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**ENERGY COMMUNITIES IN THE 4TH ENERGY
PACKAGE:
AN INVESTIGATION OF THEIR IMPLEMENTATION IN
THE MEMBER STATES OF THE EU**

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I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

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Abstract

This dissertation was written as part of the MSc in Energy Law, Business, Regulation and Policy at the International Hellenic University.

In the European Union there are more than 1.500 cooperatives of Energy Communities and lots of institutions, programs, expertise and knowledge. Still the legislation of the countries is complex and varies as is not harmonized with the Directive, which means that the evolution of Energy Communities had different starts and surely have confronted different obstacles at their course and so different are their factors of success. Their course guides to the energy unity of the European Union and strengthens its political coherence, as they are a part of Europe's historical evolution against the rigid policies of the states, and symbolize not only the hopes of the energy transition but also the transition to a new type of democracy characterized by the 4th industrial revolution and the Artificial Intelligence.

Particularly It is examined the Clean Energy Package regarding Energy Communities, in comparison to the present legislation and conditions over Denmark, Germany, France, Italy, Ireland, Greece and Spain. Furthermore are exposed the challenges and opportunities of Energy Communities through the factors of Technology, Finance, Legislation, Administration and Policy with a special reference to the case of Greece.

Keywords: Energy Communities, institutes, challenges, opportunities, Greece

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Preface

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ENERGY COMMUNITIES IN THE 4TH ENERGY PACKAGE:
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EU

1. INTRODUCTION

Energy has always been characterized in the history of mankind by various adjectives which gave diverse meanings to it. By the term human energy we mean the biological energy of the human body. Moreover we use the word energy to characterize aspects of the human behavior. In social terms we use the word to give social and civil perspectives and even more to characterize a civilization as the way energy is produced or consumed defines the type of society and the citizens in terms of civilization.

Talking about “Clean Energy” we talk about a civilization that respects the nature in terms of emissions. Ultimately energy characterizes the kind of consumers or producers as well as their conscience when consuming or producing.

Being a society autonomous/self-sufficient plays an important role on the independence of the society, to the independence of the citizens as personalities and to the integrity of the produced civilization.

2. THE NOTION OF ENERGY COMMUNITY

The word community in social terms defines a group of people living at the same place or having a particular characteristic in common. A community describes the common course of the people influencing their personality and common characteristics and interests.

The Energy communities do not have a clear definition. In the level of European Union, Economic Communities become active in the energy sector primarily by providing affordable energy of a specific kind, such as renewable energy, for their members or shareholders. We could say that they are vertically integrated but in a non-profit making way. Unlike a traditional profit-oriented electricity undertaker, their aim is mostly to allow their members to participate across the energy sector and this is the element that diversifies them.

According to the latest legislation there are two types of Energy communities having in common a non commercial purpose :

- a. Citizen energy communities (CECs) are included and derive from Directive 2019/944 named common rules for the Internal Market for Electricity Directive (IMED)
- b. Renewable Energy Communities (RECs) are included and derive from Renewables Directive 2018/2001 (REDII) as long as are regulated by the previous Directive 2019/944 Internal Market for Electricity Directive (IMED).

The main articles referring to them at the Directives are:

Article 2(16) Renewables Directive -'Renewable Energy Community'	Article 2(11) Electricity Directive -'Citizen Energy Community'
<p>A legal entity:</p> <p>(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;</p> <p>(b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;</p>	<p>A legal entity that:</p> <p>(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;</p> <p>(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</p>

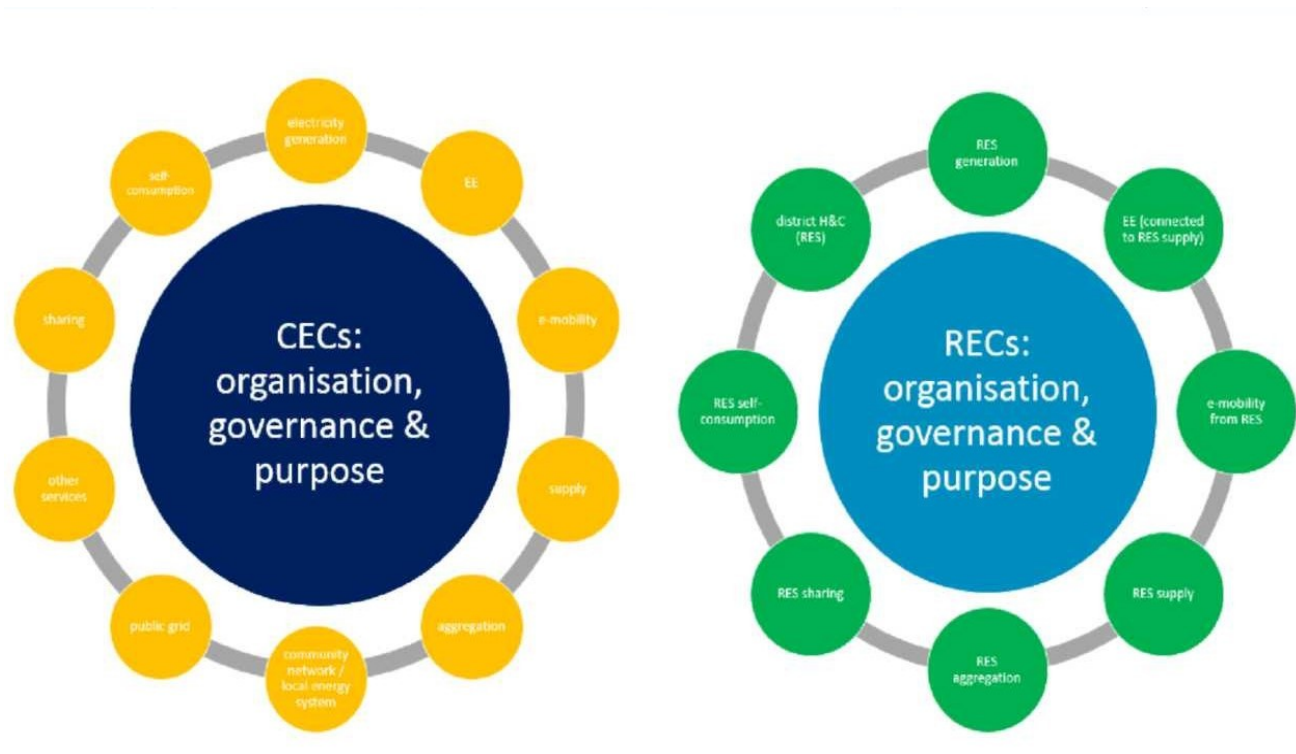
<p>(c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.</p>	<p>generate financial profits; and</p> <p>(c) may engage in generation, including from renewable 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 shareholders;</p>
<p><i>While not part of the definition, RECS are entitled to produce, consume, store and sell renewable energy, including through renewables power purchase agreements, to share renewable energy within the community, and to access all suitable markets</i></p>	

According to the above regulation Renewable Energy Communities seem to be a subset, or type, of Citizen Energy Communities:

- a) they have a geographical restriction as they refer to a local “proximity” requirement on the other hand the Citizen Energy Communities do not have locally restricted participation and so they can be used as a Virtual Power Plant. Virtual Power Plant is a cloud-based (decentralized) energy generator constituted from more than one Citizen Energy Communities that together create energy power equivalent to a common power plant.
- b) technologically they are oriented around renewable energy sources in comparison to the Citizen Energy Communities that regard the electricity sector in terms of energy produced, consumed or stored.
- c) members of the Renewable energy communities regarding the enterprises can be medium ones apart from small that Citizen Energy Communities are referring to.
- d) Renewable Energy Communities are entitled to self-arrange sharing of renewable energy sources between their members and to access to the wholesale market directly or through aggregation. On the other hand Citizen Energy Communities can also operate grid infrastructure, aggregation, storage, energy efficiency or other not exclusively referred services

e) Regarding the states, they are obliged to promote development for Renewable Energy Communities. As development we mean for example national enabling frameworks to reinforce them, provide capacity building, tools to facilitate access to finance and information, remove barriers and restrictions, insure access to low income and vulnerable households and constitute them part of the national plan for renewable energy support scheme. In the case of Citizen Energy Communities the states are obliged just give a “level playing field” to become part of the market.

e) on the other hand, as counterweight, the criteria required for a community to qualify as Renewable Energy Community are much more restrictive than in the case of Citizen Energy Communities.



All the Energy communities according to the above mentioned Directives are characterized and restricted by special membership structure, governance requirements and purpose.

Regarding the membership structure it is open and voluntary: Members can be citizens, small and micro enterprises and local authorities. In the case of Renewable Energy Communities members can be also medium Enterprises.

The governance involves various forms of ownership the type of which affects also the social impact of Energy Communities. The most common of which are the cooperatives.

The purposes of Energy communities are to provide environmental, economic, social community benefits rather than financial profits.

Under those circumstances apart from generating energy, Energy Communities consume, store, aggregate, distribute, manage and operate their network and resources, e.t.c. A more particular content of their functionality can be: District heating, Cogeneration of Heat and Power, storage through electric automobiles, renewable energy resources, sustainability, energy independence, independence from national energy policy, power market entry, full deployment of the advantages of distributed energy technology etc. Moreover they can become more complex in their structures as in case of self – consumption combined with storage, peer to peer trade (direct trade between prosumers), balancing, management of distributed energy resources and of the grid. These aforementioned actions are not exclusively named and other not described are not excluded.

The energy Communities are regulated, apart from the European Directives, by the statal fisical and legal control, as they are being part of a long historical evolution of the energy sector in which the state has always been prevalent.

3. FACTORS THAT FORMED ENERGY COMMUNITIES

3.1 The centralization of the Energy Market.

Before the second World War the sector of energy was based significantly on oil and natural gas. The states for their independence have followed a tendency of nationalization of the energy production sector. It has been clear that the statal

sovereignty was depending on the exploitation of natural resources and the regulation of the energy sector.

WWII has exposed all the aspects of the indispensability of energy and its need of a restructured Europe over its' ruins. The effort of rebuilding Europe demanded huge energy quantities and the states have promoted a centralized state-owned energy sector to control and regulate their demand. This did not let margin to local energy communities to grow and still imposes a statal regulated legal framework.

It was not until the arrival of the eighties that a free market philosophy would rise so energy would ever more be considered a commodity as all the other products. This would gradually form the concept of today's Energy communities which have the right to produce and sell energy in an integrated market.

