WP3: SERVICES FOR PROSUMERS OF SOLAR ENERGY. LEGAL CONTEXT. BARRIERS AND OPPORTUNITIES

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SUMMARY WP3: SERVICES FOR PROSUMERS OF SOLAR ENERGY. LEGAL CONTEXT. BARRIERS AND OPPORTUNITIES

This work package (WP3) is part of the research project, ProSumE: Enabling Energy Prosumers Services, which aims to launch an innovative network of local renewable energy production and consumption initiatives and develop services to energy prosumers on a city-wide level, with potential for scalability and reproducibility in other European and foreign cities.

Therefore, the work package (WP3) is proposed, to analyse firstly the concept of the renewable energy prosumer so that this phenomenon can be addressed, as well as the legal framework applicable to it, both in Spain and in the European Union. This legal framework is in the process of being reformed in the former case and being drafted in the latter.

Next, the best practices of services to prosumers on a national level (local self-consumption and shared self-consumption) are identified, which could be implemented in the city of Valencia in the short term and under current regulations. This is followed by identifying these on a European level (energy communities and self-consumption in buildings), which would require legal changes in Spain for them to be carried out, but which are technically and economically viable, as can be seen in other European countries. To analyse these experiences, the legal, administrative and economic aspects of its success have highlighted. These practices have been selected for their contribution to the increase in energy efficiency, as they are installations connected to the electricity grid and because they are contributing to the empowerment of the citizen.

Then, in view of the regulatory framework applicable in the Valencian Community and more particularly in the city of Valencia, we have analysed the possibilities of adapting these best practices to the local context, in order to contribute to a change in the energy model, making it decentralised and local. For this, certain self-consumption models that can be found in the city have been identified, and the steps to be followed in the administrative process for legalising and setting-up the self-consumption installations are explained.

Finally, a roadmap is proposed so that the prosumer subject can continue to grow in the city of Valencia.

For this, we have identified the barriers that prevent it being developed, which have been reduced after the approval of RD-Law 15/2018, but there are still limitations that must be overcome in order for the prosumer to have the rights that the proposed European directives grant: the right to sell energy without being classed as a producer, the right to consume in a grouped way and the recognition and regulation of local energy communities.

In addition, the existing opportunities to promote self-consumption of renewable and photovoltaic energy in Valencia are identified. On one hand, building measures currently being implemented in the city of Valencia are as follows: deductions on personal income tax (IRPF) and property tax (IBI), subsidised financing for projects, etc. Alternatively, the regulation that governs the communities of owners in Spain can be highlighted, which already considers and favours the installation of common systems for the use of renewable energies.

We have also seen how the proposed regulations in Spain and in the European Union are geared towards favouring energy decentralisation and giving the consumer a more active role in the energy market. In particular, the European directives also contain important measures for the promotion of individual and group self-consumption, as well as consumption by energy communities, to be implemented by the European institutions and Member States in the coming years.

1. Introduction

The *ProSumE project: Enabling Energy Prosumers Services* aims to launch an innovative network of local renewable energy production and consumption initiatives and develop services to energy prosumers on a city-wide level, with potential for scalability and reproducibility in other European and foreign cities.

With this purpose, this project is proposed to primarily analyse the concept of the renewable energy prosumer and the legal framework applicable to it, both in Spain and in the European Union.

The best practices for services to prosumers on European and national levels are identified below, highlighting the legal, administrative and economic aspects of their success. These practices have been selected for their contribution to the increase in energy efficiency, as they are installations connected to the electricity grid and for contributing to the empowerment of the citizen.

Then, in view of the regulatory framework applicable in the Valencian Community and more particularly in the city of Valencia, we will analyse the possibilities of adapting these best practices to the local environment. For this we will identify certain self-consumption models, we will see their legal viability and the existing measures for promoting them.

Finally, we will indicate the necessary steps for implementing the best practices for services to prosumers, highlighting the barriers and opportunities.

2. The "prosumer" of renewable energy. Concept and legal regime.

If the objective proposed in this project is to analyse the feasibility of setting up a network of *prosumption* initiatives for renewable energy in the city of Valencia, based on the analysed good practices but taking into account the applicable legal framework in Valencia, the first thing we must do is define how we are using the words *prosumption* and *prosumer*, in order to then consider what capacity is required to carry out these initiatives and under what conditions. This analysis will be carried out taking into account the legal framework applicable to the case and the proposed reform of this framework.

2.1. The "prosumer" in European Union legislation. Self-consumers and renewable energy communities.

The first thing to note is that the term "prosumer" is not a common term in legislation, whether Spanish or European. However, some references can be found in *soft law* standards such as the *Best practices on Renewable Energy Self-consumption* Document (COM (2015) 339 final) of the European Commission, of 15.7.2015, or the Opinion of

the European Economic and Social Committee (2017/C034/07) on Prosumer Energy and Prosumer Power Cooperatives. Both refer to "prosumers" as a term that defines people who are both producers and consumers, but neither of them defines it. Moreover, the EESC Opinion recommends that the European Commission "*draw[s] up a framework definition of the prosumer covering essential common elements, such as: size of the installation, individual and collective power generation, ownership of the installation and the issue of power generation surpluses*."

In this standard, the EESC describes prosumers as individuals, groups of individuals, farms, small businesses and local authorities, who are both producers and consumers of energy generated in small installations located near homes or on residential and commercial buildings (through small wind turbines, photovoltaic panels, solar collectors and heat pumps). In principle, the opinion highlights that prosumers produce energy for their own use, but individuals are also considered prosumers if they generate an amount of energy similar to what they consume, even if both processes are not simultaneous. Taking into account the European experience, it points out that the power limit of the prosumers' installations is normally between 50 and 100kW.

The concept of the renewable energy prosumer has gained strength in recent years in Europe, as well as in European institutions mainly as a result of the Communication from the Commission "Clean energy for all Europeans" of 31 November 2016. This Communication includes various regulatory proposals and measures with which it is intended to accelerate, transform and consolidate the transition of the European Union's economy towards clean energy, which (according to the Communication) will also enable employment to be generated as well as growth in new economic sectors and new business models This package of measures has three main objectives:

- Putting energy efficiency first
- Achieving global leadership in renewable energies
- Providing a fair deal for consumers

The prosumer has a significant role in these challenges. On one hand, this is because their contribution is necessary to improve energy efficiency: the prosumer saves energy because they avoid the losses caused by transportation and distribution. However in addition, they can help make it so that the energy consumption of buildings, which represents 40% of total energy consumption, is almost nil, thanks to savings and self-generation of renewable energy. On the other hand, the European Union recognises that if it wants to be the leader in renewable energies, decentralised generation must be promoted and for this, the obstacles to self-generation must be removed. And finally, it understands that offering fair treatment to consumers means offering them the chance to play a more active role in the energy market, so that they can produce, store, share, consume and sell their own energy in the market, and do it directly or through energy cooperatives or other associative formulae.

These objectives have mainly been expressed in two approved proposals for a directive on 23 February 2017, concerning common rules for the internal market in electricity (DMIE, by its Spanish initials) and on the promotion of the use of energy from renewable sources (DFER also by its Spanish initials), the latter finally approved on December, 11, 2018[1]. The first is scheduled to enter into force on 1 January 2021, and on 30 June 2021 at the latest the national provisions necessary to comply with the provisions of the same must enter into force. The second directive will enter into force 3 days after the date of its publication in the Official Journal of the European Union, and Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with the majority of the provisions of the directive by 30 June 2021.

Both directives aim to promote the active participation of citizens in the energy sector, either directly as self-consumers of renewable energy, or indirectly through local renewable energy communities[2].

2.1.1. The self-consumer of renewable energy.-

The self-consumer of renewable energy is defined as an final customer, active consumer[3] or group of consumers, who act together, consume, and can *store and sell* renewable electricity generated in their installations, including apartment blocks, residential areas, commercial or industrial locations or those with shared services, in the same closed distribution networks, as long as, in the case of self-consumers of renewable energies that are not households, these activities do not constitute their main commercial or professional activity (article 2.2 aa DFER). According to this definition, the concept of self-consumption covers all people who, while being producers/consumers (prosumers) share a closed distribution network.

The DMIE proposal considers that, despite the fact that more and more consumers are using solar panels on the roof and batteries to accumulate energy, self-generation is still

[1] On one hand, the Proposal for a Recast Directive on common rules for the internal market in electricity (COM (2016) 864 final) and on the other the 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 (JOL 328, 21.12.2018, p. 82-209). The first Proposal (PDMIE) modifies and recasts the Electricity Regulation (R. 714/2009), the Electricity Directive (2009/72/EC) and the Regulation establishing the Agency for the Cooperation of *Energy* Regulators (*ACER*) (R. 713/2009) while the second (PDFER) substantially modifies the Renewable Energy Directive (2009/28/EC).

[2] In particular, the DMIE defines the rules on training and consumer protection, and on their open access to the integrated market (article 1); while the DFER establishes the rules on financial aid for electricity obtained from renewable sources and for self-consumption of renewable electricity (article 1).

[3] An active consumer is defined in the DMIE Proposal (article 2.6) as a person or group of people who act together, consume, store or sell electricity generated in their installations, including through aggregators, or participate in demand response or in energy efficiency schemes, provided that these activities do not constitute their main commercial or professional activity.

hindered by the absence of common standards for "prosumers". According to the proposed directive, these barriers would be eliminated if the consumer rights to generate energy for their own consumption and sell the surplus to the network were guaranteed, calculating the costs and benefits for the system as a whole.

Guaranteeing the right to self-consumption of energy is an objective shared by both Directive proposals.

Therefore, Article 15 of the DMIE directs Member States to guarantee that end customers have the right to generate, store, consume and sell self-generated electricity in all organised markets either individually or through aggregators (jointly), without being subject to disproportionately onerous procedures or charges that do not reflect the costs, and are subject to network access fees that reflect the costs, are transparent and non-discriminatory, accounting separately for the electricity supplied to the network and the electricity consumed from the network.

For its part, article 21 of the DFER also establishes various obligations of the Member States in favour of the self-consumption of renewable energies.

Firstly, they must guarantee the right of all consumers to become self-consumers of renewable energy.

Secondly, they must ensure that self-consumers of renewable energy, acting individually or jointly:

a) are authorised to self-consume and sell their excess production of renewable electricity; to consume electricity from renewable sources that they have produced and that remains within their premises; to install and use electricity storage systems combined with installations that generate renewable electricity for self-consumption, and all without being subject to discriminatory procedures and charges, tax-related or otherwise;

b) receive remuneration for the renewable electricity they generate themselves that they contribute to the network equivalent to at least the market price;

c) maintain their rights as consumers**.**

Thirdly, Member States will ensure that the distribution of network management and development costs is fair and proportionate and reflects the benefits of self-generation for the system in general, including the long-term value for the network, the environment and society.

Fourthly, Member States should ensure that renewable energy self-consumers located in the same building, including multi-apartment blocks, are authorised to participate jointly in self-consumption, as if they were a self-consumer of renewable energies on an individual basis.

Fifthly, Member States will have to carry out an assessment of the existing barriers and of the self-consumption development potential in their territories in order to establish a framework that enables the development of renewable self-consumption to be promoted

and facilitated. This favourable framework should form part of the comprehensive national plans on climate and energy and will include certain measures set out in the Directive.

In any case, self-consumers' renewable energy installations may, if they agree, be owned by third parties or be managed by third parties with regard to installation and operation, including measurement and maintenance. In these cases, the third party in question should not be considered a self-consumer of renewable energies.

2.1.2. Local renewable energy communities.

A renewable energy community is a legal entity which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity. It is a local energy community whose members or stakeholders collaborate in the generation, distribution, storage or supply of energy from renewable sources. A local energy community is defined as an association, cooperative, society, non-profit organisation or other entity with legal personality, controlled by shareholders or local members and generally aimed at value rather than profitability. A local community has legal personality, and therefore can own, create or lease community networks or manage them autonomously without their shareholders and members losing their rights as active consumers (or self-consumers).

