



**HAL**  
open science

# Increasing the Resilience of the Energy System Through Consumers: Towards Decentralised, Interconnected and Supportive Ecosystems

Louis Fontenelle (de)

► **To cite this version:**

Louis Fontenelle (de). Increasing the Resilience of the Energy System Through Consumers: Towards Decentralised, Interconnected and Supportive Ecosystems. Oxford University Press. Resilience in Energy, Infrastructure, and Natural Resources Law, , 2022, 9780192864574. 10.1093/oso/9780192864574.003.0021 . hal-03850639

**HAL Id: hal-03850639**

**<https://hal.science/hal-03850639v1>**

Submitted on 29 Mar 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## **Chapter 23 - Increasing the resilience of the energy system through consumers: towards decentralised, interconnected and supportive ecosystems**

Louis de Fontenelle

Abstract:

Resilience could be achieved through increased decentralisation of energy systems in which the consumer would have a key role. Indeed, united consumers within energy communities could become the basic cells of energy systems, producing, storing and sharing energy at the local level. Consumers can also provide various flexibility services to the networks to promote their balance and efficiency (service interruptibility, variation of consumption according to peak periods), that meaning increasing resilience. In a future electricity system based on renewable energies, supply is guaranteed by consumers themselves, since new technologies allow them to consume whenever it is most convenient for the rest of the system. Within the traditional paradigm, resilience was in the hands of supply, but in the future paradigm it will be in the hands of demand (demand response). Digital consumers are clearly providing a great service to the whole energy system, maximising energy consumption/generation and system intelligence. All these developments require a rethinking of the traditional value systems and legal norms of energy systems (universal services, continuity of service) in order to adapt them to this rise of energy consumers.

Keywords: Energy Citizenship - Energy Communities – Consumers – Resilience – Crisis

## I. Introduction

The Covid-19 pandemic crisis we are experiencing shows how our systems are interconnected and how vital cooperation is. The situation requires cross-cutting responses. Today, we face a health crisis, an economic and social crisis, all in the context of the climate crisis. This complex equation needs to be solved with a new paradigm based on short- and long-term responses to rethinking the energy model.

In this perspective, the resilience of the energy system could be achieved through increased decentralisation of energy systems in which the consumer would have a crucial role. In this particular context, united consumers within energy communities could become the essential cells of energy systems, producing, storing, and sharing energy at the local level.

What does a crisis look like for the energy sector? It could be a nuclear incident or accident, a conflict that threatens supply, or extreme weather events. The current situation is very illustrative. The pandemic has revealed multiple problems, for the agents themselves, affected by the disease, for consumption, which is being modified, and for investments, which are being redirected<sup>1</sup>. In other words, the entire system is affected. In its "World energy outlook" report, published on 30 April 2020, the International Energy Agency estimates that with the Covid-19 epidemic, the global energy system is experiencing "its biggest shock in more than seven decades", with a significant drop in consumption, particularly of fossil fuels – a "great lockdown"<sup>2</sup> – but at the same time with a correlative decline in energy-related CO<sub>2</sub> emissions.

From a general point of view, our legal systems can deal with crisis. There are rules and mechanisms in national constitutions and laws, and during the current health crisis, States have proved their ability to put in place "tailor-made" emergency legislation very quickly.<sup>3</sup> At the level of the European Union (EU), EU authorities have perceived the energy sector as strategic during the health crisis and administrations have reacted to ensure continuity of activity. Of course, there were some differences between states<sup>4</sup>, and public authorities have responded differently<sup>5</sup>. However, as a general rule, states have adapted their legal framework during the crisis to encourage operators to focus on the performance of their core tasks and provide otherwise for flexibility and solidarity by, for example, postponing tax or social payment deadlines during the health emergency period. From the very beginning of the crisis, some actors voluntarily activated their national crisis cell as a preventive measure.

Each operator defined the perimeter of its essential missions concerning its public service obligations and the economic and technical realities. Their business continuity plans (BCPs)<sup>6</sup> included the

1. \_\_\_\_\_

<sup>1</sup> Oxford Energy Forum, *COVID-19 and the Energy Transition* (Issue 123, 2020)

<sup>2</sup> Caroline Kuzemkoa et al., 'Covid-19 and the politics of sustainable energy transitions' (2020), *Energy Research & Social Science*, Volume 68

<sup>3</sup>In France, for example, this was the case with Law No. 2020-290 of 23 March 2020 1 to deal with the Covid-19 pandemic. This was a new mechanism known as the "state of public health emergency" (CSP, art. 3131-12), which can be decreed by the Council of Ministers, and which gives the Prime Minister responsibility for taking the administrative police measures required by the situation, in the event of "a public health disaster endangering, by its nature and gravity, the health of the population".

