



POCITYF

Building & Grid Retrofit Regulatory Framework

D1.3: Building & Grid Retrofit Regulatory Framework
WP1, T1.2

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Executive Summary

In order to bring the plans developed within POCITYF to reality, the regulatory framework is essential. Regulatory barriers may prevent projects from being implemented, or affect the business case for the project so strongly, that the project developer loses interest in the project. Therefore, involving the regulatory framework from the beginning is necessary. This Deliverable elaborates the regulatory framework applicable to the projects in the POCITYF Lighthouse Cities, Alkmaar and Evora. It also covers to some extent the legal situation of the Fellow Cities to the POCITYF project.

This deliverable aims to clarify the international and EU law, related to the creation of positive energy districts, and applicable to the lighthouse and fellow cities. Further, it also covers the national and even city-specific law applicable to the Lighthouse Cities. This analysis feeds into Work Packages 6 and 7 for the respective lighthouse cities. Moreover, it is also useful for the FCs, to provide examples of what works and what holds back projects.

More generally, the connection between this Deliverable and other Work Packages is that this Deliverable highlights the regulatory barriers that might affect the implementation of the POCITYF project solutions in Évora (WP6), Alkmaar (WP7) and the replication by the fellow cities (WP8). By providing a comprehensive overview of the restrictions and potential problems, the project partners can anticipate on possible regulatory issues in the implementation of their plans. Moreover, where specific rules hold back innovative projects, this information can be used for policy recommendations to national and even EU legislative and regulatory authorities.

The Deliverable starts by clarifying the projects applicable to the cities, planned within the POCITYF project. Afterwards, it analyses three layers of the legal framework: international law, EU law, and national/local laws for Alkmaar and Évora (energy, construction and heritage law, as well as, the applicable local obligations). Furthermore, the legal situation and barriers of the fellow cities is analysed following the same guidelines established for the light house cities (energy, construction and heritage law and local obligations) as much as possible. On the subject of relevant international law rules, international environment law, international cultural heritage law and human rights law, are taken into account due to their connection with the POCITYF project solutions. On the subject of the relevant EU law (EU energy law; data protection law; and public procurement and state aid law), it establishes the basis for the national laws, therefore its principles must be analysed showcasing how they shape national regimes. On the different national legal framework the elements that are holding back innovation and those which stimulate it are considered in this deliverable, allowing for the regulatory solutions from one country to be introduced in another.

The preliminary takeaways of this analysis show that monumental buildings and protected city areas are safeguarded by the national regulatory framework which aims to conserve them, while holding back in making buildings more energy efficient to a certain degree. By imposing a high standard for renovations, these frameworks call for creativity and innovation to meet the energy efficiency targets, while fitting energy solutions with the historic features of buildings. Further, the findings suggest that some innovations (such as peer-to-peer trading and vehicle-to-grid services), envisaged in the POCITYF project, are just not yet fully covered in national legislation. The rapid pace of changes in the energy sector implies that this, and other regulatory elements holding back innovation, may change in the near future. Therefore, this deliverable will be updated in 2022 showing those changes.



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1. Introduction

POCITYF focuses on positive energy buildings and districts within various cities in the EU. Various innovative plans have been developed, for example with regard to peer-to-peer energy trading and smart storage. A common challenge within the various POCITYF cities and districts is how to involve cultural heritage buildings in the energy transition. This is one of the focus points of POCITYF.

1.1. Scope, objectives and expected impact

In order to bring the plans developed within POCITYF to reality, the regulatory framework is essential: projects can only go ahead when they fit within the regulatory framework. Often, whereas projects are technically possible, there are regulatory issues that prevent projects from being implemented, or that affect the business case for the project so strongly, that the project developer loses interest in the project. Therefore, it is important to involve the regulatory framework from the beginning.

This Deliverable aims to identify the legal/regulatory framework applicable to the different plans developed in POCITYF. Although these plans will have to be elaborated further, this preliminary assessment will serve to identify possible problems that may arise. In order to find which Acts and Regulations might be applicable, it is important to have a preliminary understanding of the projects that are planned within POCITYF.

In Alkmaar, four pillars can be discerned. First, for the pillar ‘**positive energy buildings**’, buildings will be equipped with state-of-the-art insulation, solar PV installations, heat pumps and home batteries. The second pillar entails **flexible and sustainable district heating/cooling with innovative heat storage solutions**. Within this pillar, the installation of a city energy management system, based on powermatcher technology, the installation of stationary battery systems for energy storage, a virtual power plant which combines the supply and demand patterns of the different solutions, usage of DC grid technology and wind turbines which produce hydrogen are developed. The third pillar focuses on **e-mobility integration into smart grid**. Under this heading, the following projects are envisaged: smart solar charging stations, using the batteries from EVs in the virtual power plant, smart control of electric buses and the usage of public lamp posts based on DC network technology. Finally, the fourth pillar, **citizen-driven co-creation**, aims at community engagement and at replication of the demo solutions.

In Évora four pillars can also be identified. First, regarding “**positive energy buildings & districts**” the city will use its solar potential investing in PV technologies with buildings also reusing the batteries from electric vehicles as residential batteries. Within this pillar Evora will benefit from its smart grid employing a smart distribution management system, fostering grid flexibility and allowing for energy flows between buildings. The second pillar is “**P2P energy storage and management**” this pillar is based on allowing peer-to-peer energy trading and introducing innovative storage solutions. Within this pillar the other objective in Évora is to introduce flexible, innovative and sustainable district heating/cooling as using the freezing storages in stores. The third pillar of the POCITYF project is to increase the “**E-mobility integration in the smart grid**”, this consists in increasing penetration e-vehicles in the city by using the existing vehicles better and incentivising the use of electric vehicles. Benefiting from existing vehicles the POCITYF project aims at introducing vehicle to grid electricity flows (increasing the flexibility of the electric system) and introduction solar powered charging stations. To incentivise e-mobility, Évora will be introducing an E-vehicle sharing service in the city center and increasing the availability of charging points. The last pillar is that of “**Citizen Driven co-creation**”. Under this heading the POCITYF project is expected to generate a social engagement between citizens and the remaining solutions, incentivizing them to participate in this energy transition and participate in the P2P



trading platform. To achieve this objective the platform to be used to interact with energy users will be gamified, simplifying the exchange of information and increasing users' comfort.

It is clear that the projects planned within POCITYF span a wide range of topics. Therefore, this Deliverable gives a broad overview of all laws that may be applicable. For every national legal framework, the Deliverable follows the same structure of energy law (including the rules on innovative energy solutions and electric vehicles), construction law, cultural heritage law and local rules and regulations. As soon as the plans for the different cities are more elaborated, a more detailed regulatory review can be given in the updated version of this Deliverable, due in 2022.

1.2. Relation to other POCITYF activities

This Deliverable highlights the regulatory barriers that might affect the implementation of the POCITYF project solutions in Évora (WP6), Alkmaar (WP7) and the replication by the fellow cities (WP8). By providing a comprehensive overview of the restrictions and potential problems, the project partners can anticipate on possible regulatory issues in the implementation of their plans.

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This Deliverable is a first step, it will be adjusted according to findings about the regulatory framework in the course of the project. This leads to a second deliverable in March 2022, which includes the recommendations for the improvement of the legal framework for cultural heritage buildings and districts based on partner and stakeholder interaction on the findings of the pilot projects in the context of POCITYF. The relation with Task 1.1, which collected data in the relevant stakeholders, will also be improved in the 2020 version, using the outcomes of that task to assess the national legal and regulatory frameworks.

1.3. Structure of the deliverable

This Deliverable elaborates the regulatory framework applicable to the projects in the POCITYF Lighthouse Cities, Alkmaar and Evora. The regulatory framework consists of three layers: international law, addressed in chapter 2 of this Deliverable, EU law, addressed in chapter 3 of this Deliverable, and national/local laws, addressed in respectively chapter 4 and 5 for Alkmaar and Evora (discussing the applicable national energy, construction and heritage law, as well as, the applicable local obligations). The first two layers, international and EU law, are also applicable to the Following Cities (FCs) in POCITYF. The third layer, with country or even region-specific law, is only applicable to the Lighthouse Cities. However, this layer is still useful for the FCs as well, to provide an example of what works and what holds back projects. This may help project participants in the FCs to advise on how their regulatory framework could be changed in order to stimulate the creation of positive energy districts (PEDs). The Directive also includes a preliminary investigation of regulatory barriers in the FCs, provided by the POCITYF partners in the FCs, in chapter 6. Finally, in chapter 7, preliminary take-aways for the regulatory framework are provided.



2. International Law

International law forms the basis for the regulatory framework of the two other layers, EU and national/local law. Three important strands of the international legal framework relevant for POCITYF are international environmental law, preservation of cultural heritage law and human rights law. They represent three questions:

Why?

Why do cities and buildings need to be transformed into positive energy districts and neighbourhoods? Or more generally, why do societies need to change their energy consumption and production? This is because the vast majority of states agreed in the Paris Agreement that they would commit themselves to limit harmful climate change, which means, more concretely, that the emission of CO₂ and other greenhouse gases needs to be limited. Moreover, creating Positive Energy Districts also fits very well with the sustainable development goals that are adopted by the UN, namely to strive for clean and affordable energy for all.

How?

When it comes to decreasing the energy consumption of buildings, there are many ways that could be followed, depending on the local climate and the technical and societal characteristics of the building. Within POCITYF, special attention is given to cultural heritage buildings and districts. For these buildings, it is important that the historic/heritage characteristics are taken into account in energy efficiency measures as well.

For whom?

This project is not only about the energy-renovation of buildings but also about the people living or working inside the buildings involved in the project - the people for whom the projects have the largest effect. They should benefit from the measures taken inside the POCITYF project. Energy costs represent a significant cost for households, especially for low-income households. If the costs of energy can be brought down by making Positive Energy Districts, this can reduce energy poverty in these districts.

Finally, as a general remark on the international law framework, it must be noted that international law consists mainly of broad norms, that often still need implementation in the national legal framework before they can take effect. However, these broad norms of international law can still have a very important effect in stimulating national policy-makers to adopt national laws in a certain direction.

2.1. International Environmental Law

International Environmental Law encompasses several different topics related to the relation between humans and their environment, both on a local scale (e.g. pollution of the local environment, use of local resources) and on a global scale (e.g. climate change and the implications thereof). In this section, first, the Paris Agreement will be discussed, as it entails commitments for the states that ratified it with regard to limiting their CO₂ emissions. Then, sustainable development and specifically the sustainable development goals (SDGs) will be discussed. Finally, attention will be paid to protection of the ozone layer, as the refrigerants used in many innovative energy solutions have a negative impact on the ozone layer and should thus be handled carefully.



2.1.1. Paris Agreement

Over the past decades, the sense of urgency to limit the effects of climate change has increased significantly. This led to the conclusion of the Paris Agreement in 2015.¹ In the Paris Agreement, states have committed themselves to limit climate change to well below 2 degrees Celsius. Moreover, they have committed to increasing the ability to cope with the consequences of climate change, such as heat, prolonged periods of dry weather, floods and storms. For both the mitigation of climate change to well below 2 degrees and the adaptation to changing climate conditions, there is an important role for the built environment.

The Paris Agreement is signed and ratified by all EU states and by the EU itself. Thus, all POCITYF partner countries are bound by the measures in the Paris Agreement. Whereas the Paris Agreement does not include norms that are directly applicable to the POCITYF project, the obligations states have on the basis of the Paris Agreement should serve as a basis for further action on EU and national level, which includes the adoption of norms for the integration of renewable energy in the electricity system and the improvement of the energy performance of buildings, as well as making buildings more resilient to the consequences of climate change, such as extremely warm summers (increasing the need for cooling). Thus, indirectly, the Paris Agreement is at the basis of many measures that are taken in the context of the POCITYF project.

2.1.2. Sustainable Development

Sustainable development, and sustainability in general, are currently often-used terms. The concept became widely known after publication of the Brundtland report (*Our Common Future*) in 1987.² In this report, sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Since, the concept has been elaborated further, for example through the introduction of the triple bottom line (the three P’s): people, planet, profit (later replaced by ‘prosperity’),³ which should be in balance in order to achieve sustainable development.

In 2015, the UN adopted the 2030 Agenda for Sustainable Development. One part of this was the adoption of 14 ‘Sustainable Development Goals’ (SDGs). These goals aim to bring sustainable development on many different themes, in all countries. Two SDGs are specifically relevant for the POCITYF project. SDG 7 entails the right to clean, affordable and modern energy for all, and SDG 11 aims at sustainable cities and communities, which means that they should be inclusive, safe, resilient and sustainable. The SDGs are elaborated in sub-goals, such as access to electricity and the total share of renewables in the final energy consumption (for SDG 7), and access to public transport and air quality goals (for SDG 11). The plans envisaged within POCITYF will contribute to attainment of these goals in the participating cities.

2.1.3. Protection of the Ozone Layer

Another relevant but very specific subject of international climate law concerns the instruments to protect the ozone layer. This legislation is relevant as it concerns refrigerants, an indispensable part of heat pumps and climate systems for buildings. Some refrigerants used in heat pumps and climate systems have a strong negative effect on the ozone layer, which means that they should be handled carefully. As various POCITYF demo projects have innovative heating systems, refrigerants may have to be used.

¹ Paris Agreement, concluded in Paris on 12 December 2015, available at https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf.

² World Commission on Environment and Development: *Our Common Future* (the Brundtland report), available at <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>.

³ Introduced in 1994 by J. Elkington,



In international law, the use of substances that have a harmful effect on the ozone layer have been regulated since the 1980s. The Vienna Convention for the Protection of the Ozone Layer, concluded in 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol),⁴ concluded in 1987, set rules on which refrigerants may be used and under which conditions they may be used, with the aim to protect the ozone layer and to limit the use of substances that deplete it. The Montreal Protocol has been updated several times to include new types of refrigerants. The rules on refrigerants for heat pumps and climate systems are taken over into EU law,⁵ and should thus automatically also apply to the POCITYF project.

2.2. International Cultural Heritage Law

One important aspect of POCITYF is the attention paid to cultural heritage buildings and the inclusion of such buildings in positive energy districts. For cultural heritage buildings, the interests of conserving the specific characteristics of the building and the interests of the energy transition are not always in line and need to be carefully weighed against each other. In international law, the Granada Convention provides for the protection of architectural heritage on the European continent. Moreover, there are various institutions created by international law that have a specific role in the conservation of cultural or architectural heritage buildings and that may also be useful for POCITYF.

2.2.1. Granada Convention on Architectural Heritage

The Granada Convention on Architectural Heritage,⁶ adopted by the Council of Europe, is relevant for those projects within POCITYF that aim to renovate cultural or architectural heritage buildings. An important insight from the drafting procedure of this Convention is that the value of heritage buildings lies in their being used, which makes the heritage accessible to people and which protects buildings against decay.

Within POCITYF, the cultural heritage districts and buildings are in fact already being used for various functions - either as public buildings, as office buildings or as buildings with a residential function. POCITYF does not aim to change the function of the buildings, but rather the energetic performance of the buildings. Nevertheless, the Convention does provide for some rules that are also still relevant for POCITYF.

Provisions from the Granada Convention that are relevant for POCITYF are:

- That Parties to the Convention take measures to protect architectural heritage, and to include supervision and authorisation procedures (art. 3 and 4)
- That they provide financial support for maintaining and restoring of architectural heritage buildings (art. 6)
- That they undertake measures to promote the general environment in the surroundings of monuments, within groups of monuments and sites (art. 7)
- That they adopt integrated conservation policies which
 - o include the protection of the architectural heritage as an essential town and country planning objective and ensure that this requirement is taken into account

⁴ Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985, U.N.T.S. I-26164 ; Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol), Montreal, 1987, U.N.T.S. I-26369.

⁵ European Commission, Report from the Commission on barriers posed by codes, standards and legislation to using climate-friendly technologies in the refrigeration, air conditioning, heat pumps and foam sectors, COM/2016/0749 final, available at:

<https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52016DC0749>.

⁶<https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016800ca436>



- at all stages both in the drawing up of development plans and in the procedures for authorising work;
- promote programmes for the restoration and maintenance of the architectural heritage;
- make the conservation, promotion and enhancement of the architectural heritage a major feature of cultural, environmental and planning policies;
- facilitate whenever possible in the town and country planning process the conservation and use of certain buildings whose intrinsic importance would not warrant protection within the meaning of Article 3, paragraph 1, of this Convention but which are of interest from the point of view of their setting in the urban or rural environment and the quality of life;
- foster, as being essential to the future of the architectural heritage, the application and development of traditional skills and materials (art. 10)
- That they undertake to foster the use of protected properties in the light of the needs of contemporary life and the adaptation of old buildings for new uses (art. 11)
- That they undertake to foster effective cooperation at all levels between conservation, cultural, environmental and planning activities (art. 13)
- That they establish appropriate machinery for the supply of information, consultation and cooperation between the authorities, cultural institutions and associations and the public (art. 14)
- That they develop public awareness of the value of conserving the architectural heritage (art. 15)
- That they coordinate their conservation policies on a European level, by means of information exchange on amongst others “the ways in which they need to protect the architectural heritage can best be reconciled with the needs of contemporary economic, social and cultural activities” (art. 17) and that they undertake to afford mutual technical assistance in the form of exchanges of experience and of experts in the conservation of architectural heritage (art. 18).

It must be noted that these provisions are very general in nature. All depends on the implementation of the measures by national and regional authorities in the countries. For all countries involved in POCITYF, the Granada Convention has entered into force, either through ratification of the treaty or through accession at a later stage or succession of another country that originally signed the treaty.⁷ This entails that these countries are bound to the Convention and, since the Convention entered into force in 1992 for most countries, that they should have implemented these rules in their national laws and/or policies by now.

2.2.2. International Institutions and Knowledge-Sharing

Next to the protection of cultural heritage on the European continent, there are also various institutions on an international level which can be helpful in sharing knowledge on how cultural heritage buildings can be adapted to become more sustainable. In that regard, two institutions that are founded by international law are noteworthy.

First, UNESCO (the United Nations Educational, Scientific and Cultural Organisation) seeks to build peace through international cooperation in education, sciences and culture (including cultural heritage). UNESCO has a role in protecting world heritage, and it also has a programme on the development of ‘sustainable cities’,⁸ which may be useful for POCITYF for gaining knowledge from

⁷ www.coe.int provides a database of Conventions and legal acts by countries with regards to these conventions.

⁸ <https://en.unesco.org/unesco-for-sustainable-cities>.



other sustainable cities or for sharing the knowledge gained in POCITYF for the benefit of other cities with sustainable ambitions.

Secondly, ICOMOS (the International Council on Monuments and Sites), founded in 1965, is a relevant organisation. It is an associate partner of UNESCO and its aim is cultural heritage conservation of both tangible and intangible heritage, including monuments and groups of buildings.⁹ The Council provides for knowledge-sharing through various working groups and fora. One of the themes is cultural heritage and sustainable development, and within that theme, there is specific attention to sustainable development in urban areas.¹⁰ Here, again, the relevance for POCITYF lies in the exchange of knowledge and best practices, with POCITYF cities profiting from the knowledge from other cities and bringing the knowledge gained in the POCITYF project to the benefit of other cities.

2.3. Human Rights Law

As mentioned before, POCITYF is not only about making an energetic change to buildings, but also to deliver the benefits of the energy transition to the people living or working inside the buildings that lie within the scope of POCITYF. Therefore, several aspects from human rights law are also highlighted in this regulatory overview. First, the concept of ‘energy poverty’ is elaborated. Then, the right to adequate housing, as laid down in different instruments, is explained.

