliminary draft which will be directed to public consultation. Analysis presented below is done based on this preliminary draft.

The legal definition of REC will be done by the Amendments to the Law on Energy (to be amended by the terms “energy community” and “renewable energy community” and related section) and the Amendments to the Electricity Market Law (to be amended by the terms “electricity energy community”, “electricity sharing” and “electricity sharing agreement” and related articles). Amendments to the Law on Energy have been published in January 2021 for the first round of public consultations. In its turn, Amendments to the Electricity Market Law are not yet published for public consultation. Most likely, the Amendments to the noted laws could come into force no earlier than 2022.

Many details (for example, regulation for Establishing Agreement of REC, specification for concept of proximity, etc.) which have to be detailed by governmental regulation are not yet drafted.

The preliminary draft does not provide a limitation for legal forms of RECs. The discussion on legal forms will be continued in the following round of public consultations.

After the Amendments to the Law on Energy will come into force, the Cabinet of Ministers Regulation will be adopted to define the essential components of Energy Community Establishing Agreement and the procedure to change it, the rules defining relationship among members of energy community, between energy community and other participants of the market, etc. After the checking of the compatibility of the entity’s Establishing Agreement with the conditions provided by this governmental regulation, the legal entity can be registered as the REC.

The preliminary draft provides the same membership for both REC and CEC – the members can be natural persons, non-governmental organisations (societies and foundations), municipalities and municipal institutions, SMEs. Thus, in addition to REDII, the members or shareholders of REC can be also non-governmental societies and associations. The “proximity” in this draft is stated as the term “territorially bound”, details on it to ensure flexibility might be provided by the governmental regulation.

The control by REC members and stakeholders concerns both ownership rights and the rights to use the assets of the company, all or the dominating part, as well as rights or agreements that provide decisive impact on the enterprise's institutions composition, voting or decisions.

The preliminary draft states the elaboration of guiding document for establishment of RECs, including recommendations for state or municipal institutions support for RECs and participation in RECs.

Table 5. Legal gap analysis to identify gaps in the transposition of RED II concerning legal and enabling frameworks for RECs (traffic-light system)

The assessment is based on legal framework's preliminary draft				
Elements to assess the legal gap	**+**	**+/-**	**-**	**Comments**
Is there a legal definition of RECs?				Preliminary draft
Is the definition of RECs in compliance with RED II?				Yes, in principle. However not yet finally approved.
Are final customers, in particular household customers, entitled to participate in a REC?				Yes. The final customers, noted by REDII, are entitled to participate. The natural persons are entitled to participate.
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				Yes, in principle. However detailed regulations are not yet elaborated.
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				Planned. The government plans to use the assessments and findings done within the EU co-financed projects (e;g., Co2mmunity, see References)
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				The components of the enabling framework are not yet assessed and elaborated
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				Currently the support schemes are not planned in general.

Mapping Relevant Institutions with jurisdiction on RES community energy

Institution	Jurisdiction
Ministry of Economics	Key player - development of Legal and Enabling Framework
Ministry of Environmental Protection & Regional Development	Currently no direct jurisdiction on REC legal framework development. At the same time could contribute in linkage of RECs and regional development and contribution of RECs in GHG emissions reduction. The Ministry is responsible for General Regulations for the Planning, Use and Building of the Territory and for EIA regulation. The Ministry supervises the revenues related to EU ETS.
Power Transmission and Distribution Systems Operators (SO)	Responsible for the management of the electricity flow in a transmission or distribution system. Ensure system participants with the required connection to the relevant system in accordance with the uniform regulation for a system connection specified by the national Regulator, if the system participant fulfils the technical requirements determined by the SO. Transmission SO provides transmission system services and ensures balancing and stability in the transmission system.
Public Utilities Commission (PUC)	National Regulator. In the electricity supply sector it shall be regulated the production of electricity in installations, the installed electric capacity of which is more than 1 MW. Maintains the registers of electricity producers and traders
State-owned development finance institution ALTUM	ALTUM offers state aid for various target groups with the help of financial tools (such as loans, credit guarantees, investing in venture capital funds, etc.). In perspective can be relevant institution after the regulation on support mechanisms for REC will be established.
State Construction Control Bureau of Latvia	In perspective might be the institution responsible for the maintenance of RECs register. Among other functions, ensures control of construction work and acceptance for services of those structures for the construction of which the EIA procedure has been applied.
State Environmental Bureau	Supervision of performing EIA of intended activities according to the legislative requirements.
State Environmental Service (Central unit and Regional Environmental Boards)	Issue the permits (licenses), technical regulations and other administrative acts in accordance with the procedures specified in regulatory enactments regulating environmental protection. Particularly, issues the technical regulations in case the EIA procedure is not applied.
Latvian Association of Local and Regional Governments	Has the authority to represent local governments in the negotiations with the national government. Thus, could be important player if understanding the REC as the instrument for local development promotion.

Municipalities	As the general condition, the local municipalities (Council) make the decision on EIA statement. Provide the information for preparation of technical regulations issued by the State Environmental Service. The local Council adopts the municipal land-use and construction regulation (by-law) which can include wind park zoning as well as terms and conditions to install roof-top installations.
Municipal Construction Boards	Issues the Construction permit. Ensures control of construction in case EIA procedure has not been applied

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

Spatial planning is regulated by the Cabinet of Ministers Regulation No 240 (2013, with amendments) "General Regulations for the Planning, Use and Building of the Territory" (https://likumi.lv/ta/id/256866). These general regulations include particular regulations for on-shore wind plants with the capacity of more than 20 kilowatts. **At the same time there are no specific regulations stated for REC community energy.**

According to the noted General Regulations, on-shore wind plants with the capacity of more than 20 kW may be located in the territory of industrial construction, in the territory of technical construction, in the territory of agriculture and in the territory of forests[7], in accordance with the conditions of spatial plan of municipality. The local government may determine in the spatial plan of municipality or local plan the territories where the siting of wind plants is not allowed.

These General Regulations state the fixed set-back distances of wind plants from the buildings and provide that set-back distances to protect bird species or natural values are not fixed but have to be stablished during the Environmental Impact Assessment (EIA) procedure to be done according the Law "On Environmental Impact Assessment" (https://likumi.lv/ta/id/51522)

[7] With regard to forest areas, the following important aspects should be noted: (i) the wind turbines and wind parks could be sited, e.g., in peat bogs after the peat extraction is finished, and (ii) to ensure that the general norm is not applied to any forest area, applied to any forest area, in the municipal spatial plan or local plan the functional areas, in which the siting of wind turbines and wind parks is allowed, have to be defined.

Table 6. Normative defined minimal set-back distances for wind power plants and wind parks

Type of distance	Wind plant capacity is 20 kW- 2 MW	Wind plant capacity is above 2 MW
From the nearest planned wind plant and wind park boundary to residential and public buildings	500 metres	800 metres
To protect bird species or natural values	The set-back distance is determined according to the EIA	
In the area of visual perception of state protected cultural monuments	The impact on the landscape is assessed taking into account the specific situation and the specifics of the cultural monument	

Note: The boundary of wind park is determined from the side wind plant's tower of the wind park.
Source: Cabinet of Ministers Regulation 240 (2013) ''General Regulations for the Planning, Use and building of the Territory'', actual redaction October 2020.

Solar PV: Currently the national Regulation does not provide specific requirements for the ground-mounted solar PV. Solar PV placement conditions on the roofs of buildings can be specified in the municipal Land Use and Building Regulations (by-laws), and a number of municipalities use this option.

Licensing and other Regulatory Requirements for RES community energy

Licensing of REC.

As of now, no licensing requirements and procedure particular for REC are adopted. The preliminary draft legal framework on energy communities provides that the Cabinet of Ministers will issue the regulation on the essential components of Energy Community Establishing Agreement and after the checking of the compatibility of the entity's Establishing Agreement with the conditions provided by this governmental regulation, the legal entity can be registered as the REC or CEC.

Permit for new electricity production equipment. Registration of electricity producer.

Permitting for new electricity production equipment are regulated by the "Electricity Market Law" (https://likumi.lv/ta/id/108834) and described below Cabinet of Ministers Regulations issued pursuant to this Law. Both legal and natural (physical) persons are stated by the Law as the electricity producers.

Cabinet of Ministers Regulation No. 559 (02.09.2020) "Regulations regarding permits for increasing electricity production capacities or the introduction of new production equipment" (https://likumi.lv/ta/id/317214) stipulates that a permit is required if it is intended to connect to the power transmission or distribution system an electricity generation facility with a capacity exceeding 11.1

kilowatts[8]. There is the category of autonomous producers, which, according to the current provisions, is best fitting to RECs activities. Autonomous producer produces for own-consumption and may also sell the surplus of electricity generated to other electricity users, using services of such a system operator for payment in the area of operation of which the generator is located, or sell this electricity surplus to the system operator.

The applicants apply to the Ministry of Economics. The real estate cadastral numbers (and their ownership or possession rights) on which the new power plant and the power plant connection will be located, and the total planned capacity of electricity generation equipment (or inverter, if any) to be installed have to be indicated. Application for a permit is only after the applicant has already received the technical regulations from the State Environmental Service or an EIA (applicability conditions for EIA is presented below, in Table 7) has already been performed and a positive opinion on the EIA statement has been received. The period of validity of the permit shall be: (i) 3 years if the capacity of the new electricity generating installation is less than 1 MW, or (ii) 5 years if it has a capacity of 1 MW or more. It can be extended (for a maximum of 2 years), if before the expiry of the term of validity, the permit recipient provides information regarding the progress of the electricity production capacity implementation and substantiates the reasons which have caused the delay in implementation of the project.

In order to promote the interest of citizens and companies in generating electricity for own consumption, the new regulations (compared to the previous one) reduce the amount of data to be submitted. Namely, specific technical information of the equipment, as well as confirmation of the start of construction within 6 months must be submitted only for electricity generation facilities with a capacity of 1MW and more. At the same time, power plants with a capacity of less than 1 MW still have to submit a certificate to the Ministry regarding the connection of electricity generation equipment to the grid.

Registration. Cabinet of Ministers Regulation No 1227 (2009, https://likumi.lv/ta/id/199830) “Regulations regarding types of regulated public utilities” prescribes that in the electricity supply sector it shall be regulated the production of electricity in installations, the installed electric capacity of which is more than 1 MW. Such producers shall register in the Register of Electricity Producers before the start of the production, the particular provisions are provided by the Public Utilities Commission[9]. The registered electricity producer might be engaged in the trade of electricity. There could be the necessity to re-consider the regulation taking into account the specific features of RECs.

[8] If the electricity production capacity, to be connected to power distribution system, is below 11.1 kW, the described permit is not required. Instead of it, the electricity producer submits the application directly to the Distribution System Operator. The general procedure of such application is stated by the national regulator (Public Utilities Comission).
[9] ‘’Regulations regarding General Authorisation and Regulation in the Energy Sector’’. Decision No 1/3 if the Board of the Public Utilities Commission’’, 7th March 2019, amended 23th December 2019.

Prosuming: selling excess produced electricity to the grid

The prosuming is not currently included in the Electricity Market Law (https://likumi.lv/ta/en/en/id/108834). Households can produce the electricity for own-use and make net exchange of the excess with the grid. The National Energy Climate-Plan 2021-2030 therefore provides to assess the implementation of that the electricity produced on one site and transferred to the network can be used on virtual basis at another site, to develop balanced peer-to-peer trading mechanism for different groups of own-use consumers of renewable electricity. The principles of prosumerism will be provided by the Amendments to the Electricity Market Law, as described above in the section entitled Legal Gap Analysis.

Environment-related (EAI) regulatory requirements for on-shore wind

Accomplishing EAI regulatory requirements is the pre-condition for the application for permit to introduce new electricity production equipment. In the Table 7 the EIA application requirements for construction of on-shore wind plants are presented.

The threshold for application of Initial Environmental Impact Assessment is five wind plants or the total capacity of wind park is 5 MW. If the total capacity of intended wind park will be below 5 MW and the number of wind turbines in the park will be below five, the Technical regulations issued by the State Environmental Service shall be received by the project developer. Also, the Technical regulations are issued, if after the finishing the Initial Environmental Impact Assessment there is decided no necessity for the full EIA procedure. Thus, the Technical Regulations (instead of full EIA procedure) will or might be issued for REC which will run only one or a few wind turbines. It should be noted, the Technical regulations shall be received for installation of any capacity wind turbine, including also small-scale household-owned ones of capacity of few kilowatts. These Technical regulations include specific provisions for construction and operation of wind plants and are issued considering the provisions of normative acts and technical standards. In practice the content and requirements depends on the capacity of wind turbine[10]. During issuing the Technical Regulations, the State Environmental Service provides public information and considers opinions received.

There is no separate socio-economic impact assessment required. The socio –economic impact assessment is considered as the part of Environmental Impact Assessment.

[10] For instance, the Technical regulations, issued in 2019-2020 and concerning 2-3 wind turbines' park with total capacity of around 12 MW, includes provisions to to ensure bats and birds protection, provides to perform calculation of acoustic noise, electromagnetic field, to evaluate impact on landscape, etc.

Table 7. Environmental Impact Assessment Application Requirements for Construction of On-shore Wind Plants

Requiring EIA Assessment	• number is 15 plants and more; • total capacity is 15 MW and more
Requiring an Initial Assessment.	• number is 5 plants and more; • total capacity is 5 MW and more • the height of the construction exceeds 30 metres and it is intended in a specially protected nature territory or within the distance of less than 1 kilometre from a specially protected nature territory , or from a micro-reserve established for the protection of specially protected bird species
Requiring Technical Regulations	Installation or construction of wind power plants of any capacity

Sources: (1) Law on Environmental Impact Assessment (https://likumi.lv/ta/id/51522) , (2) Cabinet of Ministers Regulation No30 (2015) ''Procedures by Which the State Environmental Service Shall Issue Technical Regulations for the Intended Activity', actual redaction (https://likumi.lv/ta/id/271841)

Incentive Schemes for RES community energy

Incentive schemes are not yet under discussion in Latvia. The existing RES-electricity feed-in-tariff system has been closed for new- comers from the 26th May 2011. The main reason for this closing was to avoid too high feed-in-tariff payment impact on end-users electricity price.

Thus, though the financial incentive schemes are not yet elaborated, the most probably financial support would be provided as state aid to co-finance investments in RES technologies, including also RES community energy projects as beneficiaries. For example, Latvia's National Development Plan 2021-2027 indicatively allocates 27 MEUR to co-finance solar power production and storage equipment. It is stipulated whether this programme might be available also for REC. However, for the time being no similar co-financing envisaged for wind energy.

Social Conditions

Ownership structures and state of the art of community energy development

Although REC legislative framework is not yet adopted in Latvia, it can be found several examples of residential (households) cooperation ("coming together") to implement RES energy projects for common benefits.

As one of the encouraging factors for such projects can be considered the participation in international projects providing both valuable external expertise and financial support for both organization activities in the community and investment co-financing. Mārupe municipality[11] is the pilot municipality of the Co2mmunity project[12]. Within the Co2mmunity project the several methodological materials[13] have been developed, expert and public discussions have been organized and two projects in Mārupe municipality related to households' co-operation within the scale of building for utilization of solar energy implemented[14, 15].

Also, in some other cities of Latvia (Valmiera, Sigulda, Rēzekne) there are some examples where the owners of apartment houses have agreed on the installation of solar heat collectors. There are also some examples where heat pumps have been installed to provide heat supply of multi-apartment buildings.
In general, it can be concluded:

- the societies of flat owners of multi-apartment buildings are widespread legal status for uniting residents to collectively manage the building. These societies will have final ownership or effective control of the installed RES technologies. Thus, the societies might be considered as one of the possible legal form for REC.
- Co-financing in the form of grant (e.g., in Latvia 50% by ERDF) is crucial condition that flat owners take the common decision on energy efficient renovation of multi-apartment building. However only in few cases the energy efficiency improvement is added also by installation of solar thermal collectors.
- Solar PV panels are being introduced in private homes and the commercial sector. The noted Mārupe apartment building is practically the only example of the introduction of a low-power PV system that provides electricity to the building's common areas.

[11] Mārupe municipality is the edge municipality of the capital city Riga. Number of population on the 1st January 2020 – 20753, the area – 104 km^2.
[12] Co2mmunity ((Co-producing and co-financing renewable community energy projects) project and its extension Energize Co2mmunity project are the projects of the Interreg Baltic Sea Region programme run in October 2017 – June 2021.
[13] the Latvia-specific Handbook for Community Renewable Energy Project is elaborated and Feasibility Study on Possibilities of Energy Efficiency Improvement and Utilisation of Renewable Energy in Mārupe municipality
[14] In the 18-apartment house (year of construction – 1981, living area 1102 m2, district heating) it is installed 4 solar PV panels (total capacity of 1.32 kW) which are connected to the electricity supply network of the building's common areas, and 18 solar heat collectors to provide preheating of the building's hot water supply
[15] 6 PV systems are installed in the residential row house – each system has total capacity of 1.32 kW and its own inverter, which is connected to the building 's internal power supply networks.

- There are no examples of citizens cooperation for wind technologies or ground mounted PV.

Social Acceptance of RES community energy and selected technologies (SKDS, 2019)

Acceptance of RES technologies. Surveys, commissioned by the Wind Energy Association in 2018 and 2019 on publics' perceptions of different types of renewable energy, their suitability for Latvia, as well as their impact on the environment and people showed a general positive attitude towards RES. In 2019 88.4% of the respondents believe that the production of solar energy causes very little or rather little damage, which is almost the same as a year earlier (87.2%). In the case of wind energy, the same was considered by 82.3% of respondents, which is more than the 78.5% found in 2018.
The next type of energy production with the least damage to nature and people is hydropower, which is considered safe or rather low damage by 57.8% of the respondents.

For the first time, the 2019 survey also found out the attitude of the respondents towards the inclusion of wind power plants in the landscape. 72% of the population believe that it is better to get wind energy, even if it means seeing wind turbines in the landscape, which is significantly more than 13.1% of the population who think the opposite - to keep the landscape without wind turbines. A survey (almost 200 respondents, April 2020) done by the windpark developer *Latflora Ltd.* at Kaigu extracted peat bog has indicated that 60% respondents support or rather supports this intention (Latflora, 2020). This could be explained by the fact that the wind park will be sited in already damaged area which needs restoration and is far from buildings. Further, Latflora ltd. is well-recognised national company developing this wind park in its own peat extraction site.

Perception of RES community energy. There are no representative studies on RES community energy.

Mapping of institutions and actors that promote or protest RES community energy and selected technologies.

Despite a general positive attitude towards RES, similarly to other countries, existing active wind energy protest groups lead to the conclusion that there is a big difference between general support and consent close to oneself**.**

There are several active opposition groups for wind energy lately established in Latvia in the areas where new wind parks are planned to be build:

- People Initiative Group: “Zemgale region without wind generators”. It is association of active residents of Dobele and Tukums sub-region, against construction of a large-scale wind park in the middle of Zemgale.
- People Initiative Group in Venstpils county against Wind Park in Pope and Targale parishes of Ventspils county.

In case of the initative group “Zemgale region without wind generators” the objections were very diverse and miscellaneous. Local entrepreneurs, including large landowners, took active part in the group with the argument, that the wind park development will significantly lower the quality of land (particularly Zemgale region has the most fertile lands and historically has been the region of intensive agriculture). The opponents have seen only very limited economic benefits for local municipality. The actions of the group was very diverse,well organised and practically stopped the implementation of the wind park project. It can be said, Zemgale group has served as the example for other groups.

At the same time, it is not studied whether these groups would be also against small-scale wind parks or separate turbine installations owned by local stakeholders.

There are two main branch organisations promoting RES energy – ‘Wind Energy Association’and Latvian Renewable Energy Federation (LAEF) lwhich unites renewable energy associations in all sectors of renewable energy. LAEF is striving to promote a non-discriminatory access to the electricity market. LAEF pay special attention to the actions of government (Cabinet of Ministers) and municipal institutions of Latvia, especially with regard to adoption of laws, amendments and regulations.

The civil society organisation NGO ‘’Green Liberty’’ mission is to contribute to the development of a society where people live in harmony with each other and the environment. Green Liberty is actively involved in advocacy work with national decision makers regarding climate and energy policy, including RES technologies implementation. The organisation promotes discussions on reducing energy poverty - the focus which is compatible with RES community energy development.

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Law on Environmental Impact Assessment, consolidated version. Available at: https://likumi.lv/ta/id/51522 (accessed 12 December 2020).

Latvia’s National Energy and Climate Plan 2021-2030. Approved by the Cabinet of Ministers Decree No 46 (4th February 2020). Available at https://ec.europa.eu/energy/sites/ener/files/documents/lv_final_necp_main_en.pdf (accessed 11 December 2020).

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1Projekti. Available at: http://www.vpvb.gov.lv/lv/ivn/projekti

RAIM (Regional Development Indicator Module), https://raim.gov.lv/lv/node/210 (accessed 14 December 2020)

Surveyor: independent research center SKDS. Available at: http://www.skds.lv/ (accessed 11 December 2020).

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Limburg (Genk) and West-Flanders (Zwevegem)

Technical, Geographical and Infrastructural conditions

Basic facts

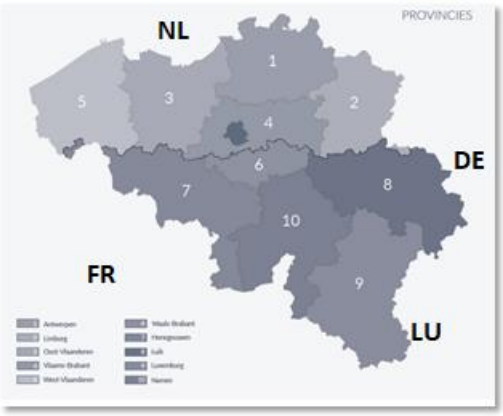

Figure 1. Map of Belgium and geographical location of the provinces

Source: https://www.belgium.be/en/about_belgium/government/federale_staat (Accessed on December 4, 2020)

Belgium is a federal state, where the democratic process is shared between a Federal Authority, three Regions (Flemish Region, Walloon Region and Brussels-Capital Region) and three Communities (Flemish community, Wallonia-Brussels Federation and German-speaking Community).[1] The Flemish Region and Walloon Region are each subdivided into five provinces (See Figure 1 for a map of Belgium with the geographical location of the provinces). The target regions of this study Limburg and West-Flanders, are two of the five provinces of the Flemish Region (Flanders). The provinces are responsible for everything on their territory that is of provincial interest and which does not come under the general interest of the Federal State, the Communities and the Regions, or under the communal interest[2].

Belgium is a small country with a total area of 30.688 km^2. The neighbouring countries are the Netherlands, Germany, Luxembourg, France and the North Sea.[3] Belgium enjoys a moderate, maritime climate. It is a flat country, since the highest peak is only 694 meters high.[4] The northern part of the province of Limburg has sandy soils, heathlands, and forests.[5] After André Dumont discovered coal in 1901 seven large coal mines were established in the province of Limburg. In 1992 the last coal mine of Limburg (and Belgium)

[1] Federal Authority. About Belgium. Available at : https://www.belgium.be/en/about_belgium/government/federale_staat (Accessed on December 4, 2020)
[2] Federal Authority. About Belgium. Available at : https://www.belgium.be/en/about_belgium/government/federale_staat (Accessed on December 4, 2020)
[3] Federal Authority. About Belgium. Available at : https://www.belgium.be/en/about_belgium/government/federale_staat (Accessed on December 4, 2020)
[4] Federal Authority. About Belgium. Available at : https://www.belgium.be/en/about_belgium/government/federale_staat (Accessed on December 4, 2020)
[5] Limburg. Available at: https://nl.wikipedia.org/wiki/Limburg (Accessed on December 4, 2020).

was closed. The western and northern part of the province of West Flanders mainly consist of the flat "Polders". The southern part of the province, "Heuvelland", is hilly with the Kemmelberg as the highest peak (156 meters) [6]. West-Flanders borders France and the Netherlands.

Table 1. Basic Facts [Limburg, West-Flanders]

Area, in km2 (2016)			**Population, number of inhabitants (01.01.2020)**		
Target region	**Limburg**	**West-Flanders**	**Target region**	**Limburg**	**West-Flanders**
Total	2.422,14	3.144,34	**Total**	882.633	1.203.004
arable land	640,80	1.350,30	*Rural*	Cf. Appendix 1	Cf. Appendix 1
grassland	410,78	739,97	*Urban*	Cf. Appendix 1	Cf. Appendix 1
forest land	439,12	90,79			
inland water	47,79	68,48			
mountainous	-	-			

Source: www.provincies.incijfers.be (Accessed on December 4, 2020)

70% of the total area of the province of Limburg is open space and consists mainly of agricultural land, the only National Park in Flanders and the largest forest in Flanders[7]. 72% of the total area of the province of West-Flanders is open space and consists mainly of agricultural land[8].The provinces of Limburg and West-Flanders have a different urban structure than the rest of Flanders[9]. The target regions do not have a large city (like Antwerp, Brussels or Ghent) but consist of a network of smaller towns and villages. Overall, the Flemish Region is rather dense. The population density is 492 inhabitants per km² (See appendix 1 for a map that shows the urban spread in the five provinces in Flanders). The province of Limburg has a population density of 364 inhabitants per km². The province of West-Flanders has a population density of 383 inhabitants per km². Limburg is slightly less dense than West-Flanders.

[6] West-Vlaanderen. Available at: https://nl.wikipedia.org/wiki/West-Vlaanderen (Accessed on December 4 , 2020).
[7] Provincies in cijfers, je stad of gemeente in kaart. Available at: https://provincies.incijfers.be/dashboard (Accessed on December 4, 2020)
[8] Idem
[9] Idem.

The Energy/Electricity context:

Liberalisation of the market in Belgium[10, 11, 12]

Flanders opened the energy market to competition in 2003, Wallonia and the Brussels-Capital Region followed in 2007. With the liberalisation of the energy market, the activities split and were divided between the commercial suppliers, which sell electricity to the consumer, and the intermunicipal companies, which still operate the distribution network in their territory nowadays (CREG, 2019).

Despite the liberalisation of the energy market, for households, the average electricity bill increased 66,41% and the average gas bill increased 18,70% between 2007 and 2019 in Belgium. Also, for commercial customers the average electricity bill increased with 21,15% and the average gas bill with 0,49% between the same period. This evolution can be mainly explained by an increase in distribution tariffs and price of electricity and gas, as well as contributions for RES (e.g., green certificate system) (CREG, 2019) [13].

There are 36 renewable energy cooperatives in Belgium, 17 of them operate in Flanders. Most of these cooperatives focus on renewable energy production, mainly through rooftop PV and on shore wind. In 2016 the two largest Flemish renewable energy cooperatives represent about 4% of the installed capacity for on shore wind in Flanders. Most cooperatives are volunteer based. These figures suggest that the cooperative energy sector is still marginal. Ecopower is the pioneer cooperative in Belgium, and one of the largest renewable energy cooperatives in Europe in terms of membership.[14]

Energy context: Electricity production, consumption and net imports

Belgium has been relying on coal and nuclear for its electricity generation for decades. Since 1990 the coal units have gradually been replaced by gas-fired generation. This evolution was completed in 2016 with the closure of the last coal-fired unit. Fossil gas has gradually increased in importance to a share of 30% of generated electricity today. Nuclear generation, that represents 50% of the total electricity produced in Belgium, is planned to be phased-out by the end of 2025[15].