<sup>4</sup> Sarah Wolff and Ladi Stella 'European Union Responses to the Covid-19 Pandemic: adaptability in times of Permanent Emergency' (2020) *Journal of European Integration*, 42:8

<sup>5</sup> EFELA, *How EFELA'S 13 countries coped with the coronavirus pandemic* (2020)

<sup>6</sup> In France, for example, these consisted of the public administrations: National Energy Ombudsman, the Energy Regulatory Commission, the National Agency for Radioactive Waste Management and Nuclear Safety, and

evaluation of consumption and production, the balancing of supply and demand, the correct routing of electricity and gas to consumption, the maintaining of the electricity and gas transmission and distribution networks (especially urgent work), and the proper functioning of IT tools and services enabling the company to adapt its operations (remote access, secure teleworking). In addition, economic actors, have sometimes, on their own initiative, put in place solidarity measures<sup>7</sup>. To sum up, the various stakeholders acted to ensure the continuity of activity and solidarity.

However, this was only a quick and immediate response to a sudden problem. Today, the issue is the convergence of problems in a time of combined economic, environmental, health, and climate crises, which reveal a problematic recomposition of our environment, not least because of the long-time frame in which these problems and their solutions arise. The reality of the global context is well known: climate disruptions are accelerating, inequalities are increasing as needs grow (on a worldwide scale, a large part of the population is deprived of access to energy and therefore to what it offers in terms of health, transport, food, etc.).

In this context, the term “crisis” seems inappropriate. Even defining the events we are experiencing as a “crisis” is questionable, given their long-term nature. However, if we agree that a crisis is a sudden and intense event of limited duration that can lead to harmful consequences, we will agree that what we are experiencing is more akin to a crisis than a problematic recomposition of our social-economic climate environment. This also explains why we must adapt our tools to this overall recomposition. We cannot stop rising water with a dam. We are learning to live on water, which requires adaptation to this broad change and choices, including shared values and policies.

In this context, the resilience of the energy system is crucial. Resilience is not a legal concept<sup>8</sup>. We find this notion in the physics of materials, where it is defined as “the resistance of a material to impact”. This notion is also in common use, where it is understood to mean “moral strength; the quality of someone who does not become discouraged or disheartened. The concept of resilience has also been used in academic work on ecological systems<sup>9</sup>. However, the notion of resilience is interesting in the context of energy transition<sup>10</sup>. In this framework, the law can help a system to be resilient, i.e. to withstand and overcome crises. This is the originality of the energy system. This system was built to work in the event of a crisis by structuring it in such a way as to avoid service interruptions. In other words, the energy system is structurally designed to be resilient. The aim is for the system to function continuously, regardless of the crisis.

The energy transition itself, i.e. the transformation of the energy sectors, is based on adapting to the climate and environmental crisis. Energy systems are therefore being restructured in such a way that no crisis will affect them. Indeed, In Europe, the energy transition is based on a set of common objectives defined by the EU throughout various successive energy packages, and lately the Clean

1. \_\_\_\_\_  
private operators: Engie, RTE, Enedis, EDF, Téréga, GRTgaz, EpexSpot, Nordpool, local distribution companies, etc. (BCP).

<sup>7</sup> For example, widening the scope of beneficiaries of the energy bill deferral, requiring the immediate payment of invoices from suppliers and subcontractors in difficulty even if the legal or contractual deadlines have not expired, donating personal protective equipment for employees - masks, freezers, etc. with other companies in the sector or with their suppliers or subcontractors.

<sup>8</sup> See chapter 2

<sup>9</sup> Holling Crawford Stanley, ‘Resilience and stability of ecological systems’ (1973) *Annual Review of Ecology* 4(1):1–24

<sup>10</sup> See chapter 2. Adde Jesse, BJ., Heinrichs, H. and Kuckshinrichs, W, ‘Adapting the theory of resilience to energy systems: a review and outlook’ (2019) *Energy Sustainability and Society* 9, 27

Energy Package,<sup>11</sup> which must be transposed, with some differences depending on the model, into the laws of the Member States<sup>12</sup>. According to this model, the aim of energy transition is thus to reconcile the security and sustainability of supply, the competitive nature of the market, compliance with environmental protection, and the fight against global warming, in particular through the development of renewable energies and the reduction of fossil fuels, energy decentralisation, intelligence and digitalisation of networks, and the democratic challenge of the appropriation of the system by the citizenry. The objective of the EU is therefore to conduct this energy transition model while designing it in such a way that it is crisis-resistant.

In the traditional system, resilience is in the hands of the supply side. But, we will see that citizens can contribute more or less directly to crisis resolution. However, we are interested in the citizens' changing role because we can assume that a large part of the system's resilience will be in their hands in the long term.

These citizens' contributions question an aspect that this study has the advantage of highlighting, which is that, contrary to what we sometimes hear, the fight against climate change is not only a physical problem, it also raises social, cultural, economic, geographical and legal issues<sup>13</sup>, particularly on the question of commitments, identities, individual and collective values. This requires interdisciplinary and sometimes even transdisciplinary approaches, involving sociology, psychology, spatial sciences, law, economics, humanities, and communication sciences.

In this perspective, we will consider the forms that these citizen contributions take (II). Then, we will look at what shapes citizen energy identities (III). Finally, we will consider the impact of these citizen initiatives on traditional energy systems and the changes they imply (IV).