The planned regulation, besides defining renewable energy communities, establishes certain obligations for Member States for their benefit (art. 22 PDFER).

Firstly, Member States must ensure that end consumers, in particular domestic consumers, have the right to participate in a renewable energy community without losing their rights as end consumers, and without being subject to unjustified conditions or procedures that prevent or discourage them from participating in a renewable energy community, provided that, in the case of private companies, their participation does not constitute their main commercial or professional activity.

Secondly, States must ensure that renewable energy communities have the right to generate, consume, store and sell this energy, without being subject to discriminatory or disproportionate charges and procedures that do not reflect costs.

Thirdly, when designing support systems, Member States will take into account the particularities of renewable energy communities while ensuring equal conditions among generators of electricity from renewable energy sources.

Finally, and as we have seen above, Member States will have to carry out an assessment of the existing obstacles and development potential of renewable energy communities in their territories in order to establish a framework for encouraging and

facilitating participation in the generation, consumption, storage and sale of renewable energy. This framework should form part of the comprehensive national climate and energy plans and should include at least the guarantees that the Directive itself establishes.

If there is also a local "electric" energy community, the PDMIE will have to be taken into account, in which article 16 establishes certain obligations of the States, for example that they must guarantee that the local energy communities:

a) have the right to own, create or hire community networks and to manage them independently;

b) may access all organised markets directly or via aggregators or suppliers in a non-discriminatory fashion;

c) benefit from non-discriminatory treatment in respect of their activities, rights and obligations as end customers, generators, managers of distribution networks or aggregators;

d) are subject to fair, proportionate and transparent procedures and to charges that reflect costs.

On the other hand, art. 16.2 DMIE directs Member States to develop a favourable regulatory framework that ensures, among other things, that participation in a local energy community is voluntary; that the shareholders or members of a local energy community do not lose their rights as domestic customers or active customers and that they may leave a local energy community, the regulations that govern the right to change suppliers being applicable in such cases.

2.2.- "Self-consumption" of renewable energy in Spain.

Having established the concept of the renewable energy self-consumer in the European Union and the applicable legal regime according to the proposed regulations, we are going to focus our attention on Spain and, in particular, on the possibilities that the legal system offers to self-consumption. But first we must define the legal framework applicable to the self-consumption of renewable energy in Spain, and more specifically to the self-consumption of electricity.

2.2.1.- Applicable legal framework.

When defining the legal framework applicable to the self-consumption of electricity in Spain, we will take into account the standards expressly dedicated to regulating self-consumption and those that indirectly affect it, as is the case of the regulations on nearly zero-energy buildings. Keep in mind that this project aims to study renewable energy self-consumption in the city of Valencia, and a city is composed mainly of buildings. In

particular, there are estimated to be around 35,000 buildings in the city of Valencia, in which enough energy could be generated to meet 34% of the city's consumption.

The legal regime applicable to the self-consumption of electricity in Spain is mainly contained in article 9 of the **Electricity Sector Law No. 24/2013**, modified in its entirety after the approval of RDL (Royal Decree-Law) 15/2018, of 5 October, on urgent measures for the energy transition and consumer protection (validated on 18 October). These provisions define self-consumption, distinguish its modalities, establish what the regime of rights and obligations of consumers subject to any form of self-consumption should be, and finally delegates the establishment of conditions for the connection and operation of self-consumption facilities to the Government.

This delegation was specified in **RD (Royal Decree) 900/2015**, which establishes the requirements for benefiting from the various modalities of self-consumption; the legal regime applicable to each one; the requirements for the measurement and management of energy or the application of access tolls to the application networks for the self-consumption modalities. This RD also regulated the application to self-consumption of charges associated with system costs and other system services (articles 17 and 18, 7th Additional Provision, 1st and 4th Temporary Provisions); the administrative Register of self-consumption of electrical energy (arts. 19 to 23), and the penalty regime for breach of the rules set forth therein (article 25), but all these regulations have been repealed by RDL 15/2018.

The radical change should be noted in the legislator's criteria in this matter when approving Law 24/2013 of the Electricity Sector and modifying it through **RDL 15/2018**. The self-consumption regulation is incorporated in Law 24/2013 in order to check and ensure that the self-consumer does not avoid their obligation to contribute to financing the costs and services of the electrical system even if it is not used[4]. For this purpose, the prescribed rules were aimed at limiting and recording self-consumption, establishing the obligation of consumers to contribute to the costs and services of the system for self-consumed energy ("impuesto al sol" - the "sun tax") and developing a disproportionate penalty system in case of breach of these rules[5]. RDL 15/2018, on the other hand,

[4] As the Law itself clearly states in its explanatory statement when justifying the regulation of self-consumption: "*The development of self-consumption as an alternative source of electricity generation outside the electricity system requires the regulation of an activity that did not have a specific legal and regulatory framework to date. The purpose of the law is to guarantee an orderly development of the activity, compatible with the need to guarantee the technical and economic sustainability of the electrical system as a whole. In this sense, the articles of the law establish the obligation of self-consumption installations to contribute to financing the system's costs and services in the same amount as the rest of the consumers. Temporarily, exceptions are established for cases in which self-consumption means a reduction of costs for the system and for the existing co-generation installations*".

[5] Thus, the following were classed as very serious infractions, which entailed a fine of 6 to 60 million euros: "*the breach of the registration obligation as well as the application of economic regimes or modalities not expressly included in this law and its development regulations*" (article 64.43); and as serious infractions, the penalty for which was a fine of 600,000 to 6 million euros: "*the failure to comply with the established requirements and obligations, when this was not classed as very serious; as well as the incorrect*

recognises that the previous regulation discouraged self-consumption and aims to promote it by modifying the current legislation and establishing three fundamental principles that must govern this activity: a) the right to self-consume electricity without charges; b) the right to shared self-consumption to take advantage of economies of scale, and c) administrative and technical simplification of requirements and procedures, especially for small-scale installations.

Regarding the regulations governing the energy performance of buildings, **Directive 2010/31/EU** (EPBD) aims, among other things, to increase the number of "nearly zero-energy buildings" (NZEB), meaning buildings with a very high level of energy efficiency that require little energy for consumption and which are supplied "*to a very large extent*" by energy from renewable sources, "*including energy from renewable sources produced on site or nearby*" (art. 2.2). It is therefore a question of buildings with the capacity to generate the renewable energy that they need for their consumption. To achieve this objective, States are instructed to ensure that by 31 December 2020, all new buildings are nearly zero-energy buildings, and that after 31 December 2018, new buildings that are occupied and owned by public authorities are nearly zero-energy buildings. In addition, **Directive (EU) 2018/844** of 30 May, which modifies it**,** has incorporated a new longer-term objective and orders States to establish a strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings by 2050. To promote the NZEB and ensure compliance with the proposed objectives, the Commission issued guidelines on 29 July 2016 (**Recommendation (EU) 2016/1318**), which define the concept of the NZEB, make note of the progress made up to that time by the States and concludes with a series of recommendations.

This regulation has been integrated into the Spanish legal system by means of **Royal Decree 235/2013** which approved the procedure for certifying the energy efficiency of buildings, which has been limited to reproducing the previous terms and referring to the Technical Building Code for the determination of the minimum requirements with which buildings must comply (Second Additional Provision). The regulations developed in order to adapt Directive 2010/31/EU with regard to nearly-zero energy buildings do not seem sufficient, and this was recently highlighted by the Committee of Experts on Energy Transition, urging the Spanish Government to revise the Technical Building Code, adapt it and specify the applicable regulations on nearly zero-energy buildings[6].

application of the modalities and their associated economic regimes included in this law and its development regulations" (article 65.35). After the reform, both infractions disappeared and the following became classed as a minor infraction in relation to self-consumption, "*the breach of the established requirements and obligations, when this is not classed as very serious; as well as the incorrect application of the modalities and their associated economic regimes included in this Law and its development regulations*" (article 66.14). In addition, the expected penalty for infractions related to self-consumption is 10% of the annual billing for electricity consumption or 10% of billing for the energy put into the grid, if this figure is higher (Article 67.2.2).

[6] Report published by the Spanish Ministry of Energy on 2 April 2018. http://www.mincotur.gob.es/es-es/gabineteprensa/notasprensa/2018/documents/180402%20np%20informe%20comisi%C3%B3n%20exp

2.2.2.- Self-consumption in Spain. Concept.

The Law of the Electricity Sector No. 54/1997 distinguished between supply and consumption activities, and within the former, the production and self-production of electric power (article 9). Self-producers of electricity were at that time defined as those natural or legal persons that generated electricity primarily for their own use (and provided they consumed a significant part of it, between 30 and 50% depending on the installed capacity). Later, Royal Decree Law 7/2006 removed the figure of the "self-producer" as a subject of the electricity system while expanding the concept of producer, including both those who generate energy for their own consumption and those who generate it for third parties. However, Royal Decree Law 13/2012 defined the figure of the consumer as anyone who can produce electric energy for consumption at the same location, and who will not be considered a producer if they opt for the singular supply modalities that will be governed by the regulations.

The term "self-consumption" is gaining presence in Spanish legislation with the creation by RD Law 9/2013 of 12 July, of the *Administrative Register of self-consumption of electrical energy* (27th Additional Provision), and shortly after with the regulation of the self-consumption of electric power in **art. 9** of **Law 24/2013** of 26 December, of the Electricity Sector.

This Law defined self-consumption as the consumption of electrical energy "from generation facilities connected inside a consumer's network or through a electrical energy direct line associated with a consumer" (article 9). Self-consumption is conceived in this norm as an individual activity, by which a person ("a consumer") consumes energy that has been generated by an installation connected to them, because it is connected inside their network or through a direct line.

According to art. 42 LSE (Law of the Electric Sector), a direct line is considered to be that which is intended as the direct link from an electricity production installation to a consumer under the conditions established by the law. RD 1955/2000 noted that if the direct line was connected to the transport or distribution networks it would lose its classification as a direct line, being included in the general system (article 69). This would not prevent the consumer from being connected to the general system, but as the National Energy Commission says, in these cases the connection should be optional, "*by means of a switch designed to enable the consumer to be supplied at all times, either from the direct line or from the network, but never simultaneously from both, otherwise there would be electrical continuity between the network and direct line, the latter losing its status as such*"[7].

ertos.pdf

[7] Report from the National Energy Commission of 7 March 2013 in response to a query raised by a company on the construction of a power generation plant and the subsequent sale and distribution of electricity. See: **https://www.cnmc.es/sites/default/files/1546578_8.pdf**

It can be said that the key elements of this definition of self-consumption are:

a) Self-consumption as an individual activity. This feature was reinforced in RD 900/2015 by prohibiting a generator from connecting to the internal network of several consumers (article 4.3); but this standard, as we shall see below, was declared unconstitutional by the Judgment of 25 May 2017.

b) The installation that generates the energy must be directly linked to the consumer in one of the two ways provided in the standard.

This concept of self-consumption has been modified after the reform of art. 9 by **RD-L 15/2018**, being understood as "*the consumption by one or several consumers of electrical power from production installations close to those of consumption and linked to them*". This new concept affects the two key elements of the concept of self-consumption:

a) Self-consumption is both individual consumption and grouped electricity.

b) The energy production installation must be nearby and linked to consumption, but there are no conditions regarding in what way, which opens new possibilities that will have to be finalised (as expected) in the regulatory development of the standard (art. 9.2). However, according to the standard, nearby installations will be considered to be those connected to the internal network of the associated consumers, those that are connected to them through direct lines, or are connected to the low voltage network resulting from the same processing plant.

2.2.3.- The shared self-consumption of electric power.