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[10] FOD Economie. (2019) De Belgische elektriciteitsmarkt en de liberalisering. Available at: https://economie.fgov.be/nl/themas/energie/energiebronnen/elektriciteit/de-belgische (Accessed on November 27, 2020)

[11] Lepage M. (2020). Wat betekent de vrijmaking van de markt voor consument? Available at: https://www.energie-vergelijker.be/blog/vrijmaking-energiemarkt/ (Accessed on December 4, 2020)

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[13] Commissie voor de Regulering van de Elektriciteit en het Gas (CREG). (2019). Studie over de componenten van de elektriciteits- en aardgasprijzen. Available at: https://www.creg.be/nl/publicaties/studie-f1914 (Accessed on December 9, 2020).

[14] Bauwens T, Gotchev B, & Holstenkamp L. (2016). What drives the development of community energy in Europe? The case of wind power cooperatives. 13. Energy research and social science: pp. 136-147. DOI: 10.1016/j.erss.2015.12.016

[15] Elia (2019). Adequacy and flexibility study for Belgium 2020 – 2030. Available at: https://www.elia.be/fr/actualites/communiques-de-presse/2019/06/20190628_press-release-adequacy-and-flexibility-study-for-belgium-2020-2030 (Accessed on December 4, 2020)

Over the past 10 years there is a notable increase in the production capacity of renewable electricity in Belgium, mainly solar and wind energy (onshore and offshore). In 2018 the installed capacity of these renewable energy sources amounted to 7,2 GW or 30% of the total installed electrical capacity and succeeded the Belgian nuclear capacity (5,9 GW or 24% in 2018). If we take a closer look at the solar capacity, we notice that about 64% comes from small photovoltaic solar panels below 20 kW, mainly installed by households. The production of electricity based on solar energy has stagnated in recent years. Production based on solid biomass has been restored since the decline in 2014. Wind energy has become the most important source of renewable electricity production in Belgium (6,5 TWh in 2017), partly due to the offshore wind farms[16]. Figure 2 reports on the gross electricity production per fuel in Belgium from 1990 till 2018 in GWh.

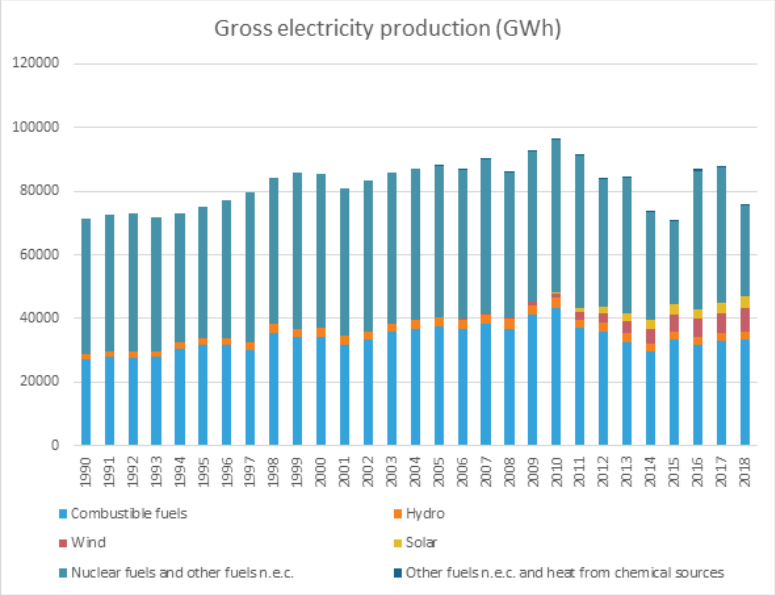

Figure 2. Gross electricity production per fuel in Belgium, 1990-2018 (GWh)

Source: Eurostat (Accessed on June 30, 2020)

In 2018, total renewable electricity production was 1.328 GWh in the province of Limburg and 1.327 GWh in the province of West-Flanders. Electricity consumption by households amounted to 1.491 GWh in the province of Limburg and 2.060 in the province of West-Flanders[17].

In the target regions, renewable energy production is also dominated by PV (mainly installed by households) and wind (on shore). The DSO in Flanders sees its role as a facilitator of energy sharing and energy communities on the distribution network in line with European and Flemish frameworks[18].

[16] FOD Economie, KMO, Middenstand en Energie. (2020). Energy key data, editie maart 2019. Available at: https://economie.fgov.be/fr/publications/energy-key-data-mars-2019 (Accessed on December 4, 2020).
[17] Appendix 2 reports on the imports, exports and net imports of electricity in Belgium between 2005 and 2019 In 2019 net imports (= imports minus exports) of electricity in Belgium turned negative for the first time since 2009 due to the high availability of the Belgian electricity production park.
[18] Fluvius. VREG Consultatie energiegemeenschappen. Fluvius reactie op consultatie. Available at: https://www.vreg.be/sites/default/files/document/reactie_fluvius.pdf (Accessed on 15 January, 2020).

Table 2. PV and wind - installed capacity and production (target regions, 2019)

Region	PV [MW]	PV [MWh]	Wind [MW]	Wind [MWh]
Limburg	683	613.658	259	531.155
West-Flanders	712	639.963	194	397.618

Source: www.provincies.incijfers.be (Accessed on December 4, 2020)

Infrastructure and Accessibility

Flanders is a well accessible region with a dense transport network that facilitates the transport of materials for energy installation. See Appendix 3 for the infrastructure density and accessibility in Belgium (2016).

Restrictions on Land Use

This section is addressed in the section on spatial planning regulations of this report.

Legal and Policy Framework and Institutions

In Belgium the competences on energy are divided between the Federal Authority and the level of the 3 Regions. The Regions have important responsibilities in areas such as rational energy consumption, promotion of renewable energy, public transport, transport infrastructure, urban and rural planning, agriculture and waste management. The federal government is responsible for large parts of the fiscal policy. The federal government is also responsible for product policy, energy security, nuclear power and offshore wind. The provincial level often drafts its own climate and energy plans and supports the 300 municipalities, of which the majority signed the Covenant of Mayors [19]and adopted SECAPS (Sustainable Energy and Climate Action Plans).

Policy Targets for RES development and RES community energy

National Energy and Climate Action Plan (NECP)

Quantitative targets RES

There are no specific quantitative targets for REC community energy. According to article 3(1) of the Directive 2018/2001 (RED II), the overall target for RES set at a European level for the horizon 2030 is at least 32% of RES in the energy mix. As stated in the National Energy and Climate Plan for Belgium (2021-2030) (NECP), Belgium's contribution to this target will consist of the total contribution of the various entities[20] and is estimated to reach 17.5% by 2030. (See Appendix 4 for the estimation of share of RES at

[19]The Covenant of Mayors was launched in Europe in 2008 with the ambition to bring together local authorities which voluntarily commit to achieve and even exceed the European Union's climate and energy targets. In the meantime, the initiative has gathered more than 7000 local and regional authorities spread over 57 countries. See: https://www.covenantofmayors.eu/en/

[20] Namely, the three Regions, Flanders, the Walloon Region, and the Brussels-Capital Region.

the horizon 2030 for Belgium).[21] According to the Flemish Energy and Climate Plan 2020[22], the total renewable energy generation in Flanders is expected to reach 28,512 GWh in 2030, which is an increase of 812 GWh compared to the draft Flemish Energy Plan of July 2018, which projected 27,700 GWh.

Qualitative targets RES

The Federal Coalition Agreement[23] highlights that renewable energy production, energy-efficiency, storage, demand management, flexibility and interconnections are essential in a future decentralized energy system.[24] The Federal Government aims to integrate the following elements into its energy policy:

- An Energy Transition Fund will be used for innovative projects that contribute to the reduction of greenhouse gas emissions and the transition to renewable energy.
- The Federal Government encourages pilot projects and is working on a regulatory framework to accelerate innovations such as renewable energy at sea, gas greening, power-to-x, production of low-carbon hydrogen and CO_2 capture, reuse and storage.
- The Federal Participation and Investment Company is expected to develop a sustainable investment strategy. One of its objectives will be to gradually reduce investment in fossil energy and fuels, following the example of the European Investment Bank. By 2030, the Federal Authority and the institutions under its jurisdiction will have completely withdrawn from companies that contribute to the emission of greenhouse gases and which are not actively engaged in the energy transition.
- A multi-year investment plan to make the buildings owned by the Federal Authority energy-efficient is a priority.

The Federal Government is committed to achieve the ambition of a climate neutral government before 2040.

Moreover, the final, integrated NECP sets qualitative targets for the community energy.[25] More specifically, the NECP mentions that 'By the end of 2020, under the Directive on electricity and renewable energy, we plan to adopt a policy framework facilitating the development of local energy communities and removing administrative burdens and legal obstacles. We will focus on information, awareness-raising and alleviating the concerns of participants and project initiators. Other support instruments may also be developed. At the same time, we will ensure continued solidarity between all system users by contributing fairly to the funding

[21] National Energy and Climate Plan for Belgium 2021-2030. Available at: https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en (accessed 24 November 2020)
[22] Flemish Energy and Climate Plan 2021 -2030. Available at: https://omgeving.vlaanderen.be/sites/default/files/atoms/files/VR%202019%200912%20DOC.1208-3%20VEKP%2021-30%20-%20bijlageBIS.pdf (accessed 24 November 2020)
[23] Federal Government Agreement 2020. Available at: https://www.belgium.be/sites/default/files/Regeerakkoord_2020.pdf (accessed 24 November 2020)
[24] Ibid
[25] National Energy and Climate Plan for Belgium 2021-2030. Available at: https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en (accessed 24 November 2020)

of climate and energy policy and the energy infrastructures supplying each consumer (NECP, p. 306). A regional decree is currently being drafted in Flanders, which will transpose the Electricity Market Directive (IEMD) and Recast of the Renewable Energy Directive (REDII), including the provisions for energy communities[26].

Regarding the quantitative targets for RES, the Federal Coalition Agreement mentions that the Belgian NECP predicts a doubling of renewable energy to 4GW by 2030.[27] Wind energy production in the North Sea is planned to be further rolled out, including an additional connection if necessary, by 2025-2026. Further possibilities to achieve additional capacity from offshore wind in the Belgian North Sea, as well as outside territorial waters are examined.

The only element stated in the Federal Coalition Agreement with regards to the qualitative targets for community energy is that the government will reinforce its support for the cooperative model, which has been fully incorporated into the new (2019) Law book of Companies and Associations[28].

Regional level: Flanders

Quantitative targets RES

In 2010, Europe set the Belgian RES targets for 2020 at 13%, of which 25,074 GWh for Flanders[29]. At the end of 2018 only 6,9% of the energy used in Flanders was renewable. As a result, Flanders had to buy 1,800 GWh Danish statistical surplus for 22,5 million € in 2020 to avoid a much bigger fine from the European Commission[30]. In its Governmental agreement of 2019[31] the Flemish Government states that it aims to increase the renewable energy production substantially to an installed capacity of 2,5 GW for onshore wind and 6,7 GW for PV.

Qualitative targets RES

The main policy directions that emerge from the Flemish Governmental agreement (2019) in this regard are:

- to avoid too many subsidies thanks to a better evaluation of the profitability that will be lowered to 7% for onshore wind and 4% for PV.
- to phase out FIP (Green Power Certificates support mechanism) and to turn to tendering of support.

[26] Draft Flemish Energy Decree 30/10/2020. Available at: https://beslissingenvlaamseregering.vlaanderen.be/document-view/5F9BEA785B1AD2000800052D (accessed 4 December 2020)
[27] Ibid 59
[28] Ibid
[29] Website of the Flemish Energy Agency. Available at: https://www.energiesparen.be/sites/default/files/atoms/files/HEB_Vlaanderen_2005_2017.pdf (accessed 24 November 2020)
[30] Van Gastel E, de Jonge Baas, M. (2020). Ook Vlaanderen koopt hernieuwbare energie om boete EU te verkomen.. Solar magazine. Available at: https://solarmagazine.nl/nieuws-zonne-energie/i22625/ook-vlaanderen-koopt-hernieuwbare-energie-om-boete-eu-te-voorkomen (accessed 24 November 2020)
[31] Governmental agreement Flanders. Available at: http://docs.vlaamsparlement.be/docs/varia/regeerakkoord-2019-2024.pdf (accessed 24 November 2020)

- to support financing shifting from tariffs low tension customers to Energy Fund.
- to limit the support for RES in duration and volume from 2021 onwards.
- to grant aid to PV projects above 10 kW on buildings or marginal land (e.g. verges) with a minimum local use of 50%, given the scarce open space in Flanders;
- to implement a strict sustainability criterion for biomass. New or renewed installations for energy use of biomass and biogas should mainly serve to meet heat needs.
- to no longer grant aid to new projects during periods of surplus electricity (negative prices) as soon as possible, as electricity generators contribute to the balancing of supply and demand.
- to make use of the EU's new renewable energy financing mechanism to fulfil Flanders share of the EU renewable energy target outside Flanders, in places where it can deliver the highest return.
- to transition to green heat with an adapted support framework for the use of sustainable biomass and biogas in the event of injection into the natural gas grid or industrial or collective heat generation. Heat grids can collectively distribute green and residual heat.
- to stop, from 1 January 2021, the use of net metering for new small-scale PV installations.
- to set up a pilot project in which the support for large windmills is tendered, on property of the Flemish Government.

Quantitative targets RES Community Energy Region of Flanders

Flanders has set no RES Community Energy targets. In 2014, the decision of the Provincial Deputy Council of East-Flanders on 20% participation of citizens and local authorities in wind projects[32] was annulled by the Flemish Region[33]. The existing policies were/are:

- A negligible small incentive for RES projects with citizen participation[34] (a slightly higher FIP). However, this will no longer be the case for new PV projects as from 2021 onwards tendering for PV will be introduced.
- An energy loan at 1% for non-commercial legal entities and cooperatives, which will be prolonged under the current government.

In December 2020 the Flemish Minister of Local Authorities and the Flemish Minister of Climate and Energy launched their common Local Energy and Climate Plan.[35] It states that by 2030 there should be:

- 1 extra cooperative/participative RES project per 500 inhabitants, with a total of 216 MW installed capacity which means 12.000 extra projects;

[32] Willems T, Vansintjan (2014). Kiezen voor een actieve rol van de burger in de energietransitie. De Wereld Morgen. Available at:https://www.dewereldmorgen.be/artikel/2014/06/25/kiezen-voor-een-actieve-rol-van-de-burger-in-de)-energietransitie/ (accessed 26 November 2020)

[33] Stating such a decision is a competence of the Flemish Region.

[34]Decision of Flemish Government. Available at: https://www.energiesparen.be/groenestroomproject-met-burgerparticipatie

[35] Common Local Energy and Climate Pact of the Flemish Minister of Local Governments and the Flemish Minister of Climate and Energy, presented 07/12/2020. Available at: https://bartsomers.be/swfiles/files/download.php?myfile=Lokaal%20Energie-%20en%20Klimaatpact_3.pdf (accessed 9 December 2020)

- Public buildings, properties and infrastructure will be made available to cooperatives for solar, wind and energy-efficiency projects. The municipality will buy the green electricity and the citizen cooperative will install, finance, monitor and control the installations. After 20 years, the installations become property of the municipality. Similar for school roofs, cultural buildings, care institutions, buildings of local associations, etc.

Qualitative targets RES Community Energy Region Flanders

The Governmental agreement (2019) states that:

- The diverse authorities will be empowered to produce renewable energy on their properties and – when possible – make participation possible.
- The active role in the transition of citizens, local authorities, and enterprises will be supported and facilitated. That is why the government will set an enabling framework for 'local' energy communities.

The Local Energy and Climate Plan[36], launched on the 7th of December 2020 reiterates the Governmental agreement, but also mentions that:

- The participation of citizens can be an element of evaluation in tenders of local authorities for sustainable energy projects (e.g. solar, wind, hydro, biomass, energy- efficiency and district heating networks).
- Local authorities can also participate or facilitate energy communities (e.g. energy sharing in neighbourhoods, stimulate participation of local companies and business parks).

Provincial level

The five provinces in Flanders support the 300 municipalities in reaching their energy and climate targets as they signed the Covenant of Mayors. They also set targets for their own organisation and/or for the whole territory of the province. Three provinces are highlighted in the next paragraphs.

Province of East-Flanders: in their Climate plan for the future [37] they state the Province should be climate neutral by 2050. It is mentioned there that *'East-Flanders Energy Landscape worked on support for windmills via two tracks: direct participation for citizens, companies and municipalities and the creation of a fund to make the environment of windmills more attractive'* (Klimaatgezond Oost-Vlaanderen, p. 17). In another document on spatial planning[38] they mention that local involvement plays a key role in aligning projects and developers and they propose 20% direct participation for citizens, businesses and local authorities and the introduction of an environmental fund. [39]

[36] Common Local Energy and Climate pact of the Flemish Minister of Local Governments and the Flemish Minister of Climate and Energy, presented 07/12/2020. Available at: https://bartsomers.be/swfiles/files/download.php?myfile=Lokaal%20Energie-%20en%20Klimaatpact_3.pdf (accessed 9 December 2020)

[37] Klimaatgezond Oost-Vlaanderen https://dms.oost-vlaanderen.be/download/13fd1f91-d46c-4db6-ae27-96dbd7b7f354/Brochure%20Klimaatgezond%20Oost-Vlaanderen.pdf (accessed 26 November 2020)

[38] Provincie Oost-Vlaanderen. Beleidsinstrumenten. Provinciale Ruimtelijke Structuurplanning. Windturbines Available at: https://oost-vlaanderen.be/wonen-en-leven/ruimtelijke-planning/beleidsinstrumenten/Provinciaal%20Ruimtelijke%20Structuurplanning/windturbines.html (accessed 26 November 2020)

[39] REScoop Vlaanderen. Available at: https://www.rescoopv.be/sites/default/files/PRB_OOST-VLAANDEREN__20130424%20draagvlakmodel_windenergiemet.pdf (accessed 26 November 2020)

Province of Flemish-Brabant: in their Climate plan[40] they state they want to be climate neutral by 2040. Nothing is mentioned about energy communities, but the Province supported the creation of Licht-groups[41] (renewable energy communities). 5 of these RECs took the cooperative legal form.

Province of Limburg: in their Climate Adaptation Plan[42] (2017) they state they want to be climate neutral by 2050. At the end of 2013, the province of Limburg already decided that at least 20% of the projects should be reserved for the direct participation of local authorities and citizens in the case of new large wind turbine projects[43].

Municipal level

In Flanders, 269 of the 300 municipalities signed the Covenant of mayors[44]. 183 municipalities are committed to reduce greenhouse gases by 20% by 2020. Already 86 municipalities committed to 40% less emissions by 2030. More and more municipalities took a council decision[45] that aims for 50% direct participation in large renewable energy projects on their territory, such as Tielt, Leuven, Tienen, Eeklo.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

On the 30th of October 2020 the Flemish government send the draft decree concerning the transposition of REDII and IEMD to the 3 advisory committees and asked for their advice by the 30th of November 2020. REScoop Vlaanderen was able to give input to the combined advice of two of them (Minaraad and SERV).Then just before the Christmas holidays the Flemish Governments took a second decision on the draft decree and sent it to the State Council for its legal advice. It is expected that the Flemish Regional Parliament will debate about the decree and take a decision on it by the end of January 2021.. Both definitions for REC and CEC are in one decree, almost completely similar to the text in the respective European Directives. Although most of the elements incorporated in the Directives will be transposed by the decree, they will still have to be made explicit by the Minister of Energy or regulated by the Flemish Regulator of the Electricity and Gas market (VREG), such as the enabling framework for energy communities.

[40] Climate plan Province of Flemish Brabant: https://www.vlaamsbrabant.be/sites/default/files/media/files/2020-06/klimaatbeleidsplan-2040.pdf (accessed 26 November 2020)
[41] Licht Vlaams-Brabant project. Available at: https://www.vlaamsbrabant.be/binaries/Projectfiche_tcm5-135252.pdf (accessed 26 November 2020)
[42] Climate Adaptation Plan of the Province of Limburg (BE). Available at: http://www.limburg.be/webfiles/limburg/product/klimaat_klimaatadaptatieplan_2017.pdf (accessed 26 November 2020)
[43] REScoop Vlaanderen. Available at: https://www.rescoopv.be/sites/default/files/PRB_LIMBURG_20131120-draagvlakmodel_windenergie.pdf (accessed 26 November 2020)
[44] Burgemeesterconvenant Vlaanderen. Available at: http://www.burgemeestersconvenant.be/ (accessed 27 November 2020)
[45] REScoop Vlaanderen. Available at: https://www.rescoopv.be/publicaties/omgevingsenergie (accessed 27 November 2020)

The federation of Flemish REScoops sees three issues in the draft decree[46]:

- The notion of 'ownership of the installations' is not well defined which might allow pure financing of projects of third non-cooperative developers.
- Energy communities would only have to inform VREG about their activities and the regulator would in turn publish the list of energy communities on its website. The Flemish REScoops advocate for an evaluation of the compliance of energy communities with the decree, which would be made public with the possibility to object.
- The draft decree allows a different interpretation than the Recitals. The Flemish REScoops interprets that is possible to set up an energy community without citizens although the Recitals explicitly states that the aim is to include them.

[46] Draft Flemish Energy Decree 30/10/2020. Available at: https://beslissingenvlaamseregering.vlaanderen.be/document-view/5F9BEA785B1AD2000800052D (accessed 4 December 2020)

Table 4. Legal gap analysis to identify gaps in the transposition of RED II concerning legal and enabling frameworks for RECs.(traffic-light system)

Elements to assess the legal gap	+	+/-	-	Comments
Is there a legal definition of RECs?				The draft decree provides a definition.
Is the definition of RECs in compliance with RED II?				Ownership of 'activa' instead of ''ownership of the RES project
Are final customers, in particular household customers, entitled to participate in a REC?				Yes, the draft decree makes this possible.
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				Yes, the draft decree entitles them to do so.
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				REScoop had one meeting with the Flemish Energy Agency and several stakeholders. VITO has conducted a study of barriers but not the potential on behalf of the Flemish Energy Agency (Delnooz et al. 2020). But we have no knowledge of a real assessment.
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				In the Governmental Agreement (2019) it was foreseen by the end of 2020 that an enabling framework should be in place that facilitates energy communities and takes away administrative burdens and juridical barriers. It will inform, sensitise and unburden initiators and participants of energy communities. Not in the draft decree. It will be part of a Ministerial decision.
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				The framework is not yet designed. The government will do this after an analyses made by the regulator VREG of how energy communities can contribute to the grid stability, avoided costs and remuneration of this. Ministerial decision and regulation by regulator VREG.

Mapping Relevant Institutions with jurisdiction on RES community energy

At Federal level there is a requirement that any legal entity (such as a cooperative or not-for profit organization) has to be established at a notary (with business plan for a cooperative) and has to comply with the new code of undertakings and associations (2019). For cooperatives this means they have to follow the ICA principles. Cooperatives can also be 'recognised' by the Minister of Economy if they comply with certain restrictions, e.g. maximum of 6% dividend. In return, the dividends of the cooperative are considered as a cost before taxes. If a legal entity raises money to invest in RES installations, it must comply with the rules of the financial regulator FSMA. On regional level, once RED II and IEMD are transposed, VREG will have to register the energy communities[47].

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

Currently, no land use restrictions are in place for RES energy communities in Flanders (see 2.3 for the relevant institutions with jurisdiction on RES communities). However, restrictions on the installation of onshore windmills can be diverse and influence the land use, and hence, the scope of actions of RES energy communities. Some of the restrictions and conditions for installing wind turbines relate to the spatial organisation of the Flemish Region (e.g. Spatial Structure Plan of Flanders, Omzendbrief RO/2014/02[48]) or at the level of a province (e.g. West-Flanders, policy framework on small wind turbines[49]). Other restrictions and conditions relate to environmental regulation (e.g., integrated building and retail permit[50]., noise, impact on fauna and flora, shadow, etc.)[51] or general safety rules (e.g. distance to buildings, underground pipes, Seveso companies, radars or signalling beacons)[52]. Also, some policies can be considered as tacit restrictions on land use and siting of wind projects (e.g. "First come, first served policy"[53]).

[47] Draft Flemish Energy Decree 30/10/2020. Available at: https://beslissingenvlaamseregering.vlaanderen.be/document-view/5F9BEA785B1AD2000800052D (accessed 4 December 2020)

[48] Omzendbrief RO/2014/02 betreft afwegingskader en randvoorwaarden voor de oprichting van windturbines. Available at: Omzendbrief RO/2014/02 afwegingskader en randvoorwaarden voor de oprichting van windturbines (vlaanderen.be) (Accessed on December 4, 2020)

[49] Provincie West-Vlaanderen (2017). Beleidskader kleine windturbines. Algemene leidraad. Available at: https://bestanden.west-vlaanderen.be/rup/publiek/B_067_KleineWindturbines/B_067_KleineWindturbines_AlgemeneLeidraad.pdf (Accessed on December 4, 2020).

[50] Integrated environmental and building permit procedure in Flanders. Available at: https://www.flandersinvestmentandtrade.com/invest/en/investing-in-flanders/setting-business/integrated-procedure-environmental-building-and-retail (accessed 26 November 2020)

[51] Order of the Flemish Government of June 1995 concerning General and Sectorial provisions relating to environmental safety, section 5.20.6 for wind energy. Available at: https://navigator.emis.vito.be/mijn-navigator?woId=40975 (Accessed on December 4, 2020).

[52] Vlaamse Energieagentschap (2019). Windgids. Praktisch naar succesvolle projecten. Available at: https://www.energiesparen.be/sites/default/files/atoms/files/Windgids-2019.pdf (Accessed on December 4, 2020).

[53] Belgium has experienced a policy of "first come, first serve", which coupled with scarcity of suitable sites, an increasing number of wind project developers and the zoning policies of the competent authorities, [which has created] a highly competitive environment and encouraged a "wind rush" on the available locations. In this context, cooperatives lack the time and resources to act as fast as large-scale wind power producers" (Bauwens et al, 2016).

Licensing and other Regulatory Requirements for RES community energy

Currently, there are no specific licensing or other regulatory requirements for RES community energy in place. In general, the connection to the grid of a renewable energy production installation/storage installation is regulated by VREG in its Technical Regulation, that [54]:

- gives priority to connecting RES/qualitative cogeneration (where heat and power are well used with high efficiency) in case of congestion and
- guarantees a maximum of 24 months to be connected for RES/qualitative cogeneration installations.

Once REDII and EMD are transposed in regional law (Energy Decree and Ministerial decisions) and regulations and tariffs are in place, renewable energy communities will have the right to share the renewable energy they produce with their common RES installations to the extent of their own consumption. This will not be considered as a sale of energy.