## **II - Actions: forms of citizen contribution to the resilience of energy systems**

Citizens can ensure the resilience of the energy system by participating in the energy recomposition which, as explained above, aims to be designed in such a way as to avoid what threatens it. Within the traditional paradigm, resilience was in the hands of supply, but in the future paradigm it will be in the hands of demand (demand response).

For this purpose, a distinction will be made between operational means of action (A) and more structural means of action (B).

### ***A. Operational means for citizen-based crisis resolution***

Energy consumers can provide various flexibility services to the networks, including service interruptibility, or variation in consumption according to peak periods. In doing so, they contribute to the promotion of a balanced and efficient supply, which means increased resilience.

#### 1. \_\_\_\_\_

<sup>11</sup> Based on Commission proposals published in 2016, the package consists of 8 new laws (Energy Performance of Buildings Directive 2018/844; Renewable Energy Directive (EU) 2018/2001; Energy Efficiency Directive (EU) 2018/2002; Governance of the Energy Union and Climate Action (EU) Regulation 2018/1999; Risk-preparedness in the electricity sector - Regulation (EU) 2019/941; European Union Agency for the Cooperation of Energy Regulators - Regulation (EU) 2019/942; Internal market for electricity – Regulation (EU) 2019/943; Common rules for the internal market for electricity - Directive (EU) 2019/944)

<sup>12</sup> In France, these provisions are contained in articles L. 100-1 et seq. of the French Energy Code.

<sup>13</sup> Zillman Donald, Godden Lee, Paddock LeRoy, and Roggenkamp Martha, *Innovation in Energy Law and Technology: Dynamic Solutions for Energy Transitions* (OUP, 2018)

In a future electricity system based on renewable energies, supply will be guaranteed by consumers themselves to an increase share, since new technologies will allow them to consume whenever it is most convenient for the rest of the system. These guarantees of the resilience of the system go through a certain number of mechanisms that ensure its functioning. In the following, we will address the issue of what is called demand-side flexibility in the electricity sector.

An electricity network must always be balanced between supply and demand, or there is a blackout. To ensure this balance, the network's mission consists of electricity balancing. It can be based on supply, by injecting more electricity, or on demand, by simply limiting or interrupting consumption. Within the European Union, the electricity transmission system operators (TSOs) have the task of ensuring that the electricity flow through the network is balanced at all times, and guaranteeing the safety, security and efficiency of the network. They also have the task of certifying generation and erasure capacities under the terms of the capacity mechanism. Obviously, in times of crisis this balancing needs to be supported by resources. Initially, only the means of production were used in balancing, then demand-side flexibility was gradually introduced, which first of all involved the introduction of a tariff policy aimed at orienting the periods of electricity consumption by consumers.

For some years now, balancing by interruptible demand has been increasing, consisting of a momentary reduction or interruption in consumption. Over the last ten years or so, the flexibility of consumers who are either electro-intensive, or small or medium-sized consumers (known as load management), and whose interruptible capacities can be aggregated<sup>14</sup>, has thus been promoted. Since then, the volumes of interruptible capacities have grown considerably, and could develop further, at the same time as new technologies make it possible to remotely control energy consumption through storage means (electric vehicles, power-to-heat, power-to-hydrogen, etc.).

The use of demand-side flexibility has several advantages. On the one hand, it allows a better integration of renewable energy, which is almost entirely intermittent, which means that the electricity produced is not injected continuously. On the other hand, ensuring the flexibility of the system through consumption avoids oversizing the network. In addition, the demand response usually results in energy savings for whoever implements the mechanism. Finally, flexibility through demand makes it possible to increase the resilience of the network in the event of a consumption or production crisis, for whatever reason (extreme climatic event, conflict, health crisis, etc.).

From a technical point of view, the erasure of consumption will take place at the request of an aggregator or an electricity supplier to a consumer or a consumption site. This may involve electro-intensive industry or small consumers - individuals or companies. Deletion consists of a temporary drop in the level of electricity withdrawal from the transmission or distribution networks. In concrete terms, a box is installed at the final consumer's home, connected to the electricity meter and various pieces of electrical equipment, which will enable the operator to remotely interrupt the use of this equipment.

From a legal point of view, this practice is authorised and regulated by law<sup>15</sup>. Erasure capacity targets are thus established in planning documents. Offers from operators are also regulated.

There are several difficulties, however. First of all, there is the relationship between erasure operators and suppliers, bearing in mind that in France, for example, a consumer can freely decide to use an aggregator rather than his supplier. This implies that the aggregator can market demand response on

1. \_\_\_\_\_

<sup>14</sup> Eid Cherelle et al, 'Aggregation of demand side flexibility in a smart grid: A review for European market design' (2015), 12th International Conference on the European Energy Market, pp. 1-5.