2.3.1. Energy Poverty

Although the primary goal of POCITYF is to create positive energy districts/buildings, a secondary goal is to reduce the costs of energy for the citizens of the participating cities. As energy costs rise,¹¹ also due to taxation, citizens spend an increasing amount of their income on energy costs, which makes it difficult to pay other costs. This phenomenon is part of the problem of ‘energy poverty’. By improvements in the isolation of residential buildings, and by installing solar panels on these buildings, energy costs can be reduced, although this requires an initial investment that is unavailable to many people. Moreover, for citizens living in rental houses or apartments, there is an extra difficulty: the tenant is not allowed to make structural changes to the building, and thus cannot initiate large scale isolation or installation of renewable energy, whereas the owner of the building is not responsible for the monthly energy usage. This means that the benefits of investment in isolation and renewable energy generation (reduction of monthly energy costs) do not lie with the person who bears the costs (the owner of the building). For POCITYF pilot projects including rental houses, this issue needs to be addressed as well. On a broader level, the issue can be solved by introducing requirements in national legislation for rental houses.

2.3.2. Right to Adequate Housing

The right to adequate housing is adopted in various instruments of international law.¹² The right to adequate housing entails first of all “four walls and a roof above your head”, but it can also be interpreted in a broader manner.¹³ Relevant to POCITYF is that it also includes the availability of

⁹ https://www.icomos.org/images/DOCUMENTS/Statutes/2018.02.02_Statutes_EN_FR.pdf.

¹⁰ <https://www.icomos.org/en/focus/un-sustainable-development-goals>.

¹¹ Eurostat published data on energy prices for households including and excluding taxes. The latest figures are available at:

https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_price_statistics and https://ec.europa.eu/eurostat/statistics-explained/index.php/Natural_gas_price_statistics.

¹² Office of the United Nations High Commissioner for Human Rights, Fact Sheet 21: Right to Adequate Housing, available at: https://www.ohchr.org/documents/publications/fs21_rev_1_housing_en.pdf, p. 11.

¹³ Ibid., p. 3-4.



resources (including electricity)¹⁴ and protection against the cold and the heat. Another aspect is the affordability of housing,¹⁵ which also includes the costs associated with housing such as the energy bill. Thus, where in the POCITYF project residential buildings are significantly improved, for example by adding isolation and by making the cost of living lower, by reducing the energy bill, this will contribute to the right to adequate housing.

¹⁴ Ibid., p. 8.

¹⁵ Ibid., p. 3.



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3. Regulatory Framework under EU law

Considering the large impact that EU law has on many different areas in our society, it can hardly be surprising that there are several areas of EU law that are particularly relevant in the POCITYF project. In that context, four areas of EU law will be treated specifically in this chapter. These areas are energy law, data protection law, and public procurement and state aid law.

Regarding the inclusion of EU energy law in this chapter, the energy sector is an economic sector largely influenced by the EU. The energy sectors of the Netherlands and Portugal are also to a large extent influenced by EU law, through the implementation of various EU Directives and application of various EU Regulations - these Directives and Regulations will be treated below. Therefore, in section 3.1, the different roles created by EU energy law, and the way they are shifting with the energy transition, are elaborated upon. For the context of POCITYF, these are transmission, distribution, generation, consumption and the newly introduced function of ‘aggregation’.¹⁶ Then, the specific rules on smart metering and billing, on demand side management, on the energy efficiency of buildings, and on charging stations for electric vehicles are explained. It must be noted, however, that the rules set in the Directive need to be implemented on national law level. Therefore, it is important to see the EU-based rules in conjunction with the rules elaborated in sections 4.2 and 5.2 on Alkmaar’s and Evora’s regulatory framework.

Although most rules relevant for POCITYF are concentrated in EU energy law, the importance of EU data protection law for the project should not be underestimated. This is because energy management systems, as envisaged to be used within POCITYF, need household energy consumption and production data. These data are personal data, protected by EU data protection law. Therefore, it is important that data collection and use happens according to the standards set by the General Data Protection Regulation. In section 3.2, the rules on data protection law are elaborated upon.

Finally, as part of the buildings in POCITYF are publicly owned buildings, public procurement law is applicable. Moreover, state aid law is applicable where private entities receive benefits from the state, for example through subsidies, grants with favourable conditions or other benefits that they would not otherwise have received. In order to keep a level playing field in the internal market in the interaction between public bodies and private entities, the EU has introduced public procurement law and state aid law. The (national) rules on public procurement and state aid law are fully based on EU law, which is why in section 3.3, public procurement law and state aid law and their applicability to POCITYF are touched upon.

¹⁶ Aggregation entails combining the consumption or production patterns (and the flexibility therein) of several smaller consumers/producers in order to create a larger market share. Officially, aggregation is defined as “a function performed by a natural or legal person who combines multiple customer loads or generated electricity for sale, purchase or auction in any electricity market.” Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ L-158/125, art. 2(18).



3.1. EU Energy Law

The energy sector has been regulated by EU law for over three decades already, with regular revisions.¹⁷ It started with one Directive and one Regulation for the electricity sector, and similarly for the gas sector, introduced in the 1990s.¹⁸ Since, the legislation has been expanded with rules on energy efficiency in buildings specifically and more generally in any product, renewable energy and alternative fuels. The ‘Clean Energy Package’ is the latest legislative revision of EU law on the electricity market, cross-border flows, energy efficiency and renewable energy. It has been adopted and entered into force, but not all provisions are already incorporated in national law.

The main principle of EU energy law, namely the introduction of competition and thus free choice of consumers and producers, requires the separation of networks from commercial activities such as generation and supply (“unbundling”) and non-discriminatory access to the networks. These basic principles are maintained, but in order to allow for new developments such as active consumers or “prosumers”, renewable energy communities and flexibility, new provisions have been introduced. In this section, the different roles in the energy sector that are relevant for POCITYF are elaborated. Then, various topics that are applicable to specific POCITYF plans are elaborated: the rules applicable to smart metering and billing, flexibility mechanisms such as demand side management, energy efficiency in buildings and charging stations for electric vehicles.

3.1.1. Different Roles in the Energy Sector

In EU energy law, there is a strict separation of ‘regulated’ parts of the sector, and commercial parts of the sector. This is because an important principle introduced in EU energy law in 1996 is the separation of network operation from commercial activities such as the generation and supply of electricity. This separation was introduced in order to improve the internal market in energy, as previously, the entire production chain (generation, transmission, distribution, supply to consumers) was in the hands of vertically integrated companies.¹⁹ This separation, called unbundling, was developed further over the years until its current form,²⁰ which means that networks can only be operated by ‘transmission system operators’ (TSOs) and ‘distribution system operators’ (DSOs).

Ownership of TSOs and DSOs are restricted based on the Directive on the Internal Market for Electricity,²¹ and on how the Member States implemented this Directive. The exact rules will not be treated here, as it lies beyond the scope of POCITYF, but it is important to make clear that there is a separation of tasks related to the operation of the electricity and gas networks and commercial activities.

¹⁷ See H. Vedder, A. Ronne, M. Roggenkamp, I. del Guayo, ‘EU Energy Law’ in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition.

¹⁸ Ibid.

¹⁹ The European Commission dedicated a working paper to the barriers to the internal energy market, which included an analysis of the effects of vertically integrated companies: European Commission, ‘*The Internal Energy Market*’ COM (88) 238 Final. It identified several obstacles to achieving an internal market in electricity, p. 70 and further.

²⁰ For the history and development of the concept ‘unbundling’ in EU energy law, see T.M. Dralle, ‘The Unbundling and Unbundling-Related Measures in the EU Energy Sector’ *European Yearbook of International Economic Law* [2018 5], p. 21.

²¹ The most recent rules are to be found in Directive 2019/944, art. 35 (DSOs) and art. 43-46 (TSOs). For a general overview of the current unbundling rules, see H. Vedder, A. Ronne, M. Roggenkamp, I. del Guayo, ‘EU Energy Law’ in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 269 and further.



The roles and tasks of TSOs and DSOs are described in the Directive. As POCITYF will mainly address local networks in cities/districts, most connections will be at DSO level rather than at TSO level. Therefore, we will focus on the tasks of DSOs rather than TSOs. For DSOs, the tasks as described in the directive are “ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency.”²² Moreover, while fulfilling this task, they need to provide information to the users of their system.²³ Interestingly, while DSOs are required to give priority to renewable energy when dispatching energy in their network, they should also act as neutral market facilitator when procuring energy losses.²⁴

Importantly, the balancing of the electricity grid (maintaining the frequency within the prescribed range around 50 Hz) is a task of the TSO, not of the DSO.²⁵ However, it is prescribed that the TSOs fulfil this task in coordination with neighbouring TSOs and with the DSOs connected to their network.²⁶

Another relevant provision for POCITYF, as it introduces energy storage as an important flexibility instrument, is that DSOs (and TSOs alike) are not allowed to own and operate energy storage facilities, except under very specific conditions.²⁷ In principle, the ownership and operation of storage facilities should be left to market entities, and exceptions should only be granted (by the NRA) when the storage facility is a fully integrated network component and when a transparent tendering procedure for the storage facility did not lead to any market parties who could deliver the necessary amount of storage capacity.²⁸

Finally, another important role in the energy sector is the role of National Regulatory Authority (NRA). As TSOs and DSOs are regulated entities, an entity needs to be established to regulate them, i.e. to check whether they act according to fair conditions for access, to set fair tariffs and whether they are not influenced by any market activities. NRAs are developed by EU law. Already by 1996, national regulatory authorities were established to settle disputes over contracts and negotiations in the newly liberalised energy market.²⁹ They gradually obtained more powers with the 2003 and 2009 Directives.³⁰ In 2000, the regulatory authorities of 10 countries voluntarily founded the Council of European Energy Regulators (CEER), to cooperate and address cross-border issues.³¹ In addition to CEER, an official EU Agency on the Cooperation of Energy Regulators (ACER) was established in 2009.³² Although there are no cross-border issues in the POCITYF project, these agencies, CEER and ACER, are still relevant for POCITYF, as they can assist in the knowledge exchange between NRAs on topics such as smart energy systems, peer to peer trading etc. In the Netherlands, the task of NRA is fulfilled by the *Autoriteit Consument en Markt* (ACM). In Portugal, this task is fulfilled by *Entidade Reguladora dos Serviços Energéticos* (ERSE).

²² Directive 2019/944, art. 31(1).

²³ Ibid., art. 31(3).

²⁴ Ibid., art. 31(4) and (5).

²⁵ In the Directive, this is referred to as ‘procurement of ancillary services’, but later it is clarified that this includes balancing services. Directive 2019/944, art. 40(1)a, d and i and 40(4).

²⁶ Directive 2019/944, art. 40(1)a.

²⁷ Directive 2019/944, art. 36, art. 54 and recital 62.

²⁸ Directive 2019/944, art. 36(2).

²⁹ Directive 96/92/EC concerning common rules for the internal market in electricity, art. 20.

³⁰ Directive 2003/54/EC, art. 23, Directive 2009/72/EC concerning common rules for the internal market in electricity, art. 7(3), 10(2), 11(8).

³¹ https://www.ceer.eu/ceer_about.

³² ACER was created by means of Regulation (EC) No 713/2009 establishing an Agency for the Cooperation of Energy Regulators, OJ L 211, 14.8.2009.



As mentioned above, other roles in the energy sector that are important for POCITYF are the roles of consumers, which are put at the centre of EU energy law with the legislative revision of 2019, and the commercial roles of generation, trade and supply of electricity and gas. With the energy transition, active consumers with solar cells on the roof of their building may also sometimes produce electricity (and thus shift roles between generating electricity and consuming electricity on a daily or even hourly basis). Moreover, some consumers may also actively participate in the energy market by influencing their own energy demand (demand side management). The different roles are explained in more detail below, with a specific focus on the different roles in POCITYF.

3.1.2. Energy (Self-)Consumption

With the Clean Energy Package, the consumer has been placed at the centre of EU energy law. Whereas the consumer used to be passive and fully dependent on the energy supplier, more and more consumers have taken an active role, combining small-scale electricity production, for example through solar panels, with electricity consumption at other moments. This active role of consumers is stimulated in the Directive through various measures, that will be discussed below.

EU energy law on consumption used to be focused mainly on the protection of households and vulnerable consumers.³³ Thus, household consumers and SMEs should enjoy ‘universal service’, which entails “that is the right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable, transparent and non-discriminatory prices.”³⁴

However, household consumers have become more active due to the energy transition, which also needed to be reflected in the legal framework. Already in the 2009 Directive, small-scale electricity production was made possible, but the possibilities for consumers to engage in the energy market have increased significantly since then. Therefore, in the 2019 legislative package, the attention has shifted towards ‘empowering consumers to participate in the energy market’.³⁵ Consumers can do this for example by offering their flexibility of demand to the market and by producing their own energy, for example through solar cells. Consumers should also be put in the position where they can consume the power produced by their own solar panels or other renewable energy installation.

If consumers are to participate in the energy market through flexibility of demand, this means that they should be able to receive energy for differentiated prices, high prices when electricity is scarce and low prices when electricity is plentifully available. This is called ‘dynamic pricing’. The Directive requires that Member States “ensure that the national regulatory framework enables suppliers to offer dynamic electricity price contracts” and that they “ensure that final customers who have a smart meter installed can request to conclude a dynamic electricity price contract with at least one supplier and with every supplier that has more than 200 000 final customers.”³⁶ As this requires implementation in the national legal frameworks, this topic will be treated again in sections 4.1 and 5.1 on the national regulatory frameworks for the two Lighthouse Cities. The Directive also provides for consumer protection, as suppliers are to inform their customers of the opportunities *and risks* of dynamic pricing, and they can only use dynamic pricing after customers have given their consent for this.³⁷

Rather than participating directly as end-consumers, consumers should also be able to engage in contracts with aggregators, who can participate in the energy market on their behalf and

³³ Directive 2009/72/EC, art. 3.

³⁴ Ibid. art. 3(3).

³⁵ Directive 2019/944, art. 3(1).

³⁶ Ibid., art. 11.

³⁷ Ibid., art. 11(2) and (3).



aggregate the demand and supply of a larger group of consumers (either households or businesses or a combination of both).³⁸ This can also be of relevance for POCITYF, where aggregators can also act on behalf of entire positive energy districts or blocks.

Finally, customers should not be impeded to act as ‘active customers’ in any way. This provision sums up several of the requirements mentioned earlier, such as that customers should be able to market their own generated electricity, that they should be able to offer their flexibility, either by themselves or collectively, or through an aggregator.³⁹ Active customers should also be financially responsible for the imbalances they cause in the electricity system.⁴⁰ This is an important nuance, as making active customers financially responsible for their imbalances lifts a burden off the shoulders of TSOs and DSOs to keep the grid in balance - a responsibility and a cost which would otherwise be socialised to all electricity users via the grid tariffs.

3.1.3. Energy Poverty and Consumer Protection

Although current EU energy law stimulates an active role of consumers, by facilitating their investments in solar panels and electric vehicles, many consumers are facing growing concerns about whether they are able to pay the energy bill at all. The problem of energy poverty has been recognised by the EU in 2009 already,⁴¹ and currently it is addressed as follows. Article 29 of the 2019 Electricity Directive requires Member-States to (i) define a set of criteria for the purposes of measuring energy poverty, (ii) continuously monitor the number of households in energy poverty, and (iii) report on the evolution of energy poverty and measures taken to prevent it to the Commission every two years as part of their Integrated National Energy and Climate Progress Reports, in accordance with Article 21 of 2018 Governance Regulation.⁴²

The Governance Regulation, in turn, requires MS to identify the numbers of customers in energy poverty and therefore are required to “[...] establish and publish a set of criteria, which may include low income, high expenditure of disposable income on energy and poor energy efficiency.”⁴³ It is remarkable that compared to the 2009 rules, some instruments Member-States used to have in order to contain energy prices, have been removed in the 2019 revision: it seems that the EU prefers to focus on market-based solutions rather than on state intervention based solutions to energy poverty.⁴⁴ However, one can wonder whether monitoring, reporting and waiting for market-based solutions will alleviate energy poverty.

POCITYF can have a positive effect on alleviating energy poverty by making local renewable energy solutions, which reduce the energy bill for external sources of energy, available to a larger group of people - also to people who could perhaps otherwise not afford the initial investment. Moreover, the energy bill is sometimes unnecessarily high due to bad isolation of residential buildings. As POCITYF also focuses on improving isolation in residential buildings, an impact on energy poverty could also be reached there.

³⁸ Ibid., art. 13.

³⁹ Ibid., art. 15.

⁴⁰ Ibid., art. 15(2)f.

⁴¹ For an overview of the legislative treatment of energy poverty in EU law, see M.M. Roggenkamp, L. Diestelmeier, ‘Energy market reforms in the EU: a new focus on energy poverty and energy (in)justice’ in I. Del Guayo, L. Godden, D.D. Zillman, M.F. Montoya, J.J. González (eds.) *Energy Justice and Energy Law* (OUP, 2020).

⁴² Ibid., p. 14.

⁴³ Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, OJ L-328/1, art. 3(3)d.

⁴⁴ Ibid.



3.1.4. Collective Generation and Supply of Electricity

In the energy transition, next to consumers acting individually by installing solar panels on their own roof, the possibility of collective generation and supply of electricity by citizens collectives has come up. The collective generation and supply of electricity, for example via so-called ‘energy communities’, is very relevant for POCITYF and will be elaborated below.

The Citizen Energy Community (CEC) and Renewable Energy Community (REC) are both relatively new additions to the EU energy law framework. The CEC comes from the recast Electricity Directive (Directive (EU) 2019/944), whereas the REC comes from the recast Renewable Energy Directive (Directive (EU) 2018/2001). The two types of communities are similar but not exactly the same. Both can be relevant for the POCITYF project.

CECs are defined as follows:

‘citizen energy community’ means a legal entity that:

- (a) is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises;
- (b) has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; and
- (c) may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders;

Thus, this legal form allows for an exemption of unbundling for CECs, as they may engage in generation, supply and distribution at the same time. However, CECs do have to comply with the rules on third party access.⁴⁵ The Directive requires Member-States to provide ‘an enabling regulatory framework’ for CECs, which means for example that electricity transfers within CECs are facilitated, that DSOs cooperate with CECs and that Member States ensure that CECs have access to all electricity markets, either directly or in an aggregated form in a non-discriminatory manner.⁴⁶

The REC is defined as “a legal entity:

-
- (a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity;
- (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities;
- (c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits;”

Thus, the differences in definition between the CEC and the REC are that for CECs, the scope is broader, i.e. not only renewable energy projects but also charging of electric vehicles, energy

⁴⁵ Directive 2019/944, art. 6(3).

⁴⁶ Ibid. art. 16.



storage and aggregation. Moreover, for CECs, there is no locational requirement, whereas for RECs, the idea is that shareholders or members are located in the proximity of the projects. For RECs, just like for CECs, the Directive requires Member States to adopt an enabling regulatory framework that ensures that participation in a REC is open to all citizens in an open and non-discriminatory manner, and that RECs can participate in energy markets.⁴⁷

Both RECs and CECs could be useful for POCITYF in order to allow citizens, and possibly also SMEs, to participate in neighbourhood energy projects in their district. Although the definition differs slightly, the requirements for Member States are similar. It matters how the provisions are implemented in national law and what are the exact requirements of the POCITYF demo sites whether CECs or RECs are used.

3.1.5. Smart Metering and Billing

An important preliminary requirement for active participation of consumers, prosumers and energy collectives in the energy market is to have real-time, accessible information about the amount of consumption and production at a given time. This information can be made available to the consumer, to the DSO and to the energy supplier via a so-called intelligent metering system or shortly a ‘smart meter’. With the Clean Energy Package, new requirements for the metering and billing of domestic energy usage (both electricity and gas as well as heating and cooling via collective systems) are included in the ‘Energy Efficiency Directive’.⁴⁸ The following provisions are relevant for POCITYF.

