

The Prosumer in European Energy Law

Henri van Soest
Researcher in energy law
Scandinavian Institute of Maritime Law
University of Oslo

Abstract

This article examines the use of the prosumer concept in European energy law. The prosumer is a participant in the energy system who both produces and consumes energy. While academic interest in the prosumer in an energy context has risen over the past few years, there remains some confusion as to the correct use of the term and the limits of the prosumer concept. The article clarifies which activities and actors are covered by the prosumer concept and compares this analysis to the relevant legal sources of EU energy law.

1. Introduction

The energy transition within the European Union is now well under way. It is clear that this transition will have a major impact on the structure of the electricity grid, not only in physical terms, but also with regard to the roles and responsibilities of the different market participants. Advances in technology and drastic cost reductions have enabled the widespread implementation of new grid technologies, such as solar panels and battery storage. This enables consumers to be more active in the grid, and to become 'prosumers'.

In a European legal context, the prosumer concept is still in its infancy. In its Framework for the Energy Union and several subsequent communications, the European Commission has made it clear that the future of energy will be citizen-oriented.¹ Nevertheless, the academic literature on prosumption is not consolidated and many different definitions of the prosumer are in circulation. This has led to confusion around the limits and proper use of the prosumer concept.

This paper aims to explore and clarify the scope and boundaries of the prosumer concept in European energy law. In the first part, the paper will give a brief overview of the origins of the prosumer concept. In the second part, we will look at the coverage and limitations of the prosumer concept in an energy context. In the final part, we will assess the extent to which prosumer activities are recognized by European energy law.

2. The prosumer concept in general

Using the Google Books Ngram Viewer, we tracked the use of the term 'prosumer' over the years. The term 'prosumer' was first used in 1970 by futurist Alvin Toffler in his book *Future Shock*,² further expanded in his 1980's follow-up *Third Wave*.³ The concept was also developed by Marshall McLuhan and Barrington Nevitt in their 1972 work *Take Today*,⁴ where they defined the prosumer as the

¹ European Commission, 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy' COM (2015) 80 final 2.

² Alvin Toffler, *Future Shock* (Pan Books 1970).

³ Alvin Toffler, *Third Wave* (William Morrow 1980).

⁴ Marshall McLuhan and Barrington Nevitt, *Take Today* (Harcourt Brace Jovanovich 1972).

'consumer who becomes a producer'.⁵ After an initial gentle growth in popularity, the concept fell out of fashion in the second half of the 1980's. From 1995 onwards, it has experienced a steady revival.

In the English language, the word 'prosumer' can mean two very different things. Depending on its meaning, the word also has a different etymological origin. In both cases, however, the word 'prosumer' is a portmanteau of two words that denote the qualities of two previously distinct individuals or entities that are combined in a single new personage, called the prosumer.

In the first instance, the word prosumer combines the words 'professional' and 'consumer'. A prosumer in this sense is defined by the Cambridge dictionary as "*a customer who wants to buy high quality technical products or equipment*."⁶ The term references the trend of amateur hobbyists buying increasingly professional equipment. The paradigmatic example is the amateur photographer, who buys a high-end single-lens reflex camera, even though, given his practical needs, a cheaper digital camera would suffice.

In a second meaning of the word, prosumer is a combination of the word 'producer and 'consumer.' The Cambridge dictionary defines a prosumer in this sense as "*a customer who helps a company design and produce its products*."⁷ The paradigmatic example in this context is Wikipedia, where the content is produced, consumed and monitored by a community of users.⁸

For completeness' sake, we mention that GERHARDT introduces a third use of the term 'prosumer', to indicate someone who makes little distinction between his home life and his work life.⁹ The prosumer is someone who is flexible in his work and can work from multiple locations at irregular times, by making use of new enabling technologies. This use of the term 'prosumer' has seemingly not been adopted in the mainstream, and it is not included in the dictionary definition of the word 'prosumer'.

Apart from the term 'prosumer', we highlight two derived terms. First of all, 'prosumption' denotes the act of engaging in prosumer activities. It exists on the same level as production and consumption, and has a neutral, scientific usage. 'Prosumerism', on the other hand, denotes a societal current or school of thought that emphasizes prosumption. This term has similar connotations to consumerism (and the less-common producerism) and could be viewed in a positive or negative light, depending on one's political preferences and worldview.

3. The prosumer concept in energy

Whereas the prosumer term has been circulating in futurist literature and sociology since the 1970s, the adoption of the word in an energy context is much more recent. The earliest trace we could find of this usage was in a paper from 2009 by TIMMERMAN and HUITEMA, who describe the inclusion of prosumers in the design of energy-management services.¹⁰ They define prosumers as being 'energy-producing consumers'. It is immediately clear that, contrary to its rather theoretical use in sociology, the prosumer in an energy context denotes a specific type of participant in the energy system.

⁵ George Ritzer, Paul Dean and Nathan Jurgenson, 'The coming of age of the prosumer' (2012) 56 Am Behav Sci 379.

⁶ See <<http://dictionary.cambridge.org/dictionary/english/prosumer>> accessed 30 November 2017.

⁷ Ibid.

⁸ George Ritzer and Nathan Jurgenson, 'Production, Consumption, Prosumption' (2010) 10 J. Consumer Cult 13, 19.

⁹ William Gerhardt, 'Prosumers: a new growth opportunity' (Cisco 2008) <https://www.cisco.com/c/dam/en_us/about/ac79/docs/wp/Prosumer_VS2_POV_0404_FINAL.pdf> accessed 16 November 2017.

¹⁰ Wim Timmerman and George Huitema, 'Design of energy-management services – supporting the role of the prosumer in the energy market' (CAISE-DC'09 doctoral consortium, Amsterdam, 2009).