<sup>15</sup> Ex : in French Law, Code de l'énergie, Articles L271-1 et s.

the energy markets via the NEBEF (Block Exchange Notification of Demand Response) system as if it had been produced or purchased without the supplier's authorisation. However, in return, he will have to pay the supplier for the energy through a third party, in accordance with the independence principle. It is also necessary to ensure that the interruption or reduction has really occurred using a reference corresponding to the "normal" consumption of the site without flexibility. NEBEF are not only valued on the demand response markets but also on other erasure channels like capacity mechanisms. These mechanisms have the advantage of ensuring that consumers' or suppliers' responses to TSOs receive a fixed premium, independently of this capacity being activated, in order to deliver energy.

### ***B. Citizens' energy ecosystems: a structural factor in crisis resolution***

What better way to guard against global risks than to set up local, sustainable, safe means of production, disconnected from the general network and its risks? This is what energy decentralisation aims for, whose legal framework has gradually been established, first in the framework of individual or collective self-consumption, then in that of energy communities.

These local energy ecosystems are interesting to study from many aspects: from a scientific point of view because they are based on various innovative technologies, and from the point of view of social and human sciences because they involve environmental and spatial recompositions, as well as uses and behaviours<sup>16</sup>.

The legal concept of collective self-consumption has clearly prefigured energy communities from a legal point of view. This is a group of consumers and producers, located in geographical proximity, who join together within a legal entity in order to produce electricity by their own means, and consume it for their own needs, according to terms and conditions that they determine collectively. This is currently the most highly developed framework in European law. However, European legislative recognition is recent, through Article 21 of the 2018 Renewable Energy Directive<sup>17</sup>.

Participatory financing has also prefigured energy communities. In this case, it involves financial support from natural or legal persons for a given project. This practice is encouraged by the development of digital platforms, both generalist and specialised, whose aim is to bring together project leaders, the public, and the territories<sup>18</sup>. Obviously, in this case, citizen involvement depends on the type of funding involved, which may be donations, loans, investment in securities. Whether participatory financing or collective self-consumption is involved, the aim is to participate in the development of citizen and local participation and thus raise public awareness.

The essence of this approach now lies in the new concepts of renewable energy communities (RECs) and citizen energy communities (CECs), which can be brought together under the banner of energy communities. The concept of "energy communities" comes from European Union law<sup>19</sup>. It translates

1. \_\_\_\_\_

<sup>16</sup> Ryghaug, Marianne, Tomas Moe Skjølvold, and Sara Heidenreich, 'Creating Energy Citizenship through Material Participation' (2018) *Social Studies of Science*, 48(2): 283–303

<sup>17</sup> Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (hereafter Directive RE 2018, article 2)

<sup>18</sup> Ertiö, Titiana Petra, and Akshay Bhagwatwar, 'Citizens as Planners: Harnessing Information and Values from the Bottom-Up' (2017), *International Journal of Information Management*, 37(3): 111–13

<sup>19</sup> Directive RE 2018, article 2 - Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (hereafter, Directive electricity market 2019)

into law a de facto reality that is part of the energy and environmental transition<sup>20</sup>. This concept refers to a group of public or private, natural or legal persons (citizens, local and regional authorities and their public establishments, small and medium-sized enterprises) which, within a given area (a building, a district, a commercial zone), will take charge of all or part of the production, transmission, distribution and supply of energy and use this energy for different purposes, according to rules which they will establish among themselves.

Within the framework of the Clean Energy Package, the European Union establishes two concepts: the concept of "renewable energy community", in the 2018 Renewable Energy directive, and that of "citizens' energy communities", in the 2019 Electricity Directive of 5 June 2019. These directives are intended to be transposed into national law in order to adapt them to national specifics. In France, the first part of the provisions has been adopted under the Energy-Climate Act and the second part will be adopted under an ordinance (pursuant to Article 38 of the French Constitution) which reorganises all applicable provisions around a chapter dedicated to "energy communities"<sup>21</sup>.

The status of these communities is not predetermined by the European legislator. The Renewable Energy Directive specifies that "Member States should therefore be able to choose any form of entity for their renewable energy communities"<sup>22</sup>. It is therefore conceivable that these legal entities could take the form of an association, a cooperative, a commercial company, or a public company.

From the point of view of participation, this is considered "open and voluntary". However, limits are set in the directives to ensure that the organisation is designed in such a way as to avoid any stranglehold of traditional market players. Thus, CECs must be "effectively controlled by members or shareholders who are natural persons, local authorities, including municipalities, or small enterprises" and "members or a shareholder [...] who are engaged in large-scale commercial activity or whose main field of economic activity is the energy sector may not, individually or jointly, have unilateral decision-making powers within that community"<sup>23</sup>. Similarly, the shareholders or members of RECs are "natural persons, small and medium-sized enterprises or local authorities and their groupings"<sup>24</sup> with local proxies for energy projects and where an enterprise participates in a renewable energy community, such participation may not constitute its principal commercial or professional activity<sup>25</sup>.