3.2 The road towards the creation of the European Energy Communities.

The road passed through the integration of the energy market and consecutive energy packages to abolish various existing monopolies and oligopolies. This road was not without obstacles which would be barriers to the rights of the citizens such as high prices and lack of investments, exposing the market even to risks of security of supply.

Unbundling is the separation of energy supply and generation from the operation of transmission networks. In the beginning the unbundling of the monopolies as a concept started from Great Britain. European Union followed the path of unbundling of G. Britain in the 1990s, but still already had the experience from the European Coal and Steel Community. Coal has always been, until recently, a necessary element for the creation of energy.

The European policy has always been interested in the unbundling solution to the energy field, substantial for the existence of European Union, which would give the flexibility (to the energy field) to operate and harmonize in a union level, far from the rigorous governance of the member states. In other words behind the

unbundling, [deriving from the directives and laws of the EU that are applied through National Regulatory Authorities], was the strategic management of the energy market to obtain a central harmonization, sometime at the beginning, confronting the monopolistic interests of the states. These were the first steps towards the “localization” of the energy market through communities.

The first Energy Package

In the heart of the first Energy Package were the free competition, transparency, free access to the energy networks and security of supply. Through “liberalization” the aim was to cure the distortion of the monopolies and oligopolies (which were often in accordance with the national interests and sovereignty) and to protect efficient competition in the market.¹ Still even after all these first changes there would be a long way to meet the standards needed for the Energy Communities.

The second Energy Package

The Second Energy Package came along with the Kyoto protocol climate convention which created for the first time a legal obligation for the reduction of emissions. This package aimed to increase competitiveness and improve service quality, guarantee fair prices for consumers, establish rules on Public Service Obligations, improve interconnection and bolster security of supply. The consumers could choose freely their respective suppliers (the industrial customer from 1st July 2004 and the domestic ones from 1st July 2007). This second step of unbundling under this package was legal and functional. Unfortunately the lack of regulatory framework especially in the market of Renewable Energy Sources and incorrect implementation of the existing rules by public and private companies hampered

¹<https://www.rokas.com/en/press-articles-a-publications/energy-and-environment/item/65-towards-a-truly-open-european-energy-market-the-benefits-for-serbia>

progress and investments. Thus, in the end, another step has been made towards liberalization of the markets

The Treaty on the Functioning of the European Union

In May 2008 the Treaty on the Functioning of the European Union was signed. In its article 194 §1 c. the Treaty institutes saving and efficiency, as well as the development of new and renewable forms of energy as basic elements of the E.U.'s energy policy. This article brings energy policy and the protection of the environment together in a common legal framework. It should be noted, at this point, that this Treaty was the result of a long political process which gradually turned the E.U.'s environmental and energy policy into a legislative priority.

Still after the stipulation of the treaty the competence of the energy policy remained to the states, as of "*shared competence*". This has provoked ambiguous and controversial points of view that have lit new imperative needs for flexibility to blunt the differences that came from different statal needs (e.x. geopolitical). New policies ought to be found referring to the base of the European Union, to solve the problems and change the energy map without creating problems to the statal authorities. European Union has always been a union of civilizations with common roots based on democracy and this new energy map would be found at its' citizens that would take the burden the responsibility and the right of the new energy strategy, to smooth over the controversial statal policies.

The Third Package

The third package was issued in August 2009 and was linked to the objectives of Kyoto Protocol. It aimed at the liberalisation of the internal markets of electricity and natural gas and at improving the functioning of the internal energy market and

resolving certain structural problems. The environmental aim of the third package was:

- The reduction by 2020 of green-house gases to 20% of the 1990 levels;
- The increase by 2020 of energy production by renewable sources to 20% of the total amount of the energy consumed in E.U.;
- The increase of energy efficiency in order to decrease the consumption of energy to 20% of the estimated consumption in 2020;
- The increase of the use of new generation biofuels at least to 10% for the transportation
- The construction of a fully competitive free market, that would function as the basis for the creation of sustainable energy and environmental policies. Such a market should give priority to international networks which can interconnect regional energy markets and establish a secure supply between different states, that now energy communities would take advantage of.

The Package aimed at increasing the E.U.'s **energy security**, by reducing its dependence on imported energy and contributing to the creation of a European Energy Union. The E. U. is close to achieving these goals, although there is still a big deviation concerning its targets set for the consumption of transportation energy, which covers almost half of its emissions².

The third energy package has enhanced the priority of effective unbundling. If a single company operates a transmission network and generates or sells energy at the same time, it may have an incentive to obstruct local Energy Communities access to infrastructure. This prevents fair competition in the market and can lead to higher prices for consumers. Under the third package, the networks started being independent, so they can be used by autonomous producers.

The Crisis over Energy

2

Even after the above mentioned legal framework was created, the Legislator left to the states the research and exploitation of Fossil Fuels as energy is explicitly referred at article 4 of TFEU of "*shared competence*" between E.U. and the States. The efficiency of the above framework was tested in the Russian-Ukrainian crisis of 2009 when all Russian gas flows through Ukraine were stopped for 13 days, cutting off supplies towards Southeastern Europe and partially to other European countries. During which the crisis rhetoric of the E.U. was ambiguous, unclear and without unity between the states.

The different geopolitical perspectives of the states of European Union were revealed. Germany was not afraid of the Russian tactic and indeed had in 2011 inaugurated Nord-Stream pipeline that permitted a privileged behaviour from Russia, independent from the rest of Europe. Also the Russian-Ukrainian crisis had not touched Germany as much as the countries of South Eastern Europe. On the other hand Britain, France and most of the European countries had felt rather insecure, but as the competence of the policy was national (shared competence) they could not take any unanimous decision to confront the problem. Moreover this crisis has unveiled the problem of a European Energy market that ought to cover its own needs.

A solution to this problem would be if the consumers were able to produce energy on their own. The proceeding towards being an EU energetically autonomous would accelerate.

3.3 The evolution of Distributed Energy technology and Artificial Intelligence

All this political perspectives came along with the beginning of the 4th technological revolution of Artificial Intelligence. New smart technologies came up that changed the perception of the traditional ways of energy managing at all levels. Now the Distributed Technologies permit electric generation and storage performed by a variety of small devices that can provide revenue streams while connected to the microgrid (of the Energy Community) or to the energy distribution

system, helping to decrease overall microgrid costs and increase survival time during a grid outage³.

Regarding the production:

- The photovoltaic panels saw a radical fall at cost and became accessible to bigger percentage of the population, giving to the consumers independence and autonomy. The European industry had interest in investing in Photovoltaics.

The value and prestige of usage of wind turbines had a linear anode according to the sales in European field, that still today exists.

Regarding the consumption

-Cogeneration of Heat and Power is a big challenge for the buildings. A Cogenerator of Heat and Power unit is a system that produces heat and electrical power from gas simultaneously. This unit is used for supplying power to buildings and hot water for heating or cooling through high efficient heat and power generation. The efficient energy level rise up to 87% of the fuel burn rate in total production, which is extreme⁴ in comparison to the efficient level of the conventional heating and powering mounts to 33%.

Regarding the storage

- A new day for storage seemed to be rising using the capacity of the batteries of the electric vehicles. Through the smart metering systems, the electric vehicles are considered as part of one net. The huge store capacity of electromobility, considered as a net, is the back up storing solution to the intermittency of the renewable energy sources that increase the survival time in the community when supplies are limited.

³<https://www.energy.gov/eere/femp/distributed-energy-technologies-resilience>

⁴<https://www.yanmarenergysystems.eu/Micro-Cogeneration-CHP-unit/>

Moreover new technology inventions regarding the storing materials, like superconductors, gave new hopes for the future of storing capacity.

Regarding the technology

- Smart metering systems interoperability would procure with data both the consumers and producers as to regulate and give flexibility to consumption/production and energy efficiency. Smart metering systems, apart from metering can transmit accurate data feedback in real time, and provoke immediate correspondence of the microgrid they are part of. By showing the needs at every part of the energy-microgrid, help the system to cover them so as to secure the flows of electricity and to balance the needs of production or consumption or energy storage in real time. More over smart metering systems provide better visibility of networks for Distribution System Operators so the cost of maintenance is reduced and consequently the bills are lower to the customers. Moreover they contribute to the deployment of smart grid and to the connection with the internal market of electricity. Also they provide data useful for the creation of economic assessments in order to contribute to the national energy plan.

To sum all the above up, they would create the idea of a consumer that would produce energy, store and effectively respond to the needs of the community he is part of, by balancing production and consumption. The producer that can be also a consumer and be an active part of an energy community, would be called "Prosumer", a synthesis of the aforementioned adjectives, the main substance of the Energy communities.

3.4 Towards 2050

The Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet', describes the following vision:

"In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society."

The European Commission in 28th November 2018 adopted a strategic long-term vision for a prosperous, modern, competitive and climate neutral economy by 2050 – A Clean Planet for all⁵. With this strategy Europe aims to lead the way for climate neutrality by investing in new technological solutions, enhancing the citizens' role and aligning action in key areas such as industrial policy, finance, or research – while ensuring social fairness for a just transition.

4. THE EVOLUTION OF THE LEGAL FRAMEWORK.

Following the above historical, political and technological changes, the European legislator has evolved the legal framework, regarding the base of the regulations of the Energy Communities, as below:

The first Energy Package

The EU project "Liberalisation of the Energy Market" contained the directives 96/92/EC and 98/03/EC which set common rules to the internal electricity and

⁵https://ec.europa.eu/commission/presscorner/detail/en/IP_18_6543

natural gas market respectively.⁶ The first Energy Package which entered into force in 1996, described the liberalization of energy markets, *a sine qua non* for the creation of the European Communities in subject.

The second Energy Package

a) The directives 2003/54/EC and 2003/55/EC which impose common regulations on the internal electricity and natural gas markets respectively (the latter have repealed the above-mentioned 96/92/EC and 98/03/EC as not having the expected results);

b) 2003/796/EC: Commission Decision of 11 November 2003 on the establishment of the European Regulators Group for Electricity and Gas.

The core of the development was the separation of the transmission and distribution and the mandatory establishment of natural energy Regulators.

The third Energy Package

a) The Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing the Agency for the Cooperation of Energy Regulators;

b) The Regulation (EC) 714/2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003;

c) The Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning the common rules for the internal market in electricity, which repealed the Directive 2003/54/EC, and

⁶The first legislative package (Directives 96/92/EC concerning common rules for the internal market in electricity and 98/30/EC on common rules for the internal market in natural gas), see the full text at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0092:EN:HTML> and http://eurlex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.1998.204.01.0001.01.ENG&toc=OJ:L:1998:204:TOC.