Research and innovation projects can benefit from a regulatory sandbox. The specificities to be granted a regulatory sandbox are specified in the law [55].

Incentive Schemes for RES community energy

The actual Flemish support scheme is well described on the RES Legal website of the European Commission [56]. *'The region of Flanders uses a quota system and a certificate trading scheme to support renewable energy. In general, all renewable energy generation technologies are eligible for the quota system. The green electricity certificates are issued by the Flemish Regulator of the Electricity and Gas Market (VREG). The amount of electricity to be produced for one certificate varies across technologies and is based on a technology-specific banding factor. This so-called banding factor accounts for the specific technology costs and efficiencies for amortisation. Thus, one certificate is not necessarily equal to 1 MWh. The grid operators are obliged to meet their quota obligations, i.e. present green certificates for the quota defined by law, every year by 31 March'*. Currently, there is only an incentive for community energy in the green certificate system. From 2021 onwards this incentive will no longer exist for new PV projects since the support will be tendered. Flanders follows with this switch to tendering the EU recommendations that suppose tendering support is leading to lower prices for consumers.

[54] VREG. Technical Regulation in Flanders. Available at: https://www.vreg.be/nl/technische-reglementen (accessed 26 November 2020)
[55] Titel X/1 Regelluwe zones voor energie van het besluit van de Vlaamse Regering van 19 november 2010 houdens algemene bepalingen over het energiebeleid. Available at: https://navigator.emis.vito.be/mijn-navigator?woId=77409 (Accessed 15 January, 2021)
[56] Flemish support scheme for RES. Available at: http://www.res-legal.eu/search-by-country/belgium/single/s/res-e/t/promotion/aid/flanders-quota-system-groenestroomcertificaten/lastp/107/ (accessed 26 November 2020)

Social Conditions

Ownership structures and state of the art of community energy development

Belgium saw its first legal framework for the cooperative movement in 1873. The fundamental principles were optional at the time, which led to a double lecture of the cooperative type of undertaking: one following the principles inspired by the Rochdale Society and one aiming for this legal form for the convenience of the model. To embed the ICA principles, the National Council for Cooperation was created in 1955. The cooperative legal entity saw a boom in the 1980s thanks to the flexibility of the legal definition. This side effect resulted in a weakening of the image of the cooperatives, which were seen as undermining other legal forms, such as the private companies with limited liability. This effect lead to a revision of the legal framework in 1991, giving the possibility to create a cooperative society with limited liability, or a cooperative society with unlimited liability. These traditional cooperatives could be found in primary and tertiary industries, such as insurance, pharmaceutical distribution, agriculture. These cooperatives have been impacted by the economic globalization through increasing competition and technological advances. By the early 2000s, they evolved from consumer cooperatives to financial cooperatives. (Defourny et al, 2002)

The same can be observed for energy cooperatives. Some cooperatives follow the cooperative ideal (REScoops), while others are incumbent-owned power companies which create a cooperative to make their wind projects come to life, while obliged to have a percentage of citizens' participation into the latter (Fincoops). One historical example of energy cooperative is the one of Ecopower, founded in 1991, the first energy cooperative in Belgium. With respect to attitude towards the cooperative model in the sector of energy, the "top-down" initiatives, using the cooperative model to finance RE production plants undermines the legitimacy of the "bottom-up" approach as the cooperative doesn't allow the members to co-own the wind-turbines. To counter this phenomenon, REScoop Belgium was created in 2013 to voice and promote the cooperative ideal, and from the historical case of Ecopower created in 1991, and Beauvent in 2000, REScoop Flanders now count 16 cooperatives[57]. (Bauwens et al, 2016)

Community energy legal development in Flanders can be summarized into 2 main points:

a) From a research and innovation perspective some projects benefit from a regulatory sandbox (e.g. Thorpark in Genk, Limburg).
b) Concerning the energy cooperatives, a cooperative can be a cooperative society with limited or unlimited liability, following the new Code of undertakings and associations[58]. The cooperatives can be 'approved' by the Minister of Economy and can seat to the National Council of Cooperation. The Council promotes the cooperative ideal as defined by the ICA[59]. It is unclear in practice what it means when cooperatives are not 'approved' with respect to how they fit the ICA principles. The renewable energy

[57] Idem
[58] Code of undertakings and associations (2019). Available at : https://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&table_name=loi&cn=2019032309
[59] Book 8 of the code of undertakings and associations (2019). Available at : https://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&table_name=loi&cn=2019032309 (Accessed on December 9, 2020)

cooperatives are owned by their members, instead of investors and "net earnings are usually divided pro rata among the members not according to their shareholding – but according to the volume of transactions they have conducted with the firm."[60] They are also a democratic organization, respecting one person one vote rule, and "the absence of barriers for new entry members".[61] The ownership structure is defined by the energy cooperatives in their statutes. Some provinces such as the target region of Limburg, and municipalities however foresee a minimum percentage of share of participation of the citizens in the energy initiative[62] (see 2.1.4 and 2.1.5 Policy Targets for RES development and RES community energy on provincial and municipal level).

In the Target Regions, Limburg counts 1 energy cooperative, and West-Flanders counts 3 energy cooperatives.

Social Acceptance of RES community energy and selected technologies

Social acceptance of RES community energy in Belgium has mostly been studied from the perspective of the energy cooperative and focused on on-shore wind. Onshore wind technology has limited social acceptance in Belgium. Cooperative ownership of wind turbines can enable the social acceptance by a fair cost distribution, involvement in decisional processes and establishment of a trust relationship between the project developer and the residents. Participation in a cooperative significantly increases the positive attitudes towards the technology (Defourny et al., 2002).

Since 2014, the Flemish Energy Agency (VEA) carries out a yearly survey across Flanders in collaboration with VREG to understand the support for wind projects by the Flemish population. 1000 people[63] are surveyed each year. The survey concludes that in 2020:

- Concerning the installation of a wind turbine in general, great majority of Flemish respondents (70%) is in favour. Respondents with a green electricity contract are significantly more in favour than the ones who don't have one (77% versus 62%).
- Concerning the share of respondents opposed to wind turbines, it represents only a small minority (4%) of Flemish respondents.
- Concerning the installation of wind turbines in their own municipality, the majority of the Flemish respondents (57%) would be in favour of it. Nevertheless, this is a significant decrease compared to 2019 (62% in 2019 against 57% in favour in 2020). The neutral group increased. Respondents with a green contract are more in favour than the ones who don't have a green contract (62% would be in favour of installing a wind turbine in their own municipality compared to 52% among the respondents who do not have a green contract). West Flanders has the least supporters (47%).

[60] Bauwens T, Gotchev B, & Holstenkamp L. (2016). What drives the development of community energy in Europe? The case of wind power cooperatives. 13. Energy research and social science: pp. 136-147. DOI: 10.1016/j.erss.2015.12.016

[61] Idem

[62] RESCOOPV. (2020). Omgevingsenergie. Available at: https://www.rescoopv.be/publicaties/omgevingsenergie (Accessed on November 30, 2020)

[63] The respondents must reside in the Flemish Region, is over 18 years old and takes care of the energy bills.

- Concerning the proportion of respondents who want to be actively involved when a wind turbine is installed in their neighbourhood, it is decreasing after an increase in 2019 (52% in 2019, down to 46% in 2020). The proportion of people who do not want to be involved at all rises back to the level of 2018 (9% in 2018, which decreased to 6% in 2019, and rose back to 9% in 2020). People with PV panels and a green contract also want to be more actively involved.
- Concerning the proportion of Flemish who want to contribute financially if a wind turbine is installed in their neighbourhood, it represents the majority of the respondents (61%). Men more often want to contribute financially (64% men, 56% women), just like respondents with a green contract and PV panels. The interest to contribute financially increases with the level of education and family income and decreases with age.[64]

Mapping of institutions and actors that promote or protest RES community energy and selected technologies

In Flanders, actors that promote or protest RES community energy and selected technologies are the following:

- REScoop Vlaanderen[65] is the federation of renewable energy cooperatives in Flanders that seeks to promote the cooperative ideal in the energy domain. They actively promote renewable energy communities following the REScoop Charter[66] which include the International Cooperative Alliance principles[67] . Several of these principles are reflected in the REDII definition of a REC.
- Bond Beter Leefmilieu (BBL)[68] is the Flemish environmental umbrella organisation. The association advocates for a transition to 100% renewable energy and *supports renewable energy communities across Flanders. REScoop Vlaanderen is member of BBL.*
- *Opposition movement Leefbare Energie Vlaanderen*[69] *protests wind projects on topics related to proximity of houses, density of Flanders, visual and noise nuisance, impact on human health, subsidy scheme, legal framework that they defend as less stringent than neighbouring countries, etc*

[64] Flemish energy Agency (2020). Review of the support base for wind energy. Results of the survey in 2020. Available at:https://www.energiesparen.be/sites/default/files/atoms/files/draagvlak_windenergie_2020.pptx. (Accesssed 4 December 2020)
[65] REScoop Vlaanderen, the Flemish federation of renewable energy cooperatives. See: https://www.rescoopv.be/)
[66] The REScoop Charter. See: https://www.rescoop.eu/uploads/rescoop/downloads/REScoopEU_Charter.pdf
[67] The ICA principles. See: https://www.ica.coop/en/media/library/research-and-reviews/guidance-notes-cooperative-principles
[68] Bond Beter Leefmilieu, the Flemish environmental umbrella organisation. See: https://www.bondbeterleefmilieu.be/
[69] *Leefbare Energie Vlaanderen, a Flemish organisation linking opponents of wind project. See:* https://www.leefbareenergievlaanderen.be/

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North-Brabant

Technical, Geographical and Infrastructural conditions

Basic facts

The Dutch target region for COME-RES is the Province of Noord-Brabant (North-Brabant).

Figure 1. Map of Noord-Brabant.

Noord-Brabant is a province in the south of the Netherlands counting around 2,5 million inhabitants. The capital of the province is the city 's-Hertogenbosch. The province has a variety of economic activities ranging from high-tech industry, to manufacturing industry to intensive agricultural industry. The total number of municipalities is 62, of which there are 5 bigger cities which play a centre role in their surrounding subregions. The city of Eindhoven (with 234.000 inhabitants) is the city with the largest population number. The city of Altena is the city with the largest surface area of about 200 km². In and nearby the cities the roads are congested, but there are still larger parts of the province that are less densely populated.

Table 1. Basic Facts, Noord-Brabant (the Netherlands

Area, in km²		**Population, number on 01.01.2020**	
Total	5 082,06	**Total**	2.562.955
Land	4 905,46	*Urban*	
agriculture land	2 389,29	*Rural*	
forest land	835,30		
inland water	176,59		
Mountainous	0		

Source: https://opendata.cbs.nl/statline/#/CBS/nl/

The Energy/Electricity context

At present, fossil fuels (gas, oil, and coal) still make up a major part of the energy supply in the Netherlands, while the share of renewable energies is relatively modest. The country's energy mix is mainly based on the large gas reserves of the Groningen field that ensure gas supply security until 2030. However, in March 2018, the government announced that it will stop gas extraction from the Groningen field by 2030. The decision was made for safety reasons concerning the increase of earthquakes caused by gas extraction (Dutch Government 2018). The phasing out implies a significant turn in Dutch energy supply policy (e.g. every Dutch household has to be disconnected from the gas grid by 2030 and by then has to rely on other energy sources for heating and cooking).

The main local energy resource of the province of Noord-Brabant is the 'Amercentrale' in Geertruidenberg, a coal- and biomass-fuelled combined heat and power plant with 600 MW electrical capacity and 350 MW heat capacity. There are numerous smaller power production units (mainly combined heat and power plants) scattered around the province. Data on the total electricity production in Noord-Brabant is not available. The total electricity consumption of Noord-Brabant in 2019 was 58962 TJ (or 6 378 333,33 MWh).

Table 2. Electricity consumption vs. known renewable electricity production, Noord-Brabant (the Netherlands)

Electricity consumption vs known renewable electricity production		
	electricity consumption, incl. solar electricity behind the meter (TJ)	known renewable electricity (TJ)
2010	55086	7119
2011	55964	7833
2012	56461	8146
2013	57896	7070
2014	56323	5661
2015	56933	5192
2016	57543	5868
2017	58274	6177
2018	59751	8838
2019	58962	

Source: https://klimaatmonitor.databank.nl/jive/report/?id=energiegebruik&inp_geo=provincie_11

Infrastructure and Accessibility

The province is well accessible by all kinds of transport modalities (road, railway, airport). Infrastructure is good and well maintained. In rush hours congestion (mainly around the bigger cities) is a problem.

Restrictions on Land Use

There is a lot of debate in the province about the use of land for the production of renewable energy. Legal restrictions concern the use of land near (military) airports, natural habitats (Natura 2000 and local protected natural areas) and protection of groundwater (no or limited use of cold/heat storage and geothermal energy) (see also the section on spatial planning regulations).

Legal and Policy Framework and Institutions

Policy targets for RES development and RES community energy

Dutch NECP and climate agreement

The Dutch 'Integrated National Energy and Climate Plan 2021-2030' (NECP) contains the main priorities of the climate and energy policy for the next 10 years. The contents are largely determined by the Climate Agreement (established in June 2019) involving over a hundred representatives of lower administrations, industry, and interest groups, under the leadership of the Dutch 'Social and Economic Council' (Sociaal-Economische Raad, SER). This agreement contains a package of measures, adopted by consensus, aiming to achieve the politically agreed CO_2 reduction target of 49% by 2030 compared to 1990 levels. The climate agreement also mentions a specific goal of 50% ownership of RES projects on land by citizens by 2030. To supplement the (new, national) measures in the Climate Agreement, the NECP also contains (i) policy arising from European obligations, (ii) ongoing policy and (iii) policy announced in the Coalition Agreement, but which is not part of the Climate Agreement.

Further, the Dutch NECP includes the following provisions: "*In addition, the government has introduced a fiscal incentive scheme for energy cooperatives that stimulates regional renewable energy communities (energy cooperatives). Members of such cooperatives within the first energy tax bracket are no longer required to pay tax on the percentage of the jointly produced renewable electricity attributed to them. The reduction of the rate of the first bracket to zero is applied to the personal energy bills of members' private consumption (up to 10,000 kWh per year). In this way, these cooperatives are able to produce energy in a more cost-effective manner. At present, the government is also examining whether this scheme can be integrated into the subsidy for feeding back energy in the future. In addition, the government is examining whether a development facility can be set up that allows energy cooperatives to fund development costs (Parliamentary Paper 31 239, no. 287)*".

In many cases, the regional level is the right level of scale for linking the energy transition challenge with other challenges in the physical environment, and thus comparatively weighing up the various interests. Hence, the Climate Arrangement also stipulates the creation of 30 energy regions which together cover the entirety of the Dutch territory. Each energy region is obliged to work out a Regional Energy Strategy. The Regional Energy Strategy offers a new instrument in which municipalities, provinces and water boards work together at the regional level and assess renewable electricity generation, the heat transition in the built-up environment and the related storage and infrastructure needed. They do this together with grid operators, businesses and civil society. The implementation of all Regional Energy Strategies should lead to the generation target of 35 TWh RES on land by 2030 and the development of the necessary local heat infrastructures needed to decouple Dutch buildings from the gas grid by 2030. In line with the assessment principles in the draft 'National Strategy on Spatial Planning and the Environment' (Nationale Omgevingsvisie) which provides a sustainable perspective for the living environment (which comprises both the built and the natural environment)), the Regional Energy Strategy also includes preferred transition pathways in the built environment, the industry, the mobility and transport sector, agro-food products, and the energy system. The Regional Energy Strategy is established by the municipal councils, provincial states and the water boards' general administrative bodies. Elected representatives and day-to-day administrators are usually involved from the beginning of the Regional Energy Strategy process. However, the way in which this happens may vary from one region to the next.

The province of Noord-Brabant supports the Climate Agreement. The provincial Board has adopted an 'Energy Agenda 2030' (Energy Agenda) in which it is stated that by 2050 Noord-Brabant will use 100% renewable energy (for all sectors, including industry and transport) and realise a 90% reduction of CO_2-emissions (compared to 1990). To achieve this a substantial change (50% renewables and 50% reduction of CO_2-emissions) is already necessary and agreed upon in 2030. In 2020 a new Board was formed which is currently translating the 'Energy Agenda' into a new Executional Agenda for the next 3 years. The role of energy communities is mentioned in this plan but there are no formal provincial supporting schemes (i.e. a local energy community can sometimes get a subsidy for a project, but there is no general policy to support the energy community movement as a whole).

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

The position of RECs in national legislation and in national and/or regional policies is just beginning to take form. In current legislation and policy, the operational position of RECs is not explicit.

The new energy law (Energiewet) that is currently under review, states that RECs and CECs are in principle already in a position to be active on the energy market. It is not clear whether specific enabling frameworks will be elaborated. The terms of Guideline (EU) 2019/944 are however more explicit. The new energy law should provide more explicit measures to strengthen the position of RECs and CECs in the implementation.

Table 3. Legal gap analysis, Noord-Brabant (the Netherlands)

	+	+/-	-	Comments
Is there a legal definition of RECs?				Not yet, but there will be an overarching definition for an energy community in the new Energy Law (Energiewet)
Is the definition of RECs in compliance with RED II?				Not yet, but there will be an overarching definition for an energy community in the new Energy Law (Energiewet)
Are final customers, in particular household customers, entitled to participate in a REC?				
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				The Dutch government strives to establish frameworks for the electricity market that encourage fair competition between market parties and do not discriminate against any one party, including parties that offer renewable energy, demand response and storage, including through aggregation. A supply licence must be requested to supply small consumers. The ACM monitors these licences.
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				It is unknown if the National government is carrying out this assessment. No assessment is planned on a regional level.
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				In the Climate Agreement (2019) it was foreseen that by the end of 2020 an enabling framework should be in place. It would have to facilitate energy communities and take away administrative burdens and juridical barriers. This enabling framework is not taken up in the draft new Energy Law (Energiewet). It will probably be implemented by Ministerial decision.
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				The framework is not yet designed. The government will do this after an analysis.

Relevant Institutions[1]

The Ministry of Economic Affairs and Climate Policy (Ministerie van Economische Zaken en Klimaat, EZK) holds the overall responsibility on energy policy. Consequently, the Ministry EZK is responsible for climate change issues, sustainable economy and circular economy, renewable energy and energy efficiency, gas extraction in Groningen, air quality, and economic innovation (Ministry EZK 2018a). The responsible administrative unit within the ministry is the Directorate General for Energy, Telecommunications and Competition. Due to its responsibilities, the Ministry EZK also has a leading role in the negotiations and implementation of the Climate Agreement. In addition to the Economics Ministry, further ministries hold responsibilities on energy and climate change issues. The Ministry of Finance and the Ministry of Infrastructure and Water Management (Ministerie van Infrastructuur en Waterstaat, IenW) are particularly relevant. Apart from infrastructure and mobility, environmental questions, and water management, the Ministry IenW is involved in matters of sustainable economy and circular economy, renewable energies, air quality, and energy efficiency in transport. The responsibility for energy efficiency in buildings, water management, and spatial planning is covered by the Ministry of the Interior and Kingdom Relations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, BZK). The Ministry of Education, Culture and Science (Ministerie van Onderwijs, Cultuur en Wetenschap, OCW) is another relevant department for energy research and science issues.

Several advisory boards give advice on energy and sustainability issues. Following the oil crisis of 1973–1974, the General Energy Council (Algemene Energieraad, AER) was set up by law in 1976. Its tasks were to give advice to the government on energy issues, provide information for public discussions, and monitor the advisory process. The AER was abolished in 2014, and its tasks were delegated to the newly established Council of Environment and Infrastructure (Raad voor de leefomgeving en infrastructuur, Rli). Around this time another council was established, the Advisory Council on Research, Technology and Innovation (Adviesraad voor Wetenschap, technologie en innovatie, AWTI), which accordingly advises on research questions, technology, and innovation. Over time, the Social and Economic Council (SER) has become an important actor in the field of energy and climate protection policies. The government established the SER in 1950 as the central advisory body on social and economic questions. The SER published its first reports on environmental and sustainability policies in the 1970s. At present the SER bases its mission on a broad understanding of welfare, which seeks to balance economic, ecological, and social dimensions. Since energy and climate policies affect all sectors, different levels and stakeholders, the council supports cooperative policy making by the government, the social partners, and other interest groups. Another important expert institution is the Netherlands Environmental Assessment Agency (Planbureau voor de Leefomgeving, PBL). The PBL works out cost calculations and projections on energy and climate policy measures, CO_2 emission developments, and energy efficiency measures. The PBL also participates in the negotiations on the Climate Agreement. The Netherlands Authority for Consumers and Markets (Autoriteit Consument & Markt, ACM) under the responsibility of the Ministry of Economic Affairs

[1] This section is an excerpt from Musch (2019), Section “Political institutions and actors”.

and Climate Policy (EZK) supervises the electricity, gas, and district heating markets. Consequently, the ACM is also charged with the regulation of the transmission system operators (TSOs) and distribution system operators (DSOs) of the electricity and natural gas networks. The state-owned companies TenneT and Gasunie Transport Services (GTS) are the designated TSOs of the national high-voltage electricity grid and the gas transport system, respectively. Both TenneTand and Gasunie also operate in Germany. The regional grid operators Cogas, Enduris, Enexis, Liander, Rendo Netwerken, Stedin, and Westland Infra manage the lower-voltage networks.

The central government also involved the provinces and municipalities in the negotiations of the Energy agreement via their umbrella organisations, the Association of the Provinces of the Netherlands (Interprovinciaal Overleg, IPO) and the Association of Netherlands Municipalities (Vereniging van Nederlandse Gemeenten, VNG). According to their statutory role in the fields of spatial planning, regional economy, licensing procedures, and mobility, the provinces undertake various implementation tasks. Likewise, local authorities are included in the implementation (cf. section on licensing and other regulatory requirements).

Regulatory Procedures and Incentive Schemes

Licensing requirements for RES communities in Noord-Brabant, the Netherlands

If a RES community wants to produce and sell renewable electricity, they have to respect the regulations applicable to regular electricity suppliers (e.g. licensing requirements). As for regular electricity suppliers, connection to the grid has to be approved by either the high-voltage electricity transmission grid manager (i.e. Tennet) or the regional distribution network manager (i.e. Enexis in Noord-Brabant).

Many RES communities therefore contract licenced energy suppliers that offer ‘green’ energy contracts on the market. A group of Dutch cooperatives however have joined forces to establish their own local energy supplier, a so-called ‘cooperative of cooperatives’ with a permit to trade on the energy markets. Since 2013 two cooperatively owned energy suppliers have been active on the market. Both were awarded the highest ranking as green suppliers in the Netherlands in November 2018. Revenues are returned to the local members. More than 130 cooperatives all over the Netherlands are members of one of these cooperative suppliers.

Also innovative is the introduction of a certified trademark or label, the so-called ‘Keurmerk MienskipsEnergie’ that serves as a quality guarantee for local and fair energy, i.e. supported by and benefiting communities. This trademark plays into the trend of a growing demand for locally generated electricity. Municipalities are increasingly ‘greening’ their procurement strategies and are contracting cooperative suppliers for green and local energy.

Impact Assessment and Land Use Planning Requirements of relevance to RES communities in Noord-Brabant, the Netherlands

In the Netherlands the current legislation is being revised and nearly all relevant legislation will be taken up in the new 'Environment and Planning Act' (Omgevingswet). Environmental legislation consists of dozens of laws and hundreds of regulations for land use, residential areas, infrastructure, the environment, nature and water. Each has its own starting points, procedures and requirements. This makes the legislation too complex for the people who have to work with it. Consequently, it takes longer to get projects off the ground. The cabinet wants to simplify the laws on the environment and planning and to combine them in a single 'Environment and Planning Act'. For the time being, the Act will replace 15 existing laws, including the 'Water Act', the 'Crisis & Recovery Act' and the 'Spatial Planning Act'. The provisions of eight other laws will be transferred to the 'Environment & Planning Act'. The new bill has been approved by both Chambers of Parliament. The cabinet now draws up introductory legislation. The expectation is that the Act will take effect in 2021.

The new Act will result in fewer regulations and will reduce the burden of conducting studies. At the same time, decisions on projects and activities can be made better and more quickly. Moreover, the Act is more in line with European regulations and allows more room for private initiatives. The most important current legislation (to be involved in the new Environment and Planning Act) are:

- **Environmental management law (Wet Milieubeheer):** Legislation for defined activities, such as the realisation of a wind turbine or wind site, that can have a negative environmental impact.
- **Environmental impact assessment law (Milieueffectrapportage, m.e.r.):** In an environmental impact assessment report for wind sites the effects of the site on the environment and on nature are mapped. Mostly different alternatives are compared to each other. The m.e.r. is the base for a site allocation plan, integration plan and for permits. Wind sites with a power over 15 MW or with a minimum of 10 turbines are obliged to undertake a m.e.r. procedure. Wind sites under 15 MW, but with at least 3 turbines follow a so-called form-free judgement that determines whether a m.e.r. is necessary.
- **Electricity law (Elektriciteitswet):** In the Electricity law of 1998 the division of authority between national, provincial, and municipal governments is made clear. This law also gives rules for production, transport and supply of electricity. Wind sites with a capacity up to 5 MW have to be approved by the municipality. Wind sites between 5 and 100 MW are primarily governed by the municipality. However, if a municipality does not make a decision, the project initiator can ask the Province to decide. Wind sites with a capacity of more than 100 MW are approved by the National Government.
- **Law for the protection of nature (Natuurbescherming):** With the realisation of a wind site the interest of nature must be taken into account. The Law for the protection of nature lays down rules for the protection of natural habitats (Natura 2000-areas) and of plant- and animal species. If an

activity such as a wind site has a negative impact on protected natural areas and/or on protected plant- and animal species the developer must produce a proper assessment to map the impact and take measures to mitigate the impact. The authority then decides on a permit for the activities.

- **Water law (Waterwet):** The Water law deals with the management of surface and groundwater.

Incentive Schemes for RES[2]

On a national level there are 4 incentive schemes for established technologies. Next to this, a net metering scheme is in place for small consumers (i.e. consumers connected to the network via a small-scale consumer connection of max. 3 x 8 Amps). This scheme will be replaced after 2023.

1) A tax incentive that consists of a return of paid VAT for solar panels for natural persons
2) The SDE++ scheme (for large projects)
3) the 'zip code catchment area' arrangement (for smaller projects)
4) The 'experiment regulation' (experimenteerregeling) creates regulatory sandboxes to experiment with new integrated energy solutions that are not (yet) permitted on current law (e.g. peer-to-peer energy trading).

The SDE++ provides subsidies for the use of techniques for the *generation* of renewable energy and other CO_2-reducing techniques. This subsidy is intended for companies and organisations (non-profit and otherwise) in sectors such as industry, mobility, electricity, agriculture and the built environment. If an SDE++ subsidy is granted, it will be awarded over a period of 12 or 15 years. The duration of the subsidy will depend on the technology used.