The concept of prosumption in an energy context goes back thousands of years and historically, most people or households provided their own energy. Even when energy began to be used in a systematic way, such as through watermills and windmills, the converted energy was usually used to power one specific machine, for example a flourmill or a spinning machine. In this way, the production and consumption of usable energy remained part of the same enterprise. Vertically integrated energy monopolies only began to arise at the beginning of the 20th century, when highly capital-intensive fossil fuels began to take an increasingly important place in the energy system and the specific nature of electricity led to a centralization of generation.¹¹ It was only at that point in time that the roles of producer and consumer were clearly split.

We are currently witnessing a return to a distributed energy system. However, the start of this development also precedes the introduction of the word 'prosumer'. The strength of the economic argument for centralized generation had already begun to wane in the 1960s, as the development of decentralized technologies reduced the importance of economies of scale in electricity generation. Technologies that are inherently prone to decentralization, such as solar power, were developed as early as the 1950s. Mention of local micro-generation, which is in essence a form of prosumer activity, goes back to the late 1980s.

It is clear that the relatively recent word 'prosumer' is only a label for a concept that is significantly older. Today's evolution towards greater decentralization and increased prosumer participation is not a new phenomenon, but harks back to the classic way of energy provisioning. However, the circumstances in which prosumption takes place today are radically different, because the electricity grid offers a fully functioning alternative to prosumption, thereby changing prosumption from a need to a choice.

4. Definition of the prosumer term in an energy context

Since the first use of the word 'prosumer' in an energy context, the academic literature has accepted and adopted the concept and today there is a whole body of work surrounding the prosumer in the energy context. Unfortunately, most academic contributions use the term 'prosumer' very liberally, and often provide only a brief and incomplete definition.

We list a few select definitions, in order to give the reader an idea of the disparity between the different definitions in use in the literature. JACOBS uses 'prosumer' as a general term that not only encompasses generation but also other essential grid services, such as storage, grid balancing and demand response.¹² LAVRIJSEN and CARRILLO PARRA limit themselves to stating that "*energy consumers are becoming more active as they are able to produce electricity themselves, for instance by installing solar panels, and supplying it to the energy network, thereby becoming prosumers*",¹³ while later on in the article referring to demand response as a form of prosumption. FORD, STEPHENSON and WHITAKER list several definitions of the prosumer concept from the non-legal energy literature. These definitions are very wide-ranging in scope. They also provide their own definition: "*An energy prosumer is a consumer of energy who also produces energy to provide for their needs, and who in the instance of their production exceeding their requirements, will sell, store or trade the surplus energy.*"¹⁴ This definition is very detailed and quite restrictive. It also emphasizes the requirement of electricity production to provide for the producer's own needs, which is not commonly found in other definitions.

¹¹ Jeremy Rifkin, *The zero-marginal cost society* (Palgrave MacMillan 2014) 47.

¹² Sharon Jacobs, 'The Energy Prosumer' (2017) 43 *Ecology LQ* 519, 524.

¹³ Saskia Lavrijssen and Arturo Carrillo Parra, 'Radical Prosumer Innovations in the Electricity Sector and the Impact on Prosumer Regulation' (2017) 9 *Sustainability* 1207.

¹⁴ Rebecca Ford, Janet Stephenson and Juliet Whitaker, *Prosumer collectives: a review* (University of Otago 2016).

Defining a new concept inevitably means abstracting the different elements of the concept to their common core.¹⁵ As a result, every definition is faced with a tradeoff between broad applicability and concreteness. Because the prosumer is a fundamental participant within the dynamics of the electricity system, on a par with the producer and the consumer, the term should be given a general definition that is able to encompass the various kinds and degrees of possible prosumption. For that reason, we think the best approach is to define prosumption as broadly as possible, all the while ensuring that the concept does not become so broad as to lose its relevance.

The core of the prosumer concept is its negative relationship with the classic producer and consumer concept: the prosumer combines elements of both, and is therefore neither.¹⁶ Being true to the etymological origins of the word, a 'prosumer' can be defined as 'someone who both produces and consumes energy'.¹⁷ The resulting conceptualization is the following: everyone who only produces energy is a producer, everyone who only consumes energy is a consumer, and everyone who both produces and consumes energy is a prosumer.¹⁸

5. The expansion of the prosumer concept

Several of the academic definitions of the prosumer include activities that are neither production nor consumption, such as demand response, energy efficiency and grid services. These definitions are examples of a trend in the literature to expand the concept of the prosumer. Taken on their own, these activities relate to the active consumer, rather than to the prosumer.

The active consumer is a consumer who makes active decisions related to his energy consumption, i.e. a consumer who engages in demand-side management. As we have already seen, the prosumer is a market participant who both produces and consumes energy, and consequently engages in both supply and demand management. This means that all prosumers are also active consumers. Conversely, all active consumers need to undertake production activities in order to be considered prosumers.

Strictly speaking, there is a clear delineation between these two concepts, based around the necessity to engage in production activities. In reality, however, there are several arguments that justify a partial or complete overlap between the active consumer concept and the prosumer concept.

First of all, production and consumption are not two opposites, but rather two sides of the same coin.¹⁹ It makes no difference to the electricity system whether a participant reduces his reliance on the energy grid by increasing his own supply of energy by 10 KWh through own generation, or by reducing his demand by 10 KWh through demand response. The effect is the same: the person in question takes 10 KWh less electricity from the grid. Applications of this principle can be seen in the creation of a level playing field between supply- and demand-side measures in capacity mechanisms,²⁰ and the

¹⁵ Tom Ginsburg and Nicholas Stephanopoulos, 'The Concepts of Law' (2017) 84 Univ. Chic. Law Rev. 147, 150.

¹⁶ This is an example of differentiation: Ibid. 154.

¹⁷ This definition is used by the European Commission: European Commission, 'Staff Working Document: Best Practices on Renewable Energy Self-consumption' COM (2015) 339 final, 2; The definition is also found in academic literature: Yael Parag and Benjamin Sovacool, 'Electricity market design for the prosumer era' (2016) 1 Nat. energy 1; and Peter Kästel and Bryce Gilroy-Scott, 'Economics of pooling small local electricity prosumers – LCOE and self-consumption' (2015) 51 RSER 718, 719.