Other Secondary Legislation:

- The Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources which amended and subsequently repealed the Directives 2001/77/EC and 2003/30/EC. This Directive was opening the road for the implementation of the third package as to increase the share of Renewable energy to 20% up to 2020 in E.U. As it becomes obvious, the share of fossil fuels will decrease in favour of the renewable sources. For Greece the target was, in turn, set to 18% in accordance with the country's prevalent economic condition and its spatial energy distribution.

- The Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009, which amends the Directive 2003/87/EC, improves, and extends the greenhouse gas emission allowance trading scheme of the European Community.

5. THE CLEAN ENERGY PACKAGE

The Package "Clean Energy for All Europeans" decided on 26 March 2019 (not officially published yet) covers the objectives of the Paris Agreement. The 2030 climate and energy framework includes E.U.-wide targets and policy objectives for the period from 2021 to 2030. This framework helps drive progress towards a low-carbon economy and build an energy system that ensures affordable energy for all consumers. The key targets for 2030 are:

A) At least 40% cuts in greenhouse gas emissions (from 1990 levels);

B) A share of at least 32% for renewable energy; Diminution of the cost of Renewable Energy Sources.

C) An improvement of at least 32.5% in energy efficiency; That is for example Improvement of energy efficiency of the buildings, eco design of european products and energy labeling

- D) The establishment of a new governance process;
- E) The enablement of the active participation of consumers whilst putting in place a strong framework for consumer protection. The consumers can generate their own electricity and feed the surplus back to the grid. Organize in RES communities for the production, consumption, storage and sale of renewable energy. Stop buying heat / cooling energy from a district heating / cooling system if they themselves can achieve significantly better energy efficiency.

As far as it concerns the Energy Communities they play an important role to achieve those targets as described to Directive 2019/944 for the Internal Market for Electricity.

The Directive gives emphasis to the enhanced role of the consumers and their right to self-generated energy⁷ without changing the rights or obligations obtained from the previous energy packages⁸. Consumers constitute the base for the Energy Communities and thus their position is crucial.

Particularly special reference is made to the rights of the consumers to aggregate⁹ in terms of production, consumption and supply, and *constitute aggregation schemes and permit them to enter the market, or to function as intermediaries between customers and the market*. Energy communities are a certain form of aggregation specially regulated and promoted by article 16.2(d) by means of flexibility and energy efficiency¹⁰. Also the Energy communities can aggregate between them to strengthen their role in the market.

Between the members of the community *offsetting energy must be without statal restrictions* and the sharing of energy must be free of charge¹¹ and regulated by the community itself. European Union through aggregation opts for multiple consumer microgrids that support the whole system with secure supply, as in total they can cover system needs better. That-way the system becomes more resilient as

⁷Preamble paragraph 37

⁸article 16 par. 1(c)

⁹Preamble paragraph 39, article 13

¹⁰Article 16

¹¹Article 16 2(e)

well as energy effective. Both are considered crucial matters in the Directive for Energy Communities as well as for the Treaty on the Functioning of the European Union,.

Customers are *able to participate directly or through aggregation in the energy whole sale cross-border, or regional, market*. For example “Interreg North Europe Programme” is a tool to foster transnational cooperation between Energy Communities of North Europe, as to become a key economic player and an attractive place to work and live with a total budget of 370 million euro and a co-funding rate up to 60% from European Union.

The aforementioned smart metering system technology play very important role and its full deployment is in detail referred to the Directive for Energy Communities¹². *Smart metering systems* permit adjusting the consumption to the market signals and thus benefiting lower electricity prices or incentive payments. In the meantime they increase the alert of the consumers and permit them to respond to the demand of energy. *Demand Response* is a temporary change in energy consumption, generally with a decrease in service level (e.g. less comfortable climate, sub-optimal lighting) that takes place even through aggregation and consequently the aggregators become active players in the electricity market.

The *smart metering systems can provide data* to help consumers with accurate billing and information. Accurate, understandable, concise billing is of crucial importance for the European legislator¹³ as it can give all the details needed to estimate the course of the energy planning and to allow consumers invest on various sectors as on dynamic electricity price contracts.

*Dynamic electricity contracts*¹⁴ are the electricity supply contracts between suppliers and final customers that reflect the price variation in the wholesale market and consequently help for better prices the consumers. The state is obliged to inform on the risks of dynamic contracts and to secure minimum exposure of the communities to wholesale market and price risk.

¹²Preamble paragraph 37

¹³Article 18

¹⁴Preamble paragraph 37, article 11

The role of the communities in the fourth package

Energy Communities have the same rights and obligations and are in equal position with the other players of the market producers, distributors, consumers, depending on the role each energy community has, of a producer distributor, consumer, or complicated.

Moreover, the Directive 2019/944 directly empowers the role of Energy Communities as Distributor System Operators, either under general regime or as “Closed Distributors System Operators”. The legislator foresees the *Energy Communities can contribute to the modernization of the distributing network*. So, clarifies certain legal aspects of the functionality of the Energy Communities as distributors without prejudice of the existing regulation regarding Distribution Energy Operators¹⁵.

The role of the state

The state is obligated by the European legislator to remove barriers and restrictions, to let the Energy Communities “level playing field” and in the case or Renewable Energy Communities to support them actively and to promote their interests. Is also obliged to provide legal framework open to cross-border participation. To entitle Energy communities to own, establish, purchase or lease distribution networks and to autonomously manage them and establish their own rules respecting the existing framework of the Distributor System Operators.

Taking everything into consideration it is evident that in terms of strategic energy policy, the Clean Package increases the security of the E.U.'s energy supplies as the Energy needs are spread to the consumers and reduces EU dependency on energy imports, creates new opportunities for growth and jobs, and brings environmental and health benefits.

¹⁵Article 16 par. 4

6. THE IMPLEMENTATION OVER THE EUROPEAN COUNTRIES

Even if the Directives regarding the Energy Communities are new, the concept itself existed before. Germany, Netherlands and the United Kingdom have had numerous over the last decade¹⁶. In United Kingdom there are 248 energy cooperatives, in Germany there are 791 in 2018, in Netherlands the platformed showed 484 Energy Cooperatives.

6.1 The European institutes and programs:

Institutions of Energy Cooperatives in Europe

-Covenant of Mayors for climate and energy¹⁷, is the world's largest movement for local climate and energy actions with over 318.843.930 inhabitants and 60 countries. It is a European co-operation movement involving local and regional authorities. Signatories of the Covenant of Mayors voluntarily commit to increasing energy efficiency and the use of renewable energy sources on their territories. By their commitment, they support the European Union 20% CO 2 reduction objective to be reached by 2020.

-Network of Renewable Energy cooperatives in Europe (REScoop.eu), funded by EU, has around 1500 association of Energy Cooperatives is involved in representative its members in European Union level. On the map of network of Renewable Energy cooperatives in Europe (REScoop.eu)¹⁸ are pointed 31 members

¹⁶https://www.pvp4grid.eu/wp-content/uploads/2019/05/1904_PVP4Grid_Bericht_EUnat_web.pdf

¹⁷<https://www.covenantofmayors.eu/about/covenant-initiative/covenant-in-figures.html>

¹⁸<https://www.rescoop.eu/>

from Belgium, 156 from France, 21 from Spain and 44 in Italy¹⁹, 47 in Denmark, 5 in Portugal, 3 in Ireland, 2 starting in Greece and 1 in Croatia ²⁰.

Other Institutions to help energy communities

There are institutions custodians of all kind of information or expertise. as the exchange of knowledge and know-how is of primary importance:

-Clean Energy for EU Islands Secretariat: A one-stop-shop for Europe's island communities transitioning to clean energies. Whether islands are looking to connect with other island communities, technical experts, or need support on project development, or practical materials to help advance the transition on the island.

-The EU Energy Poverty Observatory (EPOV) is an exciting new initiative by the European Commission to help Member States in their efforts to combat energy poverty. It exists to improve the measuring, monitoring and sharing of knowledge and best practice on energy poverty²¹.

European programs around Energy Communities

-Horizon 2020 was the biggest EU Research and Innovation programme ever, with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract by taking great ideas from the lab to the market. Horizon Europe (2021-2027) is even bigger with 100 billions for research and innovation.

- The RESCOOP 20-20-20 program funded by the EU in the context of Intelligent Energy Europe (2012-2015), it was a project during which 12 cooperatives from all over Europe were studied with the aim of analyzing how the social acceptance of

¹⁹<https://www.rescoop.eu/community-energy-map>

²⁰<https://www.rescoop.eu/community-energy-map>

²¹ <https://www.energypoverty.eu/>

RES projects is affected by a possible involvement of the local community to energy cooperatives²².

-The main objective of the CO-POWER (Community Energy) project was to accelerate the development of RES projects across Europe by creating a favorable legislative framework as well as a broad alliance of social actors to support them²³.

-The WISE POWER program focused on improving the participation and support of wind turbines by society, while enhancing the involvement of local communities in the design and implementation of wind energy projects²⁴.

-The RESCOOP PLUS program (Horizon 2020) aims to make energy cooperatives in Europe able to operate beyond energy production and supply and in the field of energy saving, and to better understand their energy behavior²⁵.

-RESCOOP MECISE (Renewable Energy Cooperatives Mobilize European Citizens for Sustainable Energy Investment - Renewable Energy Cooperatives Mobilizing European Citizens to Invest in Sustainable Energy) refers to a Horizon 2020 program during which six large-scale projects are active. with energy efficiency, promoting partnerships with cities and municipalities²⁶.

-FLEXCOOP aims to introduce a fully automated Demand Response framework and a set of tools for home electricity consumers like virtual power plants²⁷.