As we saw earlier, the shared self-consumption of electric energy was not only not included in the concept of self-consumption but was expressly forbidden. Section 3 of Article 4 of Royal Decree 900/2015 denied that possibility by stating that "*In no case may a generator be connected to the internal network of several consumers*".

However, this provision was declared void by the Spanish Constitutional Court in judgment 68/2017, of 25 May, which considered that the restrictive rule was not essential according to the criterion that the Court has been applying (STC (Constitutional Court Judgment) 18/2011) in order to interpret the Constitution (article 149.1.25 EC) and therefore it impinged on the powers of the Autonomous Communities. The Catalan Generalitat defended its power to promote the implementation of self-consumption installations in owner associations or shared properties; whereas the Spanish Public Prosecutor argued that the law of the electricity sector (article 39.3) establishes that all installations intended for more than one consumer will be considered a "distribution

network" and must be assigned to the distribution company in the area, it not being possible for an "internal network" of several consumers to exist.

The Constitutional Court considered that Article 4.3 "is based on the existence of internal networks of several consumers" and that this internal network of several consumers corresponds to what is technically called a "connection facility", meaning: "*those that through the supply join the distribution network with the internal or receiving facilities of each of the users that can be found in the same housing development or building, and that always run through common areas but remain the property of the users, who are responsible for its preservation and maintenance (as established by the complementary technical instruction for low voltage ITC-BT 12 of the Ministry of Science and Technology)*".

The Court did not see any reasons nor were any presented at any time to justify the prohibition that would prevent the Autonomous Communities from promoting measures for implementing common self-consumption installations in housing developments, large residential buildings, or any other complex buildings or those with community elements, and from which several users can benefit. In addition, the Court added that this prohibition made it difficult to achieve the energy efficiency and environmental objectives as established in Directive 2009/28/EC on the promotion of the use of energy from renewable sources; Directive 2010/31/EU on the energy performance of buildings, or Directive 2012/27/EU on energy efficiency.

In particular, the Court focused its attention on Directive 2010/31, which considers decentralised energy supply installations based on energy from renewable sources to be a means of guaranteeing that buildings comply with the minimum energy efficiency requirements to be established by Member States. It also recalled the fact that the aim of the Directive for 2020 is the implementation of the "nearly zero-energy building" which means that the building reaches a very high level of energy efficiency and in which the amount of energy required should be supplied, to a very large extent, by energy from renewable sources, including energy from renewable sources that is "*produced on site or nearby*"; as has also been established by Spanish legislation in Royal Decree 56/2016 of 12 February, mentioned above.

The possibility of promoting shared electric self-consumption is especially interesting for the objectives of the *Prosume* project, given that most of the buildings that could benefit from the implementation of power generation facilities from photovoltaic sources in the city of Valencia are buildings comprising individual dwellings, commercial buildings and other types of buildings, made up of a variety of energy users[8].

[8] *In this regard, an article on 18 February 2018 published by the newspaper El Mundo reported a new proposal for a non-binding resolution presented in the Courts by the PSPV (Socialist Party of the Valencian Country) to urge the Consell (Valencian Council) to regulate the shared self-consumption of electricity among the residents of a single block of flats. The article highlights that, at that time (referring to the ruling of the Constitutional Court), the energy generated from self-consumption in residential buildings was only allowed to be used for energy expenditure in the common areas (lighting and lift); if the residents installed*

After the ruling of the Constitutional Court, it was clear that the regional legislator had the authority to promote shared self-consumption of electric power, and it was even revealed that this measure would contribute to meeting the objectives set in terms of energy efficiency of buildings (NZEB); but an express recognition of the right to shared self-consumption was necessary in order to offer sufficient legal guarantees, as reflected in the recent reform in art. 9.1.

Indeed, as noted, one of the main new aspects of the reform that occurred with RDL 15/2018 has been the recognition of shared self-consumption. In this way, the concept of self-consumption also becomes closer to that considered in the European regulations analysed above, where the self-consumer of renewable energy is thought of as a consumer or group of consumers who act together, consume, and can *store and sell* the renewable electricity generated in their facilities.

Shared self-consumption is covered but not regulated, it must be developed legally in the coming months. However, the new definition of the self-consumer offers some indications. Electricity consumers must have a close relationship, since the production facilities must be close to those of consumption and connected to these consumers. The concept of "nearby facilities" for the purpose of self-consumption is yet to be specified, but in any case they will be considered as:

- those that are connected to the internal network of the associated consumers;

- those that are linked to these through direct lines;

- those that are connected to the low voltage network coming from the same processing plant.

Shared self-consumption implies the creation of an internal network shared by all associated consumers. This internal network may be independent or connected to the electricity network at one point. The creation of this internal self-consumption network allows generated energy and contracted energy to be shared, generating a single invoice.

This joint action regarding the electrical system is done as co-owners of property (or their usage rights), and not under a different legal personality, therefore, its constitution and operation will be governed in the absence of specific legal provisions as agreed by the members of the community (co-owners) and in their absence by the regulations of the Spanish Civil Code regarding the joint ownership arrangement (arts. 392 et seq.).

If the members of this community were included in a block of flats, art. 396 of the Spanish Civil Code (CC) and Law 49/1960 of Horizontal Property (LPH) that develops it would be applicable. It is interesting to note that this regulation expressly recognises the following as common elements of a building, as they are necessary for its proper use and enjoyment: the common facilities or services for the supply of water, gas or

solar panels on the terrace it had to be for individual use.

electricity, "including those making use of solar energy"[9], and they are subject to the following regulations, among others:

a) the installation of common (or exclusive) systems for the use of renewable energies, or of the infrastructures necessary to access "new collective energy supplies", may be agreed, at the request of any owner, by a third of the members of the community that they represent, in turn, one third of the participation quotas (article 17.1.1 LPH);

b) the works that are necessary for proper maintenance and fulfilment of the property's duty of upkeep, its services and common facilities will be mandatory and will not require prior agreement of the Board of Proprietors (although it could mean a modification of the constitutional deed or of previous agreements), (Article 10.1 a, LPH)

c) on the other hand, the community will not be able to pass on the cost of the installation or adaptation of said common infrastructures, nor those resulting from their upkeep and subsequent maintenance, to those owners who have not expressly voted in the Board in favour of installing the system. However, if they later request access to the energy supplies, and this requires taking advantage of new infrastructures or adaptations made to pre-existing ones, they may be authorised provided they pay the amount that they would have been responsible for, duly updated, applying the corresponding legal interest (article 17.1.2 LPH);

d) the installation making use of solar energy as a common asset is indivisible, and the rights to it can only be alienated, encumbered or seized "together with the specific exclusive part to which it is an inseparable annex", meaning together with the dwelling or premises that they service (Article 396 CC).

e) This regulation is prescriptive and therefore is mandatory. In matters not foreseen in these regulations, what has been agreed upon by the co-owners in their deeds, statutes or adopted agreements will be applied.

Ultimately, if it takes place among the residents of a residential building, shared self-consumption has an applicable, clear, adequate and incentivising legal framework for these initiatives. In other cases, the consumers (co-owners) will have to agree on the rules that will govern the management of their shared self-consumption system, and failing this, the norms of the Spanish Civil Code regarding the joint ownership arrangement will

[9] According to art. 396 of the Spanish Civil Code, the common elements of a building are "all those necessary for its suitable use and enjoyment such as the land, surface, foundations and roofs; structural elements, among them pillars, beams, frameworks and load-bearing walls; facades, with the external adornments of terraces, balconies and windows, including their look or configuration, the closing elements which form them and their external coatings; the foyer, stairs, caretaker's cubicles, corridors, passageways, walls, pits, patios, wells and the spaces destined for lift shafts, tanks, meters, telephone or other communal services or facilities, even those which should be of exclusive use; lifts and facilities, conduits and pipes for drainage purposes and for the supply of water, gas or electricity, even for solar energy; and for hot water, heating, air conditioning, ventilation or smoke extraction; for fire detection and prevention purposes; for entry-phones and other security facilities of the buildings, and shared aerials and other facilities for audiovisual or telecommunications services, until they reach private spaces; easements and any other material or legal elements which are indivisible as a result of their nature or destination".

be applied (arts. 392-406). And in both cases, it will be necessary to take into account the regulations that are being drafted in RDL 15/2018, because special provisions will also apply.

Regardless of the circumstances included in the law on individual or shared electricity self-consumption, the current regulations have not provided for the existence of energy communities, which would offer many more opportunities for the implementation of renewable energies in local environments, and in Valencia they could contribute to the development of its neighbourhoods and districts.

2.2.4.- Self-consumption modalities.

Law 24/2013 of the Electricity Sector defines self-consumption and at the same time makes a distinction between its different modalities:

a) Supply with self-consumption without surplus. If the generation installation has physical devices installed that prevent the supplying of surplus energy into the transport or distribution network.

b) Supply with self-consumption with surpluses. When nothing prevents the generation installation from supplying surplus energy into the networks.

The person who performs supply with self-consumption with modality a) will be considered a consumer, while whoever performs modality b) of supply with self-consumption will be considered a consumer and producer.

Only in the first case would we be facing a self-consumer or prosumer as seen in the proposed European regulations, meaning a person who can produce, consume and sell the surplus of the energy produced, without being considered a producer. We could say that self-consumption is recognised in this legislation as a right inherent to consumers, the right to generate the energy necessary for consumption, and in addition, store it or sell the surplus (unused surplus).

On the other hand, the previous modalities of supply with self-consumption, have the fact that they generate energy for self-consumption and are connected to the electrical system in common, while it is possible to generate energy for self-consumption without any connection to the electrical system (isolated installation). However, the latter circumstance is not subject to the rules on self-consumption that we are analysing. The reason for this exclusion may be that the purpose of the regulation on self-consumption in Spain was not from the outset its promotion, as has been the case in the European Union, but to ensure that self-consumption installations connected to the network contribute to financing the costs and services of the electrical system. With the 2018 reform it seems that the aim is to justify that as there is no physical possibility to supply energy into the network (because it is prevented by a physical device installed in the system) this supply modality must be exempt from a series of obligations that apply to

other self-consumption modalities[10].

3. Criteria for selecting good practices

The roadmap (2020-2030-2050) to achieve the de-carbonisation of the economy, presents the key pillars to foster an energy transition starting with the general public.

These pillars are collected in the winter package published by the European Commission "Clean energy for all Europeans" (which we referred to in section 2.1), and are as follows:

1. Prioritise energy efficiency
2. Increase renewable energies
3. Engage consumers in the electricity market

Consequently, the examples of good practices to be selected need to prioritise energy efficiency, increase the production of renewable energy and allow citizens to participate.

3.1. Increase in energy efficiency.

Thus, the action of "prosuming" increases energy efficiency:

1. Regarding the Spanish electricity system. As it helps reduce the losses due to transport and distribution, having a positive impact from several different points of view:

A) Economic:

a) Impact on the wholesale market, as "for every euro of reduction of income in the system due to self-consumption there is a net gain of five euros for consumers due to the annual reduction of the pool price and associated taxes"[11]

b) By covering demand with renewable energy, the purchase of petroleum derivatives is being reduced. Thus, it is estimated that in 2015 the impact of photovoltaic installations "prevented the purchase of 1,422 tonnes of oil equivalent (toe), which represented a

[10] Among others, if the power of the installation does not exceed 100KW, it will be subject exclusively to the corresponding technical regulations (article 9.6) and these facilities will also be exempt from obtaining access and connection permits for generation (second additional provision RDL15/18).

11 Annual report of the Spanish Photovoltaic Union (UNEF) *Global Solar Boom*, 2017, p. 56. Spanish text available at:

https://unef.es/wp-content/uploads/dlm_uploads/2017/07/informe-anual-unef-2017_web.pdf?utm_source=Emailing&utm_medium=Email&utm_campaign=Informe%20anual%20UNEF%202017.

saving of 357.1 million euros"[12].