¹⁸ Regardless of the balance between the two elements: someone who produces a lot but only consumes very little is a prosumer, as is someone who consumes a lot but only produces very little.

¹⁹ Kaisa Huhta, 'Prioritising energy efficiency and demand side measures over capacity mechanisms under EU energy law' 2017 35 JENRL 7, 10.

²⁰ Capacity Mechanisms Working Group, 'The Participation of Non-Generation Activities, Demand-Side, and Storage in Generation Adequacy Measures' (European Commission 2015)

intention of the European Commission to treat energy efficiency as an energy source, representing the value of energy saved.²¹

Secondly, we posit that all acts of demand-side management — the defining element of the active consumer — are also forms of prosumption.²² By its very definition, prosumption combines supply and demand management within a single personage. There is an evolution to a situation where prosumers will switch fluently between different technologies, to the extent that there will be a continuous management of energy that integrates elements of all these activities. The distinction between the activation and non-activation of these activities will be reduced. For example, there will no longer be clear demand response events, but rather a continuous adaptation of demand to supply. Accordingly, it is more useful and more accurate to talk about different levels of prosumer interaction, rather than different forms of demand-side management.

Thirdly, some authors include the provision of services to the grid, such as balancing services, in the prosumption concept. At first sight, these services stand apart from the production-consumption dichotomy. However, all services provided by participants to the grid can ultimately be defined as either a production or a consumption of electricity. In the case of balancing services, the service rendered is simply a swift adaptation of the prosumers' production/consumption routines to the changing circumstances of the electricity grid. A responsive energy storage system can provide frequency response services by quickly storing or releasing energy.²³

Finally, the role of energy storage cannot be clarified through the strict production-consumption dichotomy. Energy storage is a zero-sum activity, as it does not produce or consume energy, but merely moves energy in a temporal dimension. Given its increasing importance, the difficulties of including energy storage in the producer-consumption framework plead against the continued applicability of this dichotomy.

We propose the following solution. Instead of the classical producer-consumer dichotomy, we advocate classifying prosumer activities according to a trichotomy of positive generation, negative generation and reduced consumption. By positive generation, we mean increasing the supply of electricity in the grid. This can be done by selling electricity back to the grid or by P2P trading. Negative generation means reducing the demand of electricity in the grid. This can be done through increased generation for own use. In a situation of reduced consumption, the aggregated energy demand is reduced. Examples are demand response and energy efficiency measures.

The key difference between negative generation and reduced consumption is that negative generation does not reduce the overall demand for energy, but merely moves the source of the energy to a location behind the meter. Through negative generation, an entity can reduce its reliance on the grid, without changing its energy use behind the meter. Negative generation is somewhat paradoxical, as it is simultaneously an increase in production and a decrease in consumption. The solution to the paradox is that these two actions take place on two different sides of the meter.

This trichotomy can also accommodate energy storage, albeit as two different actions. Energy storage can be a form of positive generation, if the energy stored is fed back into the grid at a later point in

<http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_4.pdf> accessed 18 November 2017.

²¹ European Commission, 'A Framework Strategy for a Resilient Energy Union' (n 1) 12.

²² Stamatis Karnouskos, 'Demand side management via prosumer interactions in a smart city energy marketplace' (2nd IEEE PES international conference and exhibition on innovative smart grid technologies, Manchester, 2011).

²³ David Greenwood, Khim Lim, Haris Patsios et al, 'Frequency responsive services designed for energy storage' (2017) 203 Applied Energy 115.

time, or negative generation, if the energy stored is used for own use (thereby reducing the need for power from the grid).

With short term and long-term measures, we point to the length of the activity undertaken. Typical prosumer generation capacity cannot be easily switched on or off. For that reason, generation is classified as a long-term activity. The state of energy storage, on the other hand, depends on the balance between supply and demand and the market price and is therefore a short-term activity. The modalities of peer-to-peer (P2P) trading are still being developed. While P2P trading could in theory be used both as a short-term and as a long-term activity, it remains to be seen whether both of these forms will be used in practice.

	Positive Generation	Negative Generation	Reduced Consumption
Short Term	- Energy Storage (sell to grid) - P2P Trading	- Energy Storage (own use)	- Demand Response
Long Term	- Generation (sell to grid) - P2P Trading	- Generation (own use)	- Energy Efficiency

Classification of different prosumer activities

6. Forms of prosumer activity

Above, we clarified that production should be understood in the broadest possible sense. In the following paragraphs, we will clarify what this means in practice, and which activities are covered by this extended notion of production. This list starts with the most passive form of engagement through increased energy efficiency and concludes with the most active form of peer-to-peer electricity trading.

a. Energy efficiency measures

Energy efficiency measures are generally considered the most cost-effective way of reducing the demand for electricity and increasing the efficiency of the electricity system.²⁴ Accordingly, they have a large role to play in reducing the emissions of the energy system. Energy efficiency measures are very accessible, as they do not require the installation of smart meters, storage or generation capacity. Even in off-grid situations, energy efficiency measures are an important asset, as they reduce the need for additional generation and storage capacity and make going off-grid a more viable alternative.

Energy efficiency measures are on the borderline of the active consumer concept. One could question whether the use of energy efficiency measures displays enough activity to be considered as more than a normal consumer. However, energy efficiency measures reduce the demand for power, albeit on a long term and permanent basis, and are therefore an active intervention by consumers in the demand structure of the energy market. Consequently, energy efficiency measures fall within the extended scope of prosumption.²⁵

Energy efficiency measures are not necessarily a passive endeavour. Already in the early 1990’s, LOVINS proposed the creation of a market for energy efficiency — the so-called ‘negawatt market’ — where

²⁴ Yael Parag, ‘Beyond energy efficiency: a prosumer market as an integrated platform for consumer engagement with the energy system’ (ECEEE summer study proceedings, Toulon, 2015) 15, 16.