The Dutch 'zip code catchment area' (PostCodeRoos) arrangement is an energy tax reduction scheme for natural persons living in a certain postal code area. By stipulating a well-defined area, this arrangement facilitates the recruitment of participants in local RES communities because they are entitled to a refund of the energy tax. A condition is that these participants are connected to the network via a small-scale consumer connection (max. 3 x 8 Amps). The Zip code catchment area is determined by the place (zip code) where the electricity generation facility is located. This 4-digit area forms the heart of the rose. The entire Zip code catchment area is formed by the heart together with all adjacent 4-digit zip code areas (which form the petals of the rose). It will be replaced by a new arrangement in 2021.

The 'experimenteerregeling' ('experiment arrangement') is a scheme that provides a temporary exemption to the electricity (and in the future also gas) law to initiatives and pilot projects who want to experiment in the energy sector. The goal and underlying idea is to test the desirability of the initiatives and identify flaws and barriers in the electricity law to achieve the goals. This is an opportunity for community driven initiatives, because they can be tested in real-life environments even when they do not comply with existing regulation.

[2] Information in this section is based on RVO (2020b).

A new experiments arrangement, with a broader scope of actors and goals is expected in the Netherlands, potentially leading to even more learning effects.

Consumer participation in the energy system, self-generation and new integrated solutions (including smart meters and energy storage)

Overall, the Netherlands' aim is to ensure that consumers are able to optimally benefit from competition on the energy market, to make conscious choices and receive fair remuneration for investments in self-generation. No separate, national objectives have been formulated for this purpose, except the national target for 80% of Dutch small consumers of electricity and gas to be supplied with a smart meter by 2020. Furthermore, consumers in a competitive Dutch market are able to choose from an abundance of diverse types of providers. Suppliers offer different types of contracts, such as contracts for the supply of 100% renewable energy, the supply of 100% renewable electricity of Dutch origin, etc. There are currently 58 different licensed providers who often offer multiple options operating on the Dutch retail market. The Netherlands also has a relatively high percentage of consumers who switch suppliers (16% in 2017) (The Netherlands Authority for Consumers and Markets (ACM), 2020). In addition, a growing number of consumers have become prosumers who consume part of their own electricity and feed in the surplus electricity to the grid, for which they are remunerated through the net-metering scheme. This scheme will eventually be replaced after 2023.

The development in the field of integrated solutions including a form of energy storage (mostly in batteries) is currently being held back by a lack of demand for flexibility (gas-fired power plants cover the flexibility needs of the current electricity system). Due to the currently limited value of (local) flexibility, the commercial application of electricity storage (and thus of batteries) is lagging behind. Furthermore, there is an obstacle in legislation and regulations with regard to feeding stored electricity back to the grid (under current regulations, a supply license is needed). Furthermore, there is currently insufficient opportunity for small consumers to use the collectively stored electricity in batteries in an aggregated way to provide flexibility services to the market. For this service, firstly a smart meter is required and for secondly aggregation must be defined and regulated by law. The first requirement takes place through a roll-out by grid operators (target 80% by the end of 2020), the second requirement will be implemented via the legal transposition of the new EU Electricity Directive into the Energy law.

Social conditions

Ownership structure and State of the art of community energy development in Noord-Brabant

The Netherlands has a long tradition of co-operative ownership and decision-making, which partly explains the strong development of RES communities (Hier Opgewekt, 2018). Cooperative activities in the energy domain in the Netherlands started about thirty years ago with the first wind cooperatives. These 'first generation' cooperatives are still very active and are by now realizing large-scale projects. By the end of 2019, one or more energy cooperatives have been established in two thirds of all municipalities. An estimated number of 85,000 citizens are members of an energy cooperative, amounting to about 1% of all Dutch households.

The most prevalent form of organizing RES communities in the Netherlands is through the cooperative form. According to the latest official figures (Hier Opgewekt, 2019), 582 energy cooperatives were active at the end of 2019. Nearly 70% of all cooperatives are working on energy saving, 75% on solar and 20% on wind projects. Increasing numbers are working on district heating plans. The solar power capacity owned by cooperatives in the Netherlands doubled to 74.5 MW_p in 2018 and amounts to nearly 2% of all installed solar power in the Netherlands (most solar power to date is installed on the rooftops of individual households and companies). Cooperative wind power capacity amounts to 159 MW in 2018.[3] In other words, almost 5% of all land-based wind power capacity. Collective storage projects are a newly emerging phenomenon.

In Noord-Brabant, 56 RES communities are registered (https://www.hieropgewekt.nl/lokale-energie-monitor), all involving collective ownership of PV installations. The large majority of these communities are small-scale initiatives involving PV installations on rooftops with a rated power < 100 kW_p (up to max. 500 kW_p). Six collective wind power projects are 'in the pipeline' (planning or implementation stage).

Social Acceptance of RECs/RES in Noord-Brabant, the Netherlands

With an addition of almost 100 cooperatives in 2019, it is clear that the RES community movement is gaining momentum. Effectively, it can be said that the movement consisting of many local propagators has been organizing a nation-wide campaign for over ten years, mobilizing the Dutch for the energy transition. Public research by Motivaction (2017) shows that two-thirds of the Dutch population is positive about joint production of sustainable energy in the residential environment, and 30% is willing to participate in an energy cooperative, or in a wind collective or wind farm, and another 30% is 'perhaps' willing to do so (this number should however be compared to the approximately 1% of Dutch households that up till now have actually decided to join an energy cooperative).

[3] This number is based on the percentage active ownership by cooperatives. E.g. if a cooperative owns 53% of a particular wind turbine park, then 53% of this capacity is counted as being cooperative wind power.

Social acceptance of renewable energy generation in the form of wind turbines and/or solar fields is a growing problem in the Netherlands and in our target region. According to Motivaction (2017), the realization that a transition to more sustainable energy consumption requires changes to the living environment is not so strongly present. Six out of ten Dutch people expect that the Dutch landscape will change (drastically) in the coming years as a result of wind turbines and solar parks and power lines, but only one fifth of the population is of the opinion that the energy transition will have direct consequences for their own neighbourhood. Changes in the neighbourhood can also meet with resistance. More than four in ten Dutch people would accept changes, but almost a quarter of the population find it (very) unacceptable if their immediate living environment changes due to the construction of wind turbines and solar parks and high voltage power lines.

The University of Nijmegen has researched to what extent cooperative ownership and the vicinity of existing wind turbines influence the process of development of, and being granted a permit for, onshore wind projects in the Netherlands (Matijssen, 2019). The main conclusion is that cooperative wind projects have a higher chance of being granted a permit, but do not have a significantly higher chance of being developed. Once wind projects have received a permit there is also no difference in chance of being developed for cooperative and non-cooperative wind projects.

Relevant institutions that promote or protest RES communities and selected technologies

In the Netherlands, actors that promote or protest RES community energy and selected technologies are the following:

1. 'Energy Together' (Energie Samen, https://energiesamen.nu/) is the federation of renewable energy cooperatives in the Netherlands that seeks to promote the cooperative ideal in the energy domain. They actively promote renewable energy communities through the International Cooperative Alliance principles.
2. The 'Environmental Federation of Brabant (Brabantse Milieufederatie, https://www.brabantsemilieufederatie.nl/) is the environmental umbrella organisation for the province of Noord-Brabant. The association advocates for a transition to 100% renewable energy and supports RES communities across Noord Brabant. The Brabantse Milieufederatie is also active in representing the RES communities in the development of the Regional Energy Strategies (Noord-Brabant counts 4 energy regions).
3. The 'Foundation National Critical Platform Wind Energy' (Stichting Nationaal Kritisch Platform Windenergie, https://www.nkpw.nl/) supports local actions against wind power installation based on the opinion that wind energy can only provide a limited contribution to the sustainable energy supply of the future, whereas it has a big impact on local environments).

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Norte

Technical, Geographical and Infrastructural conditions

Basic facts

Norte is one of the seven NUTS II regions in Portugal, bordering Spain in the north and east borders, and the Atlantic Ocean in the west (Figure 1). With around 3.6 million inhabitants, it is the most populated region in Portugal. It concentrates more than one third of the Portuguese population, being responsible for nearly 39% of the national exports and representing about 29% of the national GDP (CCDR-n, 2020). As regards public administration, Norte Region is composed of 86 municipalities and 1426 parishes, organised into eight inter-municipal communities (Figure 2). A large share of the population is concentrated in the Metropolitan Area of Porto (southwest part of the region), an area predominantly urban with a high population density. On the other hand, the inner part of the region is characterised by a low population density, where agriculture and forest land occupy a significant share of the territory.

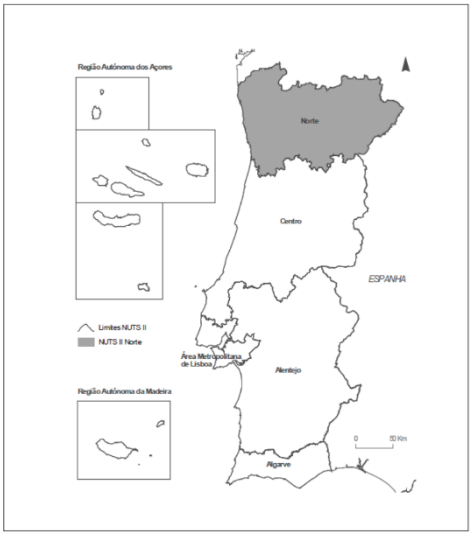

Figure 1. Territorial division of Portugal by regions NUTS II, highlighting Norte Region (INE, 2019)

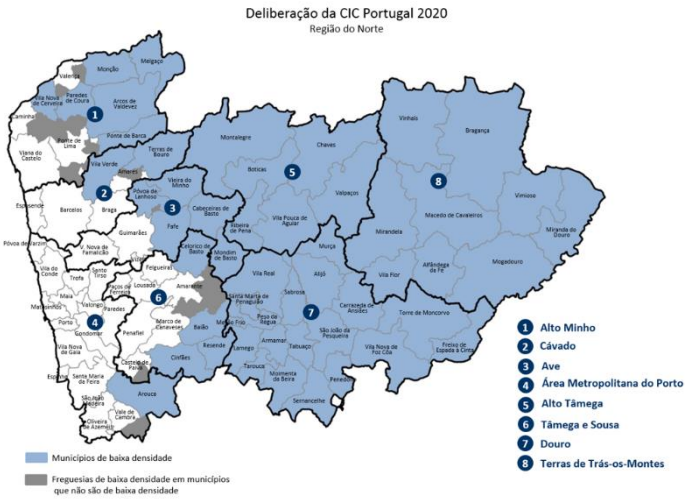

Figure 2– Territorial division of NUTS II Norte Region: NUTS III and Municipalities, with identification of low density areas (CCDR-n, 2020)

The region as a whole has over 21 thousand km^2, with 143 km of coastline. Concerning land use, over half of the territory corresponds to forest land, and about one third is used for agricultural purposes, including agricultural fields and grasslands (Table 1); around 7% of the territory consists of artificial land. The topography is irregular, with nine major mountain systems (more than 1000m high) being located in the Norte Region.

Table 1. Basic Facts of Norte Region of Portugal in 2018 (INE, 2019)

Area, in km²		Population, in 31.12.2018	
Total	21 286	**Total**	3 572 583
Land			
Agriculture land	*6 593*	*Urban*	*2 636 148*
Forest land	*12 628*	*Peri-urban*	*599 363*
Inland water	*220*	*Rural*	*337 072*

The Energy/Electricity context

In 2018, final energy use within the Norte Region exceeded 44 thousand GWh, with more than 43% for transportation purposes. The industry sector represents around 24% and the buildings' sector, including residential and services buildings, represents 28%. Electricity and diesel are the most used energy carriers, corresponding each to one third of the overall final energy consumption. Figure 3 presents a disaggregation of the final energy use per sector and energy carrier.[1]

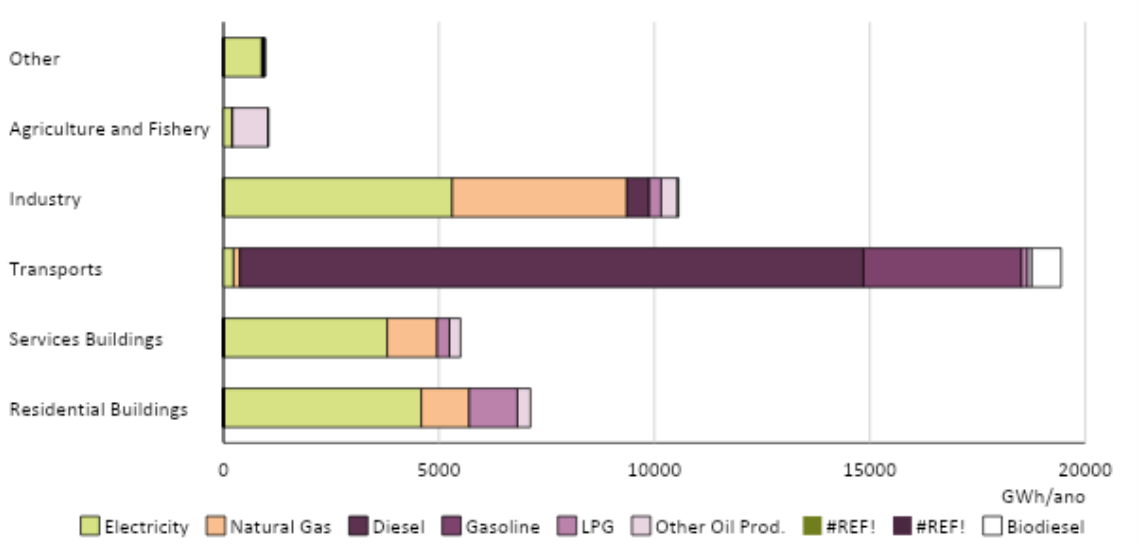

Figure 3. Final energy use per sector and energy carrier in Norte Region of Portugal, in 2018 (DGEG, 2020a)

With regards to electricity, buildings and the industry sector are responsible for the most significant share of consumption, representing more than 85%.

[1] Due to lack of available data, the direct use of biomass and solar energy are not accounted for.

Regional electricity generation from RES

Norte Region has a long history of electricity generation from RES, with several large hydro power plants being located in the region. Currently, the electricity generation from hydro in the Norte represents on average 75% of the national hydroelectricity output. However, it is subjected to high inter-annual variability. Wind power is also significant, with 2.2 GW of installed capacity, and over 5.3 TWh of yearly generation. Figure 4 presents the evolution of RES electricity generation disaggregated per technology, and Figure 5 the evolution in installed capacity.

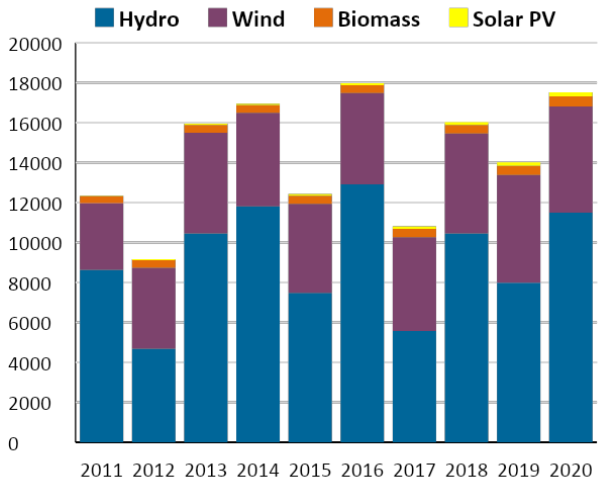

Figure 4. Evolution of RES electricity generation per technology in the Norte Region, in GWh/year (DGEG, 2020b)

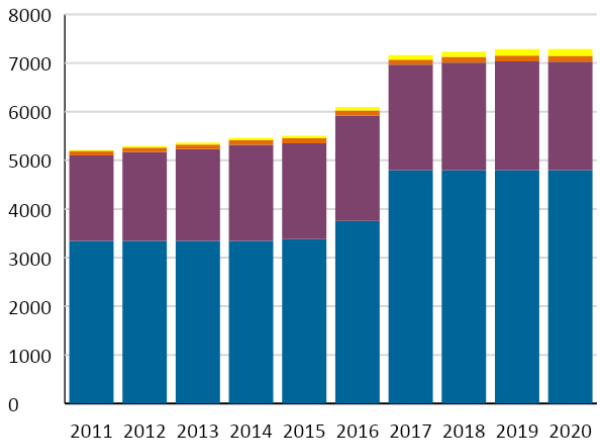

Figure 5. Evolution of RES installed capacity per technology in the Norte Region, in MW (APREN and INEGI, 2020)

Infrastructure and Accessibility

Norte is an accessible region with a dense transport network, including road and railway infrastructure, and an international airport with a capacity of 2800 passengers/hour. Table 2 presents the density of transport infrastructure, road and rail, in Norte.

Table 2. Transport infrastructure density in the Norte Region, in 2018 (INE, 2020a; INE, 2019)

Road infrastructure density[2]		**Rail infrastructure density**	
km per 1000 km^2 of regional surface area	km per 1000 inhabitants	km per 1000 km^2 of regional surface area	km per 1000 inhabitants
175.7	1.05	21.2	0.13

[2] Refers to the road infrastructure from Distritos Braga, Bragança, Porto, Viana do Castelo, Vila Real e Viseu (territorial units included in the Norte Region, not corresponding to the whole region).

Restrictions on Land Use

Within the Norte Region, a share of the territory corresponds to natural protected areas, which may incur some restrictions on land use for RES development. Restrictions are specific to each protected area and/or reserve, independently of the typology, being defined by the diploma that creates or requalifies the respective area and the related regulating diplomas. The specific restrictions can range from the obligation to perform an environmental impact assessment to the prohibition of installing any infrastructure associated with energy transformation, distribution and transport. If permitted, the installation in protected areas is always subject to environmental impact assessment. All protected areas with national ambit, including national parks, natural parks, natural reserves and protected landscapes, are subject to a dedicated planning process that includes the definition of a land-use plan, with specific regimes of resource protection and of restrictions to the different activities. The ambit of the protected area refers to the governance level responsible for the regulation and management of the area. Table 3 presents an overview of the protected surface area per typology of protected area.

Table 3. Surface of Rede Natura 2000, Ramsar and protected areas in the Norte Region in 2019 (INE, 2020b)

Type of protected area	**Surface (ha)**
National park – area with national ambit that contains representative samples of natural regions, natural landscapes and with human intervention, biodiversity elements and geolocations, with scientific, ecologic and/or educational value.	69 594
National natural park – area with national ambit that contains natural and semi-natural ecosystems, where the long-term preservation of biodiversity may depend on human intervention.	151 454
Regional natural park – area with regional ambit that contains natural and semi-natural ecosystems, where the long-term preservation of biodiversity may depend on human intervention.	24 769
Local natural reserve – area with municipal ambit that contains ecologic, geologic and physiographic characteristics with scientific, ecologic and/or educational value.	66
Regional protected landscape – area with regional ambit that contains landscapes resulting from the interaction of humans with nature, with significant aesthetic, ecologic or cultural value.	12 039
TOTAL	**257 921**

Policy Targets for RES development and RES community energy

National quantitative targets

The National Energy and Climate Plan 2012-2030 (NECP), published in December 2019, establishes the Portuguese national policy targets for RES development up to 2030 (Presidência do Conselho de Ministros, 2020). In this context, Portugal committed to achieve a **47% share of RES** in overall final energy consumption by 2030, and **80% RES in the electricity sector**. As regards electricity generation, Portugal aims at reinforcing the exploration of different endogenous resources including hydro, onshore wind, solar photovoltaic, biomass, geothermal, concentrated solar thermal, waves and hybrid systems. The perspectives in terms of installed capacity and electricity generation *per* technology are presented in Figure 6 and Figure 7, respectively. Specifically, for PV, the plan makes the distinction between centralised and decentralised generation, estimating an installed capacity of 2GW of decentralised PV in 2030 (corresponding to four times the estimated capacity in 2020).

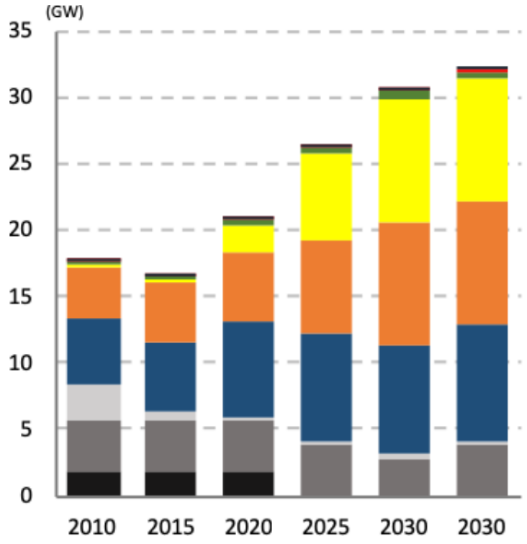

Figure 6. Estimated installed capacity for electricity generation per technology in Portugal by 2030 (Presidência do Conselho de Ministros, 2020)

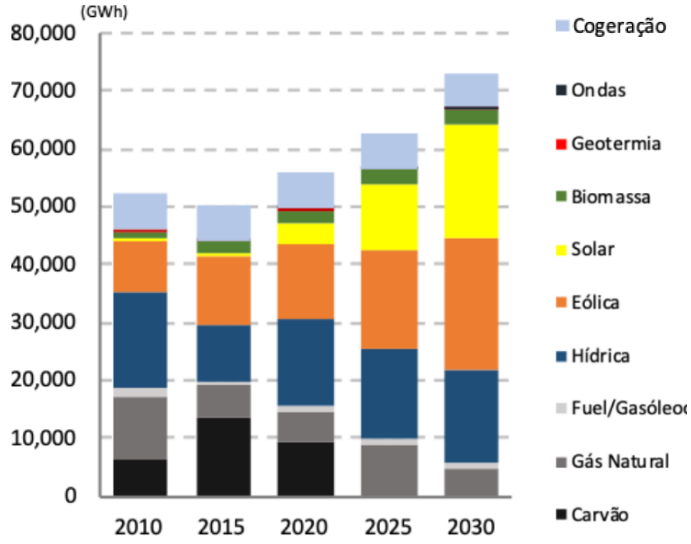

Figure 7. Estimated evolution of electricity generation per technology in Portugal until 2030 (Presidência do Conselho de Ministros, 2020)

Long-term targets for the decentralisation and democratisation of electricity generation are more ambitious, estimating an installed capacity of 12 to 13GW of decentralised solar PV in 2050 (Presidência do Conselho de Ministros, 2019c). According to the different scenarios presented in the national roadmap towards carbon neutrality, individual consumers and SMEs could be responsible for more than **20% of the national electricity generation**, with the participation of energy generation cooperatives and energy communities (Presidência do Conselho de Ministros, 2019c).

National qualitative targets

The NECP refers to the importance of energy communities for the achievement of national RES and GHG emissions reductions targets, without presenting clear targets for their implementation at national level. The promotion and dissemination of decentralised electricity generation from RES and energy communities are mentioned as particularly **relevant for the achievement of RES targets on solar PV**. Moreover, energy communities are also considered relevant for the attainment of national targets on participation of consumers in the energy system, and on the reduction of energy poverty. Within the planned policies and measures, there is one line of action specifically focusing on "Promoting the dissemination of distributed production and self-generation of energy and energy communities", including the creation of a favourable legal and regulatory framework.

It is also highlighted the existence of a broad political consensus in favouring the approximation between supply and demand, aligned with the initial legal frameworks enabling electricity production/prosuming in households. Exemptions for REC energy communities have also been subject of discussion, the most prominent one being the exemption of a tax element named "General Interest and Expenditure Costs" which include, among others, the fixed costs with the electricity transmission and distribution infrastructure.

Regional targets

At the Norte regional level, there are no specific targets for the deployment of RES and the implementation of RES community energy.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

The legal framework for RECs in Portugal, defined by Decree Law 162/2019 October 25, 2019, entered into force in January 2020.[3] This decree partially transposes the RED II, establishing the legal framework applicable to self-consumption of RES and to RES energy communities (*Comunidades de Energia Renovável*) (Presidência do Conselho de Ministros, 2019b). Moreover, the Portuguese government has implemented additional regulations which establish specific provisions for RECs, including: (1) Regulation nº266/2020 of March 20,2020 (ERSE, 2020b); (2) Directive 5/2020 of March 20, 2020, regulating grid tariffs for self-consumption (ERSE, 2020a); and (3) Despacho nº 6453/2020 of June 19, 2020, exempting RECs and collective self-consumption schemes from paying part of the grid charges (CIEG) (MAAC, 2020).

[3] A proposal for the revision of DL 162/2019 is currently undergoing a public consultation process. Source: https://www.erse.pt/atividade/consultas-publicas/consulta-p%C3%BAblica-n-%C2%BA-93/ [accessed on 22.Dec.2020]

Table 4. Legal gap analysis of the Portuguese transposition of RED II, considering legal and enabling frameworks for RECs (traffic-light system)

Elements to assess the legal gap	+	+/-	-	Comments
Is there a legal definition of RECs?				RECs are legally defined in the DL 162/2019 as a collective person, profit or non-profit, based on the open and voluntary adhesion of their members, partners and/or shareholders.
Is the definition of RECs in compliance with RED II?				Shareholders and members may include (but are not limited to) natural persons, SMEs and/or local authorities.
Are final customers, in particular household customers, entitled to participate in a REC?				According to DL 162/2019, members and/or partners of RECs can be individual or collective persons, public or private, not excluding household customers.
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				Framework for activities other than self-consumption and the treatment of potential surpluses is only established for electricity.
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				The Directorate-General for Energy and Geology (DGEG) is responsible for assessing the obstacles and potential of RECs, within the two years following the entry into force of the DL 162/2019.
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				Once the assessment of barriers and potential of RECs in Portugal is concluded, DGEG must propose measures to facilitate and promote the development of RECs. The enabling framework is required by national legislation (DL 162/2019), but it is not in place yet.
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				No support schemes in place to create a level playing field for RECs.

The legal framework applicable to RECs in Portugal has already been assessed in the context of other EU Horizon 2020 projects, including BRIDGE (Hannoset et al., 2019) and Compile (Tuerk and Frieden, 2020).

Mapping Relevant Institutions with jurisdiction on RES community energy

Ministério do Ambiente e Ação Climática (Secretaria de Estado da Energia): Government official responsible for energy is in charge of the design of the support scheme(s) that takes into account the specificities of RECs.

Entidade Reguladora para os Serviços Energéticos (ERSE): National regulatory authority is responsible for the feasibility assessment of local grid tariffs in case RECs make use of the local network to transfer electricity for self-consumption purposes.

Direção Geral de Energia a Geologia (DGEG): Entity responsible for the assessment of existing obstacles to the development of RECs, and respective potential in Portugal, being also entitled to propose the necessary measures to create the enabling framework. DGEG is also responsible for the assessment, on a case-by-case basis, of the close neighbourhood relationship and proximity criteria for RECs projects.
Agência Portuguesa do Ambiente (APA): Public authority responsible for Environmental Impact Assessment procedures.