The Energy Efficiency Directive requires Member-States to make sure that, as far as technically possible, financially reasonable and proportionate to their potential energy savings, all electricity and gas customers get “competitively priced individual meters that accurately reflect their actual energy consumption and that provide information on the actual time of use.”⁴⁹ This should happen when old meters are replaced, when new consumers are connected and when buildings undergo major renovations.⁵⁰ If the new meters are so-called ‘smart meters’ or ‘intelligent metering systems’,⁵¹ then the customers should also be able to reap the benefits of having a smart meter, by having access to their data, for example by being able to share the data collected by the smart meter with a third party acting on behalf of the final customer, who is able to show the data in an easily understandable format.⁵² This is very relevant for POCITYF where it concerns residential energy management systems that are also based on smart meters. A further requirement in this regard is that the Member States, when implementing smart meters, “shall ensure the security of the smart meters and data communication, and the privacy of final customers, in compliance with relevant Union data protection and privacy legislation.”⁵³ One can argue that this requirement is partially redundant as the data protection and privacy legislation is already very clear on this,⁵⁴ but the importance of safe and secure data communication cannot be overstated.

⁴⁷ Directive 2018/2001, art. 22.

⁴⁸ Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L-328/210. As this Directive amends the previous Directive, further references to this Directive will be to the Consolidated Version, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0027-20200101>.

⁴⁹ Energy Efficiency Directive, art. 9.

⁵⁰ Ibid.

⁵¹ Based on the 2009 Energy Package, Member States were already encouraged to introduce intelligent metering systems. Directive 2009/72/EC art. 3 and Annex I. However, no definition of ‘intelligent metering systems’ or ‘smart meters’ was given.

⁵² Energy Efficiency Directive, art. 9(2)d.

⁵³ Ibid., art. 9(2)b.

⁵⁴ See section 3.3.



Next to smart metering for electricity and gas, the 2019 Energy Efficiency Directive also contains rules for the metering of heating and cooling networks and domestic hot water. Here, meters are also necessary to make sure that final customers have meters that reflect their actual consumption.⁵⁵ This should stimulate people to behave in an energy-efficient way, as their individual behaviour is reflected in their energy bills. With a fixed sum per month, there is less incentive. It becomes more difficult for buildings that contain multiple households. Therefore, the Directive provides that in multi-apartment or multi-purpose buildings, individual meters shall be installed where technically possible and cost-effective.⁵⁶

Next to accurate metering, another topic of the Directive is the billing for electricity, gas and heating/cooling systems: these bills should be reliable, accurate and based on actual consumption.⁵⁷ This is important to reflect the cost of the energy and to provide a financial incentive to lower the amount of energy used.

Moreover, there are various other provisions from the Energy Efficiency Directive that may have relevance to POCITYF. First, the Directive states that public bodies' buildings should have an exemplary role.⁵⁸ This may be relevant where public bodies' buildings are involved in the POCITYF project. Secondly, Member-States are supposed to promote the availability of energy audits. The availability of well-trained personnel for this purpose is also relevant for POCITYF, as the knowledge gained from energy audits is the first step towards better isolation and better energy performance of buildings. Finally, the Member-States are required to perform an assessment of efficient heating and cooling systems, including cogeneration and efficient district heating and cooling.⁵⁹

3.1.6. Demand Side Management

Electricity system management entails the continuous balancing of demand and supply. As the supply side of the electricity system becomes more volatile when more renewable energy is installed, stimulating extra flexibility on the demand side, in order to absorb the volatility of the supply side, can be very valuable. This flexibility can be provided via demand side management, where flexible demand responds to a shortage or oversupply of electricity at a certain moment. As mentioned above, the participation of end-consumers and SMEs in demand side management should be facilitated.

Demand side management, if used well, can lead to a more efficient use of the networks and reduce the urgent need for network reinforcement. Moreover, it may lead to more energy efficiency, if electricity can be consumed close to the place where it is produced. EU energy law stimulates energy efficiency, both of appliances and of entire energy systems but until the latest legislative revision, demand side management was not yet anticipated in EU energy law. Now, there are different aspects to take into account.

First, an important principle is the principle of non-discrimination. Groups of comparable customers should be treated equally.⁶⁰ The question is whether some customers can be rewarded for their flexibility by participating in demand side management, or whether the principle of non-discrimination prevents this. It can be argued that customers who have flexibility in their demand are not comparable to customers who do not have such flexibility, and that it thus justified to also

⁵⁵ Energy Efficiency Directive, art. 9a.

⁵⁶ Ibid., art. 9b.

⁵⁷ Energy Efficiency Directive, art. 10 and 10a.

⁵⁸ Energy Efficiency Directive, art. 5.

⁵⁹ Energy Efficiency Directive, art. 14.

⁶⁰ For an explanation of the non-discrimination principle in EU energy law, see H.T. Kruimer, 'Non-discriminatory Energy System Operation: What Does it Mean?' Competition and Regulation in Network Industries [2011 Vol 12 No. 3].



differentiate in the contracts between these two groups of customers. Here, another differentiation can be made between household consumers and other customers, such as businesses and public buildings. For household consumers, a higher level of protection, for example against extremely high electricity prices, should be maintained, in order to make sure that households always keep access to electricity. This is why, as mentioned above, dynamic pricing is only possible under certain circumstances.

Secondly, the division of roles between the network operator, the energy supplier and the customer in demand side management should be made clear. Due to the principle of unbundling, the operation of electricity networks is strictly separated from commercial activities such as the supply of electricity. However, demand side management touches both: it improves the possibilities for efficient network management, and, if well implemented, lowers the costs of network operation, but the flexibility is also priced in the market. Moreover, an active role is expected of the customer. Therefore, the question is whether DSOs allowed to engage in facilitating demand side management, or should this lie with electricity suppliers? A solution to this is if the DSOs do not actively engage in the flexibility market but only facilitate this market, for example by making the DSO a facilitator rather than an active participant of demand side management.⁶¹

Finally, the flexibility could be used as an alternative to network investment by the DSO, as the flexibility can be used to flatten peaks and extreme lows in a local energy system.⁶² This is relevant for POCITYF, where the peaks and lows in the positive energy districts could be balanced better by using demand flexibility.

However, in this way, flexibility is also trapped at a local level of the energy system (i.e. low/medium voltage level) whereas with the increasing penetration of RES, flexibility is also needed on higher levels, and possibly also in other local levels where the flexibility of the connected parties is lower. Thus, a balance needs to be struck between keeping the flexibility in the district or neighbourhood and exporting the flexibility to a higher network level.

3.1.7. Energy Performance of Buildings

Since POCITYF is focused on energy efficiency in the built environment, a very important piece of legislation for POCITYF is the Energy Performance of Buildings Directive. This Directive stems from 2002, but has been revised in 2010 and amended further in the context of the Clean Energy Package (2018).⁶³ The following section is written on the contents of the Directive as currently applicable, including the amendments of the Clean Energy Package.

As a preliminary remark, there is a link between energy efficiency and energy performance of buildings. For example, the requirements of the Energy Efficiency Directive on smart metering (see section 3.1.5 above) are essential for ‘smart energy buildings’ as well, since smart meters can be used to closely monitor the energy performance of buildings.

The Energy Performance of Buildings Directive stipulates how the energy performance of buildings should be improved. This Directive required energy labelling of buildings and set the standards for how and when buildings should have an energy label. Moreover, the Directive provides specific rules for renovation and newly built buildings. It must be noted that Directives have to be transposed into national law, which means that the Member-States adopt rules in their national legal frameworks in order to comply with the Directive. In some cases, the rules adopted in

⁶¹ D. Kuiken, H. Mas, ‘Integrating demand side management into EU electricity distribution system operation: A Dutch example’ *Energy Policy* [2019 vol 129], p. 156.

⁶² Ibid.

⁶³ Directive 2002/91/EC on the energy performance of buildings, OJ L-1/65, 4-1-2003; Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings, OJ L 153, 18.6.2010; Directive (EU) 2018/844 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency.



Directives also have direct effect, but this is only if they are sufficiently clear, unconditional, and not dependent on national implementing measures.⁶⁴

More specifically, the Directive provides the following elements that are relevant for the POCITYF project. First, Member States should design a long-term renovation strategy of their national building stock.⁶⁵ Whereas this is national policy, POCITYF demosites may serve as examples of how the renovation of building stock towards positive energy districts could work. Second, minimum energy performance standards for renovation and for new buildings are required, and these standards become stricter over time.⁶⁶ These standards are elaborated in national law based on the standards and methodology for calculating the energy performance of buildings, which is provided by the Directive.⁶⁷ This makes the standards across Member States easier to compare.

The Directive already mentions that Member States may be more lenient with the energy performance standards where it concerns monuments, which is very relevant for POCITYF: after all, a major focus of the project relates to energy transition in cultural heritage buildings and districts. The leniency towards monuments in this Directive, is necessary as it is often impossible for monuments to reach the same level of energy efficiency as for newly built buildings - without compromising monumental values of the building. This is a main challenge for POCITYF.

Also relevant for POCITYF is that the Directive provides that existing buildings, when they undergo major renovation, they need to meet the standards of art. 4 of the Directive (the minimum requirements) as far as this is technically, functionally and economically feasible.⁶⁸ This wording creates an “escape” for when it would be too expensive to reach the standards with a major renovation, as in that case, it is not economically feasible. One can argue that this escape clause weakens the force of the Deliverable, as economic feasibility also depends on the expectations of the project developer and on the other requirements in the renovation of the building.

The Directive also requires the Member States to set ‘system requirements’, which entails how technical installations in buildings are placed, dimensioned and operated. This relates traditionally to heating systems, air conditioning, ventilation and hot water systems, as well as combinations thereof.⁶⁹ With the amendments of the Clean Energy Package, this has been broadened spectacularly, to also include self-regulating devices, e-mobility and a newly introduced indicator, the ‘smart readiness indicator’, which is an “assessment of the capabilities of a building or building unit to adapt its operation to the needs of the occupant and the grid and to improve its energy efficiency and overall performance.”

Specifically interesting for POCITYF are the requirements regarding e-mobility, as there are several pilot projects with a link between buildings and electromobility. For new and renovated residential buildings with more than 10 parking spaces every parking space should allow for ducting infrastructure that can later allow the installation of electric vehicle charging infrastructure.⁷⁰ There is an exception for projects that have received their permit before 10 March 2021 or when the costs are more than 7% of the total cost of the renovation, or when a public building has

⁶⁴ ECJ Case 26/62 *N.V. Algemene TRANSPORT— en Expeditie Onderneming Van Gend & Loos v. Nederlandse administratie der belastingen*, ECLI:EU:C:1963:1; P. Craig, G. De Burca, *EU Law - Tekst and Materials*, OUP 2008, p. 275.

⁶⁵ EPBD, art. 2a.

⁶⁶ *Ibid.*, art. 4.

⁶⁷ *Ibid.*, art. 3 and Annex I.

⁶⁸ *Ibid.* art. 7.

⁶⁹ *Ibid.*, art. 8 of the 2010 Directive.

⁷⁰ EPBD, art. 8(5)



already met comparable requirements due to the implementation of an earlier directive.⁷¹ For non-residential buildings, either new or undergoing major renovation, the requirement is that if the buildings have more than 10 parking spaces, at least one charging point for electric vehicles should be provided, and on top of this, the ducting infrastructure should be made ready to be able to install charging facilities for one in five parking spaces.

The Directive goes on with specific rules on near zero-energy buildings, as all Member States are supposed to require that all new buildings are near zero energy buildings by 31 December 2020.⁷² This may be relevant where new buildings are built in POCITYF projects.

Finally, the Directive gives details on the certification of the energy performance of buildings. Implementation of this Directive in 2003 and 2010 has led to the well-known ‘Energy Labels’ for buildings, the energy performance certificates. However, the labelling has now changed as more technical requirements are introduced.

Similar to the Directives mentioned above, it matters how this Directive is implemented in the legislative frameworks of the Member States. This is addressed in chapter 4 and 5 for the Alkmaar and Evora regulatory framework, and will also be relevant for the FCs in the course of the POCITYF project.

3.1.8. Electricity Storage, Electric Vehicles and their Charging Stations

Within POCITYF, there are also some projects that involve a link between charging electric vehicles, energy management in buildings, electricity storage and the electricity grid. In short, electric vehicles can, through their charging stations, fulfil a role in providing flexibility to the energy system. Moreover, in their batteries, they can temporarily store electricity. Within POCITYF, there are also projects envisaging stationary storage systems. Both will be treated below.

Electric Vehicles and their Charging Stations

The first rules on charging points for electric vehicles do not stem from the Clean Energy Package but from a separate Directive, the 2014 Alternative Fuels Directive.⁷³ Due to this Directive, Member States are required to ensure, through their national legal frameworks, that sufficient public charging points for electric vehicles are installed.⁷⁴

With the Clean Energy Package, ‘integration of electromobility in the electricity network’ is addressed in a separate article, with attention rather to the separation of functions in the energy sector than to the increase in charging stations without any conditions.⁷⁵ It is made clear that, with regard to the connection to the grid, DSOs have to cooperate on a non-discriminatory basis with parties that intend to install charging infrastructure.⁷⁶ DSOs cannot own or operate charging stations for electric vehicles, except for their own use,⁷⁷ except in very specific circumstances, namely that an open tender procedure has made clear that there are no market parties interested to construct and operate this infrastructure, that the regulatory authority has carried out an ex-ante review of the process and that the DSO operates the charging infrastructure on the basis of

⁷¹ EPBD, art. 8(6).

⁷² Ibid. art. 9.

⁷³ Directive 2014/94/EU on the deployment of alternative fuels infrastructure, OJ L 307, 28.10.2014, p. 1-20.

⁷⁴ Ibid., art. 4.

⁷⁵ It must be noted that the increase in electric vehicle charging stations is now also mentioned in the Energy Performance of Buildings Directive, as will be explained in the next section.

⁷⁶ Directive 944/2019, art. 33(1).

⁷⁷ Directive 944/2019, art. 33(2).



third party access and does not discriminate between (classes of) system users.⁷⁸ If the DSO, under the abovementioned criteria, operates charging infrastructure, this should be re-assessed every 5 years.⁷⁹ It thus becomes clear that the EU is reluctant to make DSOs own and operate charging stations, and that this should be considered the exception rather than the norm.

Stationary Storage Systems

Several POCITYF projects include stationary storage systems. It depends whether these storage systems are installed “behind the meter” and thus form part of an existing connection for an electricity consumer, producer or prosumer, or whether the storage system is a separate entity connected directly to the electricity grid, in which case it becomes an energy market participant in its own right. Similarly as for EV charging stations, EU energy law discourages TSOs and DSOs to become storage owners and operators. Only under exceptional circumstances, it is possible for a DSO or TSO to own or operate a storage facility.⁸⁰ This is only possible after consent from the NRA and after other options have been depleted: when the storage facility is a fully integrated network component and when a transparent tendering procedure for the storage facility did not lead to any market parties who could deliver the necessary amount of storage capacity.⁸¹

3.2. Data Protection Law

As mentioned above, it is essential for a project like POCITYF to closely monitor data protection, as (household) energy management systems require the collection and processing of personal data, which are protected by EU data protection law. The key equipment in this regard is the ‘smart meter’, which collects the household data and sends them to external entities such as the DSO, the energy supplier and possibly to an external energy management system or an aggregator. There are some rules on the safety of smart meters enshrined in the Energy Efficiency Directive (as discussed above) but this does not diminish the role of the General Data Protection Regulation, which is applicable on top of other rules applicable to smart meters.

The General Data Protection Regulation (GDPR) safeguards personal data of EU citizens.⁸² This may also be relevant when data on energy usage of consumers are shared, for example to give real time information on the current electricity demand of a building, or to predict patterns of consumption in the future and to anticipate on these patterns. It must be noted that POCITYF already pays specific attention to data protection issues in Work Package 11. In this Deliverable, the rules on data protection are set out, as these rules are also part of the regulatory framework applicable to POCITYF. However, the specific application of the rules to the POCITYF projects will not be part of this task but rather part of Work Package 11.

It must be noted that the GDPR does not protect all data, it envisages specifically the protection of *personal* data.⁸³ However, since POCITYF is involved in energy management at household level, personal data are involved. The GDPR gives specific rules on the processing of data, which comprises any operation performed on the data, including collection, storage, consultation, use and combination of the data.⁸⁴ The GDPR lists six important principles with regard to the processing of personal data:

⁷⁸ Ibid., art. 33(3).

⁷⁹ Ibid., art. 33(4).

⁸⁰ Directive 2019/944, art. 36, art. 54 and recital 62.

⁸¹ Ibid., art. 36(2).

⁸² Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation, hereinafter: GDPR), OJ L 119/1.

⁸³ GDPR, art. 2 and 4(1).

⁸⁴ GDPR, art. 4(2).



Personal data shall be:⁸⁵

- (a) processed lawfully, fairly and in a transparent manner in relation to the data subject (**‘lawfulness, fairness and transparency’**);
- (b) collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes; further processing for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes shall, in accordance with Article 89(1), not be considered to be incompatible with the initial purposes (**‘purpose limitation’**);
- (c) adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed (**‘data minimisation’**);
- (d) accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay (**‘accuracy’**);
- (e) kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed; personal data may be stored for longer periods insofar as the personal data will be processed solely for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes in accordance with Article 89(1) subject to implementation of the appropriate technical and organisational measures required by this Regulation in order to safeguard the rights and freedoms of the data subject (**‘storage limitation’**);
- (f) processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organisational measures (**‘integrity and confidentiality’**).

The “controller” is responsible for compliance with these principles. The controller is the (natural or legal) person that determines how and when the data will be used.⁸⁶ In the context of smart grids and smart buildings, this could be for example the grid operator or the company that aggregates the usage patterns of several buildings.

Thus, it is important that personal data are only shared or processed when this goes according to the principles mentioned above, thus only when this is necessary (data minimisation), when the time the data are stored is limited, and when the purpose is known beforehand and agreed upon by the participants of the project. Next to attention to data protection, specific attention should also be paid to cybersecurity, since the more data are exchanged between buildings, vehicles and the electricity grid, the more exposed the electricity supply is to hacks or other cyber-attacks. A specialised European Commission Working Group has published a report about this matter, with a list of minimum safety standards and safety measures.⁸⁷

In order to ensure compliance with the GDPR, the energy management systems used in POCITYF should be ‘secure by design’ and incorporate both data protection and cybersecurity in the system

⁸⁵ GDPR, art. 5(1)

⁸⁶ GDPR, art. 4(7).

⁸⁷ Smart Grid Task Force Expert Group 2, Final Report 2019,

https://ec.europa.eu/energy/sites/ener/files/sgtf_eg2_report_final_report_2019.pdf.



design. This is very important to monitor in order to ensure compliance with the GDPR. Within the POCITYF consortium, there is a specific work package with deliverables dedicated to data protection.⁸⁸ Therefore, the exact implications of the GDPR for POCITYF will not be elaborated further in this deliverable.

One specific issue that is relevant for POCITYF is that personal data can only be processed if there is a legal ground for this.⁸⁹ Several grounds are available. The first option is that the “data subject” (the person whose data are concerned) gives consent for this, for one or more specific purposes. However, consent can also be withdrawn again.⁹⁰ When an energy management system is based on this, it is problematic if too many participants in such a system withdraw their consent, especially if this means that the amount of participants in the energy management system goes below a certain ‘critical mass’ that is needed to make the system work.

There are also other grounds for data processing. A relevant option for POCITYF is that data processing is allowed if this is necessary for the execution of a contract to which the data subject is party.⁹¹ This can be a solution to the issue identified above regarding the withdrawal of consent. A contract between the data subject and the energy management system owner could be used, in order to make sure that there is a legal ground for data processing. Such a contract should then include

Further legal grounds include the situation that processing is necessary for the compliance with a legal obligation to which the controller is subject, vital interests of the data subject or another natural person, necessity for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller and when this is necessary for legitimate interests pursued by the controller or by a third party, except if these interests are overridden by other interests such as the fundamental rights of the data subject.⁹² The collection of data by DSOs in order to maintain the electricity grid in balance is an example of a task carried out in the public interests. Moreover, the DSO also has the legal obligation to collect certain data.