-The main objective of WISEGRID is to provide a range of proposals and technologies to increase the 'intelligence', stability and security of an open European energy network that puts the consumer at the center

²² <https://www.rescoop.eu/european-projects>

²³ <http://www.communitypower.eu>

²⁴ <http://wisepower-project.eu>

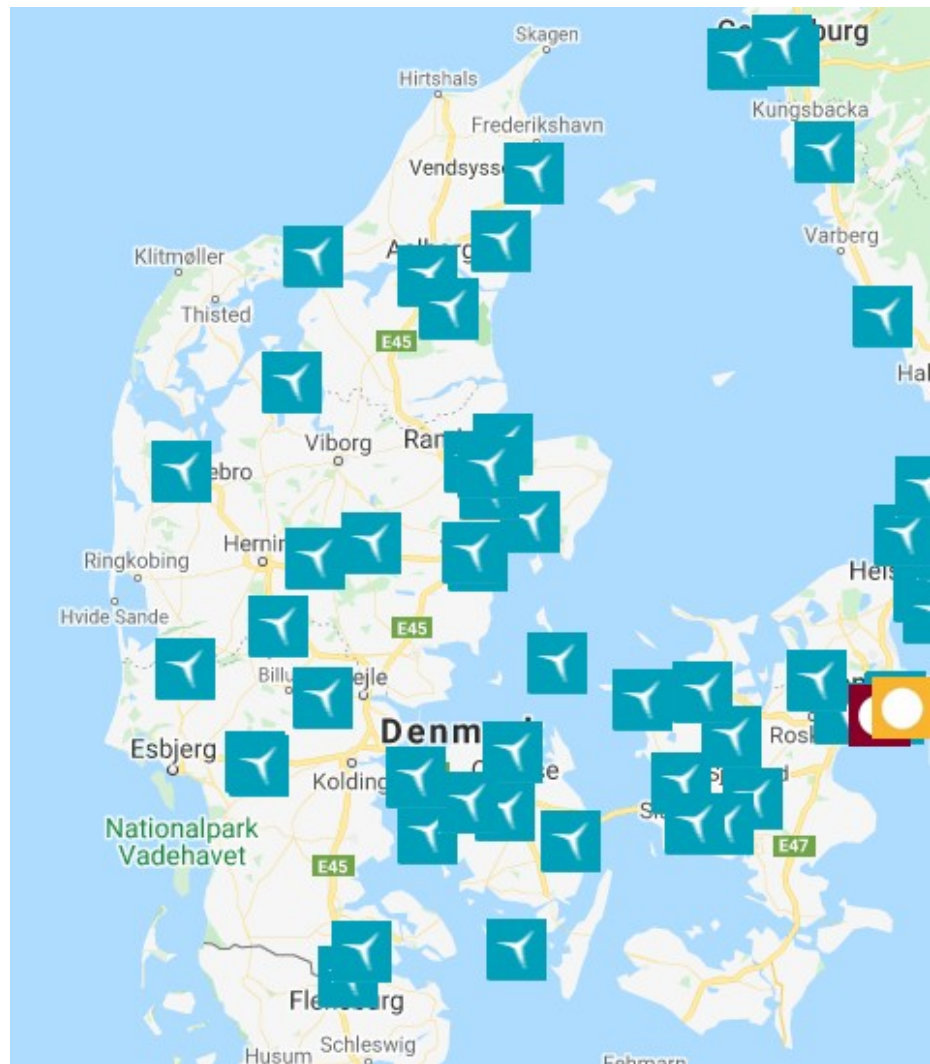
²⁵ <http://www.rescoop-ee.eu/rescoop-plus>

²⁶ <http://www.rescoop-mecise.eu>

²⁷ <http://www.flexcoop.eu>

6.2 The Countries

Denmark



map 1 Energy Communities in Denmark members of REScoop.eu

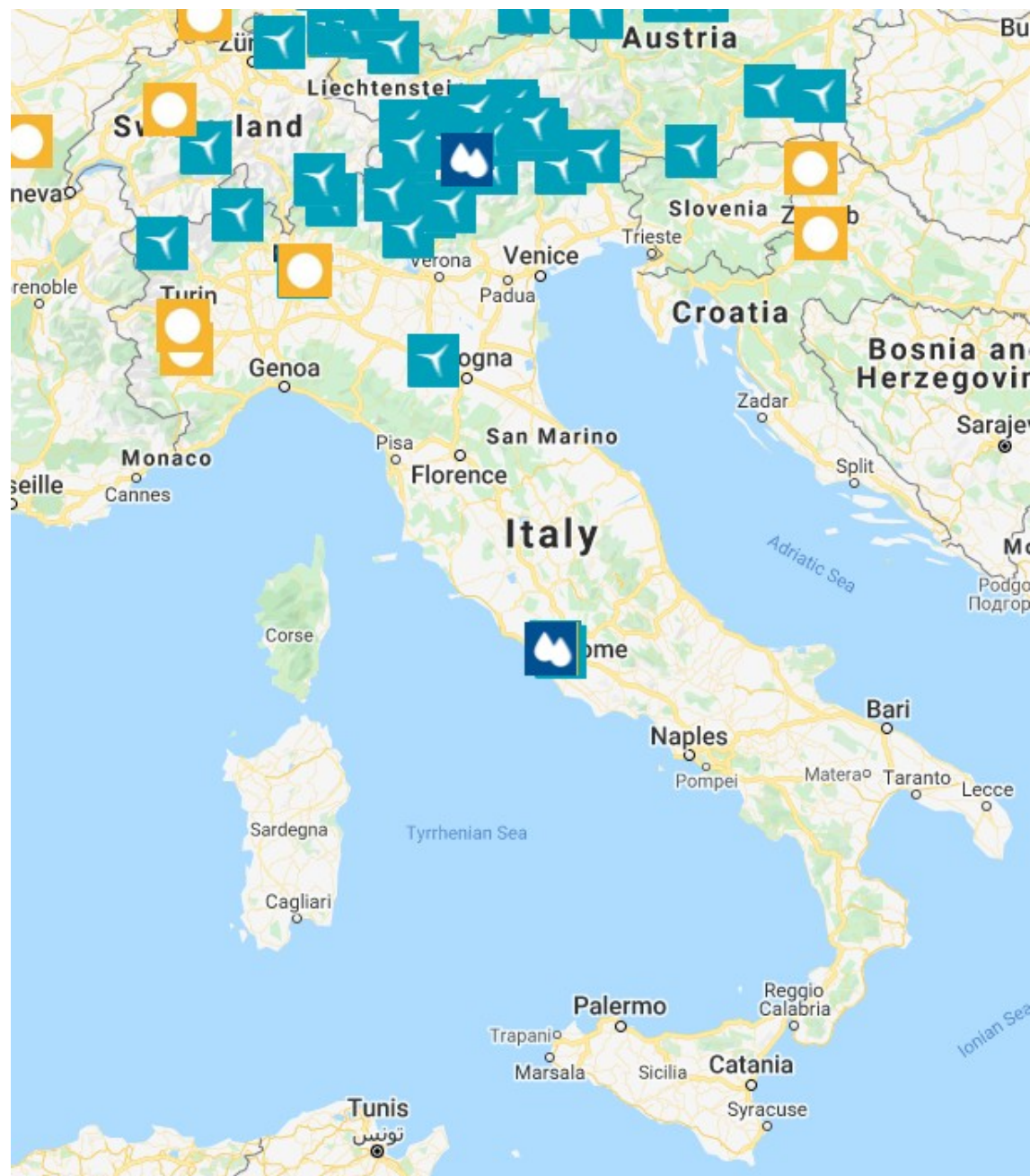
in Denmark there are 43 Energy Communities members of REScoop (see map above). Denmark is considered one of the pioneering nations regarding Wind Energy starting from 1970 and has a tradition to cooperative ownership and energy activism. Since 1970 has included tax exemptions for income from wind turbines, fixed feed-in-tariffs, guaranteed grid connection, purchase obligations and priority transmission for wind energy.

The system ownership in Denmark is based in public participation as citizens can buy wind-power shares and less in cooperatives. According to the 2009 Promotion of Renewable Energy Sources anyone who erects a wind turbine over 25

meters, without tender-ship, is obliged to sell at least 20% of the ownership shares to a person that abitates within 4,5 km radius of the turbine.

As a result of the above in 2013 in Denmark 70-80 % of the existing wind turbines were owned by communities. Now the rate is one of the highest in the world.

Italy



map 2 Energy Communities in Italy members of REScoop.eu

In Italy there are 57 Energy Communities members of REScoop (see map 2 above). There are two categories of Collective Renewable Energy Prosumers ²⁸:

a) The “historical” ones that their legal framework has been set up in the 1960s with mainly hydroplants they have created a grid of their own that is connected to a point to the main grid.

b) an “Utility efficient system” regarding entities with up to 20MW installed capacities, who can self-consume their energy or sell it to a unique local consumer. This type can be used by a large commercial or industrial consumer.

It is also possible for prosumers to directly sell to the market however the requirements are rather complicated which makes it difficult for small players to participate. It is not possible for a household to sell the energy it produces to another directly so collective self consumption is not possible. A big discussion is being made on harmonizing the Italian legislation to the European Directive 2018/2001 (REDII) as there is no specific law for self-consumption.

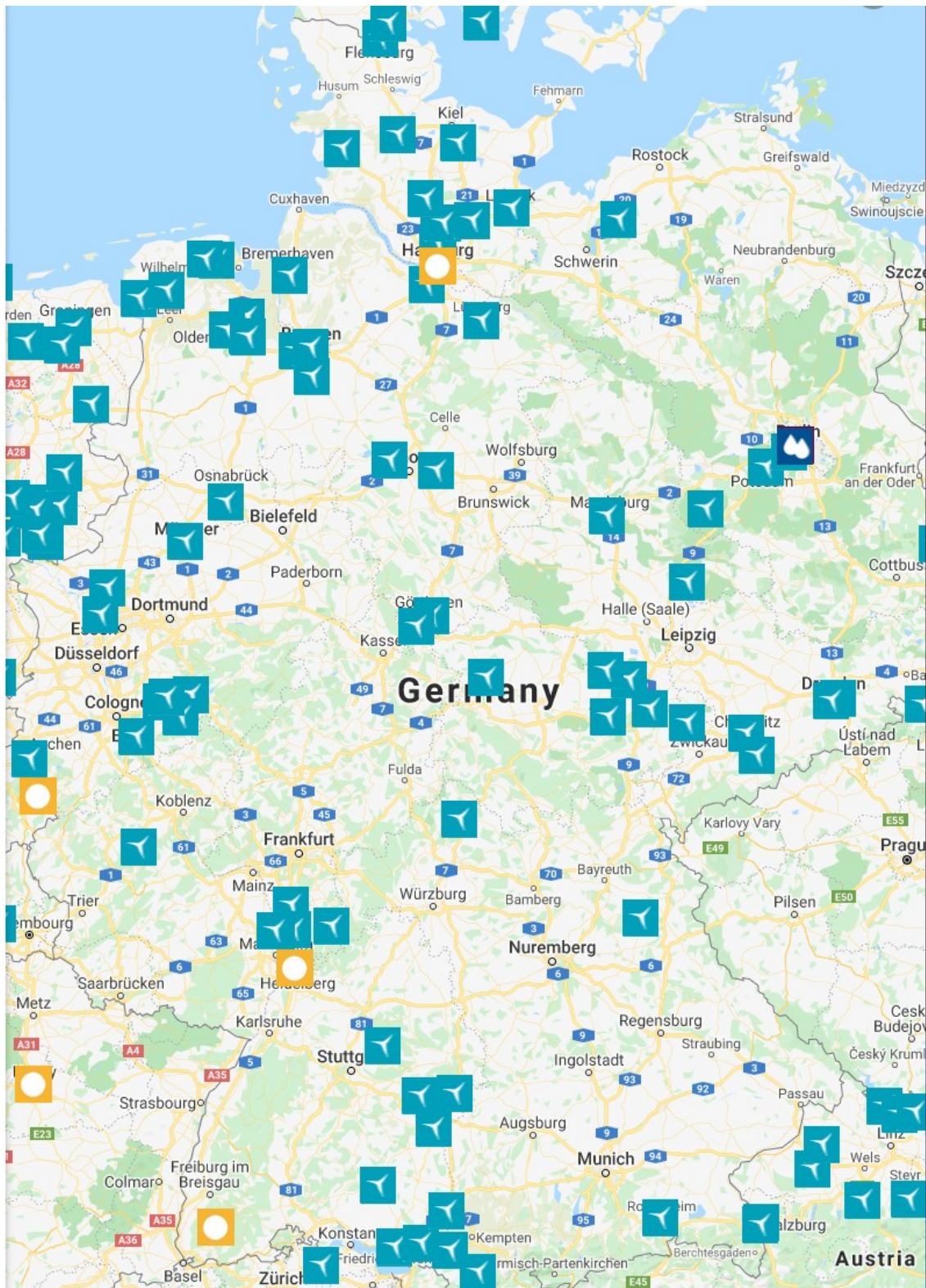
There are no restrictions on the size of Renewable system installed and consequently no limitation to the energy fed to the grid. There are also state support towards the Renewable systems as a favourable VAT regime (10% instead of 20%), real estate tax deductions, possibility to sell Renewable Energy either on a guaranteed minimum price²⁹ or on net-metering³⁰. In the last case the energy is sold to the system operator and is remunerated through an energy quota that comes from the electricity market prices and a “service quota” depending on the cost of grid services (transport, distribution, metering and other charges).