Regional Institutions
Comissão de Coordenação e Desenvolvimento Regional do Norte (CCDR-n): Regional public institution working towards the integrated and sustainable development, responsible for the implementation of policies on environment, land use and regional development in Norte Region.
Local Institutions
Local authorities/Municipalities: Local authorities are responsible for local land-use planning, licencing a significant number of infrastructures and buildings, specific buildings' regulations and promoting a series of good environmental and energy practices, competences that may have implications for the development of RES projects.
Intermunicipal authorities: Associations of geographically adjacent municipalities that gather a set of local responsibilities and competences.
Local energy agencies: Entities responsible for supporting local authorities in defining and implementing their energy policies, including the training of technical staff and awareness of general population. These agencies may be associated with one or several municipalities.

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

Not applicable.

Licensing and other Regulatory Requirements for RES community energy

RES community energy projects are subject to several exemptions from communication, registration, certification and licensing responsibilities, in accordance with the installed capacity. More specifically, the requirements for the installation of RECs projects, in accordance with Article 20 from the Decree-Law nº 162/2019, are the following:

- Installed capacity < 350W: production units are not subject to prior control
- Installed capacity 350W – 30kW: production units subject to prior communication in the dedicated platform made available by the DGEG, referring to the declaration of intent of exploration of the production unit with the identification of the promoter and characterisation of the unit
- Installed capacity 30k – 1MW: production units are subject to the prior registration for the installation and the operating certificate emitted by DGEG; the positioning of the system operator regarding the conditions and regime for injection into the grid may be required by the DGEG when connection to the grid exists
- Installed capacity > 1MW: production units are subject to licensing for production and operation by the DGEG, and the capacity reserve may be required when connection to the grid exists.

The Government official responsible for energy is entitled to define further specific requirements to RECs. Smart meters are a prerequisite for the establishment of RECs and, until January 2021, projects need to be located at the same voltage level. (Presidência do Conselho de Ministros, 2019b)

According to the legal framework on environmental impact assessment, implemented through the Decree Law 151-B/2013, revised by the Decree Law 47/2014 and by the Decree Law 179/2015, the installation of solar PV units may require an impact assessment, depending on the size, location and potential impacts on the surroundings (MAMAOT, 2013). This is decided on a case-by-case basis, by the Government officials responsible for energy and for the environment.

Incentive Schemes for RES community energy

At national level, the feed-in-tariff scheme in place until 2012 was the most relevant incentive scheme to promote electricity generation from RES. When established, through the Decree-Law 168/98 the value of the fixed guaranteed tariff was differentiated by RES technology and applied until a certain level of RES electricity generation (Proença and Aubyn, 2013). Since 2002, different regimes were developed for lower capacity generation, with the definition of the microgeneration regime by the Decree-Law 68/2002 (Netto, 2013). From then onwards, support to new RES plants can be provided through a special regime (PRE), where generators can be under the general regime (i.e. wholesale electricity market) or under a guaranteed remuneration system (Presidência do Conselho de Ministros, 2019a). Small production installations based

on a single technology can benefit from a unique remuneration system, i.e. a unique tariff is established for a 15 years period using a bidding model in which producers offer discounts to the reference tariff (MEI, 2006). The installation of solar PV has also been promoted through the initiative *Leilões Energia Solar* which corresponds to the auction of production licences for solar (GovPT, 2020).

Incentive schemes specifically targeting RECs are not yet established in Portugal. As a first step, from June 2020, RECs are exempt of one element of the grid tariff, named CIEG (*Custos de Interesse Económico Geral*).[4] The reduction applies to initiatives registered until 2021 for the first seven years of their operation (MAAC, 2020).

Social Conditions

Ownership structures and state of the art of community energy development

In Portugal, and in particular in the Norte region, community energy initiatives (although with a different designation) were frequent in the early 20th century, with small hydro power plants and distribution grids operating in relatively small regions for some emergent industries. The small share of distribution grids currently not operated by EDP Distribuição is a direct descendant from those times. Throughout the 20th century, centralization became dominant, reducing the implementation of community energy initiatives. Demand side management and the independent power producer rules of operation were only legally established in the late 1980s in Portugal, with the publication of the Decrees no. 188/88 (MIE, 1988a) and 189/88 (MIE, 1988b).

Despite the significant evolution of the energy sector, the development of Energy Communities is still limited. There are already some cases of collective investment in PV projects, where individuals gathered and invested in a common generation site. Nonetheless, the majority of existing projects still lack a shared management of energy generation and use, and a concrete active participation of the community in the energy system.

As regards ownership structures, there is some tradition of energy cooperatives owning and managing distribution grids in Portugal, mainly associated with industrial developments, municipalities and the autonomous regions (Azores and Madeira) (Hannoset et al., 2019). In Norte Region, CEVE[5] and A CELER[6] are an example of this ownership structure.

[4] The CIEG are the costs of energy policy, environmental or general economic interest associated with the production of electricity and the costs of sustainability of markets.
[5] https://www.ceve.pt/
[6] http://www.aceler.pt/

Social Acceptance of RES community energy and selected technologies

In Portugal, citizens are generally supportive of RES developments, without significant opposition by local inhabitants. A survey with 3646 respondents showed that solar power plants are considered as the most desirable technology in terms of economic and environmental benefits (Ribeiro et al., 2014). There are also studies that show some ambivalence in how communities perceive renewable energy, especially in what concerns landscape and the contribution of renewable energy to local development (Delicado et al., 2016). The authors suggest that the consideration that RES developments in Portugal did not significantly contribute to local development is highly associated with the fact that the main promoters of the energy infrastructures are large national or international companies. The lack of relation between electricity production and local economies and activities may also be a determinant factor.

As the concept of RES community energy is not widely disseminated, the perception of social acceptance of this type of developments is unclear.

Mapping of institutions and actors that promote or protest RES community energy and selected technologies

In the current context, the institutions that promote RES community energy and solar PV technologies are non-profit associations aiming at the promotion of RES at the national level. **APREN** is a non-profit association, which coordinates and represents the interests of their members towards the promotion of RES in the electricity sector. The associated members are both singular and collective persons who either are authorised producers of renewable electricity or are interested in the issues associated with the development of RES electricity generation in Portugal. APREN works together with public authorities in the definition of energy policies in Portugal, privileging from a permanent contact with the national government, energy and environment related ministries and their official agencies.

Similarly, **APESF** is a non-profit association focused on the promotion, development and dissemination of solar PV. The associated members are both singular and collective persons who either are authorised producers of renewable electricity or are interested in the issues associated with the development of RES electricity generation in Portugal. APREN works together with public authorities in the definition of energy policies in Portugal, privileging from a permanent contact with the national government, energy and environment related ministries and their official agencies.

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Norway

Technical, Geographical and Infrastructural conditions

Basic facts

Norway has a large latitudinal range, stretching over 1,750 km from the north to the south. The Norwegian landscape is dominated by the long coastal line, forest, mountains, and mountain plateau. The average density is low with 14 inhabitants per km^2 and only about 2 % of Norway's area is developed. Of the developed land most is roads, residential houses, and leisure home buildings (Statistics Norway). The population of Norway is mainly concentrated in urban[1] areas. In general Norway has many sparsely populated areas and small municipalities.

Table 1. Basic Facts Norway

Area, in km^2		**Population, number on 01.01.2020**	
Total	385 180 km²	**Total**	5 374 807
Land	365 246 km²	*Urban*	4 229 849
agricultural land	3,5 %	*Rural*	*968 576*
forest land	37,4 %		
inland water	6,2 %		
Mountainous	7,4 %		

Source: Statistics Norway

Norway's climatic conditions vary considerably. The Northern latitude has a cold climate, the Gulf stream ensures that the coast enjoys a milder climate, while it can get very cold in some of the inland areas during winter.

There are five key regions in Norway: The Northern, Mid, Western, Eastern and Southern region. There are 356 municipalities located within 11 counties. The island territories of Svalbard and Jan Mayen are outside the county division and ruled directly at the national level. The capital Oslo is considered both a county and a municipality. There are substantial differences between the Norwegian municipalities concerning population size, area size and climate. Most of the municipalities are located in the Western and Eastern part of Norway where the majority of the people live. Most of the small municipalities are in Northern and Mid Norway (Linnerud et al., 2018).

Norway has an indigenous population, the Sami. There is no registration of the Sami population, therefore it is not known how many Sami there are in Norway today, but more than 18,000 are registered with voting rights in elections to the Sami Parliament. The most concentrated Sami settlement areas are in Northern Norway (on a mountain range on the Arctic Circle) and Mid Norway. The Sami are engaging politically to

[1] Statistics Norway operates with a definition of urban (tettsted) that specify a gathering of houses with at least 200 people residing and where the distance of the houses do not exceed 50 meters.

protect ancient reindeer grazing land from development. This is of relevance for RES community energy as the Sami population has actively participated in the social movement against wind power on land because several projects have had consequences for the reindeer husbandry.

The Energy/Electricity context

The electricity generation in Norway is almost completely derived from hydropower, which constitute approximately 95 %, with small shares of thermal/fossil and wind power (Sælen and Cherry, 2017). Norway also has conducive climatic conditions for wind power in several regions (Linnerud et al., 2018). The conditions for solar is less favourable in Norway, but still relevant for decentralised systems (Standal et al., 2018). The electricity system is under the portfolio of the Ministry for Energy and Petroleum (OED) and its subsidiary agency the Norwegian Water Resources and Energy Directorate (NVE). NVE deals with more technical aspects of the electricity system together with the electricity sector. The Ministry for Climate and Environment and the Directorate for the Environment also have decision-making power regarding environment and climate issues in the electricity system.

Actors at three levels are involved in producing and/or distributing electricity in Norway:

Institution/Company	**Scale**	**Ownership**
Statnett (Transmission system operator)	National	State owned
District System Operators DSO **(**energy utility companies distributing electricity regionally)	Regional	Private or municipal owned companies under regulated monopoly
Power companies/electricity retailers (companies producing electricity for sale on the market)	Local/National	Publicly and privately owned companies

The national transmission grid is owned and operated by the state-owned transmission system operator Statnett. Further, there are 136 District System Operators (DSOs) – or energy utility companies that engage in distribution of electricity (known in Norwegian as *nettselskap*), which operate under monopoly regulations (Ballo, 2015). In addition, there are about 175 power companies engaging in electricity generation for sale (in Norwegian known as *kraftselskap*). The majority of these are owned by local or state authorities, many of the large power companies are owned by state, municipalities, or counties (Breitschopf et al., 2016).[2]

There is diversity among the DSOs, with some being very small and thereby have less capacity for incorporating new business-models and Smart Grid innovations (Inderberg, Tews and Turner, 2016). Out of the 136 DSOs, a 103 had fewer than 10,000 end-users each (Standal et al., 2018).

[2] According to NVE (2019) almost 90% of Norway's hydropower is owned by the public sector. 41% is state-owned.

In 2018 Norway produced 147 thousand GWh of electricity (Statistics Norway), which covers about 85 % of the electricity consumption. Norway both exports and imports electricity with other European countries. Norway often imports power when the price is low at night-time, while exporting at daytime when the price is higher. Norway has an open electricity market, integrated with the other Nordic countries. The market is part of NASDAQ OMX Commodities Europe and Nord Pool Spot (Linnerud et al., 2018). The delivery reliability is high and power outages are seldom. However, challenging climate conditions and technical failure do lead to power outages, especially during extreme weather events (Fadum 2019). The power outages are unevenly distributed geographically, and Norway has 'cold spots' in the electricity network (Chappels and Shove 2004). Further, there are local communities in more remote or Island communities that have interest in expanding the electricity supply for commercial activities, but the cost of grid expansion is high and falls on the commercial sector (personal communication #1). The trend of growing consumption due to electrification of new aspects of society (e.g. electric vehicles) and security of supply has led to interest among DSOs for decentralised systems to avoid or delay future expenses in grid development (personal communication #3-5).

Electricity generated from decentralised energy production from households or business sector (prosuming) constitutes a new frontier in the Norwegian electricity system and energy market. Residential energy production (mostly solar PV) has increased sharply since 2014 but is still significantly lower than in the neighbouring countries Sweden and Denmark (Inderberg et al., 2018). There are no apparent technological barriers for decentralised systems to be able to both provide for self-consumption and sell surplus produced electricity to the grid. Load forecasting is possible and detailed consumption data is provided by new smart meters. However, the complexity of introducing a grid tariff that distinguishes between the distribution of locally produced electricity and electricity imported from the transmission system and the requirement for individual household metering is perceived as an obstacle. NVE is considering possible reforms of the distribution network tariffs for addressing this issue (Aabakken, 2019, personal communication #6). There are also some operational challenges concerning responsibility, management and ownership to IT information, systems and security (Aabakken, 2019).

Infrastructure and Accessibility

Due to the uneven population and industry density, several parts of Norway are not easily accessible. The establishment of wind energy in areas that are sparsely populated and has low road connectivity has sparked protests against the large infrastructure interventions required, and the conflict between nature and new infrastructure is one of the main pillars of the wind power protests in Norway (Aakre et al., 2020; Leiren et al., 2020).

Restrictions on Land Use

There are several restrictions to land use in Norway. An important restriction is the demarcation of areas that are national wildlife or cultural landscape areas. 17 % of Norway's land is under protection (Statistics Norway). Among these protected areas are national wildlife areas for reindeer, ensuring them access to sufficiently large areas for grazing and free movement. Regional plans and demarcation of areas for reindeer are being assessed annually. The borders of such areas are political decisions (Linnerud et al. 2018). There are no regulations concerning distance from wind turbines to buildings in Norway, which means that wind development projects may be placed closer to where people live than they can in countries that have such rules (Linnerud et al., 2018).

Legal and Policy Framework and Institutions

Policy Targets for RES development and RES community energy

Norway had a renewable and market-based electricity system prior to the EU regulations on these issues in the 2000s (Jensen and Aamodt, 2018). RED (2009/28/EC) targets on renewables also encompassed energy outside the electricity sector and with the adoption of RED, Norway accepted targets on increasing the share of renewables in total energy consumption from 61% in 2010 to 67.5% by 2020 (MPE, 2012b). Norway is further obliged to reach a 10% renewable share in the transport sector by 2020 (MPE, 2012b). The first target was reached in 2014 with 69.2% of gross final energy consumption being renewable (GoN, 2016, Øvrebø, 2016). The second target was reached in 2015 (EEA 2020).

In parallel to the RED negotiations between Norway and the EU, Norway joined the Swedish green certificates scheme (also presented under the section on regulatory procedures and incentive schemes) where the two countries should jointly fulfil a target of producing 26.4 TWh new renewable energy by 2020 (Linnerud and Simonsen, 2017; Vetlesen, 2015). Sweden later increased its target by 2 TWh, and the joint target is 28.4 TWh where Norway is obliged to finance 13.2 TWh. The scheme is technology neutral and market-based, with no specific targets for wind, solar or other energy sources (Jensen and Aamodt, 2018).

In 2017 the Norwegian government decided that Norway will fulfil its climate obligation under the Paris Agreement together with the EU by joining the EU's effort sharing agreement in addition to the EU ETS (GoN, 2017). Because Norway decided to take part in the EU's effort sharing agreement, energy and climate policies and regulations, which traditionally have been kept separate, may have to be joined.
In 2016, the government published an "Energy White Paper" (Energimeldingen) about Norway's energy policies towards 2030 (Government of Norway, 2016). It highlighted four priority areas: (1) improve security in the power supply, (2) facilitate for profitable production of renewable energy, (3) make energy consumption more efficient and climate friendly, (4) and foster economic development and value creation through the effective use of profitable renewable resources. According to the White Paper the overarching pillar of Norwegian new renewable energy planning is national economic gain (based on socio-economic cost-benefit analyses), concessions for new power production will to a larger extent (than before)

emphasise the capacity to produce electricity when the demand is high. The main focus in the White Paper's section on increasing renewable energy production is on hydropower, including improvements of already existing hydropower plants, on improving the system for concessions, but also on increasing the production of onshore and offshore wind power in Norway.

There are no quantitative targets for new renewable production in the White Paper, the targets to increase renewable energy production are qualitative and based on the assumption that electricity demand will increase with increased electrification of transport and other infrastructure. The White Paper explicitly states that the Green Certificates scheme will not be prolonged when the deadline for new projects expires in 2021. The reason given is that the scheme mainly supports projects with existing technology, and to a small extent contributes to new technological development (GoN, 2016). RES community energy is not mentioned in the White Paper.

In 2019 the government launched a public hearing for the EU directives 2018/2001, 2018/2002 and regulation 2018/1999. In the answers to the hearing several actors mention RECs and that regulations in Norway need to be amended to facilitate REC establishment.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

Since Norway is not a member of the European Union (EU), but only the European Economic Area (EEA), directives and EU policies do not automatically apply to Norway but depend on individual procedures and negotiations between the EU and the EEA/EFTA for each policy. It can take several years from the EU decision is made until it is included in the EEA agreement. For instance, the Third Energy Package was not included in the EEA agreement until 2017 and adopted in the Norwegian Parliament in April 2018 (EEA, 2017). The RED II (Directive (EU) 2018/2001) is still under review by the EEA/EFTA.

Table 2. Legal gap analysis for Norway

	+	+/-	-	comments
Is there a legal definition of RECs?				No.
Is the definition of RECs in compliance with RED II?				No. The RED II (Directive (EU) 2018/2001) is still under review by the EEA/EFTA.
Are final customers, in particular household customers, entitled to participate in a REC?				RECs have not been defined yet. Final customers are entitled to become energy producers (prosuming) as households, farms or housing cooperatives. But as per now there are limitations concerning this (see the section on regulations).
Are RECs legally entitled to produce, consume, store re and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				RECs have not yet been legally defined. Neither the federal nor the state governments have carried out any assessment of the existing barriers and potential of development of REC. We do not have any information about whether such assessments are planned.
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				RECs have not been legally defined yet. The federal government, through Enova, provides a very limited economic support for household or commercial prosumers. RECs may apply under the same support scheme as commercial actors. There is no “enabling framework” (in line with RED II, Art. 22(4)) in place for REC.
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				RECs have not been legally defined yet, so no. The federal government, through Enova, provides a very limited economic support for household or commercial prosumers. RECs may apply under the same support scheme as commercial actors.

Mapping Relevant Institutions with jurisdiction on RES community energy

The electricity system is under the portfolio of the Ministry for Energy and Petroleum and its subsidiary agency NVE, NVE deals with technical aspects and multi-level coordination to ensure cost-effective energy markets, energy systems and energy use. Evaluating and granting licences for power production is part of NVEs mandate. In addition, institutions such as the county governor, county authorities and municipalities may have decision-making authority in relation to establishment of RES community energy (see the section on licencing processes). There are also specific requirements (e.g. postal address, capital, steering board) to become a legal entity depending on organization form. It is possible to register legal entities through digital services.

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

As of today, there are no specific spatial planning regulations for RES community energy, but establishment of RES community energy are regulated by national regulations under the Energy Act and Plan and Building Act.[3] The Energy Act regulates land-use for energy installations under a certain size. Decisions on power generation installation below 1MW is made by municipalities, while national level authorities make land-use decisions related to energy installations that exceed 1 MW, however, the local municipalities have a formal right to be heard.[4] Such installations require a licence from the NVE and all projects above 10 MW must go through an Environmental Impact Assessment (Linnerud et al. 2018). Recently, the Parliament decided that wind power now will be regulated by municipalities (local land use planning is a municipal responsibility, though the County level is also relevant for regional planning). Also, small energy installations are regulated under the Plan and Building Act. The Nature Diversity Act and sectoral laws related to use of forest, agriculture and cultural heritage also regulate opportunities for establishment of energy installations.

Licensing and other Regulatory Requirements for RES community energy

The Energy Act and the associated laws and regulations apply to all aspects of production, transforming, transfer, distribution, sale and use of energy, including potential RES community energy.[5] RES community energy as such is so far not defined as a legal concept in the regulations, as the RED II is not yet included in the EEC agreement.

NVE processes permit applications for the construction of power plants, dams and other power production installations, as well as for major power lines that require permission according to the Energy and/or the Water Course Act. Permits grant specified companies the right to build and run power installations and state the rules of operation. The permit-granting process includes public consultation and, depending on size, an Impact Assessment (Linnerud et al. 2018; Ruud, Wold and Aas 2016). As a member of the European Economic Area, Norway is subject to the EU Environmental Impact Assessment Directive. The demands for data collection are important not only for assessing the consequences but also in relation to participation and transparency in the permit-granting process. After the impact assessment a new round of public consultations is carried out. Permit-granting decisions made by NVE can be appealed. If the Directorate upholds its decision, the appeal is sent to the Ministry of Petroleum and Energy. The Ministry's decision is final and cannot be appealed. Due to local and national conflicts concerning wind energy

[3] A report commissioned by the NVE recommends introducing a regulatory sandbox regime that provides regulatory advice and time-limited exemptions to enable decentralised community energy systems to develop their business case and provide exchange of information between NVE and the projects. Though NVE may provide such exemptions, this has been rare historically (Aabakkken, 2019).
[4] Power generation installations that exceeds 10 MW is decided by the King in cabinet.
[5] it does not regulate waterfall property rights and production of heat energy for own commercial use, offshore wind is regulated by the Ocean Energy Act of 2014Lov om produksjon, omforming, overføring, omsetning, fordeling og bruk av energi m.m. (energiloven) - Lovdata

development in Norway there are often many feedbacks in the consultation period, and even small projects typically end up taking several years (Jensen and Aamodt 2019).

For large scale hydropower there are specific laws that also apply concerning ownership rights and regulation of river flow and transfer water. But these laws are not relevant to RES community energy.
A relevant regulation for the establishment of RES community energy is the scheme for household prosumers; 'plus customer scheme'. A 'plus customer' is defined as an end user that consume and produce energy 'behind the meter, from which the power put into the grid does not exceed 100 kW at any time. Participants of the 'plus-customer' scheme may use self-consumed electricity free of charge and are exempt from grid tariffs concerning electricity production and consumption. The plus customers can also sell their excess production to an electricity supplier without a trading license. The plus customer is responsible for complying with all technical requirements of the installation (often arranged through certified third-party companies), while the DSO is obliged to provide information on needed technical requirements and to facilitate the feed-in of electricity as part of its ordinary It is also possible to be a prosumer from which the power put into the grid ranges between 100kW and 1GWh. Such prosumers are subject to pay regular tariff and a tariff for feeding in electricity. A prosumer may not have a licensed power plant or licensed trade behind the meter' services.[6] The 100 kW limit for energy production caused some stir in the public debate, especially after a heat wave in the summer of 2018 when several exceeded this limit.
Another regulation of relevance is the compulsory roll-out of smart meters in all Norwegian housholds, which have provided Norwegian consumers with easier access to detailed information on their electricity consumption.[7] The meters also prepare for increased technological opportunities for prosumption. However, the requirement for individual household metering has implications for establishing community energy as it excludes joint production facilities (e.g. housing cooperatives) under the beneficial prosumer regulation. NVE has signalled that a new proposal on how housing cooperatives and households located in the same building can establish joint energy production projects is in process. These regulations make certain exemptions for farms and communities with their own low-voltage grid.

Incentive Schemes for RES community energy

The most relevant support schemes for RES community energy is related to the prosumer regulation described above since prosumers are exempt from certain electricity production and consumption fees (below 100kW). On national level, the state owned enterprise Enova[8] provides economic support for innovation and technology development for households and businesses. Household prosuming is guaranteed support with a refund of part of their investment costs (up to 2700 Euro) through a standardised digital system.[9] This support scheme is scheduled to end July 2021 and cannot be combined with other

[6] https://www.nve.no/elmarkedstilsynet-marked-og-monopol/nettjenester/nettleie/tariffer-for-produksjon/plusskunder/.
[7] By 2019, all households have Automated Smart meters for two way communication of in and outflow of electricity in their homes free of charge.
[8] In 2019 Enova provided of 5.6 billion NOK (520 million Euro) to energy and climate projects.
[9] El-produksjon | Enova

similar support schemes. Enova does not operate with support for the category RES community energy, but private entities can apply for support alongside commercial actors.[10] This is an important impediment for the RES community energy potential since such an application requires a level of professionalism not open to all private initiatives. Further, the projects must guarantee that they will be implemented regardless of whether they receive Enova support, which induces a high burden of responsibility on non-commercial actors. Some municipalities and DSOs have their own short term support schemes, but information is not as easily accessible and standardised as Enova's.

As mentioned earlier, Norway has had a Green Certificate scheme in cooperation with Sweden since 2012, designed to increase renewable-electricity production capacity. The scheme gives the producers of new (i.e., the added production under the scheme), renewable electricity the same support per MWh delivered on the electricity grid irrespective of which technology is used and regardless of whether the plant is located in Norway or Sweden or whether the additional production comes from a new plant or from updating and expanding an existing plant. Producers of new, renewable electricity have for 15 years the right to sell one certificate per MWh delivered on the electricity grid. Sellers of electricity to end consumers must buy a fraction of a certificate, often referred to as a quota, for each MWh of electricity they sell (Linnerud and Simonsen 2017). Norway has decided to discontinue the scheme. One consequence of the phase-out was that the NVE received a rush of applications from investors who wanted to develop wind power projects before the support ends (Linnerud et al. 2018). Prosumers were eligible for Green Certificates since 2016, but this was too expensive for individuals and therefore not a success (Indeberg, Tews and Turner 2016). Norway has particular tax regulations concerning energy production. In 2018, surplus in the power sector was taxed as ordinary income with 23%. Hydropower plants with an installed capacity above 10 MW is subject to an additional resource tax of 35,7%; thus, marginal taxes may be as high as 58,7%.

Social Conditions

Ownership structures and state of the art of community energy development

There are to our knowledge no RES community energy systems (planned or existing) in Norway that fit the definition of RED II (article 2) concerning open participation, effective control by shareholders, and where the main purpose is to provide environmental, economic or social community benefits for shareholders or local areas. Aabakken (2019) identified 30 potential RES community energy projects in the start-up or planning phase in 2019, but most were very early in the concept phase and were not open for citizen participation.[11]. Of the 30 projects a third was initiated by DSOs to ensure a stable and increased supply while keeping maximum loads and future grid investments down. A shift in consumer loads is emerging in terms of charging electric vehicles (EVs), and technological innovations that allow end-users more control over their consumption and potential production. Further, remote regions might require grid developments

[10] Borettslag og sameier | Enova

[11] Of the 30 projects, only five involved investment that had been realised. The rest were in the concept development phase (Aabakken 2019).

to ensure adequate and stable supply. Several DSOs are engaging in pilot projects equipping end-users with smart-house technologies (including production and storage facilities) to help lower peak load capacity (personal communication #3-5). According to Aabakken (2019) the main bulk of interest in community energy include property developers, and housing communities. Property owners and developers are driven by the same technological changes as the DNOs, as well as increased end-user awareness of environmental issues resulting in greater value associated with offering environmentally friendly products and services. These projects focus on energy efficiency, production and self-consumption of energy in the building design to increase the attractiveness of new residential and commercial buildings. End-user involvement and ownership was negligent in all the identified potential projects.