3.3. Public Procurement and State Aid Law

The EU internal market has an extensive system to maintain a level playing field between different market participants and to govern the relation between the public sector and the private sector. Two pillars of this system are public procurement law and state aid law. They may both be relevant for POCITYF, depending on the situation.

3.3.1. Public Procurement Law

Public procurement law aims to ensure that public organisations procure the goods and services they need in open, competitive procedures that give a fair chance to all possible market participants that are interested in delivering the service or good concerned. When, in the POCITYF project, public buildings are renovated, these activities will need to be organised via a public procurement procedure, depending on the nature and size of the order.⁹³ The rules for this originate from EU law but they are implemented in national law. Therefore, if public buildings are

⁸⁸ D11.11 Ethical Monitoring and GDPR Conformation Plan and D11.4 Data Management Plan.

⁸⁹ GDPR, art. 6(1).

⁹⁰ Ibid., art. 7(3).

⁹¹ GDPR, art. 6(1)b.

⁹² GDPR, art. 6(1)c-f.

⁹³ The threshold values for this depend on whether the order is on ‘goods’ or ‘services’ and on whether it concerns the national or regional government. The exact values are available in Commission Delegated Regulation (EU) 2019/1828 amending Directive 2014/24/EU in respect of the thresholds for public supply, service and works contracts, and design contests, art. 1.



part of POCITYF, the project developers should refer to the nationally specified public procurement rules.

3.3.2. State Aid Law

The other pillar is state aid law - designed to make sure that states and local authorities do not give financial or other benefits to one company or group of companies at the expense of others. Within POCITYF, this could be relevant where projects are not feasible without support from the (local or national) government and where authorities may want to support the projects in order for them to be realised anyway.

In principle, state aid is not permitted under EU law, unless it falls under an exemption. This could be because the amount of aid falls below a threshold,⁹⁴ in practice when less than € 200.000 per three fiscal years is granted, or because the aid measure is exempted, either as part of a category of aid or as an individually allowed aid measure.⁹⁵

In addition, in the context of the State Aid Modernisation programme, aid for culture and heritage conservation is included as a new category of aid in the new General Block Exemption Regulation (GBER)³⁶. The GBER significantly extends the possibilities for Member States to grant “good aid” to companies without prior Commission scrutiny, be it in the form of investment or operating aid. Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty.

Finally, the Guidelines on State Aid for Environmental Protection and Energy, drafted by the European Commission, give guidance on the circumstances under which state aid can be given to energy projects.⁹⁶ These Guidelines are adopted for the period 2014-2020 but it is expected that new Guidelines will be adopted to replace these guidelines after 2020. Therefore, the contents of the current guidelines will not be elaborated in detail, as they may soon be replaced by new guidelines.

⁹⁴ The threshold is set in Commission Regulation (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union (TFEU) to de minimis aid.

⁹⁵ This is then based on art. 107(2) or (3) TFEU.

⁹⁶ Communication from the Commission – Guidelines on State aid for environmental protection and energy 2014-2020



4. Dutch Regulatory Framework

It has become clear from chapter 2 and 3 that international law and EU law often need implementation at a national level. National acts and regulations fill in the norms set at international and EU level with more specific requirements. This is also the case for Dutch energy law, construction law and heritage law, which will be elaborated below. Next to these rules, which are applicable throughout the Netherlands, the specific local obligations for the municipality of Alkmaar are also treated. Finally, section 4.5 gives an interim conclusion with an analysis of how the legal framework would be applied to the POCITYF projects taking place in Lighthouse City Alkmaar, and whether any impediments are to be expected from this.

4.1. Dutch Energy Law

4.1.1. Introduction

Dutch energy law encompasses several themes, under the main categorisation of electricity law, gas law and heat supply law. As the focus in the POCITYF project lies on electricity and heat, gas is not treated in this analysis. A few years ago, the aim was to bring several Acts (mainly the Electricity Act 1998 and the Gas Act 2000) together in one integral Energy Act, which would also incorporate legislative revisions due to the energy transition.⁹⁷ However, this legislative project failed, so now the Electricity Act and Gas Act remain separated from each other, and amendments are adopted for both acts separately. This allows us to leave gas supply out of the analysis.

This section is organised according to the following structure. First, the main Acts, the Electricity Act 1998 and the Heat Supply Act are treated. With regard to the latter, it must be noted that this Act, which was adopted in 2013, is currently in a large legislative revision - it is expected to enter into force in 2022.⁹⁸

After the two main Acts, the lower legislation that is relevant for POCITYF will be treated. There are several Regulations (*Algemene Maatregelen van Bestuur (AMvBs)*, *Regelingen* and *Besluiten*) which further specify the rules enshrined in the main Acts. The discussion of the lower legislation is structured according to several topics, going from general to specific. First, the Network Codes will be treated. Then, energy tax law and support schemes. Following this, Electric Vehicles and their charging stations will be treated. Finally, the Experiments Regulation, which allows for specific innovative projects in the energy sector, will be treated. In this way, the different parts of Dutch energy law that could be relevant to the projects planned in Alkmaar are all covered.

Main Acts

4.1.2. Electricity Act

The Electricity Act is the main framework of rules related to the electricity grid and electricity market in the Netherlands. It starts with an elaborate list of definitions to terms referred to in the Electricity Act. These definitions are not only relevant for the Electricity Act itself but also

⁹⁷ This legislative project was called ‘STROOM’. It was voted down in the Upper House (*Eerste Kamer*) in December 2016. Therefore, the project was cancelled and instead, a repair act (*Wet Voortgang Energietransitie*) was drafted in order to introduce some necessary changes to Dutch energy law that were envisaged to be part of the legislative revision of STROOM.

⁹⁸ Kamerbrief Wiebes. The Minister does say that 2022 is ‘very ambitious’ so it might be that adoption is delayed until after 2022. In the next deliverable (due 2022) this will be an important point of attention.



for various other forms of lower legislation, such as Regulations, Decisions and Network Codes.⁹⁹ Provisions from the Electricity Act that are relevant for POCITYF are the rights and duties of transmission and distribution system operators (TSOs and DSOs),¹⁰⁰ where the rules from EU energy law concerning unbundling are implemented into national law,¹⁰¹ and where the tasks of network operators are laid down.¹⁰² The Electricity Act provides that network operators cannot engage in other activities than the activities necessary for the tasks established in law.¹⁰³ This can be an important limitation to innovative energy projects in the Netherlands. However, a valuable exception is that government regulations can be used to expand the range of tasks that network operators are allowed to fulfil beyond the activities listed in the Electricity Act.¹⁰⁴

Concerning the *production* of electricity, several provisions in the Electricity Act are relevant. First, a remark on definitions. Electricity production is not defined, but ‘producer’ is defined as follows: *producent: een organisatorische eenheid die zich bezighoudt met het opwekken van elektriciteit*; One could wonder whether this also encompasses prosumers, which cannot really be considered to be an organisational unit. The Electricity Directive ((EU) 2019/944) has a broader scope: there, producer is defined as a natural or legal person who generates electricity. The legal status of prosumers between ‘producers’ and ‘consumers’ is discussed in literature, but in Dutch law, for the time being, prosumers are being treated as consumers.¹⁰⁵

First, in order to coordinate the production capacity in the Netherlands, the creation or enlargement of an installation to produce sustainable electricity larger than 50 MW, with the exception of wind energy, for which the threshold is 100 MW, requires a permit (*Omgevingsvergunning*) or another administrative procedure (*Inpassingsplan*).¹⁰⁶ Moreover, a plan to construct or change such an installation needs to be notified to the Minister of Economic Affairs.¹⁰⁷ Small (household) electricity production installations, if intended to feed electricity into the electricity grid,¹⁰⁸ do not need to be notified to the Minister, but they do need to be notified to the relevant TSO, DSO and energy supplier via a website, www.energieleveren.nl.¹⁰⁹ Without notification before installation, it is not possible to supply excess electricity to the grid (*terugleveren*) or to net one’s own consumption with production at another moment (*salderen*).¹¹⁰ These two types of support for small scale electricity generation will be treated under section 4.1.5, Energy Tax Law and Support Schemes. With this registration, the DSOs know what to expect from each connection: which source of renewable energy, the connected capacity of the

⁹⁹ Elektriciteitswet, art. 1. Lower legislation that depends on the definitions in the Electricity Act can be found at:

<https://wetten.overheid.nl/BWBR0009755/2020-02-01/0/Hoofdstuk1/Paragraaf1/Artikel1/informatie>.

¹⁰⁰ Elektriciteitswet, art. 10 and further.

¹⁰¹ Interestingly, the Netherlands, contrary to all other EU Member-States, decided that DSOs also needed to be fully ownership unbundled. It thus goes further than what is required by EU law. CEER Legal Affairs Committee, ‘Implementation of TSO and DSO Unbundling Provisions’ 2019, p. 10.

¹⁰² Ibid., art. 16.

¹⁰³ Ibid., art. 17.

¹⁰⁴ The list of activities is laid down in art. 16 of the Electricity Act. Art. 17a states that this range can be expanded by government regulation (*Algemene Maatregel van Bestuur*).

¹⁰⁵ L. Diestelmeier, D. Kuiken, ‘Legal Framework for Prosumers in the Netherlands’ in M. M. Roggenkamp, & C. Banet (Eds.), *European Energy Law Report Vol. XII* (Intersentia, 2018), p. 152-153.

¹⁰⁶ Elektriciteitswet, art. 9b. For other installations (not sustainable electricity), the threshold is 500 MW). The ‘*omgevingsvergunning*’ will be elaborated further in section 4.2.1.

¹⁰⁷ Elektriciteitswet, art. 9b(3).

¹⁰⁸ Off-grid systems do not need to be registered.

¹⁰⁹ This is based on obligations from EU law (Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, art. 40(5)).

¹¹⁰ The netting mechanism (*salderen*) is reduced over the coming decade, and will be replaced with a system based on selling excess electricity via the electricity supplier.



installation and whether or not a storage device is located behind the meter. This allows the TSO and DSOs to better predict the network flows at any given moment.

Another obligation, also stemming from EU law, is that in order to make the electricity sector in the Netherlands more sustainable, the Electricity Act provides that electricity producers and suppliers have the duty to ensure that the electricity they produce or supply is produced in a sustainable and efficient manner.¹¹¹ For very large producers (more than 10 GWh per year), the efforts to produce electricity in a sustainable and efficient manner need to be reported to the Minister of Economic Affairs.¹¹² However, these reports are not public, and therefore, it is difficult to assess what this means in practice.

Concerning the production of renewable electricity, the Electricity Act also provides rules on Guarantees of Origin, which can be used to prove that a certain kWh is produced in a sustainable manner.¹¹³ This represents a market value in an electronic market system, executed by Certiq, a subsidiary of TenneT, the Dutch TSO.¹¹⁴ These Guarantees of Origin (GoOs) are essential in the system of Dutch subsidies for renewable energy, as support is coupled to the generated amount of kWh, which has to be proven by the GoOs. However, this system does not apply to small household producers, which are supported with the *salderingsregeling* and *terugleververgoeding*.¹¹⁵

As a final note, the Electricity Act requires the adoption of Network Codes. These are elaborated in the sections on lower legislation below. Moreover, it is possible to get an exemption of certain provisions of the Electricity Act, based on another type of lower legislation, the Experimenteer AMvB. This is also treated below.

4.1.3. Heat Supply Act

One of the projects planned for Alkmaar in the context of POCITYF is the introduction of a heat network in a district. Therefore, it is important to elaborate the provisions applicable to heat supply, enshrined in the Heat Supply Act.

In the Netherlands, most households in the Netherlands have an individual source of heating, often a natural gas-fired central heating system.¹¹⁶ This type of individual heat supply is not governed by the Heat Supply Act. However, 5,2% is connected to a collective heat network.¹¹⁷ This percentage is growing as the Netherlands is aiming to phase out natural gas for heating,¹¹⁸ and replacing this with another source of individual heating (individual heat pumps), and with collective heat solutions. The Heat Supply Act is applicable to the latter.

These collective heat solutions could be larger heat pumps (which supply heat to an entire block of houses) or large collective heat networks, which can have many different sources of heat but are often fed with heat from industry or waste incineration plants. Due to the costs for creating the network, heat networks are mainly useful in densely populated areas where many connections

¹¹¹ Elektriciteitswet, art. 68.

¹¹² Ibid., art. 68(2).

¹¹³ Ibid., art. 73-77a.

¹¹⁴ <http://www.certiq.nl/wij-zijn/>.

¹¹⁵ See section 4.1.5 for more details.

¹¹⁶ By 2050, all households in the Netherlands are supposed to have switched to a sustainable source of energy for heating their house, for hot water and for cooking. Dutch Government, Klimaatakkoord, 28 June 2019, the Hague, p. 15. Text available at:

<https://www.klimaatakkoord.nl/documenten/publicaties/2019/06/28/klimaatakkoord>.

¹¹⁷ Based on data for 2017. This number is rising: in 2012, 4,6% of the households were connected to a heat network. In the coming years, the percentage is expected to rise even further. Stichting Natuur en Milieu, Verkenning Warmtenetten 2018, p. 2.

¹¹⁸ See footnote [98] above.



lie relatively close to each other, such as cities. Heat networks function as natural monopolies: they require high upfront investment costs, but low transmission costs per unit of heat. Moreover, it is very inconvenient to have several heat networks next to each other in one street. Due to this, it is (at the moment) impossible to switch between different heat suppliers once connected to a heat network.¹¹⁹ Therefore, there is a need to protect consumers connected to heat networks and to regulate how such networks can be operated and what tariffs can be asked for a heat connection and supply. This is why the Heat Supply Act (and the Heat Regulation, which contains the specifics on the tariffs) was adopted.

The scope of the Heat Supply Act is the ‘supply of heat to users’, with the exception of landlords who supply heat to their tenants and owners associations (*Verenigingen van Eigenaren*),¹²⁰ which act on behalf of the owners in apartment buildings or other buildings with shared roofs/corridors/staircases etc. The Act covers both district heating networks as well as heat/cold storage (*Warmte/Koude Opslag*) and apartment block heating (*blokverwarming*). At least once a year, and at the end of a contract, heat suppliers should provide a complete and sufficiently specified bill of the delivered heat, which is an implementation of EU energy law.¹²¹ Maximum tariffs are set for the connection to a heat network as well as for the supply of the heat.¹²² Moreover, as stressed in EU energy law already, no unjustified discrimination between different users of the heat is allowed.¹²³

The Heat Supply Act creates an obligation to obtain a permit before the heat can be supplied, except in the following cases: if the supplier supplies heat to less than 10 users, delivers less than 10.000 gigajoules of heat annually, or if the supplier is the landlord or owner of the building in which the heat is delivered.¹²⁴ This permit is granted by the Minister of Economic Affairs if the heat supplier can prove to be able, from a financial, technical and management perspective, to fulfil the required tasks as a heat supplier, with further requirements and procedure filled in by the Heat Regulation.¹²⁵ The permit can be withdrawn again if the heat supplier does not comply with the rules and regulations applicable to the supply of heat.¹²⁶

Just as with electricity and gas, the Heat Supply Act protects consumers against the failure of their heat supplier: in case a heat supplier cannot fulfil its obligation to supply heat to consumers anymore, this needs to be communicated to the Minister of Economic Affairs without delay.¹²⁷ The Minister can appoint heat suppliers of last resort, which are able to supply heat in case of problems with the regular heat supplier of a heat network.¹²⁸

¹¹⁹ A parallel can be drawn between heat networks and other networks such as the electricity, gas and water networks. For an explanation of natural monopolies in the energy sector, see J. Perloff, *Microeconomics* (Pearson, 2009 5th ed.) p. 369/370; W. Kip Viscusi, *Economics of Regulation and Antitrust* (MIT Press, 2005, 4th Ed.) p. 402.

¹²⁰ Heat Supply Act, art. 1.

¹²¹ Heat Supply Act, art. 2. This is based on Energy Efficiency Directive, art. 9.

¹²² Heat Supply Act, art. 2(3) and 5.

¹²³ *Ibid.*, art. 2(4).

¹²⁴ *Ibid.* art. 9.

¹²⁵ *Ibid.*, art. 10 and the Heat Decision, *Besluit van 10 september 2013, houdende regels ter uitvoering van de Warmtewet (Warmtebesluit)*, art. 9 and 10, available at <https://wetten.overheid.nl/BWBR0033940/2020-01-01>.

¹²⁶ Heat Supply Act, art. 11.

¹²⁷ *Ibid.*, art. 12b.

¹²⁸ *Ibid.*, art. 12c.



Finally, the Heat Supply Act provides that the Dutch Authority for Consumers and Markets (ACM) is the authority in charge of the enforcement of the rules enshrined in the Heat Supply Act and in charge of setting the maximum tariffs for heat networks.¹²⁹

As mentioned above, the Heat Supply Act will undergo major legislative revision in the coming years. The focus of the current Heat Supply Act is mainly on consumer protection, but this is expected to shift towards expanding heat networks (changing the way the market is organised and changing the tariff rules) and increasing the sustainability of heat networks (mainly making the sources of heat more sustainable).¹³⁰ The new Heat Supply Act should give sufficient space for a diversity of sources of heat and thus for differentiation of the rules on a local level, and local and national authorities should have sufficient possibilities for steering heat networks in order to safeguard societal interests.¹³¹ Concerning tariff regulation, the current tariffs are set on a comparison with natural gas (expenses on heat should not be higher than if the user would have used gas-based heating). As the Dutch government is actively raising the price of heating one's house with natural gas,¹³² and promoting heat networks as a sustainable alternative, the prices of natural gas and heat networks should be decoupled in order to give people a financial incentive to switch.

Lower Legislation

4.1.4. Network Codes

In order to make the electricity network operate smoothly, specific technical rules are adopted. These rules are enshrined in so-called 'network codes'. For electricity, the following codes are available: the Tariff Code (*Tarievencode*), the Net Code (*Netcode Elektriciteit*), the Measuring Code (*Meetcode*) and the Cooperation Code (*Samenwerkingscode*).¹³³ Moreover, all terms and notions are laid down in another code, the *Begrippencode*.¹³⁴ The legal basis for adopting network codes is the Dutch Electricity Act,¹³⁵ but the underlying obligation to adopt network codes already stems from EU law,¹³⁶ where both national and European network codes are required to be adopted.¹³⁷

The Network Codes prescribe many technical details on connections, terms, tariffs and metering. As these documents are very technical and elaborate, with many specific situations and exceptions, it is not possible to give a general overview of which rules from the Dutch network codes are applicable to the demo projects. This will be added at the revision of the Deliverable in 2022, when more is known about the technical details of the demo projects.

It must be noted that, if necessary, it is possible to request an exemption from specific parts of the Network Codes. For example, one of the POCITYF projects includes the use of Direct Current (DC) technology. Nothing in the Electricity Act forbids the use of DC technology. However, the current standard in the Network Codes is Alternating Current (AC): all network codes are written

¹²⁹ Ibid., art. 15-18.

¹³⁰ Kamerbrief (Letter to the Dutch parliament), dated 14-2-2019, on the Heat Supply Act 2.0, available at <https://www.rijksoverheid.nl/documenten/kamerstukken/2019/02/14/kamerbrief-over-warmtewet-2.0>.

¹³¹ Ibid.

¹³² <https://www.rijksoverheid.nl/onderwerpen/belastingplan/belastingwijzigingen-voor-ons-allemaal/energiebelasting>.

¹³³ All codes are available at <https://www.netbeheernederland.nl/publicaties-en-codes/codes>.

¹³⁴ <https://wetten.overheid.nl/BWBR0037938/2020-01-01>.

¹³⁵ Elektriciteitswet, art. 31.

¹³⁶ Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity, art. 6. In its successor, Regulation (EU) 2019/943, chapter VII is entirely dedicated to network codes.