With regard to their purpose, RECs may take over all or part of the activities of production/consumption/storage/sale of renewable energy. CECs will also be able to carry out other energy service activities (recharging, energy efficiency, etc.). The main purpose is to provide "environmental, economic or social benefits"<sup>26</sup> to their shareholders or members, or in favour of the local territories in which they operate. In other words, they must not aim at profit. This is why an essential part of the community's activity must be carried out for its members or shareholders, or the

1. \_\_\_\_\_

<sup>20</sup> Oteman, Marieke, Mark Wiering, and Jan Kees Helderma, 'The Institutional Space of Community Initiatives for Renewable Energy: A Comparative Case Study of the Netherlands, Germany and Denmark' (2014) *Energy, Sustainability and Society* 4(1): 1–17

<sup>21</sup> Loi n° 2019-1147 du 8 novembre 2019 relative à l'énergie et au climat - Ordonnance n° 2021-236 du 3 mars 2021 portant transposition de diverses dispositions de la directive (UE) 2018/2001 du Parlement européen et du Conseil du 11 décembre 2018 relative à la promotion de l'utilisation de l'énergie produite à partir de sources renouvelables et de la directive (UE) 2019/944 du Parlement européen et du Conseil du 5 juin 2019 concernant des règles communes pour le marché intérieur de l'électricité.

<sup>22</sup> Directive RE 2018, (71)

<sup>23</sup> Directive electricity market 2019, article 2

<sup>24</sup> Id.

<sup>25</sup> Id.

<sup>26</sup> Id.



territories in which it operates, and only an ancillary part may be carried out on the competitive market (e.g. sale of surplus electricity).

Finally, and this is an essential point, the Electricity Directive opened up the possibility for States to authorise CECs to set up "closed distribution networks" in the form of microgrids. In France, this possibility was immediately ruled out because it was received with great reluctance. This hypothesis was ruled out by the main and delegated legislator, which wished to preserve the monopoly of the historic managers of the public electricity and gas networks. However, in any case, a link must be made between the communities and the network managers, who will have to allow access to the main network, under fair and transparent conditions.

In any case, energy communities can contribute to the resilience of energy systems. They could even eventually be the essential cells of energy systems, producing, storing, and sharing energy at the local level. These territorial ecosystems reflect the concepts of decentralisation and energy subsidiarity. In conjunction with technological developments (storage, microgrids, artificial intelligence, etc.), they could promote decentralised production and local flexibility and thus avoid supply and network balancing problems while reducing energy bills and raising the awareness of consumers, who are still passive concerning energy.

Of course, the success of these communities will largely depend on the various actors (citizens, communities) taking ownership of them. From this point of view, the law can promote the use of this practice, firstly by setting up an appropriate legal framework, then by establishing financial and fiscal support instruments (e.g. awarded through calls for tenders or with an electricity buy-back mechanism), but also by contributing to training and information. Of course, the most important thing will be the construction of a civic identity in the field of energy.

### **III. Identities : Energy citizenship as a resilience factor**

Citizens are actors in the energy transition, working alongside the other entities involved: national and international public actors (such as the State and its dedicated ministries, local authorities, etc.) and socio-economic actors (suppliers, transporters, distributors, aggregators, also associations and NGOs, etc.). A lot is expected of citizens. They are required to behave prudently to avoid health crises, to consume differently, to travel and build differently, in order to avoid climate crises, and they must have confidence in the economy and spend the money they have hoarded to fight the economic crisis. The citizen has multiple roles and responsibilities, and the one that will interest us is that of an actor in the energy transition and the effect that this can have in overcoming and slowing down the crises.

Here, we consider the identity of the citizen. The notion of citizen is important in law. With regard to the energy transition, other terms could have been used (consumer, civil society, etc.). However, the notion of citizenship has a double relevance in the energy field, in that it reflects:

- a legal reality, because it is the citizen who is now directly targeted in European directives<sup>27</sup>,
- and a social reality, because it is in the name of citizenship that energy projects emerge<sup>28</sup>.

1. \_\_\_\_\_

<sup>27</sup> For example, Directive electricity market 2019, (4) : « The Commission Communication of 25 February 2015, entitled 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy', sets out a vision of an Energy Union with citizens at its core, where citizens take ownership of the energy transition, benefit from new technologies to reduce their bills and participate actively in the market, and where vulnerable consumers are protected »

<sup>28</sup> It is particularly instructive to read the documentation of RESCoop, a European association that federates energy community projects and presents itself as "the European federation of citizen energy cooperatives"

In the energy sectors, there has been a change in the role of individuals<sup>29</sup>:

- they were initially seen as users of public services or large national monopolies,
- then consumer law was forged throughout Europe: they became consumers,
- next, they were able to become active consumers, i.e. through their choices, indirectly directing the composition of the mix,
- they then became 'prosumers' (contraction of producer and consumer) in the legal and technical framework of self-consumption,
- the last stage will be the energy citizen, directly referred to in the European texts, notably through the concept of citizen energy communities.