²⁵ Ibid.

the potential for energy savings could be traded.²⁶ In this market-based logic, energy efficiency is not treated as a goal in itself, but as a means of closing the ‘energy efficiency gap’ between the current energy use and the optimal energy use. In this way, the energy efficiency market leads to an optimal allocation of resources.²⁷

The European Commission is becoming more accepting of the idea that energy efficiency is a resource in itself.²⁸ The proposed Energy Efficiency Directive confirms that energy efficiency should be treated as an energy source in its own right and that it should be able to compete on equal terms with generation capacity.²⁹

b. Demand response

Demand response is the oldest form of demand-side flexibility recognized as such. Developed in the 1970’s as an emergency measure to avoid blackouts, demand response was originally limited to large companies manually reducing their electricity use. Today, the process has largely been automated for commercial and industrial customers, and residential demand response programs are becoming increasingly common and accepted. Evidence of this is the inclusion of aggregated demand response resources in capacity mechanisms.

The granularity of demand response continues to increase: after the shift from industrial to commercial and later to residential demand response, mechanisms are being developed for the operation of demand response at the appliance level. The large-scale introduction of smart metering has been instrumental in activating the demand response potential of market participants.³⁰

Demand response is closely linked to the issue of peak demand, where demand is temporarily so high that the supply side cannot match it. The imbalance might be due to practical concerns (there is physically not enough generation capacity) or financial concerns (there is in theory enough capacity, but it is cheaper to pay consumers to reduce demand than to engage the reserve capacity). Usually, the use of the specific amount of electricity is not abandoned altogether, but is instead moved to another time, when there are no peak demand concerns. For these reasons, demand response is qualified as a short-term event.

While demand response measures commonly react to the adequacy of an external energy supply, in today’s energy system this is not a necessity. For example, demand response measures can be used within a single household, in order to balance the domestic consumption of energy with the supply from the solar panels on the roof. It flows from this that demand response measures do not require a connection to the electricity grid, but can instead also be used in a microgrid and off-grid context.³¹

c. Electricity storage

It has long been accepted wisdom that electricity cannot be stored due to its physical qualities. However, the development of new storage technologies and a dramatic decrease in price have made

²⁶ Named after the ‘negawatt’, or negative watt, which expresses the amount of energy saved: Amory Lovins, ‘Negawatt revolution’ (1990) 27 Across the board 18.

²⁷ Adam Jaffe and Robert Stavins, ‘The energy-efficiency gap: what does it mean?’ (1994) 22 Energy Policy 804.

²⁸ See higher (n 21).

²⁹ Preamble 2 Proposed Energy Efficiency Directive COM (2016) 761 final.

³⁰ Datong Zhou, Maximilian Balandat and Claire Tomlin, ‘A Bayesian perspective on residential demand response using smart meter data’ (54th Annual Allerton conference on communication, control, and computing, Monticello, 2016).

³¹ For example: Benny Talbot, ‘Off-grid Demand Response’ (Knoydart Foundation 2016) <<https://www.localenergy.scot/media/98365/Knoydart-Final-Report.pdf>> accessed 17 November 2017.

electricity storage a plausible option. Accordingly, we can expect electricity storage to become an integral part of the future electricity grid.

Electricity storage delays the use of electricity and can play an important role in electricity balancing. As we have said above, energy storage can be seen as positive or negative generation, depending on its use. This is notwithstanding the fact that the overall electricity balance of energy storage is zero: no new energy is created, and the overall demand for energy is not reduced, as the use of the stored energy is merely delayed.

Energy storage does not only play an important role in grid-connected situations, but it is arguably even more important in off-grid or semi off-grid situations. Indeed, for many market actors, going off-grid only becomes an option if energy storage is available. Energy storage provides a solution for the variability of most renewable energy technologies.

d. Generation for own use

While the generation of one's own electricity is a novelty in the modern electricity grid, it has historically been the standard way of provisioning energy. The immediate use of self-generated electricity is arguably the most well-known form of prosumer activity.

Generation for own use is a form of negative generation, as it allows a market player to reduce their energy intake from the grid, while leaving their own level of demand untouched. As the generation from distributed renewable sources tends to be variable, it is often combined with another form of prosumer activity, such as energy storage or the possibility of selling excess energy to the grid.

e. Selling electricity to the grid

Due to the variable nature of renewable electricity generation, a prosumer will in most cases be unable to exactly balance his internal supply and demand. In the case of a supply surplus, the prosumer can feed his electricity back to the grid.

Usually, the prosumer is compensated for selling his electricity to the grid. A traditional way of remunerating the prosumer is through feed-in tariffs, but this method has proven expensive to maintain as the cost of electricity from renewable sources has fallen. Another possibility is to use net metering, where a participant's electricity meter turns backwards if electricity is fed back into the grid. Today, the adequate remuneration is usually determined in a more market-based way, based on the price on the wholesale markets, in a similar manner to the way the utility price is determined.

The sale of electricity back to the grid requires a two-way electricity connection, so that the electricity can flow back to the grid. In addition, utilities might not be keen on this type of interaction, as it complicates the central balancing and control of the electricity grid. These concerns make the sale of electricity to the grid less accessible than other forms of prosumer engagement.

f. P2P trading

A more novel way of dealing with supply and demand balancing involves peer-to-peer (P2P) trading. In this case, a customer can interact and trade with another customer directly, bypassing the traditional utility.

The buying of electricity from a peer is, in most cases, a financial operation, taking place in the virtual grid. While the trade is accounted as taking place between two peers, the electricity that is traded will still flow over the classic distribution grid, and the receiving peer has no way of receiving the exact same electricity for which he contracted. Although the distribution system operator (DSO) plays a

reduced role in these transactions, it will still be important for the maintenance of the distribution infrastructure that is needed for P2P transactions to take place.³²

In addition, the specific entity has to provide a trading platform where bids and offers of electricity can be matched, complete with validation and settlement of the trades. The DSO or the energy retailer could act as an intermediary for these transactions.³³ Using blockchain technology, this process could take place in a decentralized way, and only the requirement for a common trading interface would remain.