¹³⁷ The European Network Codes are available at https://www.entsoe.eu/network_codes/.



with AC technology in mind. Therefore, in order to be able to construct a network based on DC technology, the DSO will have to ask the NRA (ACM) for an exemption (*Ontheffing*) from the relevant network codes: *Netcode*, *Meetcode* and *Begrippencode*.¹³⁸ This exemption is then based on art. 37a of the Electricity Act, in combination with the Policy Rule on the Procedure for Exemptions based on art. 37a of the Electricity Act (*Beleidsregel procedure voor ontheffingen ex artikel 37a Elektriciteitswet*).¹³⁹

4.1.5. Energy Tax Law and Support Schemes

Next to serving as income for the state, the tax system may have the secondary purpose to stimulate certain (desired) activities and to hold back undesirable activities. The energy-related taxes, rebates and other forms of support are quite complex and may change. In this section, the taxes and rebates that are relevant for POCITYF will be treated.

Taxes on Energy Consumption

The Dutch government aims to stimulate an efficient use of energy (electricity and natural gas). Therefore, it charges a tax on the consumption of electricity and gas, the Energy Tax (*energiebelasting*).¹⁴⁰ In order to support the transition from natural gas to other forms of heating, the tariffs for natural gas are increased each year, whereas the tariffs for electricity are lowered.¹⁴¹ In the context of POCITYF, this effect should also help to ameliorate the business case for several projects in which a transition from gas to electricity is envisaged.

Next to the general energy tax, all electricity and natural gas consumers, both industrial and household consumers, pay a surcharge per kWh of electricity and cubic metre of gas, the *Opslag Duurzame Energie*.¹⁴² This surcharge is used again to finance support schemes for renewable energy.

Postal Code Rose

For households (not enterprises) that wish to participate in a renewable energy project in their neighbourhood, a tax measure is available. This measure is officially called Regulation on Lowered Tariffs (*Regeling Verlaagd Tarief*), but in practice, it is known as the “postal code rose rule” (*Postcoderoosregeling*). This is because the rule is based on postal codes: all households in the postal code in which the project is situated, as well as all adjacent postal codes, can participate in the measure - creating a “rose” of postal codes around the renewable energy project.

The measure is intended to be used by individuals who do not have the opportunity to place solar panels on their own roof, or a wind turbine in their garden, but still wish to invest in renewable energy in a collective form. In order to participate in the tax measure, households should form an energy cooperative or make use of an existing owners association (*Vereniging van Eigenaren*). The cooperative or association then owns the renewable energy installation, and the yield is divided over the participants. The participants receive a tax rebate over the generated kWhs. This is a rebate over the energy tax (*Energiebelasting*).

¹³⁸ Ontheffingsaanvraag Gelijkstroomnet Liander:

<https://www.acm.nl/sites/default/files/documents/2018-10/ontheffingsaanvraag-gelijkstroomnet-liander.pdf>.

¹³⁹ Beleidsregel procedure voor ontheffingen ex artikel 37a Elektriciteitswet, available at

<https://wetten.overheid.nl/BWBR0033117/2013-04-01>.

¹⁴⁰ <https://www.rijksoverheid.nl/onderwerpen/milieubelastingen/energiebelasting>.

¹⁴¹ Ibid.

¹⁴² The legal basis is the Act on the Surcharge for Sustainable Energy (*Wet opslag duurzame energie- en klimaattransitie*), <https://wetten.overheid.nl/BWBR0032660/2020-01-01>.



The postal code rose rule is going to be revised within the coming year. The plans for the revision are explained in a letter from the Minister of Economic Affairs.¹⁴³ Rather than receiving a tax rebate, energy collectives can then receive a subsidy for the generated electricity from solar installations between 15 and 300 Wp and wind installations between 500 and 1000 Wp.¹⁴⁴ This still needs to be organised by an energy collective (*energiecoöperatie*) or an association of owners (VvE). A problem with the earlier postal code was the question what happens when somebody was within the geographic area of the postal code rose, but moves to a different area afterwards. In the new rules, if a person participates in an energy collective, it only matters whether he/she lives in the postal code area at the beginning of the project, regardless of whether he/she moves to a different area afterwards.

Solar systems for Small Connections

Several POCITYF pilots in Alkmaar include the use of solar panels. For households and small connections (maximum 3x80A), it is possible to “net” the produced electricity with the consumed electricity over a year. This netting rule (*salderingsregeling*) allows households and small connections, such as SMEs, a good tariff for their electricity: rather than receiving the market value for the generated electricity (a few cents per kWh), they can net these kWh with kWh that they have used at another moment in the year,¹⁴⁵ which saves more than 20 cents per kWh. This is extra beneficial as the consumer also does not have to pay taxes and levies over these kWh. It must be noted that net metering is only possible for the amount that is consumed, i.e. if a household consumes 2000 kWh and its solar panels produce 2500 kWh, it can net 2000 kWh. The remaining 500 kWh can still be delivered to the electricity network, but for a much lower remuneration (*terugleververgoeding*).¹⁴⁶ The amount of this remuneration differs per electricity supplier. It must be noted that, whereas net metering is mostly used for solar panels, it can also be used for other types of electricity. A differentiation is made: for sustainable energy (such as solar, wind), there is no maximum amount of net metering except that it cannot exceed one’s own usage.¹⁴⁷ For net metering of energy from non-renewable sources, the maximum is set at 5000 kWh.¹⁴⁸

Net metering was introduced in 2004, but the Minister for Economic Affairs has announced that the net metering rule will be slowly reduced from 2023 onwards.¹⁴⁹ The reason for this is that the costs for solar panels are currently much lower than before, which means that the compensation

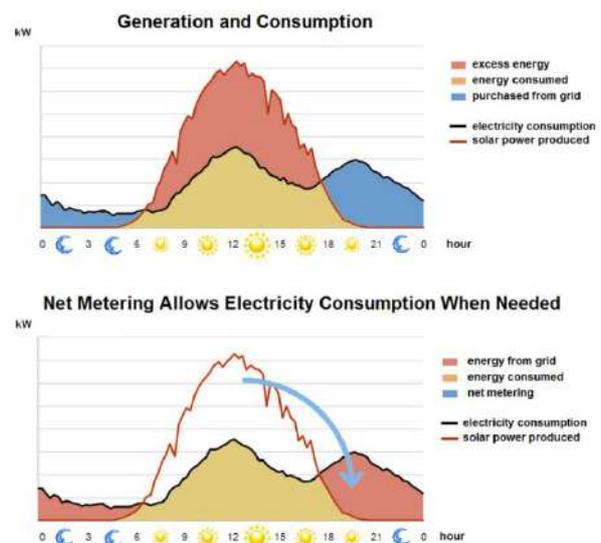


Figure 1: Net Metering, Source: Delphi 234, CC-BY-SA3.0.

¹⁴³ Letter no. 31239-318 of 25 May 2020, by Minister Wiebes, available at

https://www.tweedekamer.nl/kamerstukken/brieven_regering/detail?id=2020Z09311&did=2020D20061

¹⁴⁴ Ibid.

¹⁴⁵ Elektriciteitswet 1998, art. 31c.

¹⁴⁶ This needs to be a “reasonable reimbursement” (*redelijke vergoeding*). Elektriciteitswet 1998, art. 31c(3).

¹⁴⁷ Ibid., art. 31c(1).

¹⁴⁸ Ibid., art. 31c(2).

¹⁴⁹ Kamerbrief Minister Wiebes, 30-3-2020, available at

<https://www.rijksoverheid.nl/ministeries/ministerie-van-economische-zaken-en-klimaat/documenten/kamerstukken/2020/03/30/kamerbrief-over-afbouw-salderingsregeling>.



(fiscal stimulation) via the net metering rule was considered too generous.¹⁵⁰ Thus, in the plans announced by the Minister, from 2023 onwards, the net metering rule will be reduced with 9% per year. This entails that in the first year, only 91% of the generated electricity can be netted with consumption. The year after, this will only be 82%.¹⁵¹ The reduction of the netting rule stimulates self-consumption of the generated electricity and storage ‘behind the meter’, as this will be less expensive than delivering the electricity back to the electricity network and using it at another time.

Another tax rebate is that a household which buys solar panels can be regarded to be an enterprise (for the purpose of generating electricity), which means that VAT over the acquisition of the system can be reimbursed. This saves 21% over the original investment. This is possible for house-owners but also for tenants: the requirement is that the bill for the solar panels is on the same name as the electricity bill.¹⁵² If *enterprises* consider the acquisition of solar panels, the normal VAT rules for enterprises apply.

4.1.6. EV Charging Stations

Several of the POCITYF pilots in Alkmaar include charging stations for electric vehicles. The legal framework can be split into the public law framework (i.e. the conditions prescribed for connections) and the private law framework (i.e. the contracts between different entities). The public law framework for these charging stations depends on the setup that is used. For example: will the charging stations be located on public ground or as part of private property? Will the charging stations have their own connection, or will they be part of a larger connection? Will vehicle to grid functionality be used, and if so, how will this be integrated in the Connection Conditions between the connected party and the DSO (Liander), in order to reward the flexibility that is offered by the EV owners?

There have been several cases about whether a DSO or a company linked to a DSO can be involved in offering EV charging facilities, and if so, under what conditions. For example, after a formal investigation, the Dutch NRA (ACM) agreed with Allego (a daughter company of Alliander, the same mother company as for DSO Liander) that Allego was allowed to own charging stations but that it was not allowed to buy and sell electricity, and offer this to the EV owners.¹⁵³ Since then, an independent party (unaffiliated to a DSO) buys and sells electricity that is offered to EV owners via a Mobility Service Provider (MSP).¹⁵⁴ The MSP thus charges a tariff for the electricity (which is paid to the independent party), and also charges a tariff for making use of Allego’s charging stations.¹⁵⁵

Concerning the private law aspects of EV Charging stations, the contractual relations between the different actors matters. Several actors can be involved. Charging points can be owned by the owner of the building or by an independent ‘Charging Point Operator’ (a company operating a pool of charging points) - in the latter case, a contract for leasing a certain area in a building (parking space) is needed between the charging point operator and the owner of the building. The charging

¹⁵⁰ Ibid., p. 1-3. The investment could be recuperated in 5-7 years according to calculations by TNO. This will become approximately 9 years with the proposed changes.

¹⁵¹ Ibid., p. 2-3.

¹⁵² https://www.milieucentraal.nl/energie-besparen/zonnepanelen/zonnepanelen-kopen/btw-op-zonnepanelen-terugvragen/?gclid=EAlaIQobChMkJG--3G6QIVDNd3Ch0wsg4BEAAYASAAEgLMZvD_BwE#vragen.

¹⁵³ <https://www.acm.nl/nl/publicaties/publicatie/15462/ACM-sluit-onderzoek-af-Allego-past-werkwijze-aan>.

¹⁵⁴ The MSP is the entity with which the EV-owner has a contract, which allows the EV-owner to ‘fill up’ the electric vehicle at different charging stations.

¹⁵⁵ <https://www.acm.nl/nl/publicaties/publicatie/15462/ACM-sluit-onderzoek-af-Allego-past-werkwijze-aan>.



and billing at charging points are often managed by MSPs. In that case, another contract is needed between the charging point operator or building owner and the mobility service provider. The EV owners then engage in a contract with the mobility service provider rather than with the building owner. Finally, when the charging points also facilitate ‘vehicle-to-grid’ services, where the electric vehicles help to support the balance of the electricity grid, the main beneficiary is the DSO. A possible construction is that the DSO rewards the mobility service provider for the delivered flexibility or frequency support. The mobility service provider then transfers this benefit (at least partially) to the EV owners who offer their car for this service.

4.1.7. Innovative Energy Projects: Experiments Regulation

In the sections above, the rules applicable in Dutch energy law are elaborated. However, sometimes the currently applicable rules hold back innovation in the energy sector. Therefore, the Dutch government adopted an ‘Experiments Regulation’ which stimulates innovation in the energy sector by allowing specific exceptions of Dutch energy law, for example with regard to decentralised renewable energy generation. This is possible on the basis of the so-called “Experimenteer AMvB” (Experiments Regulation), which creates a “regulatory sandbox”.¹⁵⁶ The first Experimenteer AMvB¹⁵⁷ was valid between 2015 and 2018, and was aimed specifically at exceptions to the Electricity Act. A new version of this Regulation has been prepared by the Ministry of Economic Affairs and offered to the Dutch Parliament, but is not yet treated in Parliament.¹⁵⁸

This measure allows for experiments in demand side management, flexibility pricing etc. for both industrial and household consumers. It provides for exemptions to the currently existing rules, but it must be made clear that where exemptions can be given on the basis of other legislation, that legislation should be used.¹⁵⁹ Moreover, no exemptions are possible from rules which are based on EU legislation.¹⁶⁰ Whereas exemptions may be granted for specific rules in the Electricity Act, it is important that the project developer still proves that the principles and interests underneath the rules are safeguarded.¹⁶¹ This relates, for example, to consumer protection and the separation of network management and trade, supply and other market related activities.

4.2. Dutch Construction Law

This section on Dutch construction law is based on a combination of spatial planning law, which determines what kind of buildings can be constructed in a certain area and according to which conditions, and technical construction law. As a preliminary remark, it is important to note that this field of law is under major revision at the moment. Therefore, first, the old regime, that is currently applicable, will be treated. Then, the new regime, which is planned to be introduced from 2021 onwards but which has been postponed several times already, will be discussed.

¹⁵⁶ E.C. van der Waal, A.M. Das, T. van der Schoor, ‘Participatory Experimentation with Energy Law: Digging in a ‘Regulatory Sandbox’ for Local Energy Initiatives in the Netherlands’ *Energies* [13,2 2020] gives several examples of how experiments under this regulation work and how they are perceived by participants.

¹⁵⁷ Besluit van 28 februari 2015, houdende het bij wege van experiment afwijken van de Elektriciteitswet 1998 voor decentrale opwekking van duurzame elektriciteit (Besluit experimenten decentrale duurzame elektriciteitsopwekking); Staatsblad 2015, 99.

¹⁵⁸ <https://www.rijksoverheid.nl/documenten/besluiten/2019/04/26/ontwerpbesluit-experimenten-elektriciteitswet-1998-en-gaswet>.

¹⁵⁹ Nota van Toelichting bij Besluit experimenten decentrale duurzame elektriciteitsopwekking, Staatsblad 2015,99, p. 11.

¹⁶⁰ Ibid., p. 12.

¹⁶¹ Ibid., p. 12.



4.2.1. Spatial Planning Law

Current Regime: Spatial Planning Act

The current spatial planning regime is based on the *Wet Ruimtelijke Ordening* (the Spatial Planning Act).¹⁶² This Act specifies the obligation for authorities (both the central government and local governments, such as municipalities and provinces), to adopt *Structuurvisies* (Area Visions) for the areas they govern.¹⁶³ These Area Visions contain the main principles of the spatial planning policy in that area. Then, the Spatial Planning Act requires local authorities to adopt *Bestemmingsplannen* (Local Spatial Plans) for every area they govern. These Spatial plans contain the purpose of each area and the buildings thereon (“*bestemming*”), i.e. residential purposes, nature, industrial estate and may specify rules with regard to the use of the area.¹⁶⁴ Thus, it also specifies which activities may take place in the area they concern. Spatial Plans are adopted for a period of 10 years and have to be revised afterwards.¹⁶⁵

New Regime: Environmental Planning Act

As mentioned above, a large reorganisation of Dutch spatial planning law is anticipated. This legislative revision has been prepared for years already and will be adopted and implemented in the coming years. The Environmental Planning Act (*Omgevingswet*), which is expected to enter into force in January 2022¹⁶⁶ replaces many previous Acts, amongst which the Spatial Planning Act. In the new Act, spatial planning will be based on ‘*Omgevingsvisies*’ (physical environment visions) rather than *structuurvisies*. *Bestemmingsplannen* will be replaced with *Omgevingsplannen* (physical environment plans).

Omgevingsplannen have to be based on the framework created by the *Omgevingsvisie* of an area. These rules used to be spread over many different Acts, and the *Omgevingswet* brings all these Acts together and ensures that all locally applicable spatial planning rules are easy to find within the *Omgevingsplan*. The *Omgevingsplan* replaces the different *Bestemmingsplannen* (Local Area Regulations) with public participation procedures which are no longer centrally organised but depend on the locally applicable rules and on how deviations are allowed under the *Omgevingsplan*. Whether this is the case for the POCITYF pilot projects thus depends on the *Omgevingsplan* adopted in Alkmaar. Another change is that, contrary to the *bestemmingsplan* which is revised every 10 years, the *Omgevingsplan* is continually applicable but can be changed when needed.

For certain activities, a permit (*Omgevingsvergunning*) is needed. This relates to the construction of new buildings, renovation of existing buildings and adding a new part to an existing building.¹⁶⁷ Also for deviating from the *Omgevingsplan*, the same permit is necessary. This means that for projects in the context of POCITYF, a permit is necessary in case the building is structurally changed. Smaller changes, such as the installation of solar panels on the roof of existing buildings, is generally possible without *Omgevingsvergunning*, unless the solar panels are located on a monumental building or in a protected city area.¹⁶⁸

¹⁶² Wet Ruimtelijke Ordening, 20 October 2006, BWBR0020449, available at <https://wetten.overheid.nl/BWBR0020449/2018-07-01>.

¹⁶³ Wet Ruimtelijke Ordening, chapter 2.

¹⁶⁴ Ibid., art. 3.1.

¹⁶⁵ Ibid., art. 3.1.

¹⁶⁶ The implementation date has recently changed to 1 January 2022, it used to be 1 January 2021: <https://www.rijksoverheid.nl/actueel/nieuws/2020/05/20/nieuwe-datum-inwerking-treding-omgevingswet-1-januari-2022>. This change of envisaged implementation date is due to the fact that there are doubts whether the IT needed to implement the Environment Act might not be ready in time. This is not the first time the implementation is postponed.

¹⁶⁷ Dutch Ministry of Interior Affairs, Infoblad Verbouwingen gives a good overview. It is available here: <https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/brochures/2010/07/20/verbouwingen/infoblad-verbouwingen-16-7.pdf>.

¹⁶⁸ See section 4.3 below.



In order to obtain an *Omgevingsvergunning*, the project developer should indicate the plans in the online tool *Omgevingsloket Online* (www.omgevingsloket.nl). With this tool, one can first check whether it is necessary to apply for an *Omgevingsvergunning* (*vergunning-check*), and if this turns out to be necessary, the application is automatically sent to the right authority, who will then decide whether or not (or under which conditions) a permit can be granted. This tool is a one-stop-shop, which also takes into account whether the project entails changes to a monumental building.

The Environmental Planning Act replaces many different Acts and Regulations, it aims to centralise the rules on spatial planning and construction. The Environmental Planning Act also creates an umbrella under which more detailed rules are laid down in four main Regulations: *Omgevingsbesluit* (Regulation on the Environment), *Besluit Kwaliteit Leefomgeving* (Regulation on the Quality of the Environment), *Besluit Activiteiten Leefomgeving* (Regulation on Activities in the Environment) and *Besluit Bouwwerken Leefomgeving* (Regulation on Buildings in the Environment). These four Regulations together specify the rules applicable to activities, for example industrial activity, and buildings. They specify which activities may take place where, under what conditions and what kind of procedures are available for obtaining a permit for the envisaged activity of building. The rules applicable to buildings are very relevant for POCITYF. Therefore, these rules are explained below as construction law.