²⁸Energy Authority Resolution 578/2013/R/eel

²⁹“Ritiro Dedicato”

³⁰“Scambio sul posto”

Germany



map 3 Energy Communities in Germany members of REScoop.eu

In Germany there is strong and stable support for renewable energy, as in Denmark. Both wind turbines and photovoltaics are promoted and as of 2012 approximately half of the renewable sources capacity is installed under some form of community ownership³¹. Local authorities in Germany are autonomous and responsible for local actions, as long as the local actions are run as efficiently as a third party would run them. Over the last years have been established over 70 new municipal power utilities³² and the distribution systems belong to them. Energy communities are partnering with local authorities that can also benefit from available financing at preferential rates for example long term inexpensive financing from the German public bank KfW.

The most common ownership structure is limited partnership between a limited liability company which is the wind developer or utility, and local people that want to invest as limited partnership and the profit is distributed according to the percentage of the shares a stakeholder has purchased.

After the decision of the German government to swift away from nuclear power the new energy package (Energiewende package) confirmed the promotion of decentralized renewable energy, combine heating and power (CHP) and energy efficiency projects³³. Germany is exploring the concept of virtual power plants and virtual storage units for market's next generation, using blockchain technology. In other words more prosumers or energy communities use their networks either to store produced energy or to realize it, each prosumer/energy community when demanded, as a power plant would do³⁴. The blockchain technology is used by

³¹ Simcock, N. Willis, R. and Capener, P. 2016, Cultures of Community Energy, International case studies

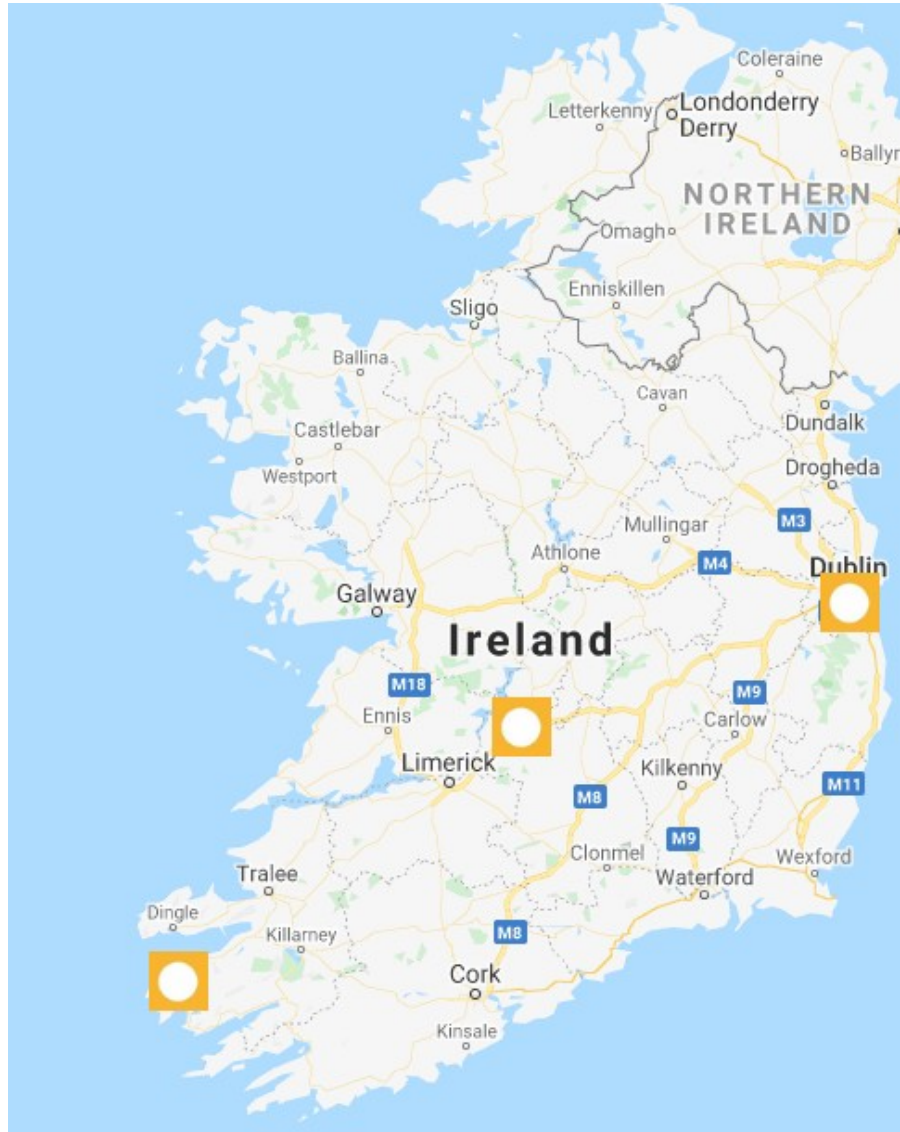
³² Wagner, O. and Berlo, K. The wave of remunicipalisation of energy networks and supply in Germany – the establishment of 72 new municipal power utilities.

³³ Energy Cities, 2017, Local Energy Ownership in Europe: An exploratory study of social public initiatives in France, Germany and the United Kingdom.

³⁴ Leuphana University of Lueneburg, EnERgioN: The generation, storage and marketing of renewable energy in the northern region: <https://www.leuphana.de/en/partners/innovation-incubator-lueneburg/sustainableenergy/energion.html> (accessed 25 June 2018). Peeters, M. and Schomerus, T. 2014, Regional renewable energy: a string of legal and financial challenges.

recording who is the producer, how much energy has produced or stored and is available for trading or has been trade, using the energy as a trade current.

Ireland



Map 4 Energy Communities in Ireland members of REScoop.eu

The network of Renewable Energy cooperatives in Europe (REScoop.eu) ascribes 3 Energy Communities in Ireland (See map 4 above).

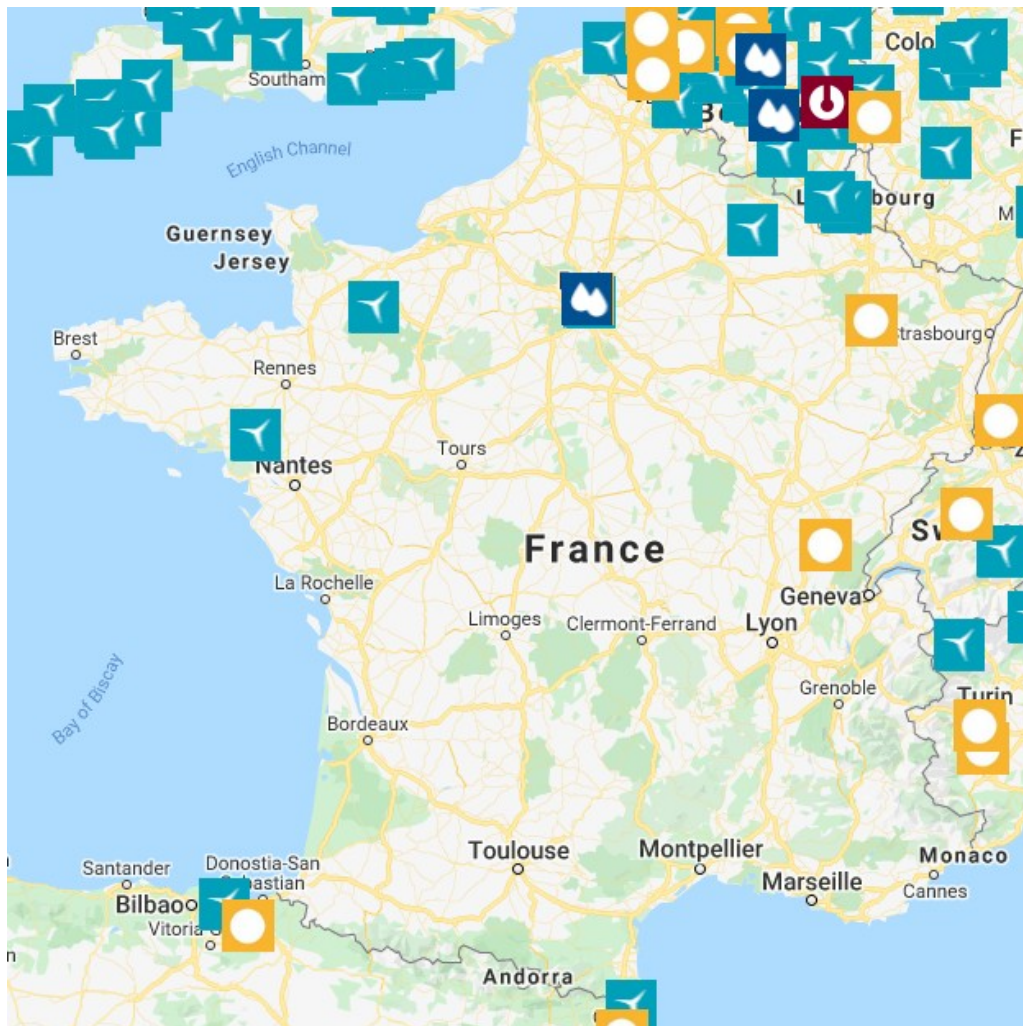
In Ireland there are several barriers which impede communities from flourishing, including access to funding and advising, at the first stages of their development and a difficult access to the power grid. Currently connecting to the grid takes long time and it is rather costly³⁵. Ireland, has always had a conservative

³⁵ Friends of the Earth Ireland, 2014, Community Energy Policy Position Paper.

energy policy, as firstly it is one of the most energy-intensive countries per capita and secondly due to the geopolitical risks, as one part of the island belongs to the United Kingdom.