B) Energy planning and security by reducing dependence on fossil fuel imports. Currently, the Spanish economy depends on 72.9% of imports to cover its energy needs[13].

C) Environment, by reducing losses due to transport and distribution, a total of 3,047 million tons of CO2 emissions and other greenhouse gases[14] (NOx, SO2 etc.) were avoided in 2015.

2. Regarding construction. Directive 2010/31/EU, on energy efficiency in construction, as we saw, introduces the concept of nearly zero-energy buildings. This means that the energy required by these highly energy-efficient buildings should be supplied, to a very large extent, by energy from renewable sources, including energy produced on site or nearby.

3.2 Facilities connected to the network

The upward trend from 2008 to 2017[15] in the installed capacity of renewable energies on an international level, indicates the clear commitment to this "type of fuel" to replace fossil fuels. On a European level, it can be observed through the directives that make up the winter package, which promote a greater participation of renewable energies in the energy *mix* within the design of the single electricity market. This development has come about mainly through the auction method**.**

Even so, the photovoltaic technology of plants of <10kW will actively participate[16]. The winter package encourages consumers to be main actors in the various markets that make up the single electricity market.

For this reason, it is very important to develop regulations that encourage installations connected to the network so that they can contribute to achieving energy objectives.

3.3 Citizen empowerment

The regulations and especially the legal uncertainty that characterise the Spanish market regarding photovoltaic energy mean that we are at a crucial moment to be able to promote this technology, seeing as since 2013, installed power has slowed down and in

12 UNEF Annual Report 2017, p. 19.

13 Spanish National Institute of Statistics (INE). Spain in figures report 2017, p. 38.

14 Photovoltaic solar energy in Spain: Current and potential development, UNEF, July 2017.

15 *Renewable Energy Capacity Statistics* 2018, downloaded from www.irena.org/resource.

16 UNEF Annual Report 2017, p. 23.

2017 it only covered 3.1% of demand in the Spanish peninsular electricity system[17].

Figure 1

Source: REE, preliminary report 2017

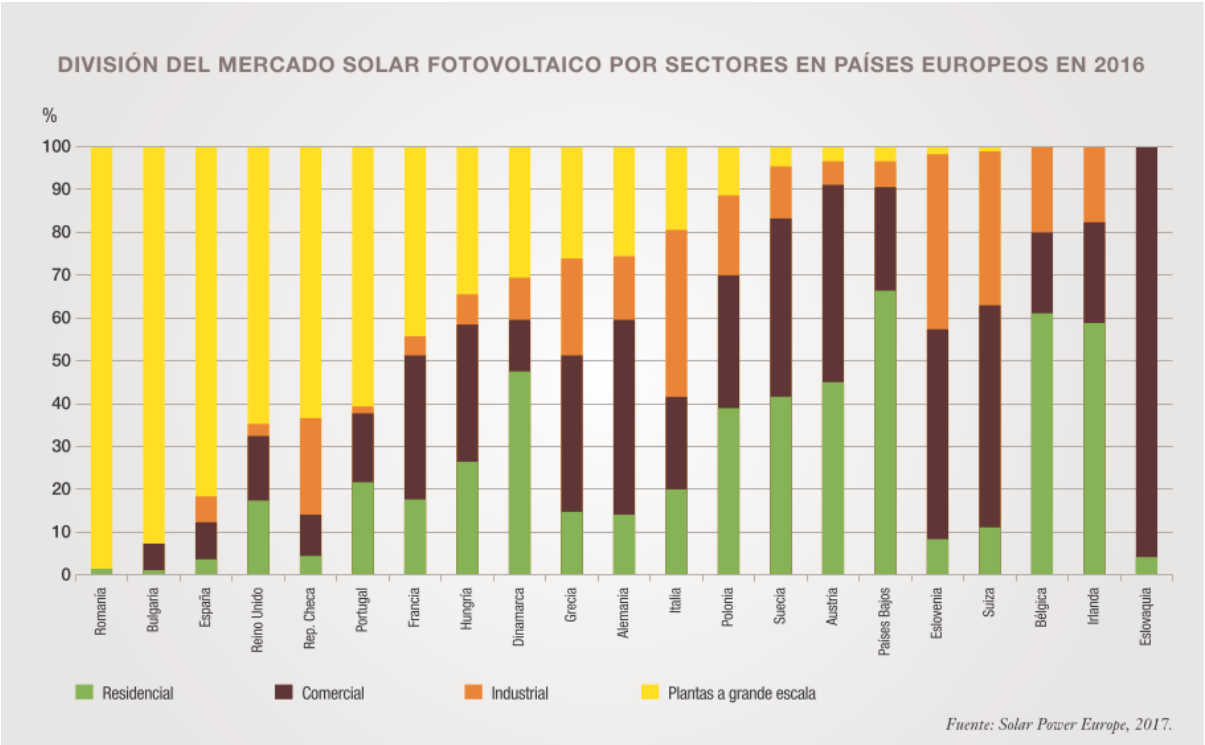
The situation that Spain is experiencing in terms of installed power is shocking mainly due to the privileged position it has from the point of view of the availability of this renewable energy source. In Spain in 2016 there was an installed capacity of 4.7 GW, whereas Germany had 41.11 GW, Italy had 18.98 GW, the United Kingdom had 11.55 GW and France had 7.13 GW[18]

In addition, among the photovoltaic projects that are in operation, it is necessary to differentiate between large-scale projects and distributed generation projects (residential, commercial or industrial). The participation of citizens through distributed generation is uneven depending on the country, as we can see in Figure 2. While 95-100% of photovoltaic projects in countries with low solar availability such as Sweden, Austria, the Netherlands, Slovenia, Switzerland, Belgium, Ireland and Slovenia are operated through distributed generation, in Spain this type of facility represents only 18% of the solar energy market, most of it being operated in large-scale projects (82%).

17 The Spanish electricity system, report by the Spanish Electricity Network (REE), preliminary report 2017, p. 15.

18 UNEF Annual Report 2017, p. 51.

FIGURE 2



Of the three selected criteria, increase in energy efficiency, connection to the network and citizen empowerment, it is the latter that takes on particular importance compared to the others when it comes to selecting the examples of good practices.

Therefore, to verify if it meets the criterion of citizen empowerment, we have taken into account the fulfilment of these four points:

1. Photovoltaic installation.
2. Distributed generation. Location of the installation near the point of consumption.
3. Ownership and management of the installation (public-private-community).
4. Promotion of the local economy.

Independently of the type of photovoltaic project (type 1 or type 2), the energy transition towards a new energy model requires new social and environmental behaviours in order to democratise the electrical system.

4. Examples of good practices.

Currently, the general public is being organised in two specific ways to be active participants in the change of model:

- Citizens organise themselves through renewable energy cooperatives so they can

supply themselves with their own energy.

- Citizens on a personal or organised basis place photovoltaic (PV) installations on the roofs of their buildings or residences.

These forms of organisation are triggering unprecedented participation in European electricity sectors. Below are four experiences of good prosumer practices.

Cities will have a fundamental role in facing the huge challenges posed by sustainability, adapting to climate change and addressing the crisis of the different environmental sinks[19]. Currently, 55% of the global population lives in cities, and it is estimated that this proportion will increase to 68% in 2050[20]. In Spain's case, cities continue to increase in population[21], being areas of high energy intensity, fuelled by a centralised electrical system based on fossil fuels (41.9%) and nuclear energy (21.5%)[22].

Therefore, the examples that are included in the report as good prosumer practices try to contribute to a sustainable city model[23], where energy democracy and justice are a basic pillar in the new configuration and role of cities.

In this new city configuration, buildings, houses, public facilities and commercial and industrial spaces will play a fundamental role, not considering their main use, in contributing to electricity generation and to a large extent meeting the city's energy needs.

Therefore, the properties (public properties, residential sector, shops, etc.) that make up the cities are presented as the keys to being able to coordinate citizen participation. In the case of the residential sector, within the EU-28 Spain is the country with the highest level of people living in flats with 65.9%, while the rest live in terraced or single-family detached houses[24].

Another significant fact that is occurring, mainly due to the 2008 crisis, is the type of property ownership; while Spain has been characterised as one of the main countries in which people own the property they live in, more and more people in Spain live in rented

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19 The word city is understood using its first definition, proposed in 1966 by the European Statistical Confederation, according to which it refers to agglomerations of more than 10,000 inhabitants.

20 http://www.un.org/es/development/desa/news/population/2018-world-urbanization-prospects.html

21 According to data from the Spanish National Institute of Statistics (INE) collected in the Municipal Register on 1 January 2017, in 2016 cities with more than 10,000 inhabitants increased in population by 0.2%, while large cities grew by 0.04%. A large city is understood as being those cities with a high density of population and equipped with infrastructures such as hospitals, airports, etc.

22 See figure 1, in section 3.3.

23 According to the Leipzig Charter, Sustainable European Cities are based on 6 characteristics: 1) Access to basic public resources; 2) Urban renewal actions; 3) Promoting urban gardens; 4) Reducing CO2 emissions (Support energy efficiency, Promote renewable energies, Encourage public transport, walking and cycling and Refurbish homes providing them with energy self-sufficiency and water recycling); 5) Favour fair trade, and 6) Triple formula: reduce, reuse and recycle.

24 Data from the European Statistics Office EUROSTAT, 2017. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php?title=Housing_statistics/en

properties.

The cases to be studied are classed according to the territory where they are being developed, differentiating between national and international cases, under the criteria described in section 3. It is important to highlight that the classification is mainly due to the different regulations and policies for the promotion of photovoltaic projects that have taken place in recent years. There is not yet a common European policy on the promotion of renewable energy given the freedom that each State has to determine its energy sources, which is why its promotion has depended on each State; and in the case of Spain, until now it has been characterised by limiting the development of renewable energies with measures such as the "sun tax" ("impuesto al sol"), which has had a huge international impact[25].

The examples of good practices that we have selected and that we will analyse below are:

a) National examples that reveal experiences of self-consumption and production with self-consumption that are being developed and are successful, under the regulations of Royal Decree 900/2015, of 9 October, as is the case of Impuls Solar Vallés in Catalonia, or shared self-consumption in a community of residents in Barcelona.

b) International cases that reveal other prosumer experiences that could occur in Spain once European legislation in process is incorporated, such as in the case of the *Low Carbon Hub* in the United Kingdom, or the *Neue Heimat* in Germany.

4. 1 Impuls Solar Vallès: local self-consumption.

The project is driven by the green energy consumers cooperative Som Energia SCCL and is aimed at its partners in the geographical area of the Vallès region (Barcelona), with the aim of bringing together a minimum of 100 people to develop the self-consumption project.

The main objective is to group demand for the photovoltaic installations to be able to make a joint purchase of the photovoltaic equipment and its installation. What is intended, through this action, is to obtain a more competitive unit price per installation, it is estimated that it is possible to achieve around a 30% discount on acquisition and installation compared to buying individually.

The total cost of the project is estimated to be between €240,000 and €350,000

25 On 14 June 2018, the European Parliament reached an agreement to recognise the right to self-consumption, as well as the right to generate, store and sell excess electric power. It banned any charge on photovoltaic self-consumption (sun tax) until 2026, at which point some type of charge may be incorporated according to the sustainability criteria of each electrical system. See: https://www.eseficiencia.es/2018/06/18/acuerdo-alcanzado-ue-asegura-marco-regulatorio-estable-autoconsumo.

depending on the final installations to be implemented and the total installed power, but it is estimated that the final price for each member is €1.7/Wp. The financing of the project is the responsibility of each person participating in the project, with the possibility, as stated in the technical specifications, that in case of subsidy from the State, it would be processed through the installer.

What the cooperative wants through this action is for its members to become an active part of the energy transition as citizens. Not only through responsible consumption, but also from the local production of the energy they consume. The promotion of local self-consumption is one of the cooperative's priorities, beyond its main functions of providing green energy to its members.