Municipality vs. Province

Whereas construction activity within urban areas is regulated by municipalities (who draft the spatial plans and are the permitting authority for construction activities), part of the planning area for POCITYF is located in Olympia Park, which is partially rural area (*landelijk gebied*). In rural areas, the province plays a large role. In this case, the province of Noord-Holland is the authority. Spatial Planning in this area is based on the *Provinciale Ruimtelijke Verordening*.¹⁶⁹

4.2.2. Construction Law

Current Regime: Woningwet (Building Act) and Bouwbesluit (Construction Regulation)

The *Woningwet* (Building Act) specifies that, unless deviation is explicitly allowed in the permit (*Omgevingsvergunning*), it is not allowed to construct a building which does not adhere to the rules applicable to that type of building.¹⁷⁰ Next, this Act specifies that the rules applicable to different types of buildings need to be laid down in a Regulation.¹⁷¹ This has been implemented by the adoption of the Construction Regulation (*Bouwbesluit*).¹⁷² This Regulation gives a detailed description of all construction rules in the Netherlands for new buildings and renovations of existing buildings - ordered in safety norms, health norms, usability (*bruikbaarheid*) and sustainability. Projects in Alkmaar which change the construction of buildings (including isolation measures, windows, etc.) will have to comply with the Construction Decision. Importantly, the Construction Decision also implements the requirements of the EU Energy Performance of Buildings Directive in the Netherlands.

The focus of this section is the energetic performance of buildings. As POCITYF will include both new buildings and the renovation of existing buildings in Alkmaar, both are treated below.

¹⁶⁹ https://www.noord-holland.nl/Onderwerpen/Ruimtelijke_inrichting/Omgevingsvisie_en_PRV/Beleidsdocumenten/Provinciale_Ruimtelijke_Verordening_juni_2019.pdf.

¹⁷⁰ Woningwet, art. 1b.

¹⁷¹ Ibid., art. 2.

¹⁷² Bouwbesluit 2012, available at <https://wetten.overheid.nl/BWBR0030461/2020-03-10>.



New Buildings

For new buildings, the current norms are based on the EPC (*energieprestatiecoëfficiënt*). The norms differ per building type.¹⁷³ From 1 January 2021 onwards, new buildings must comply with the BENG Norm (Almost Energy Neutral Building, or *Bijna Energieneutraal Gebouw*).¹⁷⁴ This is also an implementation measure for the Energy Performance of Buildings Directive. This is relevant for demo sites where new buildings are erected, such as in *Bloemwijk*.

The BENG Norm consists of three parts, namely (1) the maximum energy need of a building, to be calculated in kWh per m² of usage surface per year; (2) the maximum primary fossil fuel energy usage, also in kWh per m² of usage surface per year; and finally, (3) the minimum amount of renewable energy, in percentage of the energy usage.¹⁷⁵ These three criteria reflect the ‘trias energetica’ of minimising energy usage, increasing energy efficiency of the energy that needs to be used and increasing renewable energy. The exact norms per building type differ and are very specific - they will be part of the Construction Regulation from 2021 onwards.

Renovation of existing buildings

For the renovation of existing buildings, the norms are less strict.¹⁷⁶ However, still, an improvement compared to the norms a few years ago is required. The exact norms are very specific and can be found in the Construction Regulation itself.

New Regime: Besluit Bouwwerken Leefomgeving (Regulation on Buildings)

With the introduction of the Environmental Planning Act (see above), the parts of the *Woningwet* applicable to buildings, as well as the *Bouwbesluit* will be replaced. The rules from the *Woningwet* will be adopted in the *Omgevingswet*. The *Bouwbesluit* will be replaced by the *Besluit Bouwwerken Leefomgeving* (Regulation on Buildings in the Environment),¹⁷⁷ one of the four major Regulations that is adopted under the umbrella of the Environmental Planning Act. This Regulation copies many of the rules that were applicable in the Construction Regulation already before, although some rules are also updated.¹⁷⁸ Whereas most rules remain the same, the structure of the Regulation is very different. The old Regulation was based on different pillars, namely safety norms, health norms, usability (*bruikbaarheid*) and sustainability, the new Regulation is based on construction in general, construction of new buildings, renovation of existing buildings, use of buildings and demolishing of buildings. Another main difference between the old regime and the new regime is that some rules used to be determined by the national legislation (the Construction Regulation) will now be brought back to the municipal competence.

An interesting rule from the new regime is that whereas the *Besluit Bouwwerken Leefomgeving* provides energy and sustainability norms for buildings, municipalities can adopt *stricter* norms than the national norms, via specific rules (“*Maatwerk*”). This is possible via two ways, first of all via the specific conditions of a permit (norms for one building or one construction permission) and secondly for an entire area, via the *Omgevingsplan*. This allows municipalities to aim for higher ambitions with regard to energy and sustainability. It must be noted that only stricter norms are

¹⁷³ *Bouwbesluit*, art. 5.2.

¹⁷⁴ <https://www.rvo.nl/onderwerpen/duurzaam-ondernemen/gebouwen/wetten-en-regels/nieuwbouw/energieprestatie-beng/indicatoren>.

¹⁷⁵ *Ibid.*

¹⁷⁶ Construction Decision, art. 5.6.

¹⁷⁷ A consolidated version (including the latest changes, dated 13 May 2020) is available at https://aandeslagmetdeomgevingswet.nl/publish/pages/179195/bbl_geconsolideerd_matrix_13_mei_2020.pdf.

¹⁷⁸ See for example *Besluit van 13 december 2019, houdende wijziging van het Bouwbesluit 2012 en van enkele andere besluiten inzake bijna energie-neutrale nieuwbouw*, available at <https://zoek.officielebekendmakingen.nl/stb-2019-501.html>.



allowed, municipalities are not allowed to adopt *lower* norms than the norms enshrined in the Bbl.¹⁷⁹

Nitrogen Compensation Obligations

A large issue in the Netherlands at the moment is the issue of nitrogen deposition within protected nature areas. These areas currently contain too much nitrogen - whereas the Dutch government has a duty to protect these areas and to reduce the amount of nitrogen on the basis of EU law. This is why the Dutch Council of State (*Raad van State*) declared that the policy with regard to nitrogen (*programmatische aanpak stikstof, PAS*), based on compensation of the effects afterwards, could not serve as a basis for permits anymore and had to be redesigned.¹⁸⁰ The redesign process is currently ongoing and many measures are considered as part of a policy package to reduce nitrogen deposition. However, in the meantime, it is not possible to obtain a permit for any activity that emits nitrogen - including construction activity. Whereas the nitrogen emissions from construction activity are relatively low, it is still difficult to obtain the permit. This issue needs to be monitored throughout the project.

4.3. Dutch Heritage Law

For cultural heritage buildings or buildings within historic city centres, heritage law may be applicable. Although there are no Alkmaar demo sites situated in monumental buildings or areas, the historic city centre of Alkmaar is one of the replication areas. Moreover, as the project can also serve as an example for other Dutch cities, it is relevant to show the different rules regarding the renovation of different types of buildings and districts.

Monuments

There are different classes of monumental buildings in the Netherlands. Buildings which are considered of national importance or significance can be given the predicate 'national monument' (*rijksmonument*). Buildings with regional importance or local importance can be given the predicate 'provincial monument' (*provinciaal monument*) or 'municipal monument' (*gemeentelijk monument*). In principle, a building cannot be more than one type of monument at the same time, so it is either a national monument or a provincial monument or a municipal monument. In Alkmaar, there are 341 national monuments and 184 municipal monuments.¹⁸¹

¹⁷⁹ Bbl, art. 4.150. See also: Mr. J.J. Karens, prof. dr. ir. A.G. Bregman en prof. mr. dr. K.J. de Graaf, 'Duurzaam wonen: de rol van het bestemmingsplan en het toekomstige omgevingsplan' in KNB, *Preadvies Duurzaam Wonen*, p. 104.

¹⁸⁰ Raad van State, 29 May 2019, ECLI:NL:RVS:2019:1603 and ECLI:NL:RVS:2019:1604.

¹⁸¹ Information provided by the municipality of Alkmaar.



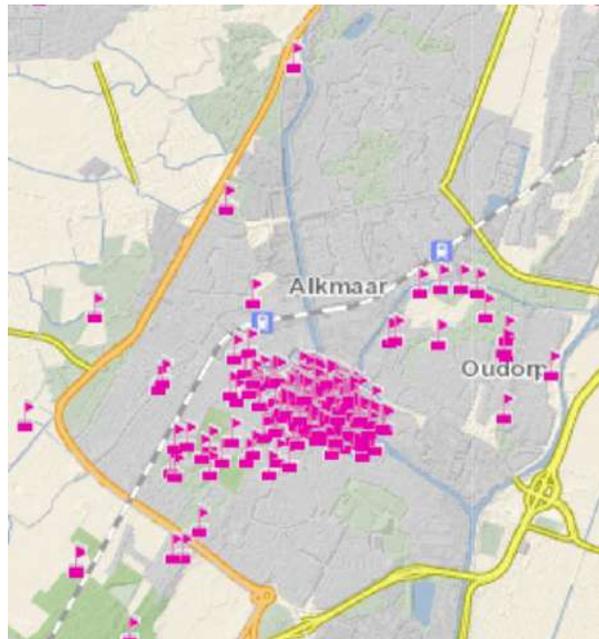


Figure 2: Location of Monuments in Alkmaar, source: viewer tool at maps.noordholland.nl.

The legislation on monuments used to be all in the same Act, the Monuments Act (*Monumentenwet 1988*), but this has been split with the introduction of the *Omgevingswet*. Now, the rules on how buildings (and other forms of heritage, such as archaeological sites and movable property) receive their predicate of ‘monument’ and the rules on selling or leasing monumental buildings are laid down in the Heritage Act (*Erfgoedwet*), whereas the rules on changes in the physical environment, including changes to monumental buildings, are laid down in the *Omgevingswet* and in the local regulations that stem from this Act.¹⁸²

Beeldbepalend pand

Next to the legislation applicable to monuments, it is also possible to mark certain buildings as *beeldbepalend pand*. There is no direct translation in English, but with this predicate, the municipality indicates that the building has a significant appearance. The protection of this predicate is less strong than that of monuments, which means that only the outside appearance (façade and roof, or sometimes only the façade) needs to stay in its original form, but that changes inside a building are permitted.

Alkmaar has 918 buildings that are qualified as *beeldbepalend pand*.¹⁸³

Protected village or city areas

Some areas in the Netherlands are given the predicate ‘protected village or city area’ (*beschermde dorps- of stadsgezicht*). The main difference between this predicate and the abovementioned categories is that this predicate is valid for an entire area or district. Buildings located within such areas are not protected as strictly as monuments (although there may be monuments located within a protected area, for which the stricter protection regime is applicable). However, some elements of construction law are restricted for buildings in these areas. As the city centre of Alkmaar is one of the replication areas of the POCITYF project, the exact construction rules in this area are relevant to consider in the development of the projects.

In general, local rules need to take into account the cultural and historical values of sites and districts. For protected city areas, specific rules are written in local regulations

¹⁸² See section 4.2.1.

¹⁸³ Information provided by the municipality of Alkmaar.



(*Bestemmingsplan*), which means that the rules are different for each area. The municipality of Alkmaar has three areas with this predicate. The historic city centre, Westerhoutkwartier and Droogmakerij De Schermer.¹⁸⁴ How these areas are regulated is stipulated in the local Heritage Regulation, which is treated below.

With regard to the norms applicable to monuments, a relevant rule from the new *Besluit Bouwwerken Leefomgeving* (Dutch construction law) is that the rule that buildings need to have an energy label when they are sold, is not applicable to monuments, irrespective of whether they are local monuments or state monuments.¹⁸⁵ This Regulation also provides several other exceptions for monumental buildings compared to the general construction rules applicable in the Netherlands: for example, several construction and renovation activities are allowed (without a special permit) for all buildings but not for monumental buildings.¹⁸⁶ This means that for the same construction intervention, a permit will be needed when the intervention relates to a monumental building. This requirement introduces an extra check for construction plans which is not necessary for normal buildings but which helps to preserve monumental buildings.

4.4. Local Obligations in Alkmaar

Next to obligations from Dutch law, there may also be local laws and policy documents in the Municipality of Alkmaar that POCITYF projects will have to take into consideration. First and foremost, the local implementation of spatial planning law will be relevant, as the required permits for construction work will have to fit within the local framework. The local Heritage Regulation has already been mentioned, but next to this Regulation, the local Area Regulations (*Bestemmingsplan, Omgevingsplan*) are relevant. For Alkmaar, there are several restrictions with regard to Olympia Park (PEB1). Part of this zone is protected landscape, as it entails specific landscape types: “*droogmakerijenlandschap*”, and partially “*jonge duinlandschap/strandwallen-en strandvlaktelandschap*”.¹⁸⁷ Moreover, it is a protected birds area (*weidevogelgebied*). In the protected zones, only limited construction activity is allowed: only a limited amount of high buildings, and not too many buildings in total. This should be taken into account when the plans for this area are developed.

Secondly, some local legal documents are relevant for POCITYF. For example, the local Heritage Regulation stipulates how municipal monuments and protected village or city areas should be treated. In the local Heritage Regulation of Alkmaar (*Erfgoedverordening Alkmaar*), it is forbidden to damage or destroy a monument and to perform actions as mentioned in art. 2.2 of the Act on General Provisions of Physical Environment Law (*Wet Algemene Bepalingen Omgevingsrecht*),¹⁸⁸ which are in practice ‘to demolish, to disturb or to change in any aspect’.¹⁸⁹

Especially the latter, to change in any aspect, is relevant for any proposed replication projects within POCITYF. In the local Heritage Regulation of Alkmaar, it is also stated that an *omgevingsvergunning* will only be granted when there is no overriding interest of heritage conservation (“*indien het belang van de monumentenzorg zich daartegen niet verzet*”).¹⁹⁰ Whether this condition is satisfied in a particular case, is assessed by the Monuments Committee

¹⁸⁴ See <https://www.gemeentelink.nl/gemeente/alkmaar/stadsgezichten/> for maps and more detailed information on these protected areas.

¹⁸⁵ Bbl, art. 6.28.

¹⁸⁶ Bbl, art. 2.15g.

¹⁸⁷ <https://maps.noord-holland.nl/WebViewer/index.html?viewer=ilc>.

¹⁸⁸ Erfgoedverordening Alkmaar, art. 10:

https://decentrale.regelgeving.overheid.nl/cvdr/xhtmloutput/historie/Alkmaar/417940/417940_1.html.

¹⁸⁹ Wet Algemene Bepalingen Omgevingsrecht, art. 2.2(1)b.

¹⁹⁰ Erfgoedverordening Alkmaar, art. 11.



(*Monumentencommissie*), which is created by the local Heritage Regulation of Alkmaar.¹⁹¹ This committee advises the local authorities on whether or not a *omgevingsvergunning* should be granted in a particular case.

This means, for example, that solar panels on monumental buildings are only possible in certain cases, and only under certain conditions. How this is implemented, differs per municipality. In Alkmaar, the website provides that it will often not be possible to install solar panels on a monument, since this would affect the monumental look of the building.¹⁹² However, it could be possible to install solar panels on a side building next to the main building, assuming that the side building has less monumental value than the main building. Moreover, where it concerns The *Rijksdienst voor Cultureel Erfgoed* (State Service for Cultural Heritage) has published a guideline with considerations on how and under what conditions solar panels can be installed on monumental buildings.¹⁹³

Thirdly, policy documents adopted by the Municipality of Alkmaar can be relevant. The city government (*College van B&W*) is formed by a coalition of five parties. In their coalition agreement, the city government states that it focuses on concrete measures and that it follows the national guidelines on the energy transition.¹⁹⁴ Alkmaar as a lighthouse city fits well in this approach, as the POCITYF project will provide a lot of experience on which concrete measures need to be adopted in order to facilitate an energy transition in various districts of Alkmaar.

4.5. Interim Conclusion

In this section, the regulatory framework concerning energy law, construction law and heritage law applicable in the Netherlands is applied to the demo projects in Alkmaar, in order to assess whether any legal/regulatory obstacles can be identified in advance. As a preliminary remark, it must be noted that it may be possible that there are no upfront regulatory issues but that these issues come up during the coming years, when the proposals are further concretised and executed. Moreover, as many laws that are relevant for POCITYF are planned to undergo revision in the coming few years, it may also be that issues that are unproblematic under the current rules will become problematic in the future, or vice versa, that issues that are currently problematic will be resolved already by the legislative revisions. Issues that arise during the project will be adopted in the revision of this Deliverable in 2022.

The demo projects planned in Alkmaar at the moment are categorised in four pillars. The projects envisaged under these pillars are mentioned below, with an assessment of whether there are any specific points of attention or unresolved issues in the regulatory framework.

(Stand-alone) Positive Energy Buildings

Buildings will be equipped with state-of-the-art insulation, solar PV installations, heat pumps and home batteries. There are no legal impediments to these projects per se, as long as the projects comply with the Construction Decision (*Bouwbesluit*). If, for some reason, a deviation from the Construction Decision is needed, this is possible under the condition that the offered solution is equivalent (*gelijkwaardig*) to the technical standards required by the *Bouwbesluit*, to be defended

¹⁹¹ Ibid., art. 3.

¹⁹² <https://www.erfgoedalkmaar.nl/nieuwsbrief-53/verduurzaam-je-monument/>.

¹⁹³ Rijksdienst voor Cultureel Erfgoed, 'Zonne-Energie en Uw Monument - Wegwijzer voor Eigenaren en Huurders', available at <https://www.cultureelerfgoed.nl/publicaties/publicaties/2014/01/01/zonne-energie-en-uw-monument-wegwijzer-voor-eigenaren-en-huurders>.

¹⁹⁴ Coalitieakkoord "Alkmaar aan Zet" 2018-2022, p 10.



by the applicants in the permitting procedure and to be decided by the authorities that hand out the *Omgevingsvergunning*.¹⁹⁵

Another point of attention relates to the proposed home/building energy management systems: they need to comply with data protection and privacy law. Furthermore, if monumental buildings are involved, legal issues may arise as these changes may endanger monumental features of the building. No monuments are involved in the demo sites in Alkmaar, but this may become an issue for replication areas.

In general, for this pillar and the next pillar, there are several Dutch technical standardisation norms (NEN-norms) that are applicable. For example, NEN norm 1010 is applicable to low-voltage electrical installations and aims to ensure the safety of this type of installations. Moreover, there are also norms applicable to the persons who design and install such installations. Based on NEN 3140 (low voltage) and NEN 3840 (high voltage), it needs to be clear for each installation, which person is the responsible person (*installatieverantwoordelijke*). This person needs to ensure that the installation was performed safely and that, after the construction work has finished, the installation can be used safely.

Flexible and sustainable district heating/cooling with innovative heat storage solutions

This pillar entails several projects, such as the installation of a city energy management system, based on powermatcher technology, the installation of stationary battery systems for energy storage, a virtual power plant which combines the supply and demand patterns of the different solutions, usage of DC grid technology and wind turbines which produce hydrogen. Legal issues related to these solutions are the following: again, for the energy management system and the virtual power plant, it is important that these comply with data protection rules, especially where personal data are involved.

Regarding stationary battery systems, they are not forbidden under EU or Dutch energy law, but there are rules related to which entity can own a battery system. For example, whereas network operators (both DSOs and TSOs) could benefit from battery storage systems for solving congestion issues, they are not allowed to operate such installations, except in very specific circumstances.

With regard to district heating/cooling networks and heat storage solutions, it is important to take into account the current legislative revision of the Heat Supply Act, which may impact the feasibility and the business case of the plans.

E-mobility integration into smart grid

Under this heading, the following projects are envisaged: smart solar charging stations, using the batteries from EVs in the virtual power plant, smart control of electric buses and the usage of public lamp posts based on DC network technology.

With regard to smart solar charging stations, using batteries from EVs in a virtual power plant, and smart control of electric buses, no legal impediments are visible in the current legal framework. It is important that the contracts between different entities (such as the virtual power plant operator, the mobility service provider(s), the charging station owner(s), the EV owners and the bus company) are adjusted to the specific functionality that is asked. Dutch private law gives these entities the freedom to engage in such contracts.

¹⁹⁵ Bouwbesluit, art. 1.3 (Gelijkwaardigheidsbeginsel). In Dutch: Aan een in hoofdstuk 2 tot en met 7 gesteld voorschrift hoeft niet te worden voldaan indien het bouwwerk of het gebruik daarvan anders dan door toepassing van het desbetreffende voorschrift ten minste dezelfde mate van veiligheid, bescherming van de gezondheid, bruikbaarheid, energiezuinigheid en bescherming van het milieu biedt als is beoogd met de in die hoofdstukken gestelde voorschriften.