Things seem to be changing after Ireland's National Energy White Paper (December 2015) and National Mitigation Plan (June 2017) attributing importance to citizens and Energy Communities. Also there is Sustainable Energy Authority of Ireland (SEAI) which gathers communities of Ireland (numbered 300 since 2020) and introduces them to the first steps of the notion of green energy and self-productivity out of Renewable Energy Sources.

France



map 5 Energy Communities in France members of REScoop.eu

The network of Renewable Energy cooperatives in Europe (REScoop.eu) ascribes 10 Energy Communities in France (See map 5 above).

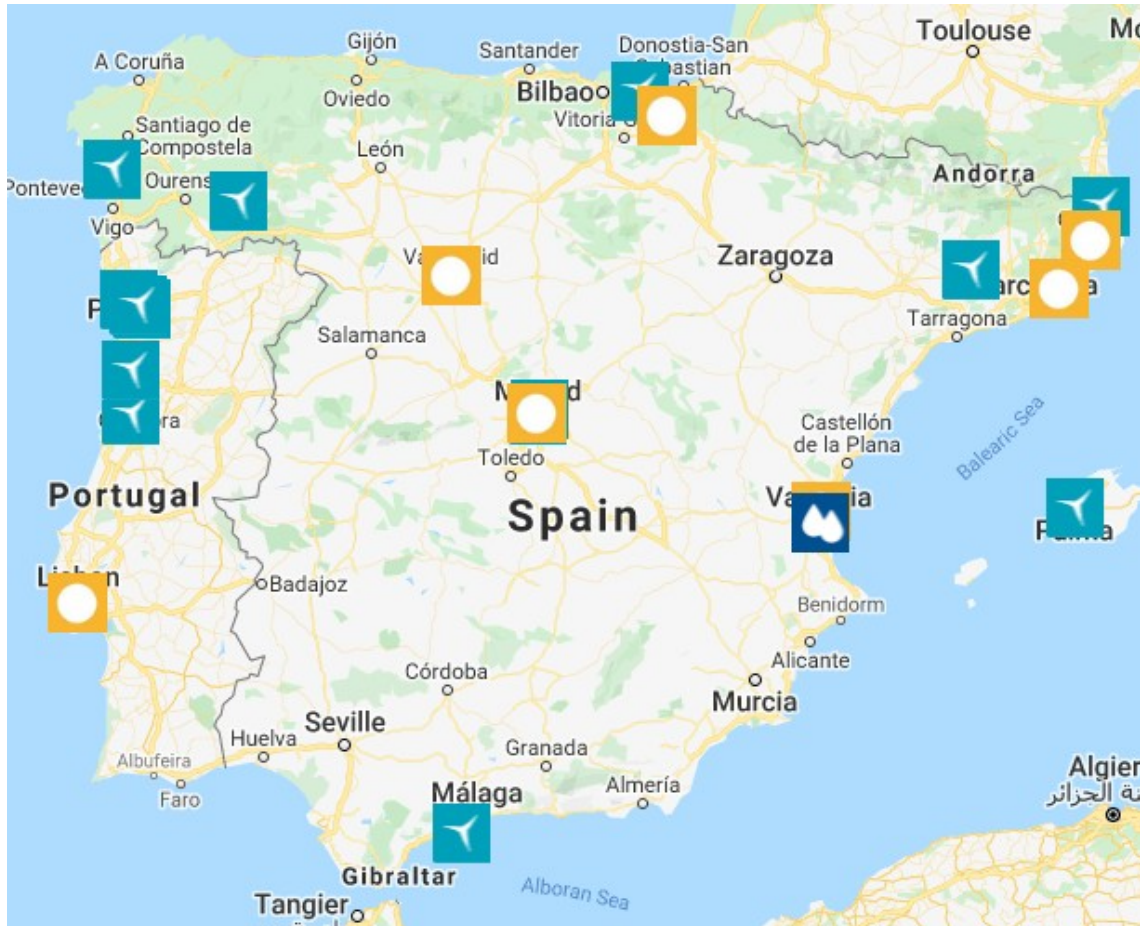
In France European regulations have been integrated in 2015 end 2016³⁶. The Energy code defines two types of energy self-consumption: the “individual self-consumption operation” and the “collective self-consumption operation” (CSO). Collective Self-consumption Operation exists when electricity is provided between one or more producers, and one or more final consumers who are tied among themselves with the legal structure as a legal person, located in proximity, and whose extraction and injection points are situated after the same low-to-medium voltage transformer station. The Collective Self-consumption Operation is possible to participate in energy markets, except if they benefit from the feed-in tariff.

The state helps the Collective Self-consumption Operations with feed-in-tariffs for projects under 36 kW, special grid tariffs and tax exemptions, though specific grid tariffs imposed by National Regulatory Authority, in certain cases, are more expensive than the normal. Collective Self-consumption Operations are exempted from energy suppliers responsibilities but if they decide to operate so they would be subject to strict and demanding requirements, such as balancing responsibility, as well as technical and financial capacity.

There is no legal definition of Renewable Energy Communities but they may adopt the legal definition of Collective Self-consumption Operations. Households can sell their surplus energy to each other, when residing to the same building, as Collective Self-consumption Operation members. Sooner or later France will harmonize its legislation to the European Directives.

³⁶Provisions 2015-992 Energy Law transition and 2016-1019 Self-Consumption Ordinance the regulates individual and collective self-consumption

Spain



6 Energy Communities in Spain members of REScoop.eu

The network of Renewable Energy cooperatives in Europe (REScoop.eu) ascribes 16 Energy Communities in Spain that meet the criteria of membership.

In Spain the Royal Decree 900/2015 has applied taxes to all the renewable energy electricity generated and self-consumed. Legal procedures were complicated creating the danger of high fines for non-compliance.

In 2018-2019 two different legislations (Royal-Decree-Law 15/2018 and Royal Decree 244/2019) eliminated the taxes and provided a new framework for collective forms of self-consumption. They have given incentives by establishing compensation

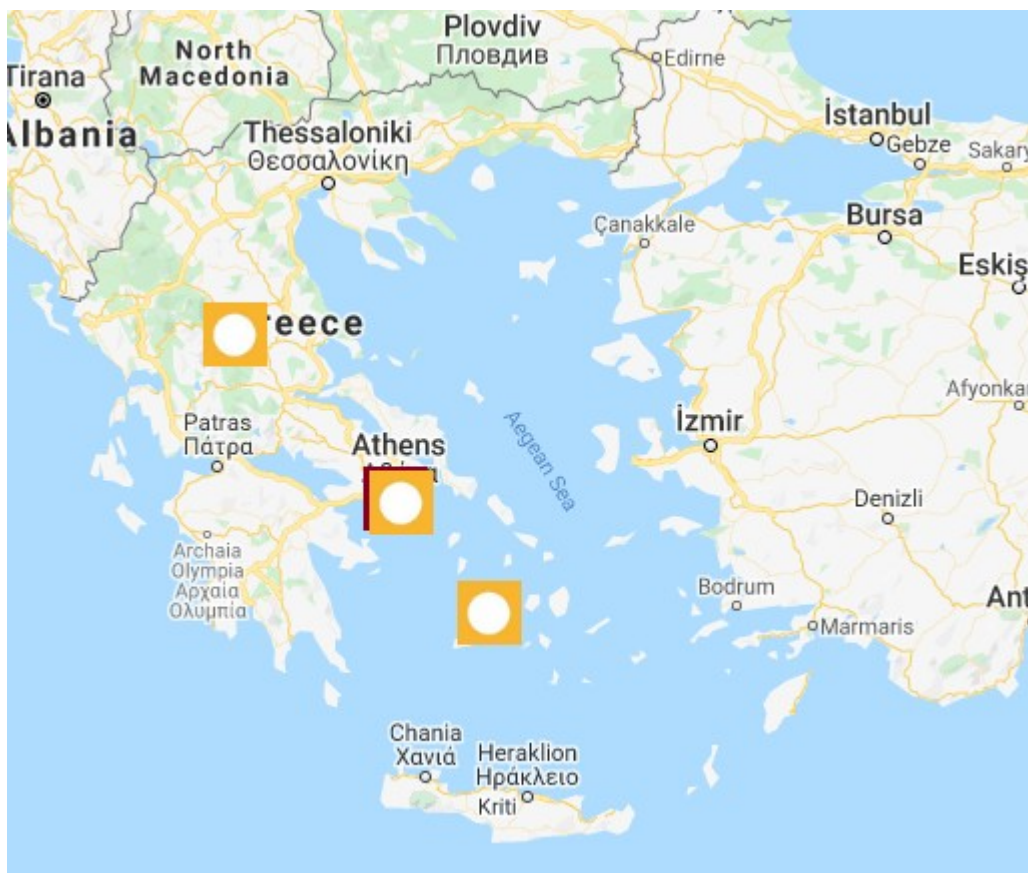
mechanisms and simplifying administrative procedures. Particularly they have defined the notion of collective self consumption and diversified the collectivities into groups, ones that provoke surplus and ones that do not provoke, for the latter have simplified the installation procedures as not to need access or connection permission to the grid.

Now for installation under 15kW the self-consumption is without limitation. For installations from 15kW to 100kW there is a compensation in forms of savings from the electric bill and for the communities is provided that there will be a distribution of the savings among the members of the community.