In recent years, similar practices have been carried out throughout Spain, especially those promoted by Ecooo, which is currently carrying out its second launch of the Oleada Solar action; and that of the Colectivo Solar in the province of Girona. These projects also aim to include people who want to acquire and install photovoltaic panels and become self-consumers of their own energy.

There is a small implementation risk for the project, mainly because the members of the cooperative, who are people with an energy culture and sensitivity to socio-environmental issues, constitute a small target audience, unlike other similar experiences. Another risk is that the participant assumes the entire economic cost, since there is no possibility of financing through the promoter.

The main features of the project are:

- Promotion of the energy transition by citizens, through the promotion of self-consumption.
- Participation in developing the implementation of distributed generation in towns.
- Local development, through promoting the generation of jobs as stated in the social clauses of the installer's contract.
- Reduction of the ecological footprint of the Vallès region.
- Increase in energy efficiency and economic savings, for the reasons described above.

The people participating in the project have a series of advantages to be able to carry out the project:

- Marketing contract signed with Som Energia (backup energy).
- Best purchase price for photovoltaic equipment and its installation.
- Start-up guarantees, as set out in article 1.2 of annex 3: "turnkey" contract for the photovoltaic installation for self-production.

The following disadvantages can be highlighted:

- The people participating in the project do not have the possibility of a community management program to group consumption, which would increase the efficiency and effectiveness of their facilities.
- Limitations on choosing the photovoltaic modules to be installed.
- The surplus production is currently fed into the electricity network for free.

Promoter	Som Energia SCCL
Participant	100 members of Som Energia within the 42 municipalities of the Vallès region (Barcelona)
Objective	• Group purchasing demand to obtain the most competitive unit price per installation (approx. 30% discount) • Improvement in the planning (material purchase, hiring of staff etc.) of the installation company
Prior similar examples	• Ecooo: Solar Surge 1, Solar Surge 2 (Madrid) • Colectivo Solar (Girona)
Service	• Material (photovoltaic modules, inverter and electrical equipment) • Monitoring • Engineering ○ Viability study ○ Self-production installation min. 1.5 kWp and max. 5 kWp ○ Start-up (Turnkey) ○ Preventive maintenance by the installer minimum once a year for the duration of the equipment warranty. • Legalisation (administrative procedures)
Features of service provision	• Local development • Local jobs • Energy sovereignty for citizens • Participation in developing the implementation of distributed generation in towns ○ Increase in energy efficiency in the electricity network (simultaneity factor)

	○ Reduction of the environmental footprint
Advantages	• Marketing contract signed with Som Energia • Best final price of equipment and installation. • Commissioning guarantees (Article 1.2 of Annex 3: "Turnkey" contract for the photovoltaic self-production installation) • Reduce energy losses from the electricity network
Disadvantages	• The people who participate do not have a community management program, which would increase the efficiency and effectiveness of their facilities. • Limitation on final products (photovoltaic modules) • Excess production is fed into the network for free ○ Supported by batteries?
Implementation risks	• The participant assumes all the economic risk since there is no financing from the promoter. • Little visibility of previous experiences • Reduced target audience
Economic cost	Estimated between €240,000 and €350,000 depending on the number of facilities and total installed power. Same final price per Wp for each client (estimated at €1.7)
Financing	• Funded by each member • There is a section in the clauses that in the event that there is a subsidy from the State, it will be processed via the installer

4.2. Community of residents: shared self-consumption.

The aim of the project promoted by the worker cooperative Azimut 360 SCCL is that the buildings' communities of residents participate in the energetic transition.

For this purpose, they propose grouping all the individual household consumptions into a shared system (common elements) with a single meter and producing part of the required energy through the installation of a photovoltaic production system on the roof of the building. The rest of the energy required for covering the community's needs is obtained through a contract signed with a commercial company (backup energy).

The scope of this project is to reduce both the fixed costs through the simultaneity factor[26], and the variable costs by optimising the energy demand, as well as reducing dependence on the electrical system.

The project meets two of the main objectives set by the European Union: decentralise the generation of electricity from renewable sources and increase energy efficiency, bringing production closer to the point of consumption.

The economic cost for developing the project is estimated at around €35,000 and it has been financed in two ways: through private investment by the residents and by participating in the "Germinador Social" tender, organised by Som Energía and Coop 57[27].

There are similar earlier examples that have tried to group all consumption under the same meter. In the absence of a regulatory development that encourages shared self-consumption, the will of the distribution company plays a crucial role in the development of the project. To date there are three similar cases (one of them dismissed by the distribution company Fecsa-Endesa), the one with the greatest media coverage being the project developed by marketer HolaLuz in the city of Rubí (Barcelona).

As we have just mentioned, the distribution company where the project is to be carried out may put its implementation at risk through administrative and technical obstacles to discourage the project's development. Other risks may be associated with its management such as with the public administration at the time of registering the installation (RD 900/2015), as well as for technical reasons: location of the building, space for the installation, insulation of the roof, etc.

The main features of the project are:

- Increase in energy efficiency and economic savings through the ICT-based energy management system: optimising demand, improving consumers' final information and detecting specific needs.
- Participation in the development of the implementation of distributed generation systems in cities.
- Active participation in the entire value chain in the energy supply.
- Responsible consumer, thanks to more and better information, which empowers them when deciding to apply energy efficiency programmes to the building to reduce the final consumption.

The project of shared self-consumption presents a series of advantages to take into

26 Simultaneity factor**:** the ratio of the maximum power provided by an electrical installation, to the sum of the power ratings of all the receivers that are connected to it.

27 The "Germinador Social" tender is "a tender to stimulate the creation of innovative social models with the aim of promoting new local agents for the energy transition" See: www.germinadorsocial.com.

account when developing an energy transition starting with the general public:

- Contribution to compliance with the international agreements that Spain has with regard to energy and the fight against climate change.
- Fight against energy poverty, since all its residents can make collective use of energy.
- Increases energy efficiency, for two reasons:
  - Production is based on renewable energies near the point of consumption, which reduces transport losses.
  - Promotion of better consumption habits.
- Increase economic savings, because:
  - The costs of exporting raw materials to produce electricity in centralised thermal and nuclear power plants are reduced.
  - By decreasing the final aggregate demand in the wholesale market (pool), the final price of matched energy decreases[28].
  - The end consumer reduces the amount to be paid to their distributor.

But some drawbacks also arise, mainly due to the fact that it is a new production and management model that has never been done before. Therefore, the following can be highlighted:

- Lack of experience in community management of the people who participate in the project.
- Measures to be taken to prevent ghost residents[29].
- Impediments that may arise with the participants when formalising a contract with a distributor, only for backup energy.

Promoter	Azimut 360 SCCL
Participant	Community of residents
Objective	Decentralise the generation of electricity from renewable sources and bring it closer to the points of consumption. Such that it contributes to the democratisation of the energetic model and improves the efficiency

28 See www.omel.es.

29 A ghost resident is understood as a resident who consumes energy but does not meet the economic expenses associated with its supply, therefore, an economic debt is generated with the other participants of the project.

	of the electrical system.
Prior similar examples	There are two examples that have tried to unify all consumption under a single meter, both have been in different situations. One was successful in the distribution area of a small distributor (Estabanell) and another that cannot be developed due to the impediments of the distributor Fecsa-Endesa.
Services	• Completion of a legal study • Completion of technical report • Obtaining BIE • Purchase and installation of electric power production equipment • Purchase and installation of consumer support equipment (equipment for local unit measurements[30], community meter, wiring, etc.) • Management of distribution procedures (withdrawal of individual meters, registering of community meter, etc.) • Management of individual consumption balance (local unit consumption information.
Features of service provision	• Improve savings and energy efficiency ○ Incorporating ICT (local unit) ▪ Demand management ▪ Improve final consumer information • Detection of specific needs for energy saving and efficiency measures • Citizen empowerment ○ Active participation in the entire energy value chain ○ Make decisions to implement energy saving and efficiency programmes in the community of residents • Participation in the development of the implementation of distributed generation in cities ○ Increase in energy efficiency in the electricity network (simultaneity factor) ○ Reduction of the environmental footprint

30 The local unit is the various dwellings that make up the community of residents.

Advantages	• Contribution to compliance with international agreements on energy and the fight against climate change • Fight against energy poverty • Greater economic efficiency: ○ Reduces costs to the electrical system ○ When the demand on the market decreases, the final price of the matched energy in the pool decreases ○ Reduces the final bill of each local unit • Greater energy efficiency: ○ Reduce energy losses due to transport ○ Production based on renewable energies ○ Citizen Empowerment: energy education ○ Capacity to implement efficiency measures: consumption habits
Disadvantages	• Lack of experience in community management ○ Decision-making for implementing measures • Ghost residents • Signing a (backup) supply contract with a distributor
Implementation risks	• Administrative ○ Registration of the installation • Impediments due to the area's distributor ○ technical reasons ○ administrative reasons • Technical: roof insulation, space for installation, etc.
Economic cost	The total cost of implementation of the project is estimated at €35,000
Financing	Various ways: Germinador Social + private investment

4. 3 Low Carbon Hub: energy communities.

This is a social enterprise[31] that promotes citizen participation in the United Kingdom's energy system in the county of Oxfordshire. Its purpose is to replicate energy projects to de-carbonise the county, so they develop both energy production projects based on renewable energy as well as energy efficiency projects to reduce final consumption.

Currently, a total of 38 facilities have been developed, mostly solar facilities, but also some mini hydraulic facilities. These facilities produce a total of 4.2 GWh/year and it is estimated that they could supply a total of 1351 homes, which would avoid approximately 1562 tons of CO2/year, if they had to be supplied with fossil sources.

The main beneficiaries of the actions carried out by the *Low Carbon Hub* are the socio-economic agents of the Oxfordshire community, since the main objective pursued by the social enterprise is to empower schools, companies or communities of residents, etc. in terms of energy; for this, it develops self-consumption projects, based mainly on solar energy.

Throughout the UK there are examples similar to the one described, such as those of *Green Energy Nayland and Greater Manchester Community Renewables*, all aimed at promoting an energy transition among the public to achieve a low carbon society.

The projects developed by the *Low Carbon Hub* have no cost for the members that need to undertake a project. They submit the requirements to the *Low Carbon Hub*, which studies their technical and economic viability and seeks private financing through green bonds[32]. The *Low Carbon Hub* ultimately plays the role of service mediator.

The other main characteristic of the projects developed by the social enterprise is that all the projects are hosted under the *Feed in Tariff*[33] scheme, which allows the project to obtain income to return the quotas agreed to the investors, in addition to dealing with the other fixed expenses associated with the project's development. For this reason, the

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31 The European Commission Communication "Social Business Initiative", of 25 October 2011 (COM (2011) 682), defines the social enterprise as "an operator in the social economy whose main objective is to have a social impact rather than make a profit for their owners or shareholders. It produces goods and services for the market in an innovative and entrepreneurial way and uses its profits primarily to achieve social objectives. It is managed in an open and responsible manner and, in particular, involves employees, consumers and stakeholders affected by its commercial activities".

32 The *Low Carbon Hub* seeks funds through green bonds. This method of financing is becoming increasingly popular since the European Investment Bank (EIB) issued this type of bonds for the first time in 2007 for investors aware of the environmental challenges, in order to comply with the Kyoto Protocol. Only those that are issued that aim to finance projects relating to alternative energy, environmental efficiency, clean transport, waste management and adaptation to climate change can be considered green bonds.

33 *Feed in Tariff* (FIT): this is a regulatory instrument for the development of non-conventional renewable energies, which establishes a minimum tariff (price per unit of energy supplied to the grid). This system is mainly described because the electrical system in which it is installed must allow the installation access to the electrical network and must purchase the supplied energy.

technical evaluation of the project is very important: insulation in the roof, space for the installation with the necessary power, etc., since this may pose a risk for the project's implementation.