In addition to the identified potential RES community projects by Aabakken (2019), Norway has a history of local involvement in energy production that is also present in business models in the power production sector today. Norway has about 300[12] small hydropower plants that are owned and operated by local farmers or residents with land and river rights. Some commercial actors also operate in cooperation with local farmers or communities (personal communication #1-2). In these cases, the hydropower plants are financed and operated centrally, but local residents lease out the land, do maintenance and have rights to revenues. Further, the landowners may have rights to the power plant infrastructure when the leasing period is over (subject to terms of agreement).

Social Acceptance of RES community energy and selected technologies

Community energy is not on the political agenda in Norway. RES such as hydropower has historically been disputed. The Norwegian environmental movement was created in response to the proposals of developing new hydropower constructions in the 1970s (Ruud, Wold and Aas 2016). Major energy developments occurred from 1920-1970 to ensure the supply of electricity to households and industry. In recent years there has been an increasing resistance and social movement against wind power on land.

Due to the favourable conditions for wind power in Norway this was signalled as a forthcoming energy source by the government. However, the building of wind power plants in areas of pristine nature and wildlife has led to a public debate about climate-friendly renewable energy versus nature conservation. In addition, it is a common claim that Norway does not need more production of renewable energy as the country is more or less self-sufficient with hydropower (Jensen and Aamodt 2020). Financial support to increase the electricity production of renewables is considered to be subsidisation of other countries in Europe for them to reach their RES targets and foreign ownership is seen as a depletion of national control and public ownership of natural resources. Because Norway does not need more wind power to decarbonize, the threshold to accept the environmental damage of such installations is relatively high, and tourist and outdoor organisations, nature conservation groups, neighbourhood organisations and

[12] Small-scale hydropower in Norway is defined by the NVE as plants less than 10MW. The number of small-scale plants in Norway is an estimate of the numbers provided by Småkraftforeninga og Småkraft AS.

indigenous peoples' representatives can often build quite strong cases against new concessions (Gullberg, 2013). The proposed National Frame for Wind[13] received 5000 critical inputs in the hearing round and the process was ended since it did not fulfil the aims of mitigating conflicts. [14]

In CICERO's yearly national survey[15] on people's response to measures towards a low-carbon society show that the general support for wind power in 2020 is higher than the resistance, but there is a sharp decline compared to 2019 (Aasen et al. forthcoming; Aasen et al. 2019). The survey findings are presented in Table 3 below.

Table 3. Support for increased wind power production on land

Norway should increase wind power production on land			
	2018	2019	2020
Matches very poorly	**4%**	**12%**	**19%**
Matches fairly poorly	7%	12%	14%
Matches neither well nor bad	17%	18%	19%
Matches fairly well	**43%**	**31%**	**25%**
Matches very well	22%	20%	16%

Karlstrøm and Ryghaug (2014) argue that there is a clear correlation between people's preferences for parties that emphasize environmental values and their attitudes towards energy technologies. However, the support is reducing among all voter groups and across geography and age, though there is higher support among young and people living in the cities Aasen et al. forthcoming). Development of mature and price-competitive offshore wind power technology may be a more likely solution if Norway is to become a large producer and exporter of wind power. However, the support for offshore wind power has also declined. Since solar PV in Norway is being installed mainly on rooftops on private, public or commercial buildings, they have not been the focus of debate. Norwegian political parties have not been very engaged in promoting solar PV, except for a few smaller parties with a clear environmental focus.

[13] The framework consists of two parts: (1) an updated knowledge base about the existing knowledge of wind power in Norway, specifying what knowledge is lacking. This work will consist of a number of subprojects, aiming to reach a wide agreement on what we actually know about Norwegian wind power. (2) Maps that define larger areas where it is possible to develop wind power. The map is based on a method for designating defined areas that are suitable for wind power.

[14] Skrinlegger nasjonal ramme for vindkraft - regjeringen.no

[15] CICERO's national survey on people's response to measurements … has 4000 respondents and has been carried out from 2018

Mapping of institutions and actors that promote or protest RES community energy and selected technologies

There are several organisations in Norway that have been active in the public debate concerning wind power in Norway. Norway also has a few organisations that engage with or promote RES that are relevant for the socio-economic conditions of RES community energy in Norway. A list of the most relevant are provided below.

AGAINST WIND (MOTVIND): This membership-based NGO was established in 2019 to organize the growing resistance towards development of wind power on land in Norway. The NGO is thus started by the engaged citizens in the context of a growing social movement against wind power on land. Their focus is on environmental consequences of wind power development and the need for democratic processes that involve local communities (including indigenous populations).

Energy Norway: Energy Norway is a non-profit industry organisation representing about 300 companies involved in the production, distribution, and trading of renewable electricity in Norway. Their vision is that Norway should take a leading role as the first renewable and all-electric society in the world. Energy Norway works actively to improve the regulatory framework in which member companies operate in Norway and in Europe. They have a focus on Norway's interconnections with our neighbouring countries to enable the Norwegian renewable energy industry to participate actively in the European market. They do not directly engage in RES community energy, but work to ensure that benefits and responsibilities are distributed evenly for those that produce energy (both private and commercial production). They have considerable influence on policy level.**Friends of the Earth Norway** (Naturvernforbundet). This is Norway's oldest environmental and nature protection organisation. The membership NGO has about 34,000 members divided between 100 local groups across the country, working to solve environmental issues locally and globally. Energy is among the key areas Friends of the Earth Norway is working on and they have been a powerful voice in the opposition against wind power on land in Norway on the basis of environment and wildlife. They focus mainly on energy efficiency and reducing energy consumption as pathways to a low-carbon society.

LNVK – National association for municipalities with wind power production: The association is a national network of municipalities engaged in wind power production. The association is not very notable in the public debate, but their main objective is to influence framework conditions for wind power development. The intention is to enable economic conditions enhancing profitability and to ensure local influence and local economic growth (for both municipalities and communities) from wind power. The association includes about 40 municipalities, mostly from western and north of Norway.

The Norwegian Trekking Association (DNT): DNT is Norway's largest outdoor life organization with about 300 000 members. DNT works to promote frugal and environmentally friendly outdoor activities and to

preserve the outdoors and the cultural landscape. The organisation's main activities is the management of recreational facilities. This work is mainly done through volunteer labour. In addition, DNT is active in the public debate and has taken a critical stance against wind power on land on the basis of nature conservation.

The Solar Energy Cluster association: The association is a national member-based organization promoting market potential and innovation in Norway's soler energy sector. Its' partners constitute both private and commercial interests, research institutions, public sector and NGOs. The Solar Energy Cluster has a wide network and potential influence on development of regulations and policies.

The environmental NGO Zero: Zero's main mission is to contribute towards making Norway a low-carbon society. Through their network Zero disseminates knowledge on low-carbon policies and instruments. Zero particularly fronts the ban of fossil electricity production, CO_2 tax on fossil energy, and development of electricity connections between Norway and other countries. These issues are of relevance in promoting RES in Norway generally, in addition Zero promotes RES community energy as means to avoid expensive grid developments in the future.

In addition to the detailed list above there are also other NGOs such as Greenpeace and WWF that take a more middle-way position calling for stricter regulations on wind power development for environmental reasons, but still acknowledging that wind power development is a necessary pathway to the low-carbon society. As mentioned, Norwegian DSOs and property developers are also important institutions that are showing a growing interest for involving in decentralized and partly community driven energy solutions (Aabakken 2019).

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Thuringia

Technical, Geographical and Infrastructural conditions

Basic facts

The Free State (*Freistaat*) of Thuringia is one of the 16 federal states in Germany. It is situated in the centre of Germany and therefore landlocked and bordering with five other federal states. Thuringia has 2,133,378 (2020) inhabitants and covers an area of 16,202 square kilometres with a population density of 132 inhabitants per square kilometre. The state is organised in 17 rural districts (*Landkreise*) and six urban districts (*kreisfreie Städte*), i.e. towns constituting a district in their own right, with Erfurt being the state capital. Large parts of Thuringia are characterised by the Thuringian Basin, which is flat, fertile and surrounded by smaller mountains. The Thuringian Forest (*Thüringer Wald*) is located in the South, the largest mountain range in the state that merges into the *Thüringer Schiefergebirge*, another mountain range in the east. The *Harz* Mountains in the North are reaching to the neighbouring states of Saxony-Anhalt and Lower Saxony. The major rivers are the *Saale, Werra, Unstrut and Ilm*.

Table 1. Basic Facts Thuringia

Area, in km²		**Population, number on 01.01.2020**	
Total	16,202.35	**Total**	2,133,378
Land		*Urban*	-
agricultural land	8,432.72	*Rural*	-
forest land	5,408.73		
inland water	194.28		
Mountainous	-		

Source: Thüringer Landesamt für Statistik, n.d.,a

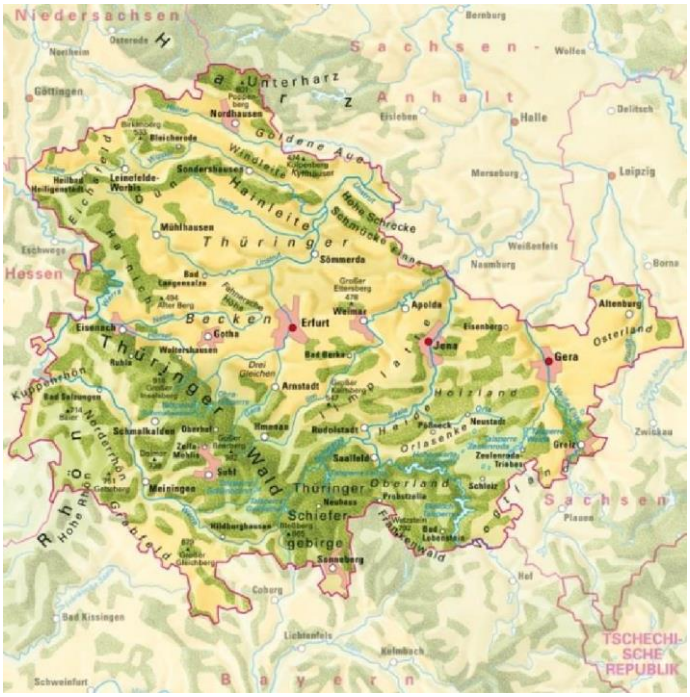

Figure 1. Landscapes and topography of the Free State of Thuringia in Germany

The Energy/Electricity context in the region

In 2017, renewable energy sources covered 26.3% of primary energy consumption (Thüringer Ministerium für Umwelt, Energie und Naturschutz, 2020, p. 34). Nearly one third of the primary energy consumption is based on mineral oil and one third on natural gas. Thuringia covers about 32% of its electricity demand through imports from other states. The electricity generation mix is rather peculiar compared to other German states as nuclear power and coal do not play any role in the electricity balance. In 2017, around 27% of electricity generation were covered by wind energy, 20% by pumped storage hydro power, 20% by natural gas, 19% by biomass and biogas and 11% by PV. Hence, electricity from RES covered approximately 59% of total electricity generation (Thüringer Landesamt für Statistik, n.d.,b). In 2017, the share of renewables in gross electricity consumption was 40.1% (Thüringer Ministerium für Umwelt, Energie und Naturschutz, 2020, p. 34). In 2019, 925 wind turbines were in operation, with an installed capacity of 1,696 MW, representing 3.2% of Germany's total wind energy capacity. In 2020, 15 new wind turbines were installed with a capacity of 52 MW representing 3.8% of the newly built gross capacity at national level (Windbranche.de, n.d.). A study conducted in 2013-2015 which aimed to identify preference areas for designating new or modifying existing wind priority zones on behalf of the Thuringian Ministry of Infrastructure and Agriculture proposed 94 areas with a total size of 9,101 ha for designation as priority areas (corresponding to 0.56% of the territory) and representing an annual wind yield of 7,134 GWh. This would cover approximately 50% of the total electricity demand. The proposed zones also include areas in forests. The study concluded that the maximum area available for wind energy use amounts to 0.76% of

the total state area corresponding to 12,369 ha and a potential electricity yield of 9,498 GWh/a (Döpel Landschaftsplanung, 2015).[1]

Infrastructure and Accessibility

Potential sites can normally be reached using the existing road network. When it comes to projects in forest areas, access is rather difficult, but possible[2].

The German grid system is subdivided into a national transmission grid covering far distances at maximum voltage levels (220 kV and 380 kV) and a distribution grid providing power on high-voltage (60 kV – 220 kV), medium-voltage (6 kV – 60 kV) and low voltage levels (< 6 kV) on a regional or local scale. Most of the wind turbines (96%) feed into the high- or medium-voltage level grid while only wind farms with large installed capacities are connected directly to the transmission grid.

A major challenge of the German *Energiewende* is the lack of sufficient grid capacity to transport wind-based electricity from the northern/eastern regions with high wind energy densities to the southern parts of Germany which have lower wind energy densities, large industrial centres and a growing demand of generation capacity due to the shutdown of nuclear and coal fired power plants. Thuringia is directly affected by the construction of three new high voltage transmission lines. It is more affected by grid expansion than other federal states, not least because of its location in the heart of Germany. This results in opportunities, but also challenges. The planned construction of the transmission lines has raised strong opposition by citizens, but also the state government and other stakeholders (Schnelle and Voigt, 2012; Thüringer Ministerium für Infrastruktur und Landwirtschaft, n.d.). On 14 September 2017, the southwest 380kV line coupling line ('Thuringian Power Bridge") between *Bad Lauchstädt* and *Redwitz* began regular operation. With the two direct current lines SuedLink and SuedOstLink, further projects are planned that will affect the Free State (50Hertz, n.d.). For several sections underground cabling is planned.

Restrictions on Land Use

Thuringia has a relatively high share of protected areas. Statewide, about 30% of the area have been classified as "taboo zone" because of the dominance of nature conservation areas that cannot be used for wind energy production (Döpel Landschaftsplanung, 2015). Additionally, other areas have been ruled out due to their significance as "high sensitivity landscape". These make up about 28% of the territory, but have large intersections with the nature conservation areas mentioned before. Around 60% of Thuringia's area

[1] The study was based on the assumption that potential areas need to reach an average wind capacity of 200 W/m^2 which corresponds to a wind speed of 5.3-5.5 m/s referring to 100 m above ground level. On average, 45% of the total state area would meet this threshold value.

[2] The Thuringian Wind Energy Decree of 2016 stipulates that the installation of wind turbines in forests is not generally ruled out (except for protected forests and several other categories) by referring to corresponding court decisions. Hence, several wind energy projects in forests were implemented. However, wind energy projects in forests are highly contested and face strong opposition. On December 18, 2020, the Thuringian state parliament approved an amendment to the Thuringian Forest Act according to which the installation of wind turbines on forest areas is prohibited at least for three years.

is excluded from potential use for wind turbines because of settlements and minimum setback distances between these and the turbines. Presently, 0.3% of the total territory is reserved for the use of wind energy.

Legal and Policy Framework and Institutions

Policy Targets for RES development and RES community energy

National policy targets

The Integrated National Energy and Climate Plan (NECP) (Bundesministerium für Wirtschaft und Technologie, 2020) adopted by the Federal Government on 10 June 2020 is based on strategies, programmes, targets and measures, such as the Energy Concept of 2010, the 2030 Climate Action Programme and the 2050 Energy Efficiency Strategy. The NECP endorses the national GHG emission reduction target of at least 55% by 2030 (compared to 1990) and the Federal Government's commitment at the UN Climate Change Summit in autumn 2019 to pursue GHG neutrality by 2050 as a long-term goal. The Energy Concept of 2010 (Bundesministerium für Wirtschaft und Technologie and Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, 2010) sets out Germany's energy policy until 2050. The Energy Concept describes specific targets and development paths through the year 2050, including the following:

1. Reduction of GHG emissions by 40% until 2020, 55% until 2030, 70% until 2040 and 80-95% until 2050 (compared to 1990 levels);
2. Increasing the share of RES in gross final energy consumption to 18% in 2020, 30% in 2030, 45% in 2040, and 60% in 2050;
3. Increasing the share of RES based electricity in gross electricity consumption to 35% by 2020, 50% by 2030, 65% by 2040, and 80% by 2050;
4. Reduction in primary energy consumption of 20% by 2020, and 50% by 2050 compared to 2008 levels;
5. Reduction of electricity consumption of 10% by 2020 and 25% by 2050;
6. Doubling the annual rate of building renovations from current levels of <1% to 2%.

In 2011, the federal government decided to phase out nuclear energy by 2022. In 2019, it took the decision to gradually phase-out electricity generation from hard coal and lignite by 2038. In 2019, the share of RES in gross final energy consumption reached 17.1%, which means that the EU target of a 18% share by 2020 can be achieved. The electricity sector is the main driver behind this development. The government’s 35% RES-E target for 2020 will be outperformed. In 2019, the share of RES in electricity consumption reached 42.1%. To speed up the growth, the target for 2030 has been recently raised to 65%, also in order to compensate for the loss of electricity caused by the gradual phase-out of coal by 2038. On the government agenda for the first quarter of 2021 there is a more far-reaching expansion path for renewables that ensures compatibility with the new European climate target for 2030 and the expected European targets for the expansion of renewables as well as with the goal of climate neutrality in Europe in 2050.

Policy Targets in Thuringia

Thuringia was the first Eastern German state to pass a climate protection law. The Thuringian Climate Act[3] has been in force since the end of 2018. In 2019, the state government adopted an Integrated Energy and Climate Protection Strategy (Thüringer Ministerium für Umwelt, Energie und Naturschutz, 2019). This strategy underpins the energy and climate goals of the Thuringian Climate Act and derives measures that shall help achieve these goals.

The Climate Act of 2019 specifies a number of climate and energy policy goals. By 2040, the total primary energy demand is expected to be covered by a mix of locally available RES. GHG emissions shall be reduced by 60 to 70% by 2030, by 70 to 80% by 2040 and by up to 95% by 2050 compared to 1990. GHG neutrality is to be achieved in the second half of the century. 1% of the total state area shall be made available for the development of wind energy (present share: 0.3%). The Act also sets the goal of a climate-neutral building stock by 2050. In 2030, 25% of the heating requirements in renovated buildings are to be covered by renewable energies. The state administration shall be climate-neutral from 2030.

Specific targets for Community Energy

Neither the federal government, nor any of the state governments have formulated any quantitative targets for the development of community/citizen energy. Several states like Baden-Wurttemberg have included citizen/civic engagement explicitly as a qualitative target in their energy and climate strategies. The Thuringian Integrated Energy and Climate Strategy of 2019 includes several provisions and measures for citizen/community energy. Hence, awarding state-owned land for the use of renewable energies to project developers in a tender process should be designed in such a way that Thuringian citizens and institutions are given preference. To improve financing options for RES projects, the state government intends to discuss alternative financing models (including citizens' funds, profit sharing, bonds, energy-saving contracting, low-interest loans, guarantees) in cooperation with Thuringia's financial sector. Special attention shall be paid to involving citizens in financing municipal projects in order to increase the acceptance of renewable energy projects. The state government is also committed to offer attractive loans even for municipalities in budgetary difficulties and to reduce bureaucratic hurdles for citizen energy projects to a necessary minimum. Furthermore, it wants to support social innovations that contribute to GHG emission reductions including cooperative energy production.

[3] Thüringer Gesetz zum Klimaschutz und zur Anpassung an die Folgen des Klimawandels (Thüringer Klimagesetz - ThürKlimaG -) vom 18. Dezember 2018.

Ownership of renewable energy installations by individuals or communities has a long tradition in Germany and Germany can be regarded as one of the pioneers regarding community ownership of RE plants (see section 4.1). Regardless of these achievements, the Federal Government has made comparatively little progress so far concerning the transposition of the RED II and its provisions for renewable energy communities.

In Germany, there is neither a legal definition of RECs pursuant to Articles 2,16 and 22,1 of the RED II, nor any comprehensive enabling framework for RECs which would fully comply with the provisions contained in Article 22,4 of the RED II. The recent amendments to the Renewable Energy Sources Act (*Erneuerbare-Energien-Gesetz - EEG*) of December 2020 did not bring any new changes in this respect.

However, since 2017, there is the legal term of 'citizens' energy companies' (*Bürgerenergiegesellschaften*) defined in the EEG. Citizens' energy companies which fulfil the eligibility criteria defined in the Renewable Energy Sources Act (RESA).[4] may benefit from certain privileges under the auctioning scheme in the area of wind energy (see the section on incentive schemes). There are at least partly parallels between the definition of 'citizens' energy company' in the EEG and the definition of RECs contained in Art. 2,16 of the RED II. However, the purpose of RECs as defined in Art. 2,16 item c) has no explicit equivalent in German law. Furthermore, the definition of citizens' energy companies has a very limited scope of application (wind energy) and there is no equivalent for the other RES, let alone for the heating/cooling sector. The RED II restricts the scope of actors eligible to form a REC to natural persons, local authorities and SMEs whereas the RESA does not limit the scope of eligible actors (except the requirements described in FN 5). The rights and possible activities of RECs specified in Art. 22,1/2 are not explicitly defined in German law. Energy sharing remains for the time being only a testing ground. It is still not possible for members of RECs to also jointly use the jointly generated electricity as it is required under European law.

Individual elements of the 'enabling framework' as defined in Article 22,4 of the RED II may be regarded at least implicitly as fulfilled. However, many provisions need still to be transposed and implemented. The EEG provides certain privileges for citizens' energy companies in the frame of wind energy auctions. Their rationale is to compensate for structural disadvantages that these companies face compared to professional/commercial project developers and institutional investors (see section 3.3). At the level of the federal states, promising policies and support measures have been developed or are under development which may also be considered as elements of an enabling framework (see the section on incentive schemes).

[4] Companies consisting of at least ten natural persons who were members or shareholders eligible to vote. Furthermore, the majority of voting rights would be held by individuals living for at least one year in the same district in which the wind installations were planned. No member or shareholder was allowed to hold more than 10% of the voting rights.

Hence, although there is no explicit legal definition of RECs in line with the RED II, there are a few elements in place which show selective parallels to the RED II. These specific provisions were introduced at an earlier stage without having the RED II in mind. The recent amendments to the EEG of December 2020 have been accompanied by a resolution of the Parliament asking the government "to assess the extent to which models for the inclusion of (...) energy communities in accordance with Art. 22 of the RED II will be possible under the "self-consumption privilege (...)".[5]

Furthermore, the government was demanded to propose further cost-efficient measures to strengthen citizen energy and local acceptance. In this context, it was requested to examine to what extent citizen electricity tariffs can be set for residents in the vicinity of wind turbines without creating competitive disadvantages for local municipal suppliers.

Table 2 – Legal gap analysis for Germany/Thuringia

	+	+/-	-	comments
Is there a legal definition of RECs?				No, but the definition of "citizen energy companies" shows certain parallels.
Is the definition of RECs in compliance with RED II?				There is no definition of RECs, but the definition of "citizen energy companies" shows some parallels although not fully in line with the RED II and with a much narrower scope of application.
Are final customers, in particular household customers, entitled to participate in a REC?				RECs have not been explicitly defined yet, but final customers are entitled to participate in "citizens' energy companies". These show certain parallels to RECs.
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				RECs have not been explicitly defined yet. "Citizens' energy companies" may produce and sell electricity and are eligible for certain privileges under the wind auctions. Further rights/ activities have not been explicitly defined. Energy sharing is practically not possible and legally not explicitly defined.
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				RECs have not yet been legally defined. Germany's NECP acknowledges that RECs have great potential for the successful expansion of renewable energies at national and European level. However, neither the federal nor the state governments have so far carried out any solid assessment of the existing barriers and potential of development of RECs. We do not have any information about whether such assessments are planned.

[5] The self-consumption privilege (*Eigenstromprivileg*) exempts self-consumption of RES based electricity from the payment of the renewable energy surcharge. This surcharge is the portion in the electricity tariff that has to be paid by electricity consumers for the support of RES based electricity and is the result of a complex equalisation scheme.

Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				RECs have not been legally defined yet. The federal government provides punctual support to “citizens’ energy companies”. It does not - or only implicitly at best - provide individual elements of an “enabling framework” (in line with RED II, Art. 22(4)). The bulk of provisions of Art.22 (4) needs to be transposed resp. implemented.
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				RECs have not been legally defined yet. Only in the area of onshore wind energy does the government take into account specificities of ‘citizens’ energy companies’ and provides certain privileges to such entities in the auction schemes (e.g. uniform pricing, see above). But these entities show only certain parallels to RECs defined in the RED II (see above). In its final NECP, the Federal Government argues that the access of renewable energy communities to the existing support schemes is ensured in a non-discriminatory manner. However, there is empirical evidence that the auctions show a general tendency to favour large-scale actors at the expense of small actors including cooperatives and other community energy organisations (see for example Jacobs, Grashof, del Rio and Fouquet 2020)

Federal Level

The current federal government is based on the “Grand Coalition” of the Christian democratic parties CDU/CSU and the Social Democratic Party (SPD) representing historically the major popular parties in most state and federal elections since 1949.

Federal Ministry for Economic Affairs and Energy (*Bundesministerium für Wirtschaft und Energie*)	Key executive energy policy making actor, responsibility for the coordination of the Energiewende.
Federal Grid Agency (*Bundesnetzagentur*)	The agency undertakes a variety of tasks pursuant to the German Renewable Energy Sources Act (EEG). In particular, it organises the auction processes for renewable energy installations, determines the level of financial payments for RES-E installations, monitors the nationwide equalisation scheme between the distribution network operators, the transmission system operators and the electricity suppliers and publishes the capacity of the newly installed renewable energy installations (monthly).
Onshore Wind Energy Agency (*Fachagentur Windenergie an Land e.V.*)	The Agency is organized as a registered, non-profit association. Its members include the federal government, the federal states, the municipal umbrella organisations, business and nature conservation associations, and companies. The purpose of the association is to promote environmental and climate protection by accompanying and supporting the nature- and environmentally sound expansion of onshore wind energy and its system integration as well as the promotion of education and science in these fields.

There are several other important policy and public administration actors that deserve to be mentioned: the Parliamentary Committee for Economic Affairs and Energy (*Ausschuss für Wirtschaft und Energie*), the Chancellor‘s Office (*Bundeskanzleramt*), the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (*Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit*), the Federal Ministry of the Interior, Building and Community (*Bundesministerium des Innern, für Bau und Heimat*), the Federal Ministry of Education and Research (*Bundesministerium* für *Bildung und Forschung*), the Federal Environment Agency *(Umweltbundesamt*) and Federal Agency for Nature Conservation (*Bundesamt für Naturschutz*). The Federal-Länder Wind Energy Initiative (*Bund-Länder-Initiative Windenergie*) meets on a regular basis. As a rule, the staff members of the federal and state ministries responsible for wind energy and regional planning participate in the initiative. The initiative deals with the following issues: exchange of information and experience on current developments in the federal and state governments, discussion of existing setback distance regulations, collection of good examples in the field of wind energy zoning at the level of regional and urban land use planning, discussion of criteria for the use of wind energy in different

natural areas, compilation of measures to facilitate repowering, presentation of current research projects and initiation of new projects. The Competence Centre for Nature Conservation and Energiewende (*Kompetenzzentrum Naturschutz und Energiewende e.V.*) supports the nature-compatible expansion of renewable energies and serves as an independent and neutral contact point. It provides information, supports conflict mediation and initiates dialogues among stakeholders.