Selling electricity through a P2P trade is a form of positive generation. In theory, P2P trading can occur as both short term and long term. Short-term trades rely on a trading platform to match prosumers for specific trades. While this would be time and labour intensive for a human, it is something that can be achieved by an autonomous entity. Long-term trades are similar to the supply contracts for an indeterminate term that are traditionally concluded with a utility. One example is the situation when a neighbour buys a share of the electricity produced by a windmill on the participant's property.

The mere element of buying electricity from a peer is not an activity covered by the prosumer concept. This is because the buyer does not have an impact, as such, on the supply and demand of electricity in the grid. Even though he changes supplier, he will still receive his electricity through the standard electricity grid. Consequently, the buying party in a P2P trade will still be qualified as a standard consumer.

7. Limits of the prosumer concept

In the previous paragraphs, we highlighted the range of possible prosumer activities. In this part, we will discuss some questions relating to the coverage and limitations of the prosumer concept.

a. Ownership of the generation

The paradigmatic example of the prosumer concept is the individual household that owns its house and owns capacity that is clearly installed on its property. While such a household is clearly a prosumer, the question as to who can be considered a prosumer when the ownership of the generating capacity is less straightforward.

Many people do not own the house they live in, but instead have a different ownership situation, such as renting a house, renting an apartment, owning an apartment, living in a co-housing space etc.³⁴ Excluding these people from the prosumer definition would limit the applicability of the concept, which does not make sense from a teleological point of view. For that reason, these other forms of habitation should also be covered by the prosumer concept.

The development of distributed generation has given rise to new market participants who act as the intermediaries in prosumer transactions. One example is solar service providers, who install, maintain and operate solar panels on the roofs of their clients.³⁵ Another example is aggregators who combine

³² Chao Long, Jianzhong Wu, Chenghua Zhang et al., 'Feasibility of peer-to-peer energy trading in low voltage electrical distribution networks' (2017) 105 Energy Procedia 227.

³³ For an interesting example from Finland, see: European Commission, 'Working Group Report "Consumers as Energy Market Actors"' (2015) <https://ec.europa.eu/energy/sites/ener/files/documents/Draft_WG_report_consumers_market_agents_TC_110315_web_version3.pdf> accessed 16 November 2017, 16.

³⁴ The European consumer organization BEUC gives an excellent overview of the possible prosumer architectures in a tenant context: BEUC, 'Tenants' access to solar self-generation' (2017) <http://www.iut.nu/EU/Energy/BEUC_%20IUT_solar_self_consumption_March2017.pdf> accessed 16 November 2017, 6.

³⁵ Jacobs (n 12) 526.

distributed generation capacity into a virtual power plant or a demand response block.³⁶ In these cases, the user transfers most of the responsibility for managing its electrical assets to a third party.³⁷ Nevertheless, the user can still be considered a prosumer, as he still takes an initial decision to engage with the electricity markets, even if it is through contracting with a third party to manage the assets. Conversely, the aggregator cannot be considered a prosumer, since he is not the legal owner of the generating capacity. This situation should not be confused with the situation where a prosumer acts as an aggregator of his own capacity.³⁸ Such a case will most often occur in the case of large-scale prosumers with diverse capacity. Since the user retains full ownership and control over the capacity, he will be a prosumer. The fact that he also takes on the role of aggregator does not change this qualification.

Issues of ownership can also arise in energy cooperatives. If the energy cooperative owns a windmill that supplies the neighbourhood, can the individual cooperants be considered prosumers? The answer is yes: even though the ownership of the windmill cannot be physically allocated to an individual cooperant (since the individual only owns a virtual share in the windmill), he will still be considered a prosumer.³⁹

b. Legal persons

Because presumption is rooted in the idea of consumers becoming more active in the electricity system, prosumers are most commonly understood to be natural persons. However, as in other areas of law, legal persons are to a certain extent equated with natural persons. Can we extend this equation to presumption? In other words, can legal persons be prosumers too?

In principle, there does not seem to be any obstacle to legal persons being prosumers. There are cases where a legal person acts as a prosumer that should clearly be covered by the definition. For example, the use of solar panels installed on a factory building owned by a company will be an act of presumption by that company. However, the geographical presence of a company is often not limited to a single location, and a company might have several establishments that have consumption and generation capabilities. In this case, the overarching legal person will be the prosumer, and not the separate factories, since they do not have legal personality. This determination can have important consequences if regulation imposes maximum limits on energy presumption.⁴⁰ However, the prosumer qualification remains linked to the original legal person and cannot be transferred through a chain of ownership.⁴¹

c. Generation for own need/use

In most cases, a prosumer will use their own generated electricity primarily to fulfill their own current electricity needs, before selling the surplus back to the grid, to another market participant, or to store it. However, we need to clarify whether generation for own need, in addition to being a common feature of presumption, is also a requirement for presumption.

³⁶ European Parliament, Competition policy and an internal energy market (European Union Publications Office 2017), 68.

³⁷ Jacobs (n 12) 526.

³⁸ Ruben Verhaegen and Carlos Dierckxsens, 'Existing business models for renewable energy aggregators' (BestRES studies 2016), 24.

³⁹ Janusz Pietkiewicz, 'Prosumer energy and prosumer power cooperatives: opportunities and challenges in the EU countries' (European Economic and Social Committee 2016), 10.

⁴⁰ See below in the case of European energy law.

⁴¹ The activities that give rise to the prosumer qualification are linked to the original player and exist independent of the investor's own energy use. An extensive interpretation taking into account the entire chain of ownership would not have a clear end, and would risk hollowing out the prosumer concept.

Some definitions of the prosumer concept presume that the use of the generated electricity for own need is indeed a precondition to be qualified as a prosumer.⁴² However, this condition does not hold up in practice. For example, a prosumer can engage in energy storage for arbitrage purposes, by storing energy when the price is low and releasing energy when the price is high. In such a case, the primary purpose of the storage is engaging with the markets, rather than fulfilling a personal need.