This project presents a large number of advantages, such as:

- It generates awareness of the collective struggle against climate change through the members' awareness actions.
- Promotion of measures to fight against energy poverty.
- Citizen participation in the energy transition to achieve a low-carbon society.
- It develops economic activity in the county through the promotion of the local economy through the required services.
- Energy efficiency programs in schools and buildings through the net profits generated by the facilities.

Source: lowcarbonhub.org

Promoter	Low Carbon Hub (social enterprise).
Participant	Socioeconomic agents of the Community in the county of Oxfordshire.
Objective	Develop renewable energy prosumer project in Oxfordshire. In schools as well as companies or communities of residents.
Prior similar examples	Green Energy Nayland.
Services	They offer practical support to groups that wish to develop renewable energy installations or energy saving projects. These services range from financial,

	engineering, operation, maintenance, management, consulting, etc.
Features of service provision	Its main feature is to mediate services: school, business, community and innovation.
Advantages	• Collective action to combat climate change. • Measures against energy poverty. • Greater economic and energy efficiency in Oxfordshire. • Local development (community relations, local economy, etc). • Increase the number of facilities owned by the Oxfordshire community. • Citizen participation: democratisation of the electrical system.
Disadvantages	• With respect to Spain: Feed in tariff.
Implementation risks	• Technical: roof insulation, space for installation, technological gap, network restrictions, etc.
Economic cost	No cost for members.
Financing	Private Investment (Green Bonds).

4. 4. Neue Heimat: Self-consumption in buildings

At the end of 2013, the Heidelberg Energy Cooperative together with the *Familienheim* Housing Cooperative in Heidelberg, planned the development, along with other members (*Grüner Strom and Naturstrom),* of the self-consumption project for the tenants[34] of seven apartments located in Nubloch, called "New Home".

It was the first project in Germany under the concept of direct consumption (self-consumption) carried out by a housing energy cooperative. This project was possible thanks to the Tenant's Electricity Law, which allows tenants to participate through local self-consumption of renewable energy, at a fair price, in the citizen's energy transition, this being the main objective of the project.

Tenant's electricity (*Mieterstrom*), also known as district electricity, is intended to decentralise electricity production. The model is based on the interaction between owners, tenants and electricity providers. The owner produces electricity from renewable sources located on the roof of the house or building and sells it directly to his tenants through an

34 In this case, the tenants are the cooperative members who participated in the construction project of the houses.

electricity supplier (distributor). The local sale has advantages for both parties: the owner's investments become more profitable, while the electricity costs for the tenants are reduced, since the price of this is more economical than market electricity prices, by eliminating the costs for use of the network and the so-called concession tax.

Although this was the first case in Germany of a cooperative project (energy-housing), subsequently other projects have been developed by both cooperative companies and by capitalist companies in various cities: Munich, Wolfen, Frankfurt, etc.

The property of the building belongs to the *Familienheim* Heidelberg Housing Cooperative, which cedes the use of the roof to the Heidelberg Energy Cooperative. The latter owns the facilities and operates them, with the capacity to supply more than 100 homes. The main purpose of the management is to supply as much solar energy as possible on-site (self-consumption). Therefore, priority is given to supplying tenants before feeding it into the network. The energy that cannot be supplied by the photovoltaic installation is bought from the network (residual energy), through distributor *Bürgerwerke*, the energy that it supplies being 100% from renewable sources.

The total cost of the project amounted to €525,000, which was financed through cooperative *crowdfunding* launched by the Heidelberg Energy Cooperative. The investors were on one side, and the tenants on the other, the investors lending the capital directly to the cooperative with its repayment plan. The cooperative offered the 116 tenants the chance to be part of it by investing in the photovoltaic installations. This proposal consisted of a package of €1000, of which: €800 in the form of a loan and €200 in the form of shares in the cooperative, the nominal value of each being €100. The loans have a repayment term of 20 years with an interest rate of 3%, so that, at the end of the 20 year period, the tenant would have a return of around €1,400.

The main characteristics of the project are:

- Supply is 100% of renewable origin, either due to the direct use of the energy produced on the roof, as well as the backup energy.
- Good conditions for participation in the project.
- Fair final electricity price, below the market price.
- Option to participate as a member of the Heidelberg Energy Cooperative.

The drawback of the model is that the tenant can only supply electricity to the distributor who buys the energy from the owner, you cannot choose another distributor.

As an advantage, it should be noted that the contract is for 20 years, which allows the tenant to cover any increase in the final market price. Another advantage to be stated is that this model encourages participation in the energy transition because it distributes the benefits among owners, tenants and distributors.

Source: *Heidelberger Energiegenossenschaft*

Promoter	Heidelberg Energy Cooperative.
Participant	Tenants of the block of flats.
Objective	Encourage the prosumer subject through tenant cooperatives.
Prior similar examples	This was the first case in Germany, in 2013, of a cooperative project under the direct consumption modality. It took place in the town of Nussloch, and subsequently other projects have been developed, both cooperative and private, under the tenant's electricity law (Mieterstrom), in various cities: Munich, Wolfen, Frankfurt, Heidenberg, etc.
Service	• Technological: home automation, photovoltaic installations, etc. • Real estate: rental services. • Energy: participation in the electricity market.
Features of service provision	• Supply 100% renewable origin. • Supply of backup energy through Bürgerwerke distributor (100% production from renewable sources). • Fair conditions and prices. • Option to be a member of the cooperative (Heidelberg Energy

	Cooperative). • Active participation in the energy transition: it is being organised to make Heidelberg a climate neutral city by 2050.
Advantages	• Contract for 20 years. • Coverage facing increases in the price of electricity. • Measures against energy poverty. • Greater economic and energy efficiency. • Increase in citizen participation in the transition.
Disadvantages	With respect to Spain: Tenant electricity law.
Implementation risks	Legal: Lack of a clear regulatory framework to be able to give legal guarantees to the activity.
Economic cost	The cost of the total investment amounted to €525,000.
Financing	Carried out through cooperative *crowdfunding*. The investors were on one side, and the tenants on the other. Thus, while the investors lend the money directly to the cooperative, the cooperative offered the opportunity to the 116 tenants to invest in the photovoltaic installations and become shareholders of the Heidelberger Energy Cooperative. The tenants were offered a package of €1000 consisting of a loan of €800 and two shares with a nominal value of €100 each. The loans are repaid in 20 years with an interest of three percent. At the end of the 20 year period, the tenant will have around €1400.

5. Adaptation to the context of the autonomous region

Within the framework of the distribution of powers between the State and the Valencian Community, the State has exclusive authority in terms of the authorisation of electrical installations when its use affects several communities or the transport of energy leaves its territorial scope (article 149. 1. 22 EC 1978) and in order to regulate the basis of the energy regime (article 149.25 EC 1978). For its part, the Valencian Generalitat has exclusive authority relating to production, distribution and energy transport facilities, provided that this transport does not leave its territory and its use does not affect another Autonomous Community (article 49.1.16 EA (Statute of Autonomy) 1982), and the authority to develop legislation in terms of the basic state regulations on energy matters, as well as for their execution (article 50.5 EA).

As a result of the authority assumed, the State approved Law 24/2013 that contains

basic regulation regarding the Electricity Sector and the regulations on production, distribution and electric power transportation facilities. This law constitutes basic legislation, except for the rules on administrative procedures, (second final provision, Law 24/2013). Let's remember that article 9 of this Law regulates the self-consumption of electrical energy. In turn, Royal Decree 900/2015 that develops the previous art. 9 and establishes the regulation of the administrative, technical and economic conditions of the electric supply modalities with self-consumption, is also considered a basic rule in energy matters (sixth final provision RD 990/2015).

Apart from the regulation of energy self-consumption, the regulation of energy production facilities that will also apply to self-consumption facilities is mainly contained in Royal Decree 1955/2000, of 1 December[35]; Royal Decree 413/2014, of 6 June[36], and Royal Decree 1699/2011, of 18 November[37]; all of them that are declared basic regulations (1st, 1st and 5th final dispositions respectively).

Consequently, the Valencian Generalitat has mainly regulated the administrative procedures authorising the electric power production facilities that are within its authority[38], and has issued certain promotion rules related to the self-consumption of energy, as we will see shortly[39].

5.1 Decentralised and local model

In order to assess the possibilities offered by the city of Valencia for the development of self-consumption, it is necessary to take into account certain information regarding the type of building, the tenancy regime of buildings, and other aspects such as their

[35] Royal Decree regulating the activities of transport, distribution, marketing, supply and authorisation procedures for electricity installations.

[36] Royal Decree regulating the activity of electrical energy production from renewable energy sources, cogeneration and waste.

[37] Royal Decree regulating the connection to the network of small electric power production facilities.

[38] Among others, the Order of 11 July 1995, of the Ministry of Industry and Commerce, which establishes the recognition and registration procedure in the special regime of electrical production facilities; Decree 177/2005, of 18 November, of the Consell (Council) of the Valencian Generalitat, which regulates the administrative procedure applicable to certain photovoltaic solar energy installations; Decree 88/2005, of 29 April, which establishes the authorisation procedures for electricity production, transport and distribution facilities that fall under the authority of the Generalitat; or the Resolution of 22 October 2010, of the Directorate-General for Energy, which establishes a standardised responsible declaration on the administrative procedures in which it is mandatory to submit technical projects and/or certifications written and signed by a competent qualified technician and lacking an endorsement from the corresponding professional body.

[39] Such as Law 13/1997, of 23 December of the Generalitat, which regulates the autonomous section of Personal Income Tax (IRPF) and other transferred taxes, or Order 5/2017, of 20 February, of the Regional Ministry of Sustainable Economy, Productive Sectors, Commerce and Employment, which establishes the regulatory bases for granting aid from the Valencian Institute of Business Competitiveness (IVACE), within the framework of the Compensation and Promotion funds linked to the wind farm Plan of the Valencian Community.

habitability and intended uses.

5.1.1 Buildings

Currently the production of energy in the Spanish electricity system operates as a centralised model, based mainly on power plants (nuclear, combined cycle, hydraulic, etc.) located far from the consumption points. One of the premises for achieving a new energy model as promoted by the European directives is to decentralise production, bringing the points of production closer to those of consumption.

Thus, the decentralised model occurs because cities participate by producing the electricity they consume. Buildings are one of the main elements of the geography of cities.

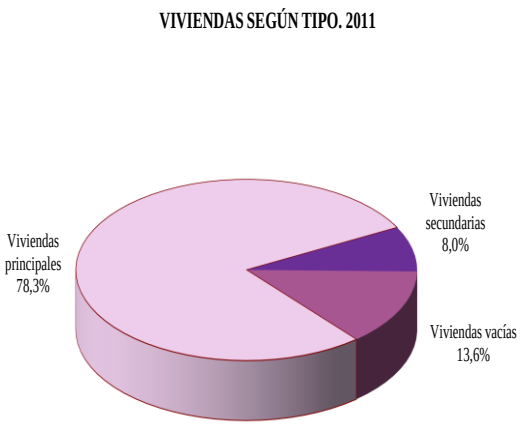
As we already explained in section 4, Spain is the EU-28 country with the most people living in flats. According to several studies carried out by the Spanish National Institute of Statistics (INE) such as the *Analysis of the features of residential buildings in Spain* (2001), published in 2013, and *Spain in figures,* 2018, on the state level 67% of housing is multi-family, while in the Valencian Community this percentage increases to 73%. If we focus only on municipalities with more than 50,000 inhabitants, the values are very similar for both cases at around 84% (this gives us an insight to the great potential for the development of shared self-consumption in Spain).