This notion of citizen is obviously not neutral in legal terms. The notion of citizen traditionally has a precise legal definition, which does not fit well with other disciplinary approaches<sup>30</sup>. Citizenship from a legal perspective refers to the status of a person recognised by the law of a sovereign state. Therefore, the concept of citizenship refers only to natural persons and not to legal persons, and may differ from one State to another. Although the EU is not a sovereign state, the Maastricht Treaty of 1992 referred to the concept of European citizenship<sup>31</sup>. On the basis of this concept of citizenship, a citizen is basically an individual who has specific rights and duties in the territory of the State where he or she resides.

In the field of energy and the environment, this concept of citizen is referred to, for example, in the context of constitutional or international environmental law, in particular through the prism of the right to participate in environmental decision-making. This is stipulated in the Aarhus Convention. In addition, citizens are also explicitly targeted in the text relating to the energy transition: they are invited to make participatory investment, self-consumption and energy communities. In other words, the public authorities ensure that this citizenship can emerge.

An "energy citizenship" would therefore emerge and it is in the name of this "energy citizenship" that citizens, actors of the energy transition, could also play a role in crisis prevention, thus contributing to what is called the general resilience of the system.

This concept of "energy citizenship" could leave a lawyer perplexed because traditionally we learn that citizenship is a coherent and global concept that is not broken down into areas of activity. One is either a citizen or one is not. Accordingly, there is no such thing as energy citizenship, environmental citizenship, digital citizenship, etc. A definition of the term is therefore essential. This is the heart of the problem because at least two concepts coexist.

Firstly, energy citizenship can be defined, from a legal point of view, as the person who, in a democratic state, legally has the status of citizen (acquired by nationality) and consequently has the rights and duties that are attached to this status. In law, citizenship is indeed based on rights and duties; first and foremost the right and duty (whether or not sanctioned) to vote. In this framework, the link with energy is obvious: citizens, either by themselves or through their representatives, can express

1. \_\_\_\_\_

<sup>29</sup> Diestelmeier, Lea, 'Changing Power: Shifting the Role of Electricity Consumers with Blockchain Technology – Policy Implications for EU Electricity Law' (2019) Energy Policy 128(January): 189–96 – Lamoureux Marie, *Droit de l'énergie*, LGDJ, 2020

<sup>30</sup> Devine-Wright, Patrick, 'Energy Citizenship: Psychological Aspects of Evolution in sustainable energy technologies' (2007) Governing technology for sustainability

<sup>31</sup> Treaty on European Union, 1992, Title 1, Article B. EU citizenship is now established in Article 9 of the Consolidated Version of the Treaty on European Union [2016] and in the article 20 of Consolidated Version of the Treaty on the Functioning of the European Union [2016]

themselves on energy-related texts (laws, international treaties, administrative acts) and thus improve their knowledge, convictions and even their commitments. Citizens also have many other rights and duties that may be directly or indirectly related to energy. Indirectly related rights include the precautionary principle, the right to a healthy environment and the right to demonstrate; rights more directly related to energy citizenship, such as the right to public participation in the development of energy policies and projects, or the right to energy supplies to meet basic needs. Rights directly related to energy include the obligation to contribute to the cost of public energy services, and to adapt to energy efficiency or conservation, to pay taxes or charges to support energy transitions and to combat global climate change. Thus traditionally a link between citizenship and energy can be legally established in texts that set out the rights and duties of the citizen in concrete energy standards.

However, citizenship could also be seen as being defined not (only) by law but as the embodiment of the aspiration of individuals or collectives of individuals to influence the choices of human societies. This is done by claiming specific values in deed and in word with the aim that these values will be shared by the majority and incorporated into the norms of societies and organised institutions. In this case, the legal study of the citizen's identity is based on individual action and commitment to influence public policies<sup>32</sup>. The rights and obligations of citizenship are not set by law but by ethical or moral rules that the individuals concerned set for themselves. In this sense, energy citizenship is acquired through its practice.

These different perspectives are both linked to an individual's identity<sup>33</sup>, so they are not unconnected, but the processes by which this identity develops are very different. What seems to be the common goal is the necessary awareness of a citizenship which is expressed, on the one hand through the exercise of rights and duties, and on the other through the implementation of individual or collective actions for changes deemed necessary.

Having said this, it seems that the two concepts are different and that this difference is due to the role of the State in each case.

In the first case, citizen identity is forged from above<sup>34</sup>. This stems from a 'statist' view of citizenship, where it is sovereign power that defines who is a citizen and what citizenship means. It is therefore the people - then defined as a coherent whole - who, through their representatives or by themselves (through referendums), establish the founding framework of citizenship. In this framework, energy citizenship is only an emanation, an offshoot of this citizenship whose conceptual framework is defined by the state. In this sense, the desire of the public authorities to build an 'energy' citizenship can be explained as their objective is energy transition, since energy communities promote renewable energies, accelerate the transitional process by multiplying the number of actors involved, and at the same time foster the social appropriation of the whole by the very fact of this involvement. To this end, the state sets up rules that favour citizen initiatives, for example through participatory investment, self-consumption and energy communities<sup>35</sup>.