Thuringia

The current state government of Thuringia is based on a left-wing coalition of three parties (Die Linke, SPD, and Bündnis 90/Die Grünen). It is a minority government, formed after the election to Thuringian state parliament (October 2019) and a subsequent government crisis in 2020.[6]

Ministry of Environment, Energy and Nature Conservation (TMUEN)	TMUEN is the highest state authority in the fields of nature conservation, energy, climate and sustainability. It consults strategies with the municipalities and interest groups and represents the interests of Thuringia towards the federal state and the EU. The current administration supports RECs and tries to improve their legal conditions and fundings (TMUEN, 2019, 42, 67)
Ministry of Infrastructure and Agriculture	The Ministry approves priority zones (*Vorranggebiete*) for wind energy.
Thuringian Energy and GreenTech Agency (ThEGA) [7]	On behalf of the state government, the Thuringian Energy and GreenTech Agency established a service unit for wind energy which promotes and supports the further development of wind energy in Thuringia. It offers information and consulting to citizens, municipalities, associations and owners of potential wind energy sites. The service unit also issues the quality label “Partner for Fair Wind Energy” to project developers which comply with five criteria ensuring procedural and financial participation of local citizens and communities on a voluntary basis.[8]
Thuringian State Administration Office (*Landesverwaltungsamt*)	The Thuringian State Administration Office is responsible for issuing permits for wind energy plants if a permit is applied for 20 or more wind turbines. In all other cases permitting is up to the counties and independent cities.
Regional Planning Communities: Northern, Central,	The Regional Planning Communities are public bodies responsible for the development and implementation of regional plans according to the Thuringian State Planning Act. Every

[6] Together, the three parties of the government coalition do not have a majority of their own in the Thuringian state parliament, but only 42 votes compared to 48 votes of the opposition consisting of AfD, CDU and FDP. The governing parties concluded a ‘stability pact’ with the CDU which envisages selective and temporary cooperation on substantive issues.
[7] Thüringer Energie- und GreenTech-Agentur, see www.thega.de.
[8] In the frame of the WinWind project a Best Practice case study has been elaborated which covers the wind energy service unit and the label (see Themann, Krug and Di Nucci, 2020).

Southwest and East Thuringia.[9]	planning community is obliged to draw up a regional plan for the respective region thereby determining priority zones for wind energy.

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

Whereas fundamental political decisions about the *Energiewende* are made at the federal level, the designation of appropriate sites for wind energy developments is the responsibility of the federal states. Wind energy zoning in the context of spatial planning differs from state to state. Usually, designation of wind energy zones is either performed by regional planning bodies and corresponding regional plans or by the municipalities in their municipal land use plans.

In Thuringia, four “regional planning communities” (*Regionale Planungsgemeinschaften*) have been established as public bodies. Each of them has a regional planning office staffed with professional planning officials and a decision-making body, the assembly of elected political representatives from the district/counties.

The Thuringian Wind Energy Decree (*Windenergieerlass*) of 2016 (Thüringer Ministerium für Infrastruktur und Landwirtschaft, 2016) specifies the planning framework and provides guidance to the four regional planning communities for the designation of priority zones for wind energy. In those zones the installation of wind turbines takes priority over other types of land uses. At the same time, installations outside these areas are prohibited. The Wind Energy Decree takes into account current legislation and relevant court decisions and includes a detailed description of 19 hard and 22 soft “taboo zones”. The remaining areas, i.e. the areas outside the taboo zones, are referred to as potential areas. The final designation of the priority zones is based on a subsequent assessment and balancing process taking into account competing public (including municipal) and private concerns.

Although the development of the regional plans and wind energy zoning is accompanied by public consultation procedures, municipalities and local residents often perceive the designation of priority zones as a top-down process with limited scope to influence the process. They often feel badly informed and complain that their concerns and objections are not sufficiently considered (Themann, Krug and DiNucci, 2019, p. 106-107).

According to the Coalition Agreement, the territorial 1%-target referring to priority areas for wind energy (see the section on policy targets) is to be broken down to the four planning regions and included in the State Development Programme as a requirement for the regional planning communities. The regional plans are to be adjusted accordingly (Die Linke Thüringen et al., 2020). Repowering of wind turbines should be intensified. The government also plans to set up an Energy Transition Dialogue Forum (*Dialogforum*

[9]Regionale Planungsgemeinschaften Nord-, Mittel-, Südwest- und Ost-Thüringen, see www.regionalplanung.thueringen.de.

Energiewende) which should help to find decentralised solutions with local interest groups, especially in the course of drawing up the new regional development plans.

There are no specific provisions or privileges for citizen/community energy projects in the context of regional planning and wind energy zoning.[10]

Licensing and other Regulatory Requirements for RES community energy

There are no privileges or special provisions for community wind farms concerning permitting. Permitting of wind energy plants is mostly determined by federal legislation. The procedures for permitting of wind turbines are generally the same for all wind farms, whether community owned or not. Wind turbines with a size of > 50 m are subject to permitting pursuant to the German Federal Pollution Control Act (*Bundesimmissionsschutzgesetz, BImSchG*). Permits are usually granted by environmental authorities. They shall ensure that no harmful effects on the environment are caused by wind turbines. The permit for a wind farm pursuant to the Federal Pollution Control Act concentrates all other necessary permits and approvals. Hence, the permitting procedure comprises all relevant assessments of the project – no other permissions are required. The permitting authority assigns the application documents to all concerned authorities (*Träger öffentlicher Belange*) and obtains their reasoned opinions.

Formal participation of the public is dependent on the question whether an Environmental Impact Assessment (EIA) is required. This is mandatory only if the number of wind turbines reaches or exceeds 20. Projects below this threshold (i.e. projects with 3-19 plants) require an environmental pre-assessment. If this pre-assessment comes to the conclusion that a complete EIA is necessary, public consultation is mandatory. For projects that do not require an EIA, or where the initial screening results in the finding that no full EIA is necessary, public participation is not formally required.

If a permit is applied for 20 or more wind turbines, the Thuringian State Administration Office (*Landesverwaltungsamt*) is responsible for issuing the permit, in all other cases permitting is up to the districts and independent towns. The Thuringian state government adopted several guidance documents and recommendations for the approval of wind energy plants, e.g. referring to the consideration of nature protection requirements for birds (Thüringer Landesanstalt für Umwelt und Geologie, 2017) or bats (Dietz et al., 2015).[11]

[10] More details about wind energy zoning in Thuringia and Germany can be found in the WinWind report Screening of Technical and Non-technical Regulations, Guidelines and Recommendations (Giuffrida et al., 2019).
[11] More details about the approval procedures for wind farms in Thuringia and Germany can be found in the WinWind report Screening of Technical and Non-technical Regulations, Guidelines and Recommendations (Giuffrida et al., 2019).

Incentive Schemes for RES community energy

Since 2017, remuneration rates for RES based electricity in Germany are no longer fixed by the federal government but are generally determined through an auctioning scheme. The auction design encompasses a “price only’ selection process, i.e. the only award criterion is the support level for the renewable electricity. For onshore wind installations larger than 750 kW, the “pay as bid” rule applies which grants bidders the prices they have offered. As a rule, onshore wind projects can only participate in the auctions if the operators have received a permit under the Federal Pollution Control Act (*Bundesimmissionsschutzgesetz*).

Community wind projects are generally confronted with multiple challenges: lack of legal frameworks considering/recognising community ownership, higher transaction costs for collective decision-making and the administration of a large membership, complex and burdensome administrative procedures (e.g. planning, permitting, grid connection), lack of expertise and market oversight, lower economies of scale and limited possibilities for project financing. Referring to the transition to competitive bidding and auctions, projects with a majority of local shareholders already in the planning stage appear to be particularly affected because of small project portfolios and weak capital base, preventing the recovery of sunk development costs caused by unsuccessful bids (Grashof, 2019, p.28).

To ensure participation of community wind energy projects, the amendments of the Renewable Energy Source Act of 2017 included special privileges for “citizens’ energy companies” (*Bürgerenergiegesellschaften*). While some of those privileges have been withdrawn in 2018, others are still in force today including a preferential price rule (uniform pricing instead of pay as bid rule which is the standard rule) (Krug and Di Nucci, 2020, p. 22).

In December 2020, the Renewable Energy Sources act was amended again. The amendments bring some improvements for individual self-supply and in the area of tenant electricity (*Mieterstrom*). They also include provisions for the financial participation of municipalities affected by wind energy plants. Operators of onshore wind energy installations may offer the municipalities within a 2.5 km radius of the wind turbines a unilateral payment amounting to 0.2 cents per kilowatt hour of electricity fed into the grid. The operators may request refunding of the paid amounts from the grid operator. Therefore, these payments would be financed through the renewable energy surcharge (*EEG-Umlage*) which is ultimately borne by the electricity customers. The recent amendments were accompanied by a resolution (*Entschließungsantrag*) of the Parliament asking the German government to propose additional cost-effective measures to strengthen citizen energy. In addition, the trade tax (*Gewerbesteuer*) breakdown shall be adjusted so that the municipality in which a wind farm is located actually benefits and not the municipality where the project company is located, which is mostly the case. However, in our view, the amendments do not yet appropriately transpose the provisions for RECs as defined in the recast Renewable Energy Directive (see the legal gap analysis section).

Some of the federal states in Germany have developed complementary support and financial incentives for community renewable energy. In 2018, the state government of Schleswig-Holstein, the COME RES model

region, set up a community energy fund (*Bürgerenergiefonds*), a revolving fund which provides risk capital for citizen/community energy projects to pre-finance their upfront costs.[12] The fund is administered by the Investment Bank of Schleswig-Holstein, the 100% state owned development bank of Schleswig-Holstein. It started operation in 2018 and is the first of its kind in Germany. The fund serves to finance preparatory measures for citizen energy projects in the sectors of renewable heat, new mobility, renewable power generation, energy efficiency and digitalization. The state government of Thuringia plans to set up a similar fund (MDR Thüringen, 2020).

Social Conditions

Ownership structures and state of the art of community energy development

Besides Denmark, Germany can be regarded as one of the pioneers regarding community wind farms. Community ownership of wind farms was particularly successfully developed in the federal state of Schleswig-Holstein, the model region in the frame of COME RES. It has a long tradition in the coastal region of Northern Friesland and the island of Fehmarn (Krug and Di Nucci, 2020).

Community wind farms in Germany mostly use the legal form of a limited partnership with a limited liability company as general partner (*GmbH & Co. KG*), a hybrid of a private limited company (*Gesellschaft mit beschränkter Haftung, GmbH)* and a limited partnership (*Kommanditgesellschaft,* KG). Usually, citizens provide capital as limited partners (*Kommanditisten*). In contrast to other European countries such as the Netherlands, the cooperative society model is less common in Germany for wind farm operations.

By the end of 2019, the number of energy co-operatives in Germany founded since 2006 reached 883, involving 200,000 members and investments in renewable energies of 2.9 billion EURs. In 2019, the energy cooperatives generated about 8.31 TWh of electricity from wind and PV representing 3.5% of total renewable electricity generation. Between 2008 and 2013, the number of energy cooperatives increased from 24 to 718. The peak in terms of annual foundations was reached in 2011, when 167 new cooperatives were founded. Since then, however, the number of new foundations constantly declined. In 2019, only 14 new cooperatives were founded (DGRV, 2020).

In the Eastern German federal states in (former GDR), community wind energy is still underdeveloped and there is no 'tradition' of citizen/community wind energy as in Schleswig-Holstein. In East Germany there are only few examples of wind turbines owned by local communities, e.g. partnerships or co-operatives. In Thuringia, 90% of the wind energy investors come from outside Thuringia (ThEGA, 2016, p.9). Although Thuringia has the second highest number of energy cooperatives in Germany (compared to the number of inhabitants) (Agentur für Erneuerbare Energien, 2018, p.182), there are only a few wind energy plants

[12] More information can be found at https://www.ib-sh.de/produkt/buergerenergiefonds/.

owned by cooperatives. Investments by cooperatives were mainly made in PV projects, probably because of lower entry barriers and lesser complexity.

In Thuringia there are currently 30 citizen energy cooperatives (Guthke and Schwalbach, 2020). The association *BürgerEnergie Thüringen e.V.* is the umbrella organisation of the Thuringian citizen energy cooperatives. It has currently 14 member organisations (ibid). *BürgerEnergie Thüringen e.V* and several energy cooperatives in Thuringia have joined forces to offer the joint electricity product *Thüringer Landstrom*. This product is offered through *Bürgerwerke eG*, a German green electricity provider and an umbrella organisation of citizen energy companies bundling green electricity from local generation to supply households and enterprises throughout Germany. There are several other community/citizen renewable energy initiatives which are not organised as cooperatives, but which use different legal forms (e.g. limited partnerships).

The low diffusion of community wind farms in East Germany might be partly explained by socio-cultural grounds (e.g. reluctance of the population to invest in community owned companies and cooperatives due to historical reasons and the socialist heritage) and economic as well institutional reasons (Bauwens et al, 2016; Holstenkamp, 2014). A key barrier is the land ownership structure. Often, the owners of the land are not local farmers, local residents or municipalities. This fact is related to the privatisation of formerly state-owned agricultural and forest areas in Eastern Germany. The *Bodenverwertungs - and Management GmbH (BVVG)* auctions land in designated suitable/priority wind areas so that financially strong investors have competitive advantages when securing land for wind turbines (Gotchev, 2016). Income from land lease payments partially is generated by landowners, who are not located on-site. Local/regional value creation from wind turbines has therefore been limited so far. Overall, the transition from the FIT/FIP system to competitive bidding and auctioning tends to favour large players and has resulted in a decline of the number of newly established REC initiatives and energy cooperatives (DRGV, 2020).

Social Acceptance of RES community energy and selected technologies

In Germany, there have been numerous surveys and studies examining the social acceptance of the Energiewende in general, and the local acceptance of renewable energy plants including wind energy plants specifically. One of the recent surveys commissioned by the German Renewable Energies Agency (Agentur für Erneuerbare Energien, 2021) and conducted by YouGov illustrates that the growth of renewable energy continues to be of great importance for the German population. According to the results, 86% of those surveyed consider further expanding the use of renewable energy ‘important’ or ‘extremely important’. Asked about their attitudes towards different types of energy plants in the vicinity of their own living place, 47% of the respondents with no wind turbines in their vicinity consider wind power in their neighbourhood as “good” or “very good”, whilst those living in the vicinity of wind turbines even show a higher support rate (56%) (cf. Fig. 2).

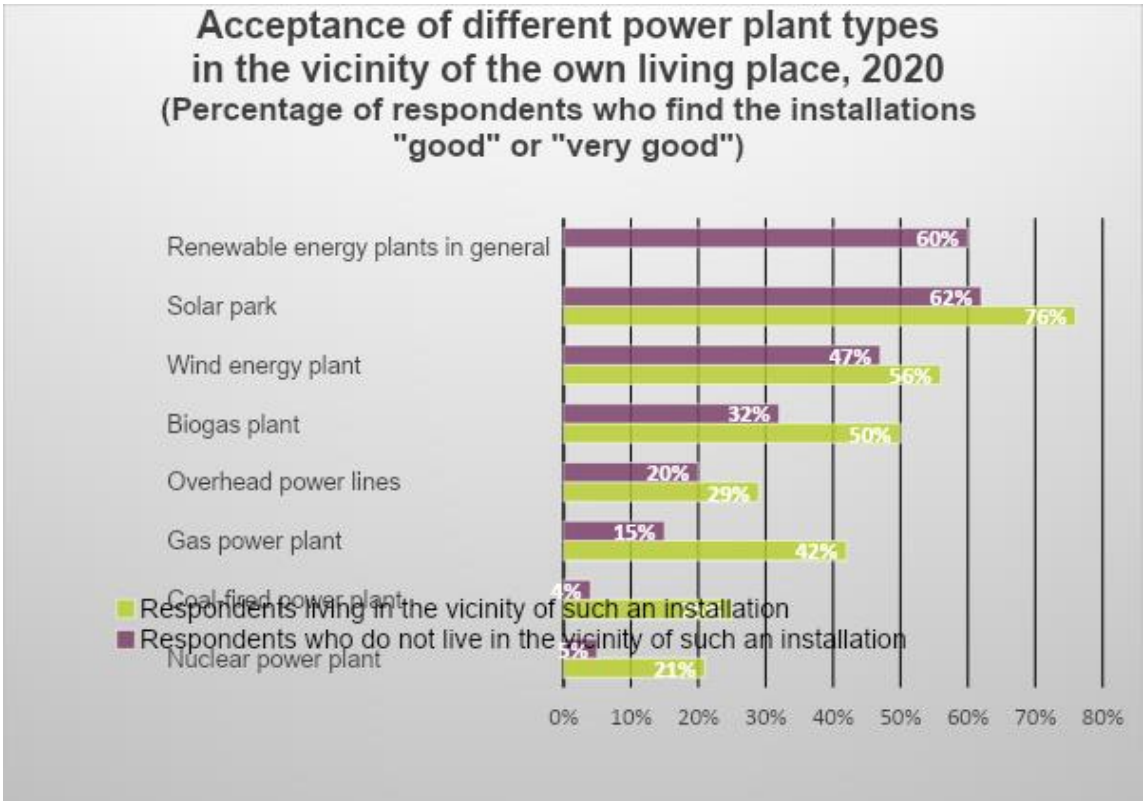

Figure 2. Acceptance of different power plant types in the vicinity of the own living place, 2020
Source: Survey from YouGov on behalf of the Renewable Energies Agency, n=1051, t=12/2020

These findings are supported by the annual representative surveys of the Onshore Wind Energy Agency (see the most recent survey from 2020, FA Wind, 2020, p.5). The Social Sustainability Barometer for the German Energiewende (*Soziales Nachhaltigkeitsbarometer Energiewende*) which is based on a survey among 6.549 households conducted in 2019 (Wolf, 2020) shows rather different results. The share of disapproving amongst the households with wind turbines in their neighbourhoods was slightly higher (22%) than among those households with no wind turbines in their neighbourhoods (19%). This survey also showed that support rates for the expansion for wind energy are lower in eastern Germany (39%) than in western Germany (55%). Another finding was that in large cities, the proportion of supporters of wind energy is almost one third higher (58%) than in sparsely populated rural areas of Germany (45%). The households were also asked about their preference for a number of pre-defined measures to increase local acceptance of wind power. Most respondents supported opportunities for profit-sharing through own investments (66%) and revenue-based levies to be paid by the operators of wind farms to the affected municipalities (65%).

In a survey conducted in Thuringia in 2018, 1,051 persons were asked about their attitudes towards wind energy plants. 59% of all respondents expect the construction of additional plants to have a rather negative impact on the people in the region. 37% expect advantages or no effects. From 360 respondents living in a distance of 600 m to 5,000 m to wind turbines only 30% expect more advantages or no impact, whereas 65% see more disadvantages. From 691 respondents who do not live in the vicinity of turbines, 31% expect

more advantages or no impact, while 65% expect more disadvantages (forsa and C-KCM Richard Schmidt, 2018).

325 wind turbines with a capacity of more than 1,000 megawatts (MW) were subject to lawsuits throughout Germany in 2019 (FA Wind, 2019). The most frequent grounds for lawsuits are to be found in species protection. Violations of the protection of bird and bat species are claimed for half of all affected wind turbines. General species protection reasons are a major cause for a quarter of the abovementioned lawsuits. However, local opposition is not only ignited by species protection: the visual impairment of the landscape, concerns about possible side effects on health and the possible loss of property value are further reasons for local protests. Most protest groups are in particular engaged in nature protection activities.

The online stakeholder survey carried out in Thuringia, Saxony and Brandenburg within the project WinWind assessed the relative importance of different acceptance factors and tried to identify measures that promote acceptance (see Di Nucci et al., 2020). The focus was on the local acceptance of wind energy projects. The main barriers to acceptance include the number and size of turbines, their visibility, distance from residential areas, impact on the environment and avifauna, and on health and well-being. The most important drivers for local acceptance of wind energy projects were their contribution to meeting electricity demand, the possible GHG savings, the local "attachment" of the turbine owners, the information about the projects and the transparency of the planning and approval process, local value creation and the economic situation of the local citizens.

Mapping of institutions and actors that promote or oppose RES community energy and selected technologies

Apart from the Ministries described above (section on relevant institutions with jurisdiction), amongst the institutional actors promoting community energy, we find the Thuringian Energy and GreenTech Agency ThEGA with its wind energy service unit. In line with the Coalition Agreement, the government plans to strengthen ThEGA in order to assist municipalities by providing qualified advice on problem identification and establishment of energy cooperatives, personnel development, networking and project management (Die Linke Thüringen et al., 2020). Furthermore, there are several associations, initiatives and networks which promote community energy, including the German Renewable Energy Association (*Bundesverband Erneuerbare Energien*), the German Wind Energy Association (*Bundesverband Windenergie e.V.*) with its Advisory Council for Citizen Energy (*Bürgerwindbeirat*) and with its regional branch in Thuringia.

Further supporting associations include the Alliance for Citizen Energy (*Bündnis Bürgerenergie e.V.*), the National Office for Energy Cooperatives in the German Cooperative and Raiffeisen Confederation (*Bundesgeschäftsstelle Energiegenossenschaften im Deutschen Genossenschafts- und Raiffeisenverband e.V.)*, the *Netzwerk Energiewende Jetzt e.V.* and the Renewable Energies Agency *(Agentur für Erneuerbare Energien).* The following organisations can also be regarded as supporters of community energy in Thuringia: *Deutsche Kreditbank AG Erfur*t, *Ethikbank Eisenber*g, *Naturstrom AG*, *Klimaschutzstiftung Jena-Thüringen*, and *Nachhaltigkeitszentrum Thüringen*. There are also several project

developers which have concluded cooperation agreements with *BürgerEnergie Thüringen e.V.* (*Energiequelle GmbH*, *Ostwind Erneuerbare Energien GmbH*, *BOREAS Energie GmbH*, *ABO-Wind* AG). Among the associations which should be mentioned are *SolarInput e.V* and the Thuringian Renewable Energies Network (ThEEN), an umbrella organisation for renewable energy, energy storage, energy efficiency and sector coupling. There are also several municipal utility companies (*Stadtwerke*) which have established co-operations with citizen energy cooperatives.

Local opposition towards wind energy developments including community/citizen projects has been growing steadily in Thuringia. The Thuringian Association for a Reasonable Energy Policy (*Vernunftkraft – Thüringer Landesverband Energiepolitik mit Vernunft", THLEmV*) unites 66 local groups and citizen initiatives opposing mainly wind energy, but also other renewable energy projects like pumped storage hydro power plants. Regarding wind energy, this group declares to be concerned mainly about the inefficiency and the negative environmental and aesthetic impact of wind turbines. Furthermore, wind farms are alleged to lead to a "technical alienation of the landscape' (Vernunftkraft–Thüringer Landesverband Energiepolitik mit Vernunft, n.d.).
As in other regions in Germany, wind opponent groups in Thuringia are often supported by right-wing populistic parties and movements like the Alternative for Germany (AfD), which are perceived as instrumentalizing local protest for their political purposes (Radau, 2019, Meier, 2019).

On the national level, the federal initiative *Vernunftkraft e.V.* is an umbrella organisation of initiatives and their regional associations that campaigns for the abolition of the Renewable Energy Sources Act (EEG) and a halt to the expansion of wind power and photovoltaics. It represents more than 800 organisations in Germany (Bundesinitiative Vernunftkraft e.V., 2019) and also opposes citizen/community wind energy. The association *Windwahn* reported 1,131 initiatives and associations against wind energy in 2020 (Windwahn, 2020).

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Warmia-Masurian

Technical, Geographical and Infrastructural conditions

Basic facts

The Polish target region selected for COME-RES project activities is the Province of Warmia-Masuria.

Figure 1. Map of the Warmian-Masurian Voivodeship

Warmian-Masurian Voivodeship or **Warmia-Masurian Province** is located in north-eastern Poland. The voivodeship has an area of 24,173 km^2 and a population of around 1,422,737 (as of 2019). Its capital and largest city is Olsztyn (with 171.853 inhabitants). Warmian-Masurian Voivodeship is divided into 21 counties, 2 city counties and 19 land counties. These are further divided into 116 municipalities. The Voivodeship contains 50 cities and towns.

The Warmian-Masurian Voivodeship is the fourth largest region in Poland, it covers 7.7% of the territory of Poland. Demographically, the region can be classified as the least populated areas of the country. The population density is approximately 59 people per km^2, which is around half of the population density in Poland as a whole. Clean, slightly transformed natural environment, abundance of forests, large distance from industrial, tourist and agricultural areas, nature and insufficient technical infrastructure are the main features of the region.

Table 1. Basic Facts [Warmian-Masurian Voivodeship]

Area, in km^2		**Population, number on 01.01.2020**	
Total	24 173,17	**Total**	1 422 737
Land		Urban	842 096
agriculture land	13 150,20	Rural	580 641
forest land	7 928,80		
inland water	1 377,87		
mountainous	-		

The Energy/Electricity context

Local electricity production covers only about a dozen percent of demand and takes place mainly in combined heat and power plants and renewable sources, including wind farms, small hydropower plants, biomass power plants and biogas. Consumption of hard coal in Poland in 2019 was 68.3 million tonnes. Despite the fact that Poland is still a coal-dependent country, the utilisation of coal in the Warmian-Masurian province is relatively low. The consumption of hard coal in the region was around 1 million tonnes in 2019. The hard coal was mainly consumed by the energy sector (energy supply companies) and small consumers.

The share of RES in final energy consumption in Poland in 2019 was 12.18%. The share of RES in final electricity consumption in Poland in 2019 was 14.33%. The consumption of natural gas in Poland (without taking into account the consumption for the technological needs of the gas sector) in 2019 amounted to 691.5 PJ, which means an increase by 4.7% compared to 2018. The second lowest consumption of natural gas occurred in Warmian-Masurian Province (around 1.5% of total consumption in the country). Natural gas was mainly utilised by small consumers and industry. Heat consumption in Poland in 2019 was 444.3 PJ, so it decreased compared to 2018 by 0.7%. The Warmian-Masurian Province was responsible for only 3% of total heat consumption in the country. Electricity consumption in 2019 was 161.0 TWh which means a decrease by 1.2% compared to 2018. Electricity consumption in the Warmian-Masurian Province was one of the lowest in the country – c.a. 2.5% (4 TWh). The Province had also a marginal contribution to the consumption of liquefied petroleum gas, light fuel oil and heavy fuel oil in 2019.
The structure of electricity production from RES in 2017 was as follows:

- Biogas – 126 GWh;
- Biomass – 200 GWh;
- PV – 8,9 GWh;
- Hydropower – 141,6 GWh;
- On-shore wind – 673,2 GWh.

The capacity of installed RES installations in Poland and in the Warmian-Masurian Province are presented in Table 2 below.