With regard to Direct Current (DC) network technology, the current standard in the Netherlands is Alternating Current (AC). As mentioned above (section 4.1.6), an exemption from several network codes will be required in order to use a DC network.

With regard to smart mobility, several Dutch standardisation norms (NEN-norms) are applicable, with regard to charging stations, electrical buses, and the communication between buses and charging stations. These norms have to be respected, and parties involved in the e-mobility projects need to make clear agreements on who is responsible for following which part of the norms.

Citizen-driven co-creation

This pillar aims at community engagement and at replication of the demo solutions. In practice, this comes down to stakeholder and ecosystem management, group meetings and the organisation of an innovation festival. No legal/regulatory impediments are expected from this type of activity.

Other Remarks

Several innovative projects that are possibly problematic under existing Dutch energy law can obtain an exemption under the Dutch Experiments Measure. This measure allows for exemptions from the Dutch gas and electricity legislation. This proves to be very helpful for projects in the context of POCITYF. However, one limitation is that where the Dutch legislation is based on EU law, no exemptions are possible. This can be a barrier to innovative projects. This needs to be monitored throughout the project. If it appears in the course of POCITYF that this is indeed a barrier, a suggestion could be to make experimental exemptions possible in EU law as well. This should be developed further in the course of POCITYF.



5. Portuguese Regulatory Framework

5.1. Portuguese Energy Law

5.1.1. Introduction

Implementing innovative solutions to a problem can often require legal hurdles to be cleared. As regulations tend to be enacted and modified in response to an activity, it is foreseeable that the solutions to be implemented through the POCITYF project - given their pioneering nature - will to an extent be at odds with the existing legal regime.

This is reflected when looking at the legislative priorities of today, with policymakers seeking to enact new legal regimes concerning emerging energy solutions (such as energy sharing between positive energy buildings; energy sharing within districts; peer-to-peer energy trading; and vehicle to grid frameworks). The topics of renewable energy communities transferring energy between buildings, trading energy in the market and e-vehicles being used and incentivised will be discussed through this analysis of the Portuguese framework.

As a result of these changes in the legal landscape, there may be two different kinds of obstacles (besides blatant prohibitions) to energy innovators - either that the law recently enacted is unable to sufficiently address the targeted problem; or that there is no regulation specifically concerning itself with a particular solution (potentially even involuntarily restricting an innovation).

Before exploring the intricacies of the applicable Portuguese legal framework affecting the solutions proposed by the POCITYF project, it is necessary to address the actual legislation that establishes the basis for the electricity system.

5.1.2. The basic principles for the organisation of the electricity system

Decree Law (DL) 172/2006¹⁹⁶ established in 23rd August 2006 provides the basis for the national electrical system organization and operation. This DL describes the regulatory framework for the generation, transmission, distribution and commercialization of electricity and for the electricity markets organization.

In Portugal, exploration of concessions, for transmission and distribution grids, organized markets, last resort suppliers and the logistics of changing suppliers is regulated by the Energy Services Regulatory Authority (*Entidade Reguladora dos Serviços Energéticos* - ERSE),¹⁹⁷ which (for the purpose of contextualising this within EU law) serves as Portugal's National Regulatory Authority. DL 172/2006 defines an organised market as a system with different contracting methods that allow demand and supply of electricity to meet, and parties to search for market instruments which have electricity as their underlying asset.¹⁹⁸

DL 172/2006 stipulates that, under the 'ordinary and special regime',¹⁹⁹ the generation of electricity requires the awarding of production and operating licenses.²⁰⁰ In principle, this creates an obligation on POCITYF (when generating electricity from renewable energy sources - RES) to

¹⁹⁶ DL 172/2006, Diário da República, Series 1, n.º 162/2006, 23 August 2006 <<https://dre.pt/pesquisa/-/search/540627/details/maximized>>; in its 11^o version, last altered by DL 76/2019, Diário da República, series I, n.º 106/2019, 3 June 2019.

¹⁹⁷ DL 172/2006, Article 3(4)

¹⁹⁸ DL 172/2006, Article 2 (qq).

¹⁹⁹ Which applies to production through cogeneration, renewables and self-consumption.

²⁰⁰ DL 172/2006, Article 4(1).



attain the relevant licenses. There are, however, multiple exceptions to this rule; these can be found in specific regulations (such as the regulation pertaining to self-consumption). This is further explored in the following paragraphs.

The electrical energy generation from RES, using only one production technology, technology with maximum installed capacity up to 1MW with the objective of selling all the energy to the grid, subjected to previous registration and the acquisition of an operating license (*Certificado de Exploração*).²⁰¹

For every individual Generation Centre,²⁰² there must be a corresponding production license when the production units use the same primary source.²⁰³ The licensing terms of every generation group that use the same primary source are present within the production license of the correspondent Generation Centre.²⁰⁴ Further, if electricity generation is pursued in conjunction with energy storage, the production license shall incorporate the conditions applicable to the storage of energy - however if the energy storage is pursued independently, a distinct storage license (*Licença de Armazenamento*), with specific terms to be defined, is required.²⁰⁵

The license requirements are of relevance for the POCITYF project as it entails the creation of large production capacity (above 1MW) that will be covered by the license requirements of this DL. Further, articles 27.º-B and 27.º-C will also apply to the acquisition of an exploration certificate should their facility have a generating capacity of between 30kW and 1MW.²⁰⁶

DL 172/2006 establishes that the issuance of a production license is dependent on the previous allocation of capacity, establishing the requirements for it.²⁰⁷

The operator will issue a title in the name of a requiring party within 45 days of hearing the national energy system administrator (if additional explanations are not necessary).²⁰⁸ The allocation of capacity is dependent on a deposit being made within 30 days of the date on which the operator is informed of there being capacity available, and will stipulate conditions of access.²⁰⁹ In some cases a tendering procedure (*procedimento concorrencial*) is in place.²¹⁰ The deposit will have combined value of:²¹¹

- €10,000 for each MVA (Mega Volt Amp) reserved.
- A maximum of 5% of the costs bared by the system operator in the construction and/or reinforcement of the grid necessary to receive the energy produced by the Generation Centre.
- Value of the title issued by the system operator in the terms communicated by the entity managing the tendering procedure (if applicable).

The reservation of transmission capacity in the national distribution and transport grid may be dependent on the prior tendering procedure mentioned above, if such is established by ministerial

²⁰¹ DL 172/2006, Article 4(5).

²⁰² DL 172/2006, Article 2 f): Generation Centres is the generic designation given to hydroelectric station, power station that uses RES in cogeneration or thermoelectric plant.

²⁰³ DL 172/2006, Article 4(6).

²⁰⁴ DL 172/2006, Article 4(9).

²⁰⁵ DL 172/2006, Article 4(6,9,10-11).

²⁰⁶ See below the requirement of UPACs and CERs., section 5.1.3 Legal regime applicable to self-Consumption.

²⁰⁷ DL 172/2006, Article 5-A (1).

²⁰⁸ DL 172/2006, Article 5-A (4, 10, 12).

²⁰⁹ DL 172/2006, Article 5-A (11)

²¹⁰ Ibid.

²¹¹ Ibid.



order from the government member responsible for energy.²¹² The tendering procedure can be digital, with access open to all the interested parties who fulfil the requirements established in the tendering procedure.

The Portuguese Directorate General for Energy and Geology (DGEG), is the competent entity for issuing the production licenses. When issuing them, it shall consider:²¹³

- The Generation Centres' impact on the national electricity grid,
- Their contributions to the environmental targets as well as the renewable energy and gross consumption targets;
- The production technique in question and their contribution for the environmental policy and electric system's flexibility;
- The reliability and security of the electricity system.

The production license (required for installations with a generation capacity of above 1MW) is dependent on a positive environmental impact assessment (EIA).²¹⁴ This is however, largely unproblematic, as the legal regime on EIAs does not seem concerned with RES, not including them in the projects covered by the DL (with the exception of hydro projects transferring over 100 million m³/year of water).²¹⁵ Where the installations (even those not ordinarily covered by the EIA DL) are located in areas identified by the "Rede Natura Program"²¹⁶ as conservation areas, an EIA (to be granted by the Commission for the Coordination and Regional Development - *Comissão de Coordenação e Desenvolvimento Regional* - CCDR) is required.²¹⁷

These considerations matter for the POCITYF objectives since the solutions to be employed aim at ticking every box of the concerns by: lowering the burden on the national electricity system; contributing to a more environmentally friendly energy production and use; increasing the system's flexibility by introducing decentralized units (buildings) which cover their own as well as and other buildings' needs and distribute the energy they produce locally not threatening the security of the electricity system.

The cost of connecting an electricity generator to the grid must be met by the license holder. Construction or reinforcement of the national electricity grid infrastructures that are not established in the national distribution and transmission grid's investment and development plan (being asked to be anticipated), are born by the requesting party.²¹⁸ This may be of relevance to the POCITYF project, as if the energy surplus from certain buildings becomes considerable (and use of a distribution grid is required), there would be administrative hurdles (and fees payable to the DSO) if a connection to other buildings is to be made.

Energy produced from renewables is taken into account within the national energy policy, and operators must do what possible to give equal treatment and opportunities to RES generators.²¹⁹ Furthermore, these sources currently benefit from being treated more equally than others - a result of the State's active interest on their development. This may be seen for example by:

²¹² DL 172/2006, Article 5-B (1,2).

²¹³ DL 172/2006, Articles 6 (1-a), c), g), h)).

²¹⁴ DL 172/2006, Articles 33-J (3) g), 33-M (2, 3).

²¹⁵ DL 151-B/2013, 31 of October 2013, Annex I.

²¹⁶ Established by DL 140/99, 24 of April 1999.

²¹⁷ DL 172/2006, Articles 10-A(1).

²¹⁸ DL 172/2006, Article 16-A, 16(1-C).

²¹⁹ DL 172/2006, Article 17, 17-A.



The production of electricity through renewable energy, based in only one production technology, with a maximum installed capacity up to 1 MW and focused on the total sale of the energy to the grid is remunerated, by choice of the produces, either through the general remuneration (market prices sale) or guaranteed remuneration (based on a tendering regime that fixates the tariff value based on the lowest price offered).²²⁰ In short feed-in schemes support the production of renewable energy.

The DL establishes that a ministerial order shall establish a guaranteed capacity for production centres in the national electricity system.²²¹ This means that renewable energies may also have an advantageous grid access.

5.1.3. Legal regime applicable to the self-consumption

DL 162/2019²²² establishing the legal regime applicable to the Self-consumption (which came into force in the beginning of 2020) is extremely relevant when discussing new and emerging Portuguese legal regimes that address Smart Cities - and consequently aspects of the solutions to be put into practice by the POCITYF project. To better understand the opportunities and constraints related to self-consumption it's important to clarify the legal aspects of it (keeping in mind that this DL is under revisions and changes are to be expected).

Renewable energy communities and production units for self-consumption

DL 162/2019 sets out the legal regime for renewable energy communities, transposing Directive 2018/2001.²²³ In the Portuguese legislation, self-consumption is defined as 'the consumption of electric energy produced by a unit that primarily runs on the renewable energy associated with an electrical installation of use (IU).²²⁴ Importantly, DL 162/2019 also provides definitions for **UPAC** (*Unidades de Produção para o Autoconsumo* - Production Unit for Self-consumption) and **IU** (*Instalação Elétrica de Utilização* - Electrical Installation of Use). While the IU is simply an electrical installation intended to allow for the electricity to be used,²²⁵ the definition of UPAC is more specific and abstract. The UPAC stands for one or more Production Unit for self-consumption that mainly uses the renewable energy as a primary source, associated to one or various IU to satisfy its own electricity needs. The UPAC might be the property of (or managed by) a third party, who installs, exploits, meters, and maintains the UPAC, under the instructions of the self-consumers. In essence, the UPAC seem comparable to the CECs (Citizen Energy Community) mentioned in the EU Law section.

DL 162/2019 also discusses renewable energy communities, recognizing their contribution to the attainment of Portugal's goals and objectives regarding energy and climate. In essence, CERs are comparable to RECs in EU Law. A CER is defined as:²²⁶

a, profit or non-profit, legal person based on an open and voluntary membership of members, partners or shareholders, who may be natural or legal persons (pessoas individuais ou colectivas), public or private in nature, autonomous from their members

²²⁰ DL 172/2006, Article 27-D(1).

²²¹ DL 172/2006, Article 33-A(1).

²²² DL 162/2019, Diário da República, Series 1, N.º 162/2006, 25 October 2019. <<https://dre.pt/pesquisa/-/search/125692189/details/maximized>>.

²²³ DL 162/2019, Article 1(2); See EU law section 3.1.7.

²²⁴ DL 162/2019, Article 2(d), cc)).

²²⁵ DL 162/2019, Article 2 t).

²²⁶ DL 162/2019, Article 2 j).



and partners but effectively controlled by them (including small and medium-sized enterprises or local municipalities).

The DL establishes cumulative requirements for the membership or participation of legal persons: they should be located in proximity to the renewable energy projects or develop activities related to the renewable energy projects; and the projects are detained and developed by the legal person itself;

This means that municipalities may be members of a CER. This is in line with the POCITYF, wherein public buildings are used (as the municipality is a party to the project and supports the proposed solutions).

Per DL 162/2019, renewable energy communities may:²²⁷

- *Produce, consume, storage and sell renewable energy through renewable energy supply contracts.*
 - *Share, within the electricity their units produce without prejudice of their rights and obligations as consumers.*
 - *Access all adequate energy markets both directly or through aggregation, without suffering any discrimination (they are nonetheless liable for any deviation they cause on the national energy system.)*
- Lastly, the participation in a CER while retaining their rights and obligations as end consumers, is a right of consumers in itself.²²⁸*

These objectives are also aligned with those of the POCITYF, as CERs can produce, consume and store their electricity, allowing them to employ almost all of the planned technical solutions.

Requirements of CERs and UPACS

It is important to note that the licensing and registration requirements and the regime on commercial relationships, rights, duties and metering of CERs are the same as for UPACs (although additional requirements may be enacted by way of a ministerial order).²²⁹ This means that the regime established through DL 162/2019 is cross-sectional to both of these communitarian legal persons. Further:

The POCITYF project seeks to create districts where buildings are not only self-sufficient, but also stresses the need to meet the electricity needs of the neighbourhood by incorporating it as a goal. Thus, the creation of either a CER or a UPAC is required if buildings are to share the energy they generate within a district.

The conditions for the use of UPACs and CERs are directly dependent on their installed capacity:²³⁰

- Installations with a capacity of below 350W are not subject to any prior verification or notification.

²²⁷ DL 162/2019, Article 19.

²²⁸ DL 162/2019, Article 19(7, e)).

²²⁹ DL 162/2019, Article 20(1).

²³⁰ DL 162/2019, Article 3.



- Installations with a capacity between 350W and 30kW (inclusive) are only require prior notification to be given.
- Installations with a capacity between 30kW to 1MW (inclusive) require a prior registration and the award of an exploration certificate.²³¹ Further, if the registration request predicts the possibility of injecting power into the national/public electricity grid (RESP), the system operator will issue a statement on the technical conditions of grid access, with compliance with the applicable regulation required for the use of the UPAC.
- Installations with a capacity of above 1MW require the UPAC to have a production and operation license (*licença de produção e exploração*).²³² If the UPAC is capable of injecting over 1MW into the public grid, that the possibility of obtaining a production license is dependent on the previous allocation of grid capacity.²³³

DL 162/2019 also establishes that the surplus electricity (after self-consumption) may be sold either through bilateral contracts or in the organized market, directly (to another market participant) or through an aggregator.²³⁴

The ability to sell directly is a boon to the POCITYF project, as it opens the possibility for parties to buy and sell at a rate which better reflects the scarcity or oversupply of the electricity market. When trading electricity in the market, self-consumers will be held accountable for any deviation that they may cause in the national electric system.²³⁵

When selling electricity to other parties, the self-consumer must inject only the agreed amount of electricity into the grid, as the consumer shall withdraw that amount from his connection point. The self-consumer's responsibility results from the fact that a lack of compliance with the contract will result in the electricity supplied to the final customer being sourced from a pool (which, lacking the injection, becomes unbalanced between outputs and inputs). As a result, self-consumers' responsibility translates into a duty to rectify the imbalance (through acquiring enough electricity to cover their lack of injection), or transferring their balancing responsibilities to a market participant or designated representatives.²³⁶

Who can install a UPAC

DL 162/2019 seems to support the creation of positive energy districts in projects that join a diverse group of parties, as self-consumption through a UPAC is open to self-consumers acting both individually *and* collectively, such as:²³⁷

- condominiums / buildings with or without horizontal ownership;
- neighbouring self-consumers; industrial, commercial, or agricultural units;
- other infrastructures located in a defined area which has a UPAC;
- Renewable Energy Communities - (CERs).

²³¹ Certificate granted under, DL 172/2006, Article 27-B and 27-C added by Article 3. DL 76/2019, Diário da República, series I, n.º 106/2019, 3 June 2019 <<https://dre.pt/application/conteudo/122476954>>.

²³² Article 8 et seq.

²³³ DL 172/2006, Article 5-A, added by DL 76/2019, Diário da República, Series I, n.º 106/2019, 3 June 2019, Article 3, in force since 4 June 2019.

²³⁴ DL 162/2019, Article 4(1).

²³⁵ DL 162/2019, Article 4.

²³⁶ DL 162/2019, Article 4(2).

²³⁷ DL 162/2019, Article 5(1).



While allowing CER participation in self-consumption Production Units may represent a good method of incentivising private investments, it is necessary to establish how the considered communities are to interact with the CER. The UPAC, instead of seeking to make a profit, aims primarily to provide its members (or the place where the community operates) with environmental, economic and social benefits. For CERs, meanwhile, getting a solid return on an investment may constitute its primary goal. While the provisions on UPACs do not mention the possibility of having municipalities as a member, the possible participation of CERs seems to open the door to indirect participation by the municipality.

The neighbourhood and proximity to the project is assessed by Portuguese Directorate General for Energy and Geology (DGEG), in regard to the physical and geographical continuity of the project.²³⁸ The transformation substations connected to the project, the different voltage levels in the project, and “any other technical and regulatory elements” all stand as relevant factors for the assessment. The assessment then can be qualified as being technological in nature. However, the DGEG has not been set any objective requirements / standards to guide its decision-making. This raises questions relating to: (1) the exact definition of a ‘proximity relation’; (2) whether the distance from the project as a whole has a higher impact than the distance from the other participants; and (3) whether the size of a participant (and its contribution) affects the assessment.²³⁹

This might be problematic when implementing some solutions, should the various positive energy districts be intended to form one large UPAC/CER, as the distance between them may bring issues. If, instead, each individual district acts as its own UPAC/CER, it is unlikely that any issue pertaining to proximity will be discussed, as the proximity between buildings does not seem to constitute a problem under DL 162/2019 (except for in cases where there are technological limitations or problems with connections between them).

When intending to connect a Production Unit covered by a guaranteed compensation to a UPAC, the Production Unit’s metering system must allow for differentiation between the electricity produced by the UPAC and the electricity produced by the guaranteed compensation unit. This means that, with due precautions, it may be possible to connect an already existing renewable energy production installation to the collectives that are already taking advantages of investments made in the surrounding areas.

Collective self-consumers²⁴⁰

When the self-consumer participating in the UPAC acts as a member of a group (a ‘collective’), DL 162/2019 raises additional obligations and requirements:²⁴¹

- When the UPAC installation registry is made on behalf of a condominium, potentially financed by homeowners (*condóminos*), the procedure must follow what the Civil Code states for innovations in a condominium. This means that it must be approved by the majority of the homeowners and that majority be representative of two thirds of the building’s total value. Further, the owner who votes against may be excused from

²³⁸ DL 162/2019, Article 5(2).