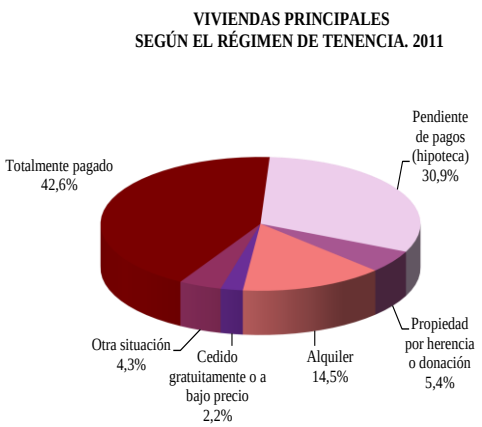
The most common building model in the city of Valencia is that of buildings divided into flats, which usually entails the individual ownership of each dwelling and the co-ownership of the common areas. Any installation that exceeds the limits of a private home must have the approval of the community of residents.

As we saw in section 2.2.3, Spanish legislation expressly contemplates the installation of common and individual systems for the use of renewable energies and the necessary infrastructures to access new collective energy supplies in blocks of flats. It also establishes that any owner can request its installation, the approval of one third of the members of the represented community being enough, with one third of the participation quotas in turn. The community will not be able to pass on the costs of installing or adapting the infrastructure, nor those derived from its preservation or subsequent maintenance, to the owners who did not expressly vote in favour of the installation, but if they later request access to energy supplies and this requires using the new infrastructures or adaptations made, they may be authorised provided that they pay the amount that they would have had to pay, duly updated, applying the corresponding legal interest.

5.1.2 Tenancy regime

Another important fact to note, as was put forward in section 4, was that, mostly due to the 2008 crisis, the number of people living in rented properties had increased. Thus, only 58% of the real estate stock is used as the owner's main dwelling, which has reduced significantly compared to the data from the INE's 2001 census, which was 67% (this constitutes a barrier to self-consumption).





Focusing on the city of Valencia and according to data published by the City Council regarding the population and housing census of 2011[40], 78% of the city's dwellings are occupied as the owner's main dwelling and 21% of them are rented, granted for use on a concessionary basis or other (they are not owned).

In the case of rented homes, the owner can carry out improvement works that cannot be deferred until the conclusion of the lease and the tenant must bear with them, provided that the requirements set forth in art. 22 of the Urban Housing Law 29/1994 (LAU) are met.

The tenant, on the other hand, cannot perform any work that modifies the configuration of the dwelling or its accessories without the written consent of the landlord. Notwithstanding the power to terminate the contract, the landlord who has not authorised the completion of the works may demand, at the end of the contract, that the tenant restore the property to its previous state, or may keep the modification without the tenant being able to claim compensation (article 23 LAU).

40.http://www.valencia.es/ayuntamiento/catalogo.nsf/IndiceAnuario?readForm&lang=1&capitulo=4&tema=5&bdOrigen=ayuntamiento/estadistica.nsf&idApoyo=58FB3C7A3D56E414C1257DD40057EB6C

In the communities of owners who are considering the installation of a photovoltaic power generation system, it is the owners who must make the decision with the majorities stated above, but it may be the case that the owner has no interest in paying for this installation but the tenant does. In these cases, the landlord and tenant could agree on how to participate in the project, who pays for it and the recovery of all or part of the costs at the end of the tenancy.

Given that more and more people are living in rented property, it would be interesting to be able to rely on a system such as the one proposed by the German tenant's electricity law, discussed above, which benefits both the landlord and the tenant.

5. 2 Models for the city of Valencia

In view of the characteristics of the city of Valencia and the regulations applicable to self-consumption of renewable energy, as a guide, we have suggested five self-consumption models for Valencia. However, we would like to highlight that other variations are possible that combine what we believe to be essential elements to consider.

Therefore, before presenting the proposed models, we will comment on the elements that are decisive for designing other self-consumption options. These elements are: the location of the installation in relation to the consumer's dwelling; the type of housing; the individual or collective self-consumption of energy from the generating facility; ownership of the generating facility and self-consumption with or without surpluses, i.e. according to whether or not the generated energy can be fed into the main network.

5.2.1. Determining elements for configuring the different self-consumption models.

1st Location of the installation in relation to the dwelling. The power generation installation has to be close to the point of consumption, which means that it does not necessarily have to be connected to the internal network of the associated consumer or consumers, but can be linked to the home by a direct line, or connected to the low voltage network derived from the same processing plant. Therefore, conditions on the roof of the building where the consumer is located (shading, gradient or orientation) do not in themselves determine the feasibility of installing a photovoltaic energy generation system, it is necessary to see what other (public or private) roofs or areas in the vicinity could offer better conditions. The possibility of locating the installation is the first and main requirement for carrying out the project. Other elements that we will see below will depend on this.

2nd Type of housing and individual or collective consumption.

A second important element to consider is whether the consumption of the energy of

photovoltaic origin will be individual or collective. If it is a single-family dwelling, consumption will be individual, unless that dwelling is incorporated into a network of other dwellings that share generation and metering facilities. If the dwelling is part of a block of flats, each dwelling may have its own generation system, there may be a generation system only for consumption by the building's common elements, or there may be a generation system that serves the common elements and all or several of the dwellings located in the building. The legislation in force has not only removed the prohibition established by RD 900/2015 on connecting a generator to the internal network of several consumers (article 4.3), it also expressly provides for self-consumption as an individual action by a person, either physical or legal, or by several consumers (article 9.1 LSE).

If the consumption is collective, the various consumers act as a group, without needing to adopt legal personality. However they should regulate the following as best suits their interests: the manner in which they deal with the costs of the installation and its maintenance, the decision making and appointing someone to represent the interests of the group. If the generation installation has been promoted by the community of owners, it will be included as a common element of the building (article 396 of the Civil Code) even if it does not benefit all the co-owners. Once its installation has been approved by the community of residents, only those who voted in favour or joined the agreement later have the right to make decisions about it.

3rd The photovoltaic energy-generating installation may be the property of the consumer or of third parties.

This possibility, which is expressly considered in the proposed European directives, can be presumed in the legislation in force in Spain after the removal of the rule that required the owner of the supply point and the owner of the generating installation connected to its network to be the same (art. 5.1 c RD 900/2015).

This new framework opens up several possibilities, but all of them must have in common that, although the facilities may not be owned by the consumer, the generated energy must be fully or partially supplied to them. The installation, owned by the third party, can be managed by the consumer him/herself (individual or group), through a lease (with or without purchase option), on the basis of a concession or any other; but it can also be managed by its owner or by a third person, with whom the consumer(s) contract(s) the supply of energy, and where appropriate, the leasing or transfer of the roof. It is also necessary to draft agreements that compensate the cost of the supply with the cost of transferring the roof.

4th Self-consumption with or without surpluses.

This final element is the one with the greatest legal significance, because the new Royal Legislative Decree 15/2018 adds to it the requirements to be met for installing a self-consumption system, as well as the rights and obligations of the self-consumer. Previously, the criterion that determined the applicable legal framework was the

classification of the installation as one of energy production or otherwise.

After the 2018 reform, the Law of the Electricity Sector differentiates between self-consumption supply modalities with or without surpluses, depending on whether or not a physical device has been installed that prevents the feeding of surplus energy into the transport or distribution network. (article 9.1). However, by partially repealing Decree 900/2015, for the time being it has left in force the distinction that was made between self-consumption modality type 1 and type 2, depending on whether the installation is registered or not in the administrative register of production facilities (art. 4).

By combining both regulations and notwithstanding the modifications to RD 900/2015 that may be introduced through the regulation pending approval, it is necessary to make a comparison between self-consumption modality type 1 and self-consumption without surpluses, because in both cases, the installation is not classed as producing and the self-consumer is considered exclusively as a consumer. On the other hand, we can also compare self-consumption modality type 2 with self-consumption with surpluses, because in both cases the installation is classed as production (even if it does not supply energy to the network) and the self-consumer is considered a consumer and producer.

5.2.2. Self-consumption models:

The five models of self-consumption of renewable energy that we propose could be developed in the city of Valencia immediately or in the near future as soon as the recently approved regulations are established. To facilitate the specification of the necessary procedures for their establishment as well as the rights and duties of their holders and existing promotion measures, we will group the five models into two categories based on whether they are type 1 models (without surpluses), or type 2 models (with surpluses).

MODELS type 1 or without surpluses.

MODEL A (individual consumption, in situ)

Individual consumer (natural or legal person) that has one (or several) electric power generation facilities in their internal network, intended for their own consumption, that has a physical device installed that prevents energy surpluses from being fed into the transport or distribution network (main network).

A.1. Single-family or commercial premises, which has a generation installation in its internal network.

A.2 Block of flats that has a power generation installation to service the common elements of the building (lift light, electronic door entry, etc.).

In these cases, even if the consumer produces energy, it will be understood that there is only one party and they will be considered a consumer. In case A.2, there is only one

energy supply point for these common elements, so even if its owner is a community of residents, which has no legal personality, we can also consider it as an individual consumer[41].

MODEL B (Collective consumption, in situ)

These are consumers who have an associated form of one or several electric power generation installations for the consumption of their respective homes or premises and which have physical devices that prevent the power from being pumped into the main network. It may be collective self-consumption, with a single point of supply to the system and, where appropriate, several connection points to the internal network of each consumer. This model is permitted but lacks the necessary legal development that allows it to be applied at this time. It differs from the previous model (A.2) in that the service provided by the generation installation goes beyond the common elements of the building. It is not about serving only those common elements (lift, hallway, staircase, etc.), but also the individual dwellings of the co-owners, and this action surpasses the powers attributed by law to the community of residents. Therefore, and because the community of owners lacks legal personality, we include this circumstance as one of collective self-consumption.

B. 1. Block of flats whose owners share ownership of the supply point (group of residents), being able to share ownership of the power generation installations or not.

B. 2. Commercial installation comprising several premises, grouping several consumers who share, as in the previous case, ownership of the supply point (group of merchants), being able to share ownership of the power generation installations or not.

MODEL C (collective consumption, nearby)

Consumers who, on a partnership basis, have one or more electricity generation installations connected through a direct line, intended for consumption by all of them, with a physical device that prevents energy being fed into the main network. It may be collective self-consumption, with a single point of supply to the system and several connection points to the internal network of each consumer.

The installation connected through a direct line enables the lack of space or other conditions on the roof of the consumers' buildings to be addressed, by using installations

[41] The community of owners does not have legal personality but the law recognises that it has certain powers. It has the capacity to be part of a civil judicial process (article 6.5 Law of Civil Procedure); it can enter contracts through its president (article 13.3 Horizontal Property Law), and it can hold bank accounts. But it cannot hold deposit accounts or other investment instruments, nor can it own any property. As it lacks legal personality, the community of owners does not hold the right of ownership of the common property, which belongs to the various owners on a co-ownership basis (article 396 Civil Code), nor could it acquire a parking space for the community, or be awarded the flat of a delinquent partner at public auction.

located in nearby places with better conditions. It would therefore be a "nearby production facility". Although the concept of "nearby facilities" will be legally regulated, it will include, among others: those linked to the internal network of connected consumers through direct lines or connected to the low voltage network derived from the same processing plant (article 9.2).

COMMON CHARACTERISTICS

These type 1 or without surplus models are more basic, characterised by producing photovoltaic energy for consumption in their own network or nearby, and without the possibility of feeding into the general network, since they will have a physical device installed that prevents this. The consumer that generates the energy will be considered exclusively a consumer.

On the other hand, there are no limits regarding the power contracted by this consumer or installed generator power, nor is it necessary for the consumer to be the owner of the generation facilities connected to their network.

Self-consumed energy from renewable sources will be exempt from any type of charge or toll, and the energy deficits that the self-consumers acquire through the transport or distribution network will be subject to the same treatment as those of the rest of the consumers.

The measurement configurations that are applicable to self-consumption installations will be defined in terms of regulations by the Government, but they must contain the measurement equipment strictly necessary for the correct invoicing of prices, tariffs, charges or tolls that are applicable.