1. \_\_\_\_\_

<sup>32</sup> Arentsen, Maarten, and Bellekom, Sandra, 'Power to the People: Local Energy Initiatives as Seedbeds of Innovation?' (2014) *Energy, Sustainability and Society* 4(1): 1–12

<sup>33</sup> Bouzarovski, Stefan, and Bassin Mark, 'Energy and Identity: Imagining Russia as a Hydrocarbon Superpower', (2011) *Annals of the Association of American Geographers*, 101(4): 783–94

<sup>34</sup> Lennon, Breffní et al., 'Citizen or Consumer? Reconsidering Energy Citizenship' (2020), *Journal of Environmental Policy & Planning* 22(2): 184–97.

<sup>35</sup> Burke, Matthew J., and Stephens Jennie C., 'Energy Democracy: Goals and Policy Instruments for Sociotechnical Transitions' (2017) *Energy Research and Social Science* 33: 35–48

In the second case, citizen identity is specific to each individual and can intervene in collectives and communities. In this case, citizenship is no longer defined by the State but is understood as part of the individual's identity, which is in turn understood as an awareness of belonging to a global ecosystem and of bearing individual responsibility and a willingness to act.

Of course, in reality things are more complex. These two concepts coexist and act reciprocally<sup>36</sup>, creating a dialectic. Fundamentally, there are ultimately also two opposing conceptions of the general interest, one is proactive, and conceived as being at the initiative of the state, which decides transcendently on individual interests. The other only involves the state as an arbiter of the various interests of citizens. In short, interactions are created and are at the root of the dialectical process. The state relies on citizen initiatives, supports them and appropriates them, while collectives use this support to develop their own concept and thus influence the state's public policies. While this fruitful dialogue is verifiable, it is not on a significant scale at present. If we look at the figures, we can see, for example, that this civic identity is only in its infancy with regard to energy and has not led to an increase in commitments.

Whatever the situation, a citizen identity is never acquired or sudden. This is why both public authorities and citizens' groups, convinced of the need for the energy transition (or at least of their conception of the energy transition), are campaigning for the emergence of an energy citizen identity. This shows the determination and the limitations of the exercise: however attractive the vehicle, the important thing is that the citizen actually gets on board. In other words, citizen identity cannot be decreed. In order for citizen initiatives to multiply, citizen awareness must be developed. So how is this citizenship forged? We can already see the ineffectiveness of simple injunctions to become a citizen. According to the most recent research, it would seem that citizenship is acquired only by exercising it, and that to exercise it one must have the means to do so.

On this basis, a complex interplay of actors is created involving some very interesting legal issues. It would seem that citizenship identity has two main vectors for forging itself. Firstly, the means of appropriation, i.e. the means of informing, training and convincing in order to forge at least opinions, at best convictions, so that people produce and consume green and local energy in individual or collective projects. Secondly, the means of action to foster citizen engagement. The idea is to have the public authorities and other actors support individual or collective projects so that they bring together individuals, communities and companies as shareholders in local projects in the form of cooperatives or companies. This involves financial, administrative or fiscal support.

Obviously, this citizen identity requires some minimum conditions to be met in order to be forged. It can therefore be assumed that energy poverty is a major obstacle to the construction of this identity<sup>37</sup>. This is one of the major challenges of the Clean Energy Package, which addresses these issues of support, to enable the fastest possible implementation of local energy communities and energy decentralisation through collective self-consumption and also the technologies that support it.

1. \_\_\_\_\_

<sup>36</sup> Van Aalderen, Nicolien, and Horlings Lummina Geertruida, 'Accommodative Public Leadership in Wind Energy Development: Enabling Citizens Initiatives in the Netherlands' (2020) *Energy Policy* 138

<sup>37</sup> Roggenkamp, Martha M., and Diestelmeier Lea, 'Energy Market Reforms in the EU: A New Focus on Energy Consumers, Energy Poverty and Energy (in)Justice?' (2020) In *Energy Justice and Energy Law – Distributive, Procedural, Restorative and Social Justice in Energy Law*, eds. Iñigo Del Guayo et al. Oxford University Press

#### **IV. Recomposition: The positive and negative effects of energy citizenship on traditional energy systems**

There is significant potential for developing energy communities, according to a recent study which shows that half of European citizens could produce their own renewable electricity by 2050, thus covering 45% of the energy demand, in today's rather favourable context of constantly falling renewable energy prices and technological development (smart grids, electricity storage, electromobility). However, this favourable context will need to be reassessed in the light of the real impacts of the current COVID-19 health crisis, which are difficult to assess today.

There are certainly many advantages to citizen energy ecosystems: reduction of energy bills, securing production, reduction of environmental impact, optimisation and intelligence in the use of networks, association and therefore awareness of energy issues among actors-consumers. However, there are also disadvantages to these communities, mainly in that they disrupt the organisation and functioning of the current, highly centralised system, which could generate costs in terms of network reinforcement and possibly transfers of charges between users of these networks. The deployment of energy communities thus gives rise to legitimate fears on the part of existing players, whose customers could gradually become competitors. It also entails risks, if it were to emerge too abruptly, in terms of competition, or disparities between territories and populations. These communities would have to rely to a large extent on the production of renewable energies, dependent on wind or sunshine conditions, which would obviously favour the territories where these conditions are optimal, an additional advantage when transferring the load of the main networks from consumers who are members of a community to consumers who are not. All of these issues will have to be debated.