²³⁹ This can be compared with the implementation in the Netherlands, where proximity is based on the “postal code rose”, see section 4.1.5.

²⁴⁰ The use of the word collective here results from the fact that, under Portuguese Law, a legal person is a definition which includes any person with legal personality and capacity, including natural persons, so the term collective is used to differentiate between an individual and a company/association or other.

²⁴¹ DL 162/2019, Article 6.



- supporting their share of the costs if the innovation is considered a luxury expense or disproportional to the cost of the building).²⁴²
- Even when the Production Unit is not made in behalf of the condominium but will be installed in common area of the condominium,²⁴³ or the areas are to be used to install cables or other components for the production of electricity, an authorization passed by simple majority in a owners/condominium meeting is required.²⁴⁴

These requirements may represent an obstacle to individuals in residential areas seeking to join a UPAC resulting from the solution's implementation. The need for a majority approval may complicate the access to the project, especially for residential buildings with multiple apartments where the use of a common area may not be optional.

Even when the collective self-consumer is not a condominium, an internal procedure must be approved, with this procedure defining:²⁴⁵

- the requisites of entry and exit of participants;
- the deliberative majorities;
- its electricity sharing rules and resulting ratios;
- rules on the shared payment of the due tariffs;
- what is done with the electricity surplus;
- its commercial relations policy and (if applicable) the use given to the related revenues.

Furthermore, they must also appoint a duly qualified technician and a managing body for the collective self-consumption entity, to be entrusted with the practice of operational management of the activity. The owners may also define the powers of the managing body, granting them the competence to manage the internal grid, to manage the connection with the public service electricity grid, to interact with the operator (e.g. sharing the production ratios), to manage commercial relations of the UPACs (e.g. the conducts to adopt with the surplus and representative powers).

This is not troublesome for the implementation of the project's solutions, and might even be a helpful imposition. Requiring a managing body to be established ensures that the operation keeps running without any unnecessary delays (which may otherwise be caused by a lack of rapidity in decision making, limiting the efficiency of the project), and provides the flexibility required to allow for efficient energy flows between buildings. Moreover, as owners remain in control over the Production Unit and the selection of the managing body, the opportunity to replace an inefficient manager encourages productive management.

Rights of Self-consumers

Most of the rights awarded to self-consumers under DL 162/2019 are compatible with (and indeed support) the POCITYF project's solutions.²⁴⁶

The right to connect units that produce electricity from renewables (through direct lines if necessary), while consuming and even storing that electricity is at the very core of the positive energy buildings and districts solutions, as well as the peer-to-peer (P2P) energy storage and management one. This allows not only for the energy needs of buildings that have renewable

²⁴² Portuguese Civil Code, Articles 1425(1), 1426(3).

²⁴³ These requirements might be relevant in case an entity wishes to explore renewable energies (for a UPAC or CER), or simply lay cables, in the common area of a building in a horizontal property regime (roof or garden) which is not part of the CER or UPAC in itself.

²⁴⁴ DL 162/2019, Article 6(2, 3); Portuguese Civil Code, Articles 1431(2), 1432.

²⁴⁵ DL 162/2019, Article 6 (4).

²⁴⁶ DL 162/2019, Article 7.



energy installations to be reduced (by incentivising them to use the same electricity they produce - or even store it for later use), but also to use the surplus to address other buildings' needs, and even future energy needs (through energy storage).

The possibility for self-consume or store their surplus electricity (to be consumed at a later date) is not the only option included in DL 162/2019. Self-consumers may also enter into electricity purchase agreements (*Contratos de Aquisição de Eletricidade*) with electricity suppliers, or engage in P2P trading.

In the context of the POCITYF solutions, this right allows for efficient energy management that by allowing peer-to-peer and other transactions increases the flexibility of the grid, dealing with the intermittent nature of RES.

Further, the fact that there is a financial incentive for generating surplus electricity boosts interest in joining, and makes it more appealing to invest in installations that might (at times) exceed the energy needed. This may empower consumers to become electricity market participants - an explicit aim of the Clean Energy for All Europeans legislative package. Self-consumers may also request Certificates of Origin for the electricity surplus it injects in the grid, allowing them to benefit not only from the energy sold, but also from the possibility of selling the said the associated certificates in their own market.

Additional consumer rights (such as the right to information, consumer protection rights, and the right to cease generating electricity) are of the utmost importance, since the implementation of POSITYF project (in its citizen driven co-creation solutions and Positive Energy Building and Districts) seeks to attract a considerable number of individuals who produce their electricity without having any technical expertise on the matter, or any experience of doing it professionally.

Duties of Self-Consumers

As for the duties of self-consumers, most of them are not problematic: e.g. complying with the conditions of use, complying with certification requirements, and providing the entities legally responsible for inspecting the production in self-consumption with the necessary technical data.²⁴⁷

The existing duty to shoulder costs (when changing IU connections to the UPAC, of connecting the UPAC to the RESP etc.) and pay tariffs for the use of the public electricity grid may be an obstacle to smaller participants looking to get involved, as the total costs of installing a UPAC/CER may be hard to stomach due to these start-up costs.

The POCITYF project can provide smaller participants with the solutions they need to easily understand how to become involved in the production or storage of electricity. Any effort to simplify how data is made available to citizens will reduce the information disparity between small individual participants and UPACs managed by large corporations.

The Self-Consumer's duty that raises more concerns is the one to ensure that the UPAC is sized in a manner that its production meets the energy consumed in the IU as much as possible is, potentially, far more problematic.²⁴⁸ This seems to imply that DL 162/2019 envisages self-consumption only as a means of self-sustaining, but not to seek profit - while the surplus may be sold but, this does not appear to be the primary focus.²⁴⁹ This raises questions regarding the

²⁴⁷ DL 162/2019, Article 8.

²⁴⁸ DL 162/2019, Article 8 (f).

²⁴⁹ Doubts raise by the apparently incompatible nature of the two energy communities option: what happens if a UPAC is sized to produce the 2500 kWh but invests in energy savings that reduce its annual



compatibility of the UPACs with renewable energy communities (CER), as the latter is predominantly focused on selling energy while the former primarily seeks to use it.

Despite that, the CER (due to the possibility of including municipalities as members) appears to be the better alternative for the POCITYF project. Furthermore, the provision requiring the scale of the UPAC to be adjusted based on electricity demand seems to confirm the understanding that a CER might better fulfil the needs of the POCITYF project.

Metering of UPACS and CERs

It is mandatory to meter the total electricity production, electricity injected and extracted from energy storage facilities connected to the national electricity grid and in a collective UPAC/CER (such as the entities likely to be created by the POCITYF project).²⁵⁰ This metering is done remotely by the system operator, and must be capable of measuring both energy inflows and outflows. Further, the meter should be installed at the connection point between the UPAC/CER and the national electricity grid (and every associated IU except in cases of a smart grid).²⁵¹ The general requirements and rules pertaining to the metering energy consumption using smart meters (as well as an overview of the advantages they provide) can be found in section (3.1.4).

This requirement to utilise smart meters may pose as a challenge when implementing the project's solution across cities other than Evora, as not all locations have a high penetration of smart meters, and the costs tied with acquiring, installing and exploring smart meters must, per DL 162/2019, be borne by the self-consumers (unless the expected installation date was set for the near future).²⁵²

Commercial relationships of self-consumers

In their commercial relationships, self-consumers may (through the UPAC) participate in an organised market, bilateral contracts or peer-to-peer trading (all following the requirements for operating in a market following ERSE regulations).²⁵³

DL seems to share the POCITYF project's aim of simplifying the consumers' access to the market,²⁵⁴ and mentions the system operator should do so by allowing him to access the market, directly, through a facilitator or a supplier that aggregates production.²⁵⁵ This means that buildings where the solutions are implemented will have access to electricity markets in a manner that will allow them to actively interact with the electricity prices.

consumption to only 2000kWh leaving 500kWh structurally available to be sold in the market? In this case the UPAC is no longer sized to meet its consumption needs. However, it seems likely that the result of such clash would be to have the UPAC rebranded as a CER. CERs are by definition able to seek profit and as such this obligation to size the installation might not be applicable to them.

²⁵⁰ DL 162/2019, Article 16.

²⁵¹ The meter must fulfil the ministerial order n.º 231/2013 of 22 July.

²⁵² DL 162/2019, Article 16 (5) (6).

²⁵³ DL 162/2019, Article 17.

²⁵⁴ An aim shared by the Clean Energy Package, see EU law section page 20-22 and for further see EU Commission (DG for Energy), *Clean Energy for all Europeans* (2019) <https://op.europa.eu/en/publication-detail/-/publication/b4e46873-7528-11e9-9f05-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=null&WT.ria_f=3608&WT.ria_ev=search>.

²⁵⁵ DL 162/2019, Article 17 (1) (2).



Self-consumption taxes and tariffs

The UPAC (and consequently the CER) do not incur in tariffs for their internal transfers of electricity. However, when using the national electricity grid, they are required to pay tariffs for grid use (feeding electricity into the grid or consuming electricity from the grid).²⁵⁶ The tariff will, however, see a partial or total tax deduction for the costs related to sustainability and general economic interest energy policy (*custos de política energética, de sustentabilidade e de interesse económico geral* - CIEG). The amount deducted varies based on an order made once per year by the member of the energy minister, who considers the benefits that the self-consumption regime provides, and the existence of disproportional costs affecting the long-term sustainability of the national electricity system. In the absence this decision, the ERSE will define the part to be deducted.²⁵⁷

5.1.4. Portuguese E-vehicle regime

The legal sources regulating e-vehicles²⁵⁸ (electric mobility - *mobilidade elétrica*) in Portugal were adopted before the adoption of DL 162/2019 - which may explain why the regime established is unidimensional. The legal framework concerning charging points addresses the installation and operation of charging points in a detailed manner, but makes no mention of the possibility that vehicles might feed electricity back into the electricity grid.

On the subject of charging points, DL 90/2014 mentions smart meters when stating that the responsible member of the government shall establish, by ministerial order, the requirements applicable to the functioning of charging points.²⁵⁹ ERSE Regulation 879/2015 (adopted in 2015) also noted that charging points should use smart meters²⁶⁰ - by the end of the following year, a ministerial order establishing exactly the same requirement was published.²⁶¹

The character of DL 90/2014 is not directly supportive of V2G (vehicle to grid) solutions, such as those proposed by the POCITYF project. This is because DL 90/2014 establishes a charging point as being infrastructure that is exclusively dedicated to charging the vehicle's batteries.²⁶² Despite this, however, there may be some room for manoeuvre as the same article defining charging points mentions that the vehicles charged may be associated to services related to the electric mobility,

²⁵⁶ DL 162/2019, Article 18; The tariffs' value is established in ERSE, Directive 5º 2020, Diário da República, series 2, part E, nº 57, 20 March 2020, p.157-158 <https://dre.pt/web/guest/home/-/dre/130469271/details/maximized?serie=II&parte_filter=33&day=2020-03-20&date=2020-03-01&drelid=130469191> .

²⁵⁷ DL 162/2019, Article 18º (4), (5);

²⁵⁸ DL 39/2010, Diário da República, series 1, .º80/2010, 26 April 2010, p.1371 <<https://dre.pt/pesquisa/-/search/614137/details/maximized>>; amended three times, by: Law 64-B/2011, Diário da República, series 1, nº.250/2011, 30 December 2011, p.5538-(48), article 139.º <<https://dre.pt/pesquisa/-/search/243769/details/maximized>>; DL 170/2012, Diário da República, series 1, nº.148/2012, 1 August 2012, p.4007 <<https://dre.pt/pesquisa/-/search/179069/details/maximized>>; (and) DL 90/2014, Diário da República, series 1, N.º111/2014, 11 June 2014, p.3096 <<https://dre.pt/pesquisa/-/search/25676885/details/maximized>>

²⁵⁹ DL 90/2014, Article 6 (8).

²⁶⁰ ERSE, Regulation 879/2015, Diário da República, series 2, n.º249/2015, 22 December 2015, p.37122 <<https://dre.pt/web/guest/pesquisa/-/search/72953312/details/normal?q=Regulamento+n.%C2%BA%20879%2F2015>>.

²⁶¹ Portaria 221/2016, Diário da República, series 1, n.º 153, 10 August 2016, p.2714, Articles 1 and 5(2) <<https://dre.pt/web/guest/pesquisa/-/search/75126729/details/normal?q=Portaria+n.%C2%BA%20221%2F2016>>.

²⁶² DL 90/2014, Article 6 (1).



this mention might allow to argue that the DL 90/2014 is compatible with the V2G solution, even not mentioning it directly.²⁶³

The scope of DL 90/2014 is narrow, concerning itself with electric mobility and its impact in the national electricity grid (and giving scant attention to the other innovations that widespread e-vehicle ownership may provide). In essence, it is not truly something that might raise obstacles to the implementation of the POCITYF solutions, as much as it is proof that something in the legal landscape is lacking - namely a framework on the use of vehicles as power storage units capable of injecting power into the grid at different geographical points.

Expecting the creation of specific frameworks is in line with the DL 90/2014 as it mentions that the electric mobility managing entity should cooperate in investigation, update the technology and develop new functionalities of the electric mobility grid and cooperate in the integration of the electric mobility grid with the national electricity system.²⁶⁴ This means that efforts from the managing entity to incorporate V2G services can be expected, and may lead to a direct acknowledgement of this practice in the Portuguese legal framework.

Lastly, it must be mentioned, that while this DL does not establish the possibility of using vehicles as storage units, DL 162/2019 (on Self-Consumption) does so, as its definition of storage energy includes storage in vehicles when the user's installation has a bi-directional charging point.²⁶⁵ As such, it may be argued that this more recent legislation opened the door a bit further to implementing the vehicle to grid approach discussed in the POCITYF, however it is not clear whether this shall be considered a different energy source for effects of the UPAC or CER.

5.1.5. Energy Tax Law

This section will consider the relevant tax measures that might facilitate the implementation of POCITYF solutions, looking at the incentives for renewable energies included in the national personal and business income tax rules, the special consumption's tax and the state budget.

Personal Income Tax

The Personal Income Tax (IRS)²⁶⁶ establishes beneficial regimes for individuals with organised accounting (mainly those who are self-employed or entrepreneurs) who use electric vehicles in their work-related travel.²⁶⁷ Individuals with organised accounting are autonomously taxed in relation to the purchase of a light passenger vehicle, at a rate of 10% for vehicles costing under €20000, and a rate of 20% for more expensive vehicles. Hybrid vehicles are taxed at 5% and 10% respectively. Electric vehicles are exempted from these taxes entirely. This stimulates electric mobility, which is relevant for the POCITYF project.

Corporate income tax- IRC

The benefit for electric cars also exists under the Corporate Income Tax (IRC) framework.²⁶⁸ Under the framework, electric cars are exempted from the taxes, while other vehicles are taxed at a rate of between 10% and 35% - 10% for vehicles which costing less than €27500, 27.5% for vehicles

²⁶³ DL 90/2014, Article 6 (1).

²⁶⁴ DL 90/2014, Article 21 (2) n), o), t).

²⁶⁵ DL 162/2019, Article 2 l).

²⁶⁶ "Código do Imposto sobre o Rendimento das Pessoas Singulares (Código do IRS)", Law 82-E/2014, Diário da República n.º 252/2014, 2nd suplemente, Series I, 31 December 2014 <<https://dre.pt/web/guest/legislacao-consolidada/-/lc/70048167/view>>.

²⁶⁷ Código do IRS, Article 73.

²⁶⁸ "Código do Imposto sobre o Rendimento das Pessoas Coletivas (Código do IRC)", Lei n.º 2/2014, Diário da República, series I, n.º 11/2014, 16 January 2014 <<https://dre.pt/web/guest/legislacao-consolidada/-/lc/64205634/view>>, Article 88.



costing between €27500 and €34999, and 35% for vehicles costing over €35000. This tax is paid by taxable persons that do not benefit from exemptions and do not perform activities of an agricultural or commercial nature.

Unfortunately, it seems that the incentives for renewable energy in both regimes starts and stops at electric vehicles. Also, despite the substantial tax exemptions offered, the incentives for electric cars are limited to business vehicles.

The general tax law, besides the incentives on the acquisition of electric cars by businesses, does not show any manifest advantage or support of the POCITYF project. That means that special taxes must be considered as well as the tax included in legal documents which are not entirely tax oriented, such as the National State Budget.

Special Consumption's Tax

The Special Consumption's Tax Code (CIESC)²⁶⁹ encompasses a diverse set of consumption taxes that impact a wide range of goods. Within that range, it establishes a tax (known as the ISP) for petroleum and energy products. The ISP covers electricity, gas and carbon-based fuels.²⁷⁰ The fuels used by public transport vehicles, and the electricity used by trams, undergrounds, trains and trolleys, are exempted from this tax. As can be seen, a missed opportunity is that this regime does not show support for renewable energy production or the use of private electric vehicles, which could both have been exempted.

The CIESC establishes the minimum and maximum ISP unitary charges (tariffs) over the different fuels and energy products. In the tariff structure, it may be argued that the tax values are more advantageous for electricity than for carbon-based fuels.²⁷¹ This difference in values amount to (what may be interpreted) as a support for the use of electricity over hydrocarbons - but even then, there is no distinction between energy generated from RES and electricity generated from fossil energy sources. Further RES does not see any exemption under the CIESC, as the one that exists for biofuels.²⁷²

On top of the already mentioned levies, there are additional CO₂ emission costs that should be considered with the ISP.²⁷³ Electricity produced from renewable sources pays no such CO₂ tax, which means that, to a point, this can be identified as a support for renewables and therefore relevant for the POCITYF project.

The support for renewable energy in tax law seem to come from indirect benefits more than it does from big exemptions based on the environmental advantages they have when compared to fossil fuels.

State Budget

The 2020 State Budget²⁷⁴ also contemplates some tax exemptions and other provisions which may be relevant for the deployment of the POCITYF solutions. First of all, it directly mentions the possibility of creating environmental tax deductions in the IRS (individual income tax) that cover

²⁶⁹ “Código dos Impostos Especiais Sobre o Consumo”, Decree-Law n.º 73/2010, Diário da República, series I, n.º 118/2010, 21 June 2010

<<https://dre.pt/web/guest/legislacao-consolidada/-/lc/34478675/view?q=73%2F2010>>.

²⁷⁰ CIESC, article 88 (1) d), 88 (5).

²⁷¹ CIESC, articles 91, 92; see that the tax value for electricity is comprehended between 1 and 1,10 euros per MWh while (for comparison) for unleaded petrol is between 359 and 650

²⁷² Biofuels exemption CIESC article 90

²⁷³ CIESC, article 93.

²⁷⁴ “Orçamento do Estado para 2020”, Law 2/2020, Diário da República, Series I. n.º 64/2020, 31 March 2020 <<https://dre.pt/home/-/dre/130893436/details/maximized>>.



the acquisition of self-consumption production units and heat pumps with an energy label of A or higher.²⁷⁵ Until the end of 2020, the government will have the competence to decide on the scale of the deduction, with the aim of empowering the decentralised production of energy. The direction and extension of this competence is also defined: it should allow a deduction of each individual's contributions for part of the amount paid when acquiring the necessary goods and services for self-consumption, with a cap of €1000.

The 2020 State Budget also keeps a special contribution regime enacted over the energy sector, a holdover from the 2014 State Budget.²⁷⁶ This regime establishes special contributions for the energy sector, but exempts most renewable energy producers from paying those taxes.²⁷⁷

Both measures in the state budget show positive prospects for fiscal support for the deployment of POSITYF solutions throughout 2020.

²⁷⁵ Law 2/2020, Article 333.

²⁷⁶ Law 83-C of 2013, Diário da República n.º 253/2013, 1st supplement, Series 1 31 December 2013 <<https://dre.pt/web/guest/pesquisa/-/search/164404/details/normal?l=1>>, article 228.

²⁷⁷ Law 2/2020, Article 376.



5.2. Portuguese