Though Renewable Energy Communities are not namely mentioned yet the jointly acting self-consumer that is of maximum 500m away from the installation are considered “neighbour communities”.

Also the above mentioned Decree gives the possibility to Citizen Energy Communities for setting up a virtual network of Renewable Energy, integrating local working groups. A large cooperative in Spain, “Som Energia” integrates local working groups, creating a national decentralized network along Spain.

The case of Greece



map 7 Energy Communities in Greece members of REScoop.eu

According to REScoop.eu there are 3 Energy Communities members of REScoop in Greece, 2 in Athens and 1 in Sifnos Island³⁷.

In Greece there is the Law 4513/2018 named “Energy Communities and other provisions” where Energy Communities are defined as civil cooperatives with exclusive target:

- the promotion of social and solidary economy
- the innovation at the sector of energy
- the confrontation of energy poverty
- the promotion of energy sustainability

³⁷<http://sifnosislandcoop.gr/en/energyautonomy/index.html>

- the production, storage, self-consumption, distribution, transmission of energy
- the reinforcement of energy independence and security in island municipalities
- the improvement of energy efficiency of the consumption (τελική χρήση) in local and regional level

those targets ought to be achieved through activation on the sectors of Renewable Energy Sources, Cogeneration of Heat and Power, rational use of energy, energy efficiency, sustainable transport, management of demand production, distribution and supply. An energy community in Greece can be involved in all the actions of producing, distributing, supplying energy,. The provisions of the law regarding the above mentioned actions (objects of the scope) of the Energy Communities are explicitly referred³⁸ and are obligatory in the sense that there must be at least one as object of the Community and no others can be constituted. Secondly Energy Community can be involved in actions of educating, informing, participating to

³⁸The provisions of the law describing the main objects are exclusive:

- a. Production, storage, self-consumption or sale of electrical or thermal or cooling energy from RES or CHP or hybrid plants located within the CEC Headquarters Region or within CEC neighboring Region headquartered in the Attica region.
- b. Management of raw material for the production of electrical, thermal or cooling energy from biomass or bioliquids or biogas or through energy utilization of the biodegradable fraction of municipal waste. 'Management' refers to the collection, transportation, processing, storage or disposal of raw materials.
- c. Supply for members of energy products, appliances and installations, with the aim of achieving better prices for their members, reducing energy consumption and use of conventional fuels, and improving energy efficiency.
- d. Supply for members of hybrid or non-electric vehicles, and generally of vehicles using alternative fuels (electric, hybrid, gas), with the aim of achieving better prices for their members.
- e. Distribution of electricity within the Region where its head office is located.
- f. Supply of electricity or gas to end customers within the Region where its head office is located.
- g. Production, distribution and supply of thermal or cooling energy within the Region where its head office is located.
- h. Demand management to reduce the end-use of electricity and to represent producers and consumers in the electricity market, that is to give Economic Communities the opportunity to operate in the aggregation market.
- i. Network development, management and operation of alternative fuel infrastructures (eg electric vehicle charging stations), or management of sustainable modes of transport (eg electric vehicle fleet, etc.) within the Region where CEC headquarters are located
- j. Installation and operation of RES desalination plants within the Region where Energy Community is located.
- k. Provision of energy services (Energy Services Enterprise).

financial programs and provide energy services etc³⁹. The maximum geographic level of action is that of the Prefecture where the Energy Community has its seat.

According to the latest law there can be either non-profit economic communities or profit making Energy Communities that differ regarding to the membership constitution, the minimum number of the members as well as the potentiality of sharing profits.

The law promotes and special care is given to locality and to the islands (even more to those with population under 3.000 people). Regarding the members, at least 51% of them must be related with the place, having right “in rem” or be registered citizens or be seated in case of legal entities, where the seat of the Energy Community is located. The shares ought not to be bigger than 20% apart when the shares belong to local authorities that arrive to 40-50%. There is the principal that any member can participate to the general assembly with one vote, independently from its participation share.

According to the law the Energy Communities are being promoted by the state in various forms. Economic motives, technological tools as net-metering and virtual net metering⁴⁰ (as in the case of Germany) which is netmetering from distant structures or in any case from different energy supplies with different meters that are considered virtually as one.

³⁹The Secondary objects can be:

- a. Attracting funds to invest in RES or CHP or energy efficiency improvement interventions within the Energy Community headquarters.
- b. Development of plans of utilisation of RES or CHP or energy efficiency improvement interventions or technical support to the above sectors.
- c. Managing or participating in programs funded by national or EU funds. about its purposes.
- d. Advice on the management or participation of its members in programs funded by national or EU funds. about its purposes.
- e. Information, education and awareness raising at local and regional level on energy sustainability issues.
- f. Actions to support vulnerable consumers and address the energy poverty of citizens living below the poverty line within the Energy Community Headquarters Region, whether members of Energy Community, such as energy supply or offsetting, energy upgrading of housing or other actions that reduce energy consumption in the dwellings above.

⁴⁰ Ministeriall Creter: YΠEN/ΔΑΠΕΕΚ/ 15084/382 (ΦΕΚ Β' 759/05-03-2019)

The law 1413/2018 is based on a previous Law 4430/2016 which regulates the social and solidary economy. Social and solidary economy refers to the entrepreneurship that act mostly for the interests of the members and not according to the profit, in a base of democratic function. It conceives entrepreneurship as a tool for social development and prosperity.

7. CHALLENGES AND OPPORTUNITIES OF ENERGY COMMUNITIES

Apart from the expertise of the above mentioned institutes, as the Directives are new, there is no other tool that can gather all the data we have to compare the course and the needs of the evolution of the Energy Communities in the various states, and the comparative studies are very limited.

Policy, Finance, Legal Framework and Technical Knowledge are some of the key factors that the Energy Communities take in consideration.

There is no comparative research between the member states as to gather comparative results for the challenges and opportunities that energy communities meet in different member states. The energy communities are, still, on creation and considered by the states more as producers of Renewable Energy less as communities. So it is not given the political or technological importance the communities are having in order to specify and exploit their abilities. Consequently there are no data specially for Energy Communities found from the member states, for example regarding the capacities the Energy Communities have.

Technology

The evolution of technology is rapid and this gives advantages to the Energy Communities as in the case of Virtual Power Plants, Virtual Networking and

Netmetering to increase their installation power as to hold a stable position in the field of the whole-sale market and in addition to strengthen their position.

Strengthening their position will bring them in conflict inevitably with other market players as the Distributor System Operators for the control of the grids. As long as the communities grow and control their network less control over the grids be available for the Distributor System Operators challenging their survival. Until 2019 seven trials were uncoiling between Energy Communities and Distributor System Operators⁴¹ that create extra costs for the Energy Communities and even impede their evolution.

Moreover the change in Distributed Energy Technology drives spreading energy transition and this is the substance of the Energy Communities. To follow the evolution they need a close relation with European institutes (as above mentioned) or become members to a bigger network of energy cooperatives (REScoop, INTERREG). The municipality of Rafina (Greece) i.e. is part of Compile programme⁴² which gives help to microgrids. Of course the technology is demanding investments.

Financing- Incentives- Remuneration

Financing investments is even more important at the first steps of the creation of an Energy Community to materialize its plan. The cost of new technology is significant and can be obstacle to the development. Long lasting is also the repayment of the equipment, many times there are needed several years to be paid off. As the profits are not immediate, statal compensation and promotion is necessary.

Good and significant solution to this problem has given the participation schemes of consumers along with the local authorities. Local authorities, as long-living entities, with secure repayment and respectful estate propriety, usually have

⁴¹ THE FUTURE OF DSOs OUR TAKE ON ENERGY COMMUNITIES, Vlerick Business School AND REGULATORY SANDBOXES

⁴² <https://www.compile-project.eu/sites/pilot-site-rafina/>

privileged loan rates from the banks. When a Local or Regional authority participates to an Energy Community scheme, the Energy Community has privileged loan rates. In the case of Germany the Energy communities including local authorities are funded from statal KfW bank, which is specialized in funding statal organizations and Local Authorities, with exclusive rates.

Different kinds of compensation is foreseen in the different member states. Sometimes remuneration varies dependently from the size of Renewable power plants (Germany).

As incentive is given the right to the Renewable Energy Communities to participate in wind tenders, sometimes even before all others (Germany). Other times Energy Communities have a favourable VAT regime, real estate deductions, possibility to sell Renewable Energy Electricity to a guaranteed minimum price (Italy).

It exists also remuneration through the net-metering mechanism. In this case the electricity is remunerated both a) with a market percentage based on the electricity market prices and b) with a “service percentage” depending on the cost of grid services (Italy).

In other cases Energy Communities are considered premium investments, with premium Feed-In-Tariffs or special grid tariffs (France)

Compensation may have a form of savings to the electricity bill that can be divided between the members of the community (Spain).

In the case of Greece, economic incentives come from the fact that Energy Communities are considered part of solidar economy with privileged statal support due to a former Law 4430/2016, which has created a protective framework for solidar economy. Especially, the Energy Communities are given the right when a new Renewable Energy Source or cogeneration unit is constructed to be exempted from the rules of the antagonism, along with prioritizing administrative preferences and having to pay smaller guarantees for their administrative registration, when guarantees are needed by the law.

Moreover special provisions exist to various states regarding the Energy poverty and the privileges Energy Communities obtain when they contribute to the fight against it.

Legal framework

For the above reasons a clear and contemporaneous legal framework is needed as it is a complex issue. The cases of the countries analyzed have shown that there are countries like Ireland that do not have a new framework or like Spain and Greece that have a new one that is not still tested. When the framework is not stable, changes can affect Energy Communities. Changes ought to take in mind the existing experience from the big networks of cooperatives and institutes along Europe, given that every country has different standards. Special care ought to be given to the legal framework regarding the relation between Energy Communities and Distributor System Operators, for the above mentioned reasons as the competence over operation of the grid is obscure.

Policy

Energy Communities have an impact on democracy as energy is controlled locally and the consumers become responsible for the use of it. To apply all the correct meters first of all it is needed decisive policy. The problem above all are political decisions, interests and power relation. The "energy democracy" for the renewable era, considers the degree to which renewable energy sources and technologies may enable and may be enabled by democratic politics both to EU and to world level. There exists over time a tendency or compatibility between energy technologies and political power. In comparison to more centralized energy systems such as petroleum, decentralized or distributed energy technologies such as solar and wind power offer greater flexibility and can, therefore, more readily organize and enable distributed political and economic power, and vice versa, a relationship

described as distributed energy politics, that does not seem to be far from the above vision of E.U. for its citizens in 2050.