Usually, the prosumer actions will be undertaken as an additional activity. However, new technologies make it possible for market players to use prosumption as a primary activity. In principle, these enterprises will be covered by the definition of the prosumer. If this type of prosumption were not allowed, the potential role of prosumers in increasing competition in the electricity market would be greatly diminished.⁴³

d. Connection to the grid

The proliferation of prosumption has increased the possibility for market players to reduce their reliance on the electricity grid. The combination of own generation and storage capacity even makes it possible for players to go off-grid altogether. Some sources see interaction with the electricity market as an essential part of the prosumer definition.⁴⁴ We need to clarify whether actors with either a reduced or no connection to the grid can still be considered prosumers or whether, by definition, prosumers are connected to the electricity grid and interact with it.

In the first option, the prosumer remains connected to the grid, but relies less on electricity from the grid to fulfill its electricity needs. This can result in an almost off-grid scenario, where a prosumer is in principle self-sufficient, only using the grid to match exceptional changes in supply or demand. Since these people remain connected to the grid, albeit marginally, they are definitely covered by the prosumer concept. In practice, this case is likely to occur quite often in the future electricity grid, more so than the off-grid scenario.

The question of whether self-relying persons who go off-grid can be considered prosumers is a trickier question. According to the basic definition, these persons are indeed prosumers, since they are both a producer and consumer of electricity. However, some definitions refer to the active participation of 'prosumers' in the electricity market, for example by selling electricity back to the grid.⁴⁵ While these are indeed common traits of prosumers, they are not a part of the prosumer definition. Prosumers in different situations will interact with the electricity market to different degrees, and there does not seem to be any particular reason to exclude players in the lowest possible category of interaction, namely being off-grid, from the prosumer definition. For that reason, players who go off-grid are still covered by the prosumer concept.⁴⁶

The prosumer can also be connected to a separate electricity grid, such as a microgrid. The actions taken by the prosumer and the services provided to the other members connected to the grid in the context of a micro-grid are similar to those actions performed in the context of the main grid (apart from the difference in size of the grids). Consequently, there is no reason to exclude participants in microgrids from the prosumer definition.

⁴² For example: Eurelectric, Prosumers: an integral part of the power system and the market (Eurelectric 2015), 5; Nikolina Šajn, 'Electricity prosumers' (2016) European Parliament Briefing PE 593.518.

⁴³ Lavrijssen and Carrillo Parra (n 13) 1211

⁴⁴ Josh Roberts, Prosumer rights: options for a legal framework post-2020 (ClientEarth 2016), 6

⁴⁵ Bernt Bremdal, 'The impact of prosumers in a smart grid based energy market' [should this title be in italics? It seems inconsistent with the approach generally.](2014) 2 Metering International 71

⁴⁶ Jacobs (n 12) 526

e. Intent to prosume

The literature surrounding prosumption makes an implicit assumption that becoming a prosumer requires an active decision on the part of the consumer: a decision to transcend the passive state of consumerism and become a prosumer. Definitions including language such as ‘active participation in the market’ and ‘active customers’ are examples of this assumption.⁴⁷ However, this is not necessarily the case. FORD, STEPHENSON and WHITAKER distinguish between active and passive prosumers.⁴⁸ Active prosumers invest in the necessary prosumer infrastructure, inspired by environmental or economical motives. Passive prosumers are persons who become a prosumer ‘by accident’, for example by moving into a house with solar panels on the roof, where the presence of these solar panels was not a core part of their decisions to move into this particular house. Accordingly, there is no requirement of ‘intent’ to be considered a prosumer.

8. The prosumer concept in the Winter Package

The development of the prosumer concept is part of a broader movement in EU energy law and policy towards greater participation of citizens in the electricity system.⁴⁹ While market regulation traditionally looks at consumers as passive players,⁵⁰ the initial liberalisation of the electricity markets⁵¹ made it clear that consumers have an essential role to play in well-functioning markets.⁵² Open and flexible electricity markets require consumers to behave like rational economic participants and take active decisions about their electricity use.⁵³

The 2007 communication ‘An Energy Policy for Europe’ was one of the first major EU documents to recognise the role of consumers.⁵⁴ Notable reiterations include the EU’s Energy 2020 strategy,⁵⁵ the Energy Roadmap 2050⁵⁶ and the annual Citizens’ Energy Forum.⁵⁷

The Winter Package greatly expands the role of the consumer.⁵⁸ The consumer should not only act as a rational market participant; he is also expected to engage in prosumer activities.⁵⁹ However, the Winter Package does not mention the words prosumer, prosumption or prosumerism. Instead, the

⁴⁷ For example: Bremdal (n 45) 71

⁴⁸ Ford, Stephenson and Whitaker (n 14) 6.

⁴⁹ European Commission, ‘A Framework Strategy for a Resilient Energy Union’ (n 1) 2.

⁵⁰ Anna Butenko and Kati Cseres, ‘The Regulatory Consumer: Prosumer-Driven Local Energy Production Initiatives’ (Social Science Research Network 2015) SSRN Scholarly Paper ID 2631990 4 <<https://papers.ssrn.com/abstract=2631990>> accessed 15 January 2018; Lavrijssen and Carrillo Parra (n 13) 1208.

⁵¹ For an overview of the liberalisation process, see: Angus Johnston and Guy Block, *EU Energy Law* (Oxford University Press 2012).

⁵² Lucia Reisch and Hans Micklitz, ‘Consumers and Deregulation of the Electricity Market in Germany’ (2006) 29 *Journal of Consumer Policy* 399, 406.

⁵³ Butenko and Cseres (n 50) 7.

⁵⁴ European Commission, ‘An Energy Policy for Europe’ (2007) COM(2007) 1 final; Malte Fiedler, ‘The Making of the EU Internal Energy Market’ (Rosa Luxemburg Stiftung 2015) 6.

⁵⁵ European Commission, ‘Energy 2020: A Strategy for Competitive, Sustainable and Secure Energy’ (2011) COM(2010) 639 final 5.