One of the most illustrative and crucial points is the option that the European legislator leaves to the Member States to decide. The Electricity Directive allowed the Member States to authorize citizen energy communities to set up "closed distribution networks" in the form of micro-grids. In France, this possibility immediately aroused strong reservations on the part of the network operators in particular. Thus, for the time being, this hypothesis has been excluded by the French legislator, which preserves the monopoly of the incumbent public electricity and gas network operators. However, the question will inevitably arise again with the development of these energy communities, which will undoubtedly claim management of their networks. This situation would raise two types of difficulties. Firstly, such a hypothesis would imply structuring normative modifications to reconcile the existing with the new (in terms of ownership of the network or exclusivity of its management). Secondly, opening up infrastructure to competition would require extensive studies to demonstrate the benefits of running it competitively and its impact on public electricity service. Indeed, the "autonomous" management of the networks will impact the national equalisation of public network costs and, consequently, on solidarity between consumers.

The development of energy communities thus ultimately raises a crucial question at the heart of the political debate on the very future of the energy transition, including the way in which this transition is conceived. Energy communities embody a real paradigm shift that radically contrasts with the traditionally vertical vision of energy markets where, schematically, large energy companies produce gas or electricity, which are then transported and distributed across networks to final consumers. They represent a new model characterised by energy decentralisation, where some or all of the traditionally centralised functions of energy production, transmission and distribution will be disconnected from the main grid to be taken over by these communities, with necessarily smaller mesh sizes and voltage levels.

The development of new local energy ecosystems therefore requires us to rethink our energy model. This opens up three challenges, to establish a reliable measure of the impact of this new model on the market (wholesale and retail trade, flexibility, over-the-counter market), on energy networks (access,

pricing, impacts) and on solidarity mechanisms (territorial equalisation, aid, information, support, services of general interest). In addition, we need to rethink the legal model, which today is based on the idea of a universal service provided through public networks and the financing model attached to this service.

This is why the idea of transition should be at the heart of this process. It should therefore be a real transition and not too abrupt a break with the existing model. The idea is to favour the coexistence of the models and then, if necessary, discard the old model.

This notion of balance between centralisation and decentralisation has very concrete implications for production. For example, concerning French production, the "ARENH" (Regulated Access to Historic Nuclear Electricity) mechanism was designed to allow the emergence and development of competition in the French electricity sector. Suppliers can buy energy from EDF, which is obliged to sell it to them at a price determined by the government. This notion of balance is also found in network matters. Everywhere in Europe tensions are rising around the monopolies of network management in a context of rapid evolution of the energy sectors. This is due to the interest of local and regional authorities and communities, which is growing as their expertise in this field increases, and to the development of energy decentralisation, particularly in relation to local RE production. This movement is encouraging these new operators to demand that they be allowed to manage private and closed distribution networks. The Electricity Directive has clearly established the possibility for national legislators to open up this option. Resistance is strong, however. In France, for the time being, the legislator has excluded this possibility on principle, but for how much longer?

At the same time, we must question the very relevance of ending centralised network management. Beyond the legal aspects, more strategic elements of an economic, financial or even political nature deserve to be taken into consideration. First of all, because the current crisis has proved the efficiency of network managers - including local operators, the ELD - in ensuring the stability of the system. The introduction of competition for infrastructure would require in-depth studies to demonstrate the advantage in having them managed competitively, the impact that this would have on the public electricity service, and the question of the relevant local scale. This would be all the more important as nationalised management is not only based on a compilation of local networks but also on the pooled resources (human, financial and structural) that have been established over time.

Finally, the problem today is that we want the law to resolve major political issues as if the law itself contained the essential truth. The real issue here is one of politics and civics.

## **V. Conclusion**

The Covid 19 pandemic illustrates the need to ensure the resilience of energy systems in a future of increasing crises. Citizens can contribute to ensuring this resilience and even become key. They are already involved in the context of techniques such as load management. Energy communities, even more so, can increase this contribution. These communities reveal a new paradigm, with energy needs being covered on a local scale. However, the development of these consumer contributions depends to a large extent on the willingness of consumers to take them up. This is why the concept of citizenship is crucial. However, this concept covers different realities and definitions depending on whether one considers it top-down or bottom-up. These different conceptions are not insignificant because they reveal different approaches in terms of the organisation, functioning, objectives and purposes of energy communities. One of the main difficulties is the link these communities will have with the rest of the energy system. Indeed, if they were to develop, they would necessarily affect the classic functioning of energy networks which, for example, within the European Union, is based on a conception of public energy service, notably through national solidarity based on the sharing and equalisation of network access costs. For all these reasons, decentralisation must be carried out gradually, carefully, and reasonably.