-The policy of European Union in my opinion, is and will remain stable as numerous historical and strategic proceeds have evolved it, as above mentioned. There are also countries that have invested their energy (and geopolitical) independence (as possible) from third countries on green energy. Germany after the closing of the nuclear plants. It still takes further clarification especially on the relations between the state and the DSO but my opinion is that the European legislator has left such regulation to the future when the balance between the Energy Communities and Distribute System Operator will be clearer and the problems specially notified, not risking for now an intervention in the whole sale market.

-The national policies are those that ought to be also stable promoting the interests of the Energy Communities, as the last ones cannot flourish without the help of the state, mostly due to the expensive technology and the big players on the rigid wholesale market. Firstly guide them in terms of any kind of information technical, financing, operating and administrative of community projects and bring them in touch with the related programs evolving in European level as to obtain experience Knowledge and Know-How.

They need financial and other kind of incentives to survive the antagonism and to take the risks of investing further to technology. The states ought to assess the potential contribution of the communities in meeting the the national energy policy goals and so, define concrete objectives for energy communities. That way states will guide Energy Communities through finance by the public support system or available through the European Union initiatives or commercial banks. They can adopt relevant programs general or special for the communities like grants – to – loans, guarantees of cheap credit opportunities⁴³

The member states in harmonizing the directives ought no to put restrictions or objectives that are too restrictive and thus impede types of Energy Communities

⁴³ Roberts, J, Bodman, F and Rybski,R 2014. Community Power: Model Legal Frameworks for Citizen-owned Renewable Energy

in their functions. There is also a need to lift the bureaucratic barriers and simplify the administrative procedures as setting up “one-stop-shops”

Local characteristics ought to be emphasized by the member states for example with the membership of local consumers, entities or authorities so that Energy Communities obtain tight and permanent bonds.

-The Local and Regional Authorities communities are very important in making policy for the energy communities and they have also great interests in doing so as they can be part of an Energy Community or create their own with their citizens. They are those that determine the land use, provide space for Renewable projects, administrative support and access to capital at preferential rates. Hence, Local and Regional Authorities can enhance their bonds and establish common interests along with their citizens. They can also provide technical expertise and stay over the preparation and operation of the projects. In Germany the Local and Regional Authorities own the energy distribution utilities and so their interest to become energy independent is even bigger. As a result Energy Communities be helped in order to derisk their investments and have a share in a partnership with the authorities.

Local and Regional Authorities can become part of the Covenant of Mayors as to benefit from existing knowledge, experience, sustainable energy and climate action plans (SECAP). Through these plans Local and Regional Authorities can meet their energy along with social goals as the impact of energy communities is varied.

8. THE CASE OF GREECE, A PROPOSAL

In the case of Greece a problematic exists as the new technology's cost is big. Moreover the main state policy is being made towards the installation of grids for the promising use of cheap natural gas. There is the opinion that electric cars (needed for storing energy in case of self-production and creation of communities)

and green technology, will always be costly and in-affordable for the economic standards of Greece. On the other hand the country's investment on grids of natural gas, as well as the possibility of drilling cheap, self-owned, natural gas would decrease the interest towards the creation of Energy Communities and generally constitute the green-energy transition dependent to the exploitation of the natural gas. The exploitation of self-owned cheap natural gas may depreciate any investment in green energy, as long as the emissions are below the European standards.

Yet the geographical relief in Greece is varied and the energy communities can bring solutions of energy independence and an alternative to the islands that cannot be interconnected.

A proposal

Due to the multiple and rapid evolutions in all the factors:

- Financing (financial european tool),
 - Technological meaning that there is rapid development in the threshold of the 4rth Industrial Revolution of Artificial Intelligence and the options the technology is giving are not defined,
 - Political regarding the competence of the Local and Regional Authorities that is changin,
 - Institutional (in terms of the existing Institutions around Europe) and -Legal, as the current legal framework is not tested yet,
- my proposal is to constitute "one-stop-shop" made up from public servants of competent ministries.

Competent ministries can be Ministry of Development and Investments (as Energy Communities are investments and they need statal incentives and technological develomen), Ministry of Environment and Energy, Ministry of Digital Governance (as the new Distributed Technology promotes democracy with digital

means). This “one-stop-shop” will provide the ministries with all the necessary information and expertise they can absorb from the big institutes, regarding the above mentioned evolution in the fields of Energy, Artificial Intelligence, Administration, Infrastructures, to process it and use it in a multidimensional way even in other sectors. This one-stop-shop can adapt the European expertise to the needs of local present reality. It can become the reference point of Energy Communities to carry to the ministries their needs and help them to find what they need without searching all around Europe.

9. CONCLUSIONS

Energy Communities is a new form of entities European legislator have instituted towards a cleaner energy future, applying the protocols of Kyoto and Paris. The states of European union had for decades defined the energy strategy of Europe but in the Russian – Ukrainian crisis in 2013, when Russia cut of the supply of natural gas in south Eastern Europe, has been clear that the position of the states of Europe were different and controversial regarding the dependence from natural gas. In the meantime the evolution of technology of Renewable Energy Sources, Distributed Energy Systems and Artificial Intelligence permitted the organized production of energy from the consumers/citizens, which would then on be referred as prosumers. Europe to overcome the controversial energy strategies of its states invested on the production of aggregated prosumers with two Directives regarding the Renewable Energy and Electricity, has instituted the Energy Communities and has equipped them with cross-border energy trade right. Energy communities are something more than energy producers and consumers , they represent the DNA of the existence of Europe, its citizens. The citizens, with the help of Local and Regional Authorities, lift the responsibility of energy independence and this promotes new powers towards energy democracy using the new technologies means. More-over they lift the weight of interdependence as

the cross border connection and energy trade is protected by European Union.

It is a chance for the Local and Regional authorities to lift the weight as to become energy independent and help their Energy communities survive through privileged loan rates or expertise along with the administrative Know-how. That way they cultivate tighter relation with the citizens, cut the energy expenses and obtain a different weight in the political scene.

In this evolution Energy Communities meet the complex needs of new technologies, politics, finance, climate change, administration, energy and law. Under that view it is needed the experienced big European institutions, as custodians of expertise, where the states and Energy Communities need to address. Certain states (Germany, Denmark) have promoted over the years the Energy Communities, to accomplish national targets, and so their plans are more concrete. The 4th industrial revolution that now runs can also help the rest (Ireland, Italy, Greece, Spain) that did not have the same evolution, to reach the others, as they do not have the burdens of the old technology, that is installed to the former. In the case of Greece cheap natural gas may diminish the interest towards the Energy Communities, as long as the reduced emissions plan is followed.

The sure is that we are living in an interesting period of an energy transition along with a technological and a political one.

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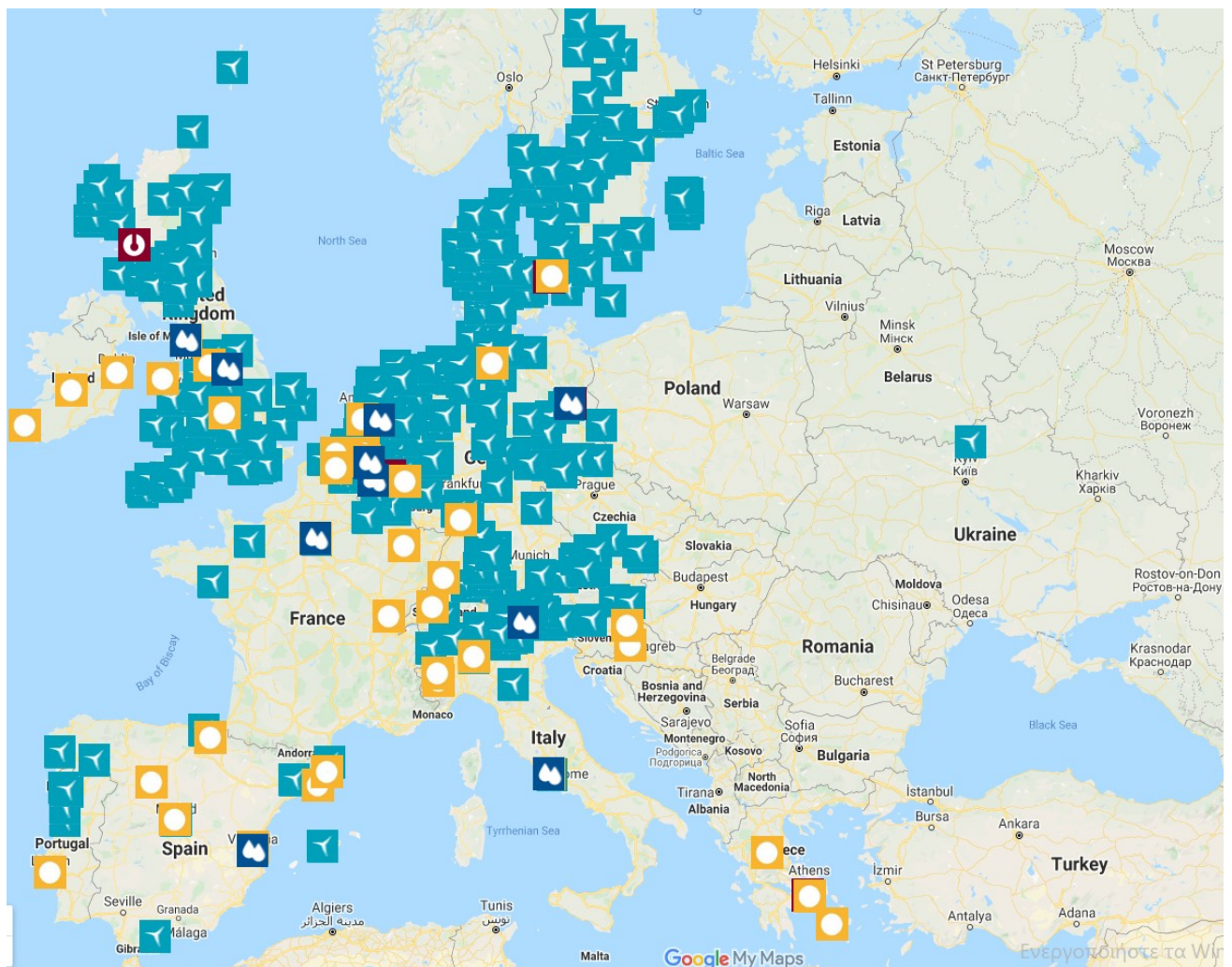
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Appendix



Map 8 : The presence of Energy Communities in Europe