⁵⁶ European Commission, *Energy Roadmap 2050* (Publications Office of the European Union 2012).

⁵⁷ European Commission, ‘Citizens’ Energy Forum’ (Brussels 2009) Press release MEMO/09/429 <http://europa.eu/rapid/press-release_MEMO-09-429_en.htm?locale=EN> accessed 18 January 2018.

⁵⁸ Officially known as the Clean Energy for All Europeans Package; however, the colloquial Winter Package name is well known and its use is widespread.

⁵⁹ European Commission, ‘New Electricity Market Design: A Fair Deal for Consumers’ (2016) 2 <https://ec.europa.eu/energy/sites/ener/files/documents/technical_memo_marketsconsumers.pdf> accessed 18 January 2018.

concept of prosumption is captured by several different terms, spread out over the legislative proposal.

In the paragraphs below, we will discuss these different terms. We will focus on three recurring issues: the personal scope of the term, the material scope of the term, and whether the prosumer activities can constitute a 'primary commercial or professional activity'. Our thesis is that the significant overlap between these terms shows that the expression of the prosumer concept does not warrant four different terms. Instead, it would be better to develop one overarching prosumer definition.

a. The different prosumer concepts in the Winter Package

The Winter Package contains four main concepts related to prosumption. The first two terms are found in the proposed electricity directive.⁶⁰ First, the active customer is defined in article 2(6) of the proposed electricity directive as 'a customer or a group of jointly acting customers who consume, store or sell electricity generated on their premises, including through aggregators, or participate in demand response or energy efficiency schemes provided that these activities do not constitute their primary commercial or professional activity'. Article 15 of the same directive clarifies the measures that Member States should take to ensure fair grid access for active customers.

Second, article 2(7) of the proposed electricity directive addresses local energy communities, which are defined as 'an association, a cooperative, a partnership, a non-profit organisation or other legal entity which is effectively controlled by local shareholders or members, generally value rather than profit-driven, involved in distributed generation and in performing activities of a distribution system operator, supplier or aggregator at local level, including across borders'. Article 16 of the directive provides outlines for Member States for the design of a national regulatory framework for local energy communities.

The proposed renewable energy directive contains two additional terms.⁶¹ Article 2(aa) of the proposed renewable energy directive defines the renewable self-consumer as 'an active customer as defined in the [proposed electricity directive] who consumes and may store and sell renewable electricity which is generated within his or its premises, including a multi-apartment block, a commercial or shared services site or a closed distribution system, provided that, for non-household renewable self-consumers, those activities do not constitute their primary commercial or professional activity'. Article 21 stresses that renewable self-consumers maintain their rights as consumers and that they should receive fair conditions when interacting with the market.

Finally, the renewable energy community is defined in article 22 of the proposed renewable energy directive as 'an SME or a not-for-profit organisation, the shareholders or members of which cooperate in the generation, distribution, storage or supply of energy from renewable sources'. In addition, the renewable energy community has to meet four out of five criteria relating to corporate governance and limits on installed capacity.⁶²

⁶⁰ Proposal for a Directive of the European Parliament and of the Council on common rules for the internal market in electricity COM(2016) 864 final/2.

⁶¹ Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources 2017 COM(2016) 767 final/2.

⁶² Art 21§1(a) to (e) *ibid*.

b. Personal scope: who can be a prosumer?

First, we need to determine who can be a prosumer. In most cases, prosumers will be individuals. However, groupings of individuals in different forms are also possible.⁶³

The definition of the active customer covers both individual customers and groups of customers acting jointly. There is no geographical limitation on the location of group members. It is unclear whether the definition also covers groupings with a separate legal personality.

The local energy community covers groups, which can take a variety of forms.⁶⁴ Article 16 of the directive states that ‘shareholders or members of a local energy community shall not lose their rights as household customers or active customers’, which shows that the local energy community can consist of active customers. As its name suggests, the local energy community has a strong local dimension.

The renewable self-consumer only mentions individuals. The article clarifies that the renewable self-consumer is a specific type of active customer. Although the definition of the renewable self-consumer includes more details about the location of the activities, the difference in personal scope between the two concepts is slight.⁶⁵

The renewable energy community covers SME’s and non-for-profit organisations. Although the directive does not explicitly mention it, in practice all renewable energy communities are also local energy communities.⁶⁶ As a result, the renewable energy community will also have a strong local connection.

In conclusion, the European framework covers individuals, unincorporated groups and groups with a separate legal personality. However, the coverage of the different terms overlaps to a certain extent. This analysis reveals a strong link between the active customer and the renewable self-consumer on one hand, and the local energy community and the renewable energy community on the other. However, this distinction is not clear-cut, as the local energy community also refers back to active customers.

The active customer seems to have the broadest application among the different prosumer concepts within European energy law. It is unfortunate that the definition of the active customer addresses both individuals and groups of consumers acting jointly. The role of groups is better addressed by the concepts of the local energy community and the renewable energy community, which deal explicitly with this.

c. Material scope: which activities are prosumer activities?

The material scope of the prosumer concept is more contentious than the personal scope. There are two main positions in the debate. Some authors stay true to the original definition of the prosumer as someone who both produces and consumes energy. Accordingly, they limit the prosumer concept to the core activities of generating one’s own energy and potentially storing and selling this energy.⁶⁷ We

⁶³ Pietkiewicz (n 39) 4; Nikolina Šajn (n 42) 2 <[http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/593518/EPRS_BRI\(2016\)593518_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/593518/EPRS_BRI(2016)593518_EN.pdf)> accessed 18 January 2018.

⁶⁴ Art. 2(7) of the proposed electricity directive offers a non-exhaustive list.

⁶⁵ Lavrijssen and Carrillo Parra (n 13) 1216.

⁶⁶ Because three out of five additional requirements set out in art 22§1 of the proposed renewable energy directive contain local elements, it is impossible to combine four requirements that do not contain a local element: Eurelectric, ‘European Commission’s Legislative Proposal on Common Rules for the Internal Market in Electricity’ (2017) Position paper <http://www.eurelectric.org/media/318372/eurelectric_positionpaper_electricity_directive_final-2017-030-0242-01-e.pdf> accessed 18 January 2018.