Lastly, accumulation elements may be installed in the self-consumption installations when there are protections established in the applicable safety and industrial quality regulations, and when they are installed in such a way that they share measurement equipment that records the net generation, or measurement equipment that records the hourly energy consumed.

MODELS type 2 or with surpluses.

<u>MODEL D (Individual consumption, in situ, own installation)</u>

Consumer of electrical energy at a single point of supply, which is connected to one or several production installations connected inside its network.

This may be the case with an industrial or commercial establishment with a wide enough roof to supply its consumption needs and to feed the surplus energy into the

electricity grid.

MODEL E (Individual or collective consumption, in situ, installation belonging to third party)

Consumers who (individually or on a partnership basis) use energy from one or more electric power production installations, located in its internal network or nearby and owned by a third party.

In these cases, we believe that the owner of the installations may be one or several companies whose economic activity consists of the production and sale of photovoltaic energy. It must be taken into account that the obligation for all production installations under the type 2 self-consumption modality to be owned by the same person has been removed. The production installation or installations may be located on the roof of the individual or aggregate consumer (school, shopping centre, etc.) or nearby.

COMMON CHARACTERISTICS

Self-consumption carried out with installations that do not have physical devices installed to prevent surplus energy being fed into the general network is considered supply with surpluses, and in these cases the consumer is also considered a producer, and is therefore subject to the rights and obligations established for both roles in the Law of the Electricity Sector and its development regulations.

The surpluses from generation installations associated with self-consumption will be subject to the same treatment as energy produced by other production installations; notwithstanding the fact that simplified compensation mechanisms can be developed between the deficits of self-consumers and the surpluses of their associated production installations, which in any case will be limited to outputs of less than 100kW.

The owners of the production installations will be considered consumers due to the consumption of their auxiliary generation services, and must sign an access contract with the distribution company for the provision of these auxiliary production services, directly or through the marketing company, or modify the existing one, in accordance with the applicable regulations to reflect this circumstance. Notwithstanding the above, the parties may formalise a joint access contract for the auxiliary production services and for the associated consumption, if they meet the requirements established in RD 900/2015 (article 8.2).

The time spent in the chosen self-consumption modality will be at least one year from the date of registration or modification of the access contract or contracts, which will be automatically renewable.

5.3. Procedure for implementing a self-consumption installation.

The commissioning of an electric power production facility must, pursuant to the Law of the Electricity Sector (Article 21 et seq.), be authorised and subsequently registered in the Administrative Registry of electricity production facilities (RAIPEE) of the Spanish Ministry of Industry, Energy and Tourism. But being associated with self-consumption, this facility must also comply with other administrative and technical conditions established in RD 900/2015.

However, as an exception, self-consumption facilities without surpluses (type 1) of up to 100kW, will be subject exclusively to the corresponding technical regulations. In particular to the provisions of the Electrical Low Voltage Regulations (article 9.6 LSE). In all other cases, the following requirements must be taken into account:

5.3.1. Authorisations for implementing a production installation for self-consumption.

As we saw at the beginning of section 5, authorisation to set up a production facility is the exclusive responsibility of the Valencian Generalitat, unless its use affects several communities or involves transporting energy out of its territorial scope, in which case the State will be responsible for authorisation. The state regime of administrative authorisation of production installations is contained in art. 53 LSE and its development regulations; while the autonomous regime is contained in Decree 88/2005, of 29 April. These standards require the following authorisations for the commissioning of a new production installation:

a) Prior administrative authorisation, which will be processed with the preliminary design of the installation. The authorisation of generation installations cannot be granted if its owner has not previously obtained the permits for access and connection to the corresponding transport or distribution networks;

b) Authorisation for constructing the installation;

c) Authorisation to operate, which allows the installations to be started up and operated once the project has been executed (article 12 D. 88/2005).

5.3.2. Permits for accessing and connecting to the corresponding transport or distribution networks.

As we have seen, to obtain prior administrative authorisation it is necessary to have obtained the permits for access and connection to the corresponding transport or distribution networks (Article 53.1 to LSE).

Art. 7 of RD 900/2015 regulates the connection and access procedure in the self-consumption modalities. However, following the 2018 reform, the first and second paragraphs of this provision are no longer applicable to type 1 or type 2 with power generation equal to or less than 15kW (sole repealing provision, 1. C RD-law 15/2018); therefore it can be interpreted that:

- type 2 consumers with power generation greater than 15 kW must request a new connection to the distribution company in the area or, where appropriate, the carrier or modify the existing one. The connection and access procedure that will apply to them is that established in RD 1699/2011[42], for the installations included in its scope of application prescribed in art. 2[43], and in the other cases, the procedure provided for in RD 1955/2000 (arts. 52 to 69).

- type 1 and type 2 consumers (with power equal to or less than 15 kW) do not need to request a new connection.

5.3.3. Access contracts for the self-consumption modality.

With the 2018 reform, it is no longer necessary to sign an access contract with the distribution company or modify the existing one, in any self-consumption modality. This does not exclude that the owner of a type 2 production facility must sign an access contract with the distribution company to have auxiliary production services or modify the existing one (article 8 RD 900/2015).

5.3.4 Administrative Registry of electricity production facilities (RAIPEE).

The regulation of the Register of electricity production facilities is contained in Royal Decree 1955/2000 of 1 December[44]. According to art. 168, all electricity production facilities that have been authorised in Spain must be registered in this registry.

However, self-consumption facilities must only be registered if they are "with surpluses" (type 2) and their associated power does not exceed 100kW (article 9.2 LSE).

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[42] This regulation governs the access and connection of the installations to the distribution network (arts. 4 to 9); the technical conditions with which the installatins must comply (articles 10 to 17) and the measurement and billing procedure (article 18).

[43] RD 1699/2011 is applicable to solar energy installations with a capacity no greater than 100 kW (and others provided for in categories b) and c) of article 2 of Royal Decree 661/2007), when they are connected to power lines of less than 1 kV from the distribution company, either directly or through the internal network of a consumer, or when connected to the side of a transformer of an internal network, at a voltage lower than 1 KV, of a consumer connected to the distribution network and provided that the installed power generation connected to the internal network does not exceed 100 kW.

[44] Royal Decree regulating the activities of transport, distribution, marketing, supply and authorisation procedures for electricity installations.

5.3.5. Administrative Register of self-consumption of electrical energy.

Finally, all consumers under any form of self-consumption should register in the Administrative Register of self-consumption of electrical energy for the sole purpose of control. This registry, regulated in RD 900/2015 (arts. 19 to 23) consisted of two sections, the first recorded type 1 consumers whose contracted power was less than or equal to 10kW, and the second, type 1 self-consumers whose contracted power exceeded 10 kW and type 2 self-consumers. But after the 2018 reform these rules have been repealed.

From now on, only type 2 consumers with installed power generation equal to or greater than 100 kW should register in the territorial self-consumption registries that are created by the autonomous communities (Article 9.4 LSE).

5.4. Measures to promote self-consumption in the city of Valencia.

5.4.1.- Deductions in Personal Income Tax (IRPF).

In relation to the type 1 or without surpluses self-consumption modalities, Law 13/1997 of 23 December, which regulates the regional portion of IRPF, establishes in art. 4 One, letter o, a deduction of 20% of the amounts invested in electricity self-consumption installations or for the use of certain renewable energy sources in the usual residence, as well as for the participation fee in investments in collective facilities where the usual residence is located.

The actions subject to deduction must be carried out by installer companies that meet the requirements established in the regulations.

The basis of the deduction will be constituted by the amounts actually paid in the year by the taxpayer, with the exception of interest, the maximum annual base of the deduction per dwelling and year not being able to exceed 8000 euros.

In the case of housing complexes under the horizontal property regime in which these installations are carried out on a shared basis, this deduction may be applied by each of the owners individually according to the corresponding participation coefficient.

The application of this deduction requires the prior recognition of the Autonomous Administration, for which purpose the Valencian Institute of Business Competitiveness (IVACE) will issue the corresponding accreditation certificate. The Resolution of 25 April 2018, of the General Director of the IVACE establishes the requirements and procedures for obtaining the accrediting certification.

5.3.2.- Subsidised financing for electricity self-consumption projects in companies and entities.

The last call for these grants was by the Resolution of 3 May 2018 for the promotion of electricity self-consumption facilities, and the regulatory bases of its concession is contained in Order 5/2017, of 20 February.

These grants are aimed at the type 2 self-consumption modalities because self-consumption facilities equipped with or that have systems that prevent the instantaneous supplying of energy to the electricity grid are not considered eligible for financing. Neither are the facilities consisting exclusively of energy management and storage systems, or self-consumption facilities with energy storage that do not have intelligent load/unload management equipment for energy/economic optimization considered eligible for financing.

The entity requesting the aid must be the owner of the self-consumption facility if they are not the same as the owner of the supply point.

The reimbursable aid consists of the granting of a subsidised loan in terms of its interest rate on the eligible costs of the associated projects. The maximum amount of the loan is 500,000 euros; the maximum percentage eligible for financing is 100% of the investment; the interest rate is 0%, without study or opening fees and with a maximum repayment period of the 10-year loan. It will be necessary to guarantee 50% of the amount of the loan granted.

5.3.3.- Other tax incentives through municipal taxes.

Some municipalities apply tax incentives to the self-consumption of renewable energies through property tax, and in the construction, installations and works tax. This is the case in the municipalities of Castellón, Elche or Valencia[45].

a) Property Tax (IBI). All three municipalities apply a deduction of 50% on the taxable base of the tax for 3 years (in Castellón it can be up to 10 years according to the value of the property), on the condition that the use of the property is predominantly residential (Elche and Valencia) and that the minimum installed power is greater than 5 KW/100m2.

b) Buildings, facilities and works tax (ICIO). This tax is paid only once when a licence is requested for the work. The three aforementioned municipalities apply a discount percentage on the tax base of 95% and in the case of Elche and Valencia the discount is conditional depending on the percentage of demand covered by solar energy (25-30%).

[45] According to the Report of the Foundation for Renewable Energies "Comparative analysis of tax incentives for self-consumption in the main Spanish cities", Madrid, June 2018. Spanish text available at: https://fundacionrenovables.org/wp-content/uploads/2018/07/ANALISIS-COMPARATIVO-BONIFICACIONES-FISCALES-AL-AUTOCONSUMO.pdf

6. Barriers and opportunities that exist for prosumers.

The latest reform of the Law of the Electricity Sector has removed significant barriers that limited the self-consumption of photovoltaic energy in Spain as we have seen, but there are still limitations that must be overcome in order for the prosumer to have the rights that the proposed and approved European directives give them, such as:

a) The right to be able to sell surplus energy without being considered a producer;

b) The right to consume as a group, because in spite of having removed the legal prohibition that existed in this regard, its regulatory development is still pending; or

c) The recognition and regulation of local energy communities, which can play an essential role in solving energy problems in remote and isolated areas, but can also contribute to improving living conditions and the social and economic development of both rural communities and urban districts.

On the other hand, there are important opportunities for promoting self-consumption of renewable and photovoltaic energy in Valencia.

We have seen how the regulations that govern the communities of owners in Spain already include and favour the installation of private and common systems for the use of renewable energies. We have also seen how proposed regulations in Spain and the European Union are geared towards encouraging energy decentralisation and giving the consumer a more active role in the energy market. In particular, the European directives also contain important measures for the promotion of individual and group self-consumption, and of energy communities, to be implemented by the European institutions and by the States.

Focusing on Valencia, weather conditions for taking advantage of solar energy are excellent, and the type of buildings also allows the generation of energy in facilities located in the consumer's network or nearby. We have seen how there are aids to promote energy facilities both with and without surpluses, and there is an institution within the Generalitat Valenciana, the IVACE, that aims to promote renewable energy sources as well as establishing, managing and processing aid schemes and incentives aimed at this, and contributes to broadcasting and informing interested parties about self-consumption, mainly through its website (w.autoconsumoaldetalle.es).