Table 2. Total installed capacity in RES technologies in Poland and in Warmian-Masurian ProvinceEnergy Regulatory Office 2020

Type of RES installation	Total capacity installed in Poland [kW]	Capacity installed in the target region [kW]	Share [%]
Photovoltaic > 50 kW	474,761	43,168	9,1
On-shore wind energy	5917,243	356,985	6,0
Hydropower	973,085	15,165	1,6
Biogas	245,366	16,503	6,7
Biomass	1492,875	26,044	1,7

Installed capacity of on-shore wind energy and biogas installations in the Warmian-Masurian province represents an average value for a voivodeship in Poland. Utilisation of biomass and hydropower is low compared to the other regions. Concentration of PV systems (mainly PV farms) in the region is relatively high.

The interest in renewable energy sources in Poland over the last decade has been steadily growing. The largest share of energy produced from renewable energy sources was recorded in the provinces of western and north-central Poland. The southern part of the country (Śląskie and Opolskie Voivodships) and Lubelskie Voivodeship, for environmental and economic reasons (occurrence of mineral deposits of energy raw materials, development of mineral-based industry) are Characterised by a much smaller share of renewable energy sources. The largest share of renewable energy sources in the Zachodniopomorskie, Pomorskie and Wielkopolskie Voivodeship is mainly due to the capacity installed in wind power plants.

Infrastructure and Accessibility

The Polish Power System (PSE) manages and operates the 400 kV and 220 kV transmission network. The owner and manager of the distribution network in the central and western part of the Province is ENERGA-OPERATOR S.A. and PGE Dystrybucja S.A in the eastern part. There are no significant sources of electricity in the Province. The fact that the region is an importer of electricity does not affect the quality of energy supplied to consumers, the possibility of connecting new customers or energy prices. The required energy is supplied from other regions via the 400 kV and 220 kV transmission networks. Energy exchange with neighbouring provinces is also carried out via the 110 kV network. Due to the poorly developed network of 400 kV and 220 kV in the north-eastern Poland, the power supply reliability of the Warmian-Masurian Province is lower than that of other regions of the country. There is a transient threat of power loss in a large area of the region. A particularly unfavourable situation is in the eastern part of the province, supplied

unilaterally by the 220 kV line Ostrołęka-Ełk. The relatively poorly developed transmission and distribution network limits to a certain extent the possibility of connecting large wind farms.[1]

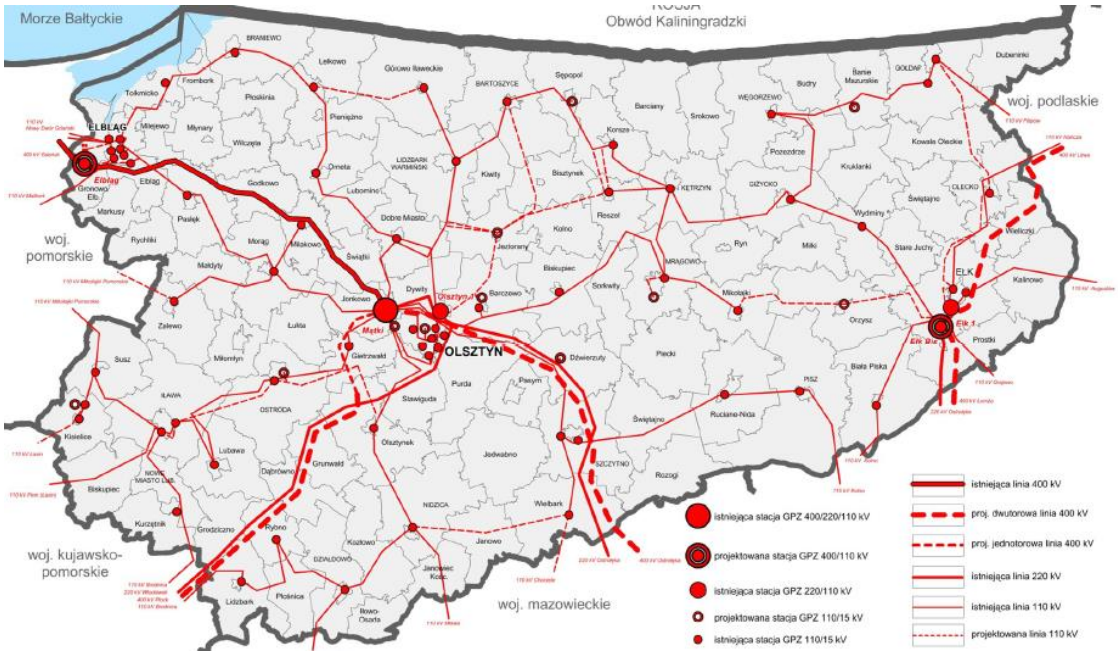

Figure 2. Map showing transmission and distribution electricity networks in the region

Restrictions on Land Use

Natura 2000 areas represent 27% of the total area of the Warmian-Masurian Region. Generally, there are restrictions on land use on Natura 2000 areas in Poland. If the location of the investment coincides with the protected areas, it is necessary to prepare an environmental impact report. Each investment planned in Natura 2000 areas, even one that obtains energy from renewable sources, must be at most neutral for the protected area or it must be shown that the benefits of its implementation will be greater than any possible damage to the area. Each planned RES investment in Natura 2000 areas must obtain a decision on the environmental conditions of the project, the so-called 'environmental decision' issued by Regional Directorate for Environmental Protection. Obtaining such a decision for an investment is given on the base of environmental impact assessment (EIA).

[1] Warmian-Masurian Energy Agency (2013) *The concept of RES Development in the Warmian-Masurian Region until 2020*

Legal and Policy Framework and Institutions

Policy Targets for RES development and RES community energy

There are no regional targets set for Poland, the only targets for RES and community energy are set for the country on a national level.

Poland's National Energy and Climate Plan for the years 2021 – 2030 was prepared with a view of establishing a stable framework for a sustainable, economically effective and just transformation in the energy sector and the whole economy. This document is intended to enable synergies with the realisation of activities in the five interconnected dimensions of the energy union, taking into account the principle of 'energy efficiency first':

- decarbonisation
- energy efficiency.
- energy security
- internal energy market
- research, innovation and competitiveness

As part of the EU-wide 2030 target, Poland declares to achieve 21-23% of RES share in gross final energy consumption by 2030 (total consumption in electricity, heating and cooling as well as for transport purposes). It is estimated that in the perspective of 2030 the share of renewable energy sources in heating and cooling will increase by an average of 1.1 percentage point per year. In transport, a 14% share of renewable energy is expected to be achieved by 2030. The RES share in electricity production will increase to approx. 32% in 2030. To enable the achievement of the above-mentioned targets, it is planned to support renewable energy sources in the form of continuation of existing and creation of new support and promotion mechanisms. It is also planned to increase the use of advanced biofuels, introduce offshore wind energy and increase the dynamics of deployment of renewable energy micro installations.

Poland supports the development of renewable energy defined in this way by undertaking several specific measures. These measures are implemented based on the Act on renewable energy sources, which has been revised in 2016, 2017, and 2019. The legislation envisages several solutions aimed at creating a stable environment for the growth of production in the renewable energy sector. Those include energy clusters, energy cooperatives, an auction system for most of the key RES technologies, interim solutions for the green certificate system, support for prosumers and a range of rules and conditions for conducting activity in the field of electricity generation, agricultural biogas, heat and bioliquids, as well as instruments intended to support them in a systematic fashion. Additionally, the Polish Government supports, by means of legislative acts[2], distributed energy generation, especially clusters and energy cooperatives, which are designed as a technologically neutral tool available to any local community, which,

[2] RES Act of 2016 with further amendments

by self-organising, has an opportunity to safeguard energy independence within the region where cooperation is developed.

The main value of such a bottom-up approach to RES lies in its contribution to the development of specific regions and local economies and stimulation of the labour market, which is achieved through the utilisation of resources available locally in the form of energy substrates, energy carriers, and human and financial capital and leads to their most effective use. At the same time, as a result of measures in the form of regulatory facilitations (RES Act), as well as the allocation of additional funding, the number of emerging clusters is growing gradually. Ultimately, the energy cluster formula is to be the basic form of developing distributed renewable energy in the sector of medium-sized and partly large installations (selected technologies). Since February 2019, the Ministry of State Assets (formerly the Ministry of Energy), as part of the MENAG scientific consortium together with the AGH University of Science and Technology and the National Centre for Nuclear Research, has been pursuing a research project entitled "Development of distributed energy in energy clusters (KlastER)". The main goal of the project is to develop a "Strategy for the development of energy clusters in Poland". The solution fully implements the provisions of Articles 21 and 22 of Directive (EU) 2018/2.

Legal Gap Analysis: Assessment of Enabling Framework for RECs as required by RED II

The position of RECs in national legislation and in national and/or regional policies is just beginning to take form. In current legislation and policy, the operational position of RECs is not explicit. Despite the fact that energy clusters and energy cooperatives have been introduced into the national legislation, there are only a few successful implementations of such solutions. Energy clusters are civil law agreements between different entities including local governments, which aim at becoming energy efficient regions through a more effective use of local renewable energy sources. Energy clusters cover the area of one county or five municipalities. The concept of energy clusters was introduced for the first time in 2016 with the definition of energy clusters in the Amendment to the RES Act.[3]

According to the RES Act's definition[4], an energy cooperative is an administrative unit whose legal personality is stipulated in the Cooperative Law. The entity generates electricity, biogas or heat from renewables and balances the demand for electricity, biogas or heat only for the benefit of the coop and its members. The maximum number of the coop's participants is 1,000, it can operate within a rural commune or a rural and urban commune. Its goal is to ensure energy security for its members who work with each other in the spirit of solidarity.

[3] Amendment to the RES Act of 22 June 2016
[4] Amendment to the RES Act of 19 July 2019

Table 3. Legal gap analysis, Poland

	+	+/-	-	comments
Is there a legal definition of RECs?				A legal definition is expected in the middle of 2021. At the moment there are definitions of energy cooperatives (2019) and energy clusters (2016).
Is the definition of RECs in compliance with RED II?				The extension of existing forms of energy clusters and energy cooperatives is expected.
Are final customers, in particular household customers, entitled to participate in a REC?				The Ministry is working on a new legal framework for collective prosumers[5].
Are RECs legally entitled to produce, consume, store and sell renewable energy and share, within the REC, renewable energy that is produced by the REC?				Similar provisions apply to individual prosumers and energy cooperatives (described in the section on incentive schemes).
Does/did the national or regional government(s) carry out an assessment of the existing barriers and potential of development of REC?				National government is carrying out several studies on this assessment only on national level[6].
Does the government provide an enabling framework to promote and facilitate the development of REC (in line with RED II, Art. 22(4))?				The Government is currently working on providing the enabling framework for development of REC[7].
Does the government take into account specificities of REC when designing support schemes in order to allow them to compete for support on an equal footing with other market participants?				The framework is not yet designed. There were some attempts to incorporate energy clusters into energy auctions and other forms of support, but not successfully finalised yet[8].

[5] Draft amendment to the RES Act of 8 August 2020
[6] Project „KlastER" – Development of dispersed energy in energy clusters (2019-2021)
[7] Draft amendment to the RES Act of 8 August 2020
[8] Draft amendment to the RES Act of 8 August 2020

Mapping Relevant Institutions with jurisdiction on RES community energy

In Poland, The Ministry of Climate and Environment is directly responsible for establishing an enabling framework for RES community energy on the national level. Besides the support schemes that are designed by the Ministry of Climate and Environment, the National Fund for Environmental Protection and Water Management creates complementary support programmes on the national level using state funds. Marshall offices in voivodeships manage mainly European funds and direct them into regional programmes e.g. Regional Operation Programmes and Operational Programme Infrastructure and Environment.

In Poland in 2019, 5 incumbent (default) suppliers and 136 alternative suppliers selling electricity to final customers, operated on the electricity market. In 2019, there were some 17.8 m end users, of which 91% (16.2 m) were consumers in G tariff group that purchase electricity to consume it for living purposes (mainly households). The rest of the final customers are consumers of the A, B and C tariff groups. Groups A and B comprise consumers supplied from the high and medium voltage grids, which are so-called industrial customers, while C group comprises consumers connected to the low voltage grid, consuming electricity for the purpose of business activity, the so-called commercial customers.

The Energy Regulatory Office (ERO) was established on the basis of the Energy Law[9] in order to maintain balance between the interests of the energy suppliers and energy consumers. The main activities of this Office include issuing the licenses to the energy companies, to supervise the company activity in the field of their compliance with the Energy Law and the license conditions as well as to approve the energy prices for these market segments for which the Energy Law provides for such procedure.

The government administration in the province is headed by the “voivodeship office” (the province office) in Olsztyn. The voivodeship self-government is headed by the marshal's office. Other resolution bodies are Counties, District Authority Offices, Communes. Marshal office is responsible for realisation of the state energy policy.

Regulatory Procedures and Incentive Schemes

Spatial planning regulations for RES community energy

Land use in the region is regulated by the Spatial Development Plan of Warmian-Masurian Voivodeship. This strategic document is prepared by the Warmian-Masurian Spatial Planning Office in Olsztyn. The document defines the conditions of spatial development of the voivodeship. Moreover, the plan consists of Spatial Policy of the Voivodeship which defines targets and directions of spatial development of the region including power engineering and renewable energy sources. In addition, the “Study on the conditions and directions of spatial development and local spatial development” plan of each municipality must comply with the regional strategic document.

[9] Energy Law of Poland of 10 April 1997 with further amendments

The “Study of the conditions and directions of spatial development” is a document which describes the municipality's policy and local rules of land management. The study is not an act of local law, contrary to the local spatial development plan. The study is adopted by the commune council and is prepared by the commune head, mayor or city president. The study of conditions is an alternative and a kind of introduction to the creation of a local spatial development plan.

The “Study of the conditions and directions of spatial development” and the local plan are the place in the spatial planning system where tasks related to renewable energy are carried out. This means that a wind farm or biogas plant must be approved by the municipal government in the “Study of the conditions and directions of spatial development” of the municipality (or city) and then a spatial development plan may be prepared for it. The process is described in Figure 3 below.

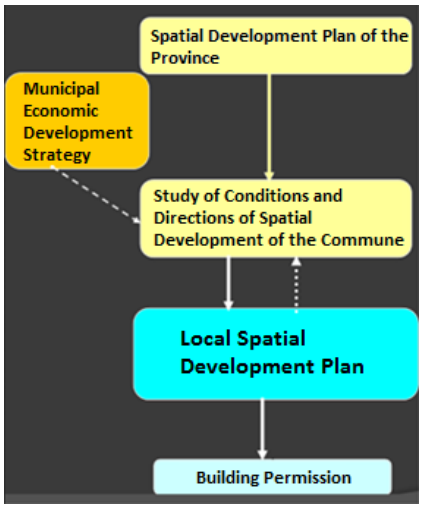

Figure 3. Spatial planning in the context of RES deployment

Licensing and other Regulatory Requirements for RES community energy

In Poland, the development of RES investments is regulated by many legal acts, but the most important is the Renewable Energy Sources Act dated 20 February 2015. This act defines the rules and conditions for conducting activity in the field of electricity generation from renewable energy sources and agricultural biogas in renewable energy source installations as well as mechanisms and instruments supporting this activity. The act also defines terms such as: renewable energy prosumer, micro installation, small installation, energy cluster and energy cooperative. The main formal requirements, the fulfilment of which may be necessary in order to implement RES investments include:

- obtaining a decision on environmental conditions
- agreeing on the conditions of project implementation in the scope of impact on the Natura 2000 area
- compliance with the local spatial development plan/ a decision on land development and management conditions

- obtaining a building permit/notification of construction
- obtaining a concession for the generation, transmission and/or distribution of energy

In addition to the above-mentioned requirements, in order to implement RES investments, it may be necessary to meet other specific requirements resulting from the applicable law.

Incentive Schemes for RES community energy

There are several support schemes for renewable electricity generation in Poland: Green certificates, which have been phased-out, but continue to run for projects that were implemented before the phase-out; auctions (tenders); Feed-in schemes; a net metering scheme for prosumers, an in-kind payment; tax incentives.

Green certificates: The 1997 Energy Law and the 2015 Renewable Energy Sources Act regulated the green certificate scheme, where renewable energy producers received: (a) the price for electricity sold in the competitive market (with the right of the renewable energy producer to sell the entire generation to the last resort supplier at a price equal to the average electricity price) plus (b) the price for tradable certificates of origin purchased in particular by suppliers selling electricity to final consumers. In this green certificate scheme, the market price for certificates may not exceed in practice the so-called "substitute fee" ("buy-out" price) which is an alternative method of fulfilment of the obligation to obtain and redeem certificates of origin.

Under the 2015 RES Law, which was adopted in February 2015 and amended in December 2015 and June 2016, the mentioned green certificate scheme would remain applicable, but with certain modifications for RES installations commissioned prior to 1 July 2016. RES installations commissioned after that date no longer benefit from the green certificates but are instead part of a new auction-based support scheme. Renewable energy producers who were part of the green certificate scheme still have the opportunity to participate in the auctions instead of the green certificate scheme.

The regulations provided in the 2015 RES Law were significantly amended on 22 June 2016. The amendments modified the incentive schemes in order to promote auctions and RES installations.

Auctions (tenders): Currently, the main incentive for renewable energy use in Poland are tenders. The first tender was organised in December 2016. The auctions are technology-neutral tool for promotion of RES. At the beginning of the scheme's operation there were some ideas to introduce energy clusters in the system. However, no auctions for energy clusters or energy cooperatives have been performed so far.

Feed-in schemes: FIT and FIP for small biogas and hydropower plants up to 1 MW. Owners of small biogas and hydro plants are eligible for a Feed-in tariff (up to 500 kW) or a FIP (0.5-1 MW).

Support scheme for prosumers: Owners of micro-installations (with capacity up to 50 kW) are allowed to exchange the surplus of energy produced under favourable conditions for gaps in energy production. The ratio is 1 to 0.8 for capacity up to 10 kW and 1 to 0.7 in the case of micro-installations between 10 and 50 kW. Support under the discount/net-metering formula is provided for prosumers for a period of 15 years, but no longer than until June 30, 2039.

Since 2019, the new legal provisions dedicated to energy cooperatives make it possible to use the discount scheme previously intended only for prosumers, but with a slight difference. The ratio of the energy fed into the grid and the energy that can be collected later for the energy cooperative is slightly less favourable and amounts to 1 to 0.6. The surplus amount of energy (0.4) is intended to cover the obliged seller with the costs of settling the balancing of the cooperative and distribution costs. Electricity collected by an energy cooperative as part of the settlement with the obligated seller is not subject to charges for the distribution service. In addition, energy cooperatives, under the new regulations, obtained several other privileges. The amount of energy generated and directly consumed by the members of the cooperative does not include the RES fee, the cogeneration fee and the capacity fee. Moreover, the obligations to redeem certain energy certificates of origin do not apply, and the energy received as part of the discount will not be subject to excise tax if the total capacity of the RES installation does not exceed 1 MW.

Tax incentives: Producers of electricity from renewable sources are exempt from the tax on the sale and consumption of electricity.

Social Conditions

Ownership structures and state of the art of community energy development

In Poland, the community energy sector starts to develop mainly based on the prosumer and distributed energy sector. In the prosumer energy sector, the energy consumer produces heat or electricity for its own needs – it is both a producer and a consumer (prosumer). Producers can be households, farms and small and medium-sized enterprises (SMEs), which are located mainly in rural and suburban areas. Prosumer power generation is based on small-scale installations of renewable energy sources, which produce electricity for the needs of a household or a company and can sell surpluses to the grid. Distributed energy sector is a small and medium sized electricity and/or heat (including cold) generation system that can also operate in cogeneration (simultaneous production of electricity and heat/cooling), supplying local communities. These systems are based on different primary energy carriers – conventional (coal, natural gas, oil) and alternative, renewable (sun, wind, water, production process gases, including biogas and biomass). Distributed energy will have a community character, within the meaning of this document, if it is based on the use of RES.

The national community energy sector is developed in 3 dominant formulas:

- individual initiatives focused on independent residential and/or farm buildings

- energy clusters
- housing cooperatives

In Poland, the Renewable Energy Sources Act defined the term of 'energy clusters' as civic-law agreements with diverse parties including natural persons, legal persons, scientific units, research institutes and local-government units. The agreement concerns the balancing of demand and generation, distribution of or trade in energy from renewables or other sources, within a distribution network with voltage below 110 kV. The cluster functions as a civil law agreement meaning it is not a legal entity and cannot conduct a business activity. The cluster nevertheless shows concern for local values, sustainability of the region and engagement of residents and municipalities. It can take the shape of a local energy community or micro-network that balances demand and supply at the local level, together with both private and public actors.

An energy cooperative is the second form of assembly available for people who want to produce energy from renewables. According to the RES Act's definition, an energy cooperative is an administrative unit whose legal personality is stipulated in the Cooperative Law. The entity generates electricity, biogas or heat from renewables and balances the demand for electricity, biogas or heat only for the benefit of the coop and its members. The maximum number of the coop's participants is 1,000, it can operate within a rural commune or a rural and urban commune. Its goal is to ensure energy security for its members who work with each other in the spirit of solidarity. Coops are founded on democratic principles, which means there is no hierarchy, all members are equal, and all decisions are voted on. Such a solution increases the members' engagement within the group because every person feels responsible for the coop's future. In other words, the coop unites individual end-users to ensure access to cheap electricity generated from renewables, which makes it possible to spread the project costs across many investors.

There are no successful energy cooperatives in Poland because this model of organisation is not very popular. This is because cooperatives do not generate profit, which goes against the contemporary reality where individuals start an enterprise to earn money to provide for themselves. In order to make energy cooperatives more popular, the lawmakers have to create an environment that facilitates the creation and implementation of such projects.

The difference between energy cooperatives and energy clusters is that cooperatives have a legal entity. As participants of legal transactions, they can, on their own behalf, perform duties and acquire rights. This is in contrast to clusters, which constitute an agreement signed by independent entities represented by a coordinator. This impacts how agreements are made – energy cooperatives may sign them on their own, whereas a cluster can sign them only through its coordinator. Energy clusters are a solution for entities interested in participating in the renewable energy sector for commercial purposes and the Zgorzelecki Energy Cluster is a good example of this. Clusters' flexible legal structure, that allows their members to shape them as they wish (within the rules of social coexistence), makes it an ideal form of

enterprise for entities that want to design an innovative product or earn profits. Whereas energy cooperatives are dedicated to those entities that want to address their demand for energy in an environmentally friendly way and unite the local community through participation in a common enterprise.

Social Acceptance of RES community energy and selected technologies

In 2013 the Polish Wind Energy Association hired an independent company to carry out a questionnaire in the Warmian-Mazurian Province[10]. The findings suggest that the vast majority (78%) of the inhabitants of the Warmian-Masurian Province are of the opinion that investments in wind energy can bring positive benefits for their region. Benefits from investments in wind energy that were most commonly ticked off by the respondents included: environmental benefits (65%), increase in communal income from taxes paid by the investor (51%) and a decrease in unemployment (46%). Study Research "Wind Energy – TNS Poland Report for Polish Wind Energy Association, July 2013"[11]shows that residents of communes with wind farms see significantly more benefits related to wind farms compared to the general population. Almost half of the residents of the Warmia-Mazurian Province had heard about risks related to the operation of wind farms. The three most frequently mentioned threats were: noise caused by turbines (57%), location of wind farms too close to buildings (47%), and depreciation of the value of the land around the power plant (44%). The vast majority of respondents (87%) expressed that wind farms are a good source of energy, of which 39% think that it is a very good source. 75% of the respondents also agreed that such power plants should be established within their own commune.

In 2020, the Polish PV Association commissioned a survey on Poles' opinions on different energy technologies (CBM Indicator, 2020). In the section comparative analysis of different RES technologies, there was the following question: imagine that a power plant will be built in your neighbourhood in the near future. Order the types of power plants listed below, starting from the one you prefer (ranked with value 1) to the one you don't want around you (ranked with value 5). First three places together mean that given technology was ranked by 1 – 3 value.

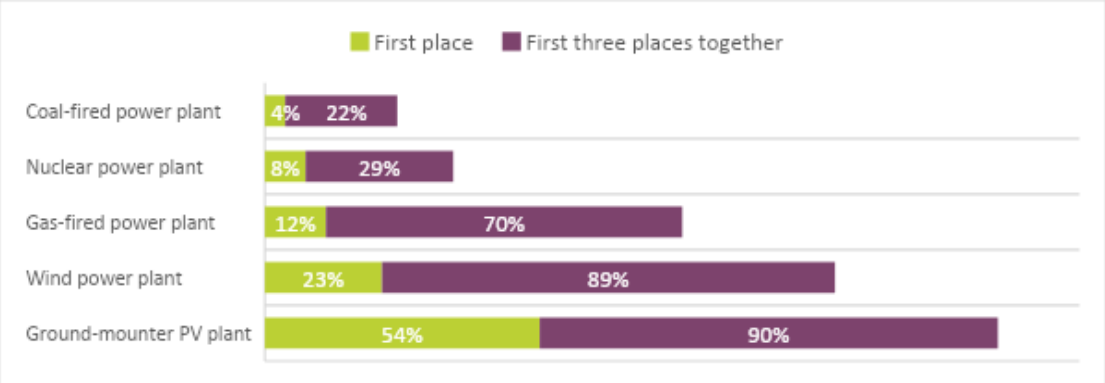

Figure 4. The results of the survey on social acceptance of different energy technologies (CBM Indicator, 2020)

[10] Wind Energy – TNS Poland Report for Polish Wind Energy Association, July 2013
[11] ibid.

Mapping of institutions and actors that promote or protest RES energy community and selected technologies

There are a number of institutions that promote RES community energy:

- The National Chamber of Energy Clusters
- Association of Municipalities Friendly to Renewable Energy
- The Polish Economic Chamber of Renewable and Distributed EnergyAlliance of Associations Polish Green Network
- Polish Wind Energy Association
- Polish PV Association
- The Polish Chamber of Biomass

The NGOs, which are against wind energy, are detected in target region (e.g. STOP wiatrakom).

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Appendix 2. Overview of interviews

ID	Organisation type	Date
Apulia		
#A1	Researcher, RSE	28.12.2020
#A2	Project Manager, RSE	28.12.2020
#A3	Project Manager, DiTNE	30.12.2020
#A4	External relations Manager, DiTNE	30.12.2020
Balearic and Canary Islands		
#1BCI	Head of Balearic Energy Agency	12.01.2021
Nord-Brabant		
#1 HJK	Assistant professor Nijmegen	10.12.2020
#2 MM	Program manager Social Innovation Noord-Brabant	3.12.2020
#3 AW	Assistant professor Eindhoven	1.12.2020
Norway		
#1NO	Commercial company small-scale RES systems	20.10.2020
#2NO	Commercial company small-scale RES systems	3.11.2020
#3NO	DSO	9.11.2020
#4NO	DSO	9.11.2020
#5NO	DSO	16.11.2020
#6NO	Researcher	4.11.2020

CONTACT

COME RES Project
info@come-res.eu
www.come-res.eu

PARTNERS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 953040. The sole responsibility for the content of this document lies with the COME RES project and does not necessarily reflect the opinion of the European Union.