⁶⁷ For example: Whitaker, Ford and Stephenson (n 14) 5.

will call this view presumption *sensu stricto*. Others take a more expansive view and include all activities that an engaged consumer can undertake.⁶⁸ In this case, activities undertaken by a consumer that do not strictly have to do with the production of energy are nevertheless included in the prosumer concept.⁶⁹ The most common example is participation in demand response activities. We will address this opinion as presumption *sensu lato*.

The active customer covers a broad range of activities and takes a *sensu lato* approach. In comparison, the local energy community includes a narrower range of activities but adds aggregation. The renewable self-consumer follows the *sensu stricto* approach. As the definition of the renewable self-consumer builds on the active customer concept, this means that active customers who engage in presumption *sensu stricto* are also renewable self-consumers, whereas active customers who engage in presumption *sensu lato* do not fall within the renewable self-consumer definition.⁷⁰ The renewable energy community, to conclude, also uses the strict approach. Interestingly enough, the renewable energy community is allowed to buy or sell renewable energy through power purchase agreements, which counteracts its otherwise strong local connection.

It is clear that the European legislator adopts both the presumption *sensu stricto* and the presumption *sensu lato* points of view. Several terms float between the two extremes, for example where aggregation is added to an otherwise strict approach. Is there a reason why the active customer and the local energy community can act as an aggregator, but not the renewable energy community? Is there a reason why only the active customer can engage in energy efficiency schemes? Unfortunately, the directives leave these questions unanswered.

d. Presumption as a ‘primary commercial or professional activity’

The requirement that prosumer activities are not undertaken as a ‘primary commercial or professional activity’ (PCPA) is a recurring theme throughout the Winter Package. This requirement allows for a distinction between the established professional electricity market players and small-scale prosumers. This barrier serves two purposes. On the one hand, it allows prosumers to maintain the benefits of being a consumer, such as coverage by consumer protection rules. On the other hand, it enables prosumers to escape the heavy financial and administrative burdens imposed on professional electricity market players.

The definition of the active customer excludes presumption as a PCPA. The threshold above which prosumer activities can be considered as someone’s PCPA is not determined. Unfortunately, this limits the potential of prosumers to participate in the energy market, which goes against the broader goals of the European energy union.⁷¹ In addition, it creates a lot of uncertainty for entrepreneurs and investors and stymies the development of new, creative business models based on presumption.⁷²

The definition of the local energy community does not explicitly mention any limitations on the exercise of prosumer activities as a PCPA. In addition, even though local energy communities are most often value-driven, the existence of profit-driven local energy communities is not excluded, and local energy communities can be incorporated. It therefore seems possible for the local energy community to undertake prosumer activities as a PCPA.

⁶⁸ For example: Jacobs (n 12) 524.

⁶⁹ Lavrijssen and Carrillo Parra (n 13) 1210.

⁷⁰ *ibid* 1216.

⁷¹ European Commission, ‘Transforming Europe’s Energy System - Commission’s Energy Summer Package Leads the Way’ (2015) <http://europa.eu/rapid/press-release_IP-15-5358_en.htm> accessed 18 January 2018.

⁷² Lavrijssen and Carrillo Parra (n 13) 1211.

Renewable self-consumers are not allowed to undertake prosumer activities as a PCPA, except in cases where he or she is a non-household renewable consumer. This implies that households could make their prosumer activities a PCPA. However, the renewable self-consumer is a special type of active customer, as was mentioned earlier. Consequently, the exception for households seems to contradict the more restrictive active customer definition, which excludes all prosumption as a PCPA. As a result, it is not clear in which situations (if any) the household exception could apply. In the case of the renewable self-consumer, the threshold for determining when prosumption becomes a PCPA is quantified. Households are considered prosumers if they feed less than 10 MWh into the grid on an annual basis. For legal persons, the threshold is 500 MWh of electricity fed into the grid on an annual basis.⁷³ While this quantification provides welcome clarity compared to the open-ended prohibition in the active customer definition, it is not clear why the threshold was set at this specific level.

Finally, the renewable energy community does not rule out prosumer activities constituting a PCPA.

It appears that the restriction on prosumer activities as a PCPA only applies to individuals, except in the case of active customers acting jointly. The directives do not explain why the PCPA threshold is determined for renewable self-consumers, while it remains undetermined for active customers.

9. Conclusion

In this paper, we have investigated the prosumer concept in European energy law. We have first looked at the origin of the word 'prosumer' and its use to describe a pre-existing phenomenon in the energy market. Next, we have studied the coverage and limitations of the prosumer concept. Finally, we have looked at the concepts introduced in the Winter Package that relate to prosumption, and analysed how these concepts relate to each other.

The prosumer concept remains a novelty in the energy sector. Both the academic literature and European policymakers do not yet agree on the concrete coverage of the concept and many different definitions circulate. Several stakeholders have tried to remediate the current confused situation. For example, the Council of European Energy Regulators (CEER) has made good proposals for clarifying the definitions.⁷⁴ However, because these proposals retain the four different prosumer definitions of the Winter Package, they tackle the symptoms but not the cause.

We believe that the most appropriate solution is to have one broad prosumer definition. This will create legal certainty for prosumers and encourage greater prosumer participation. It would also capture the fundamental nature of the prosumer as one of the core players in the electricity system. In addition, a general definition would be more future-proof and technology-neutral, two essential qualities in such a fast changing environment.

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⁷³ Art 21§1(c) proposed renewable energy directive; however, Member States can set a different threshold.

⁷⁴ Council of European Energy Regulators, 'Renewable Self-Consumers and Energy Communities' (2017) VIII 3 <<https://www.ceer.eu/documents/104400/5937686/Renewable+Self-Consumers+and+Energy+Communities-2/2f7ffa53-9b81-dbad-d49a-a6331d6d5150>> accessed 18 January 2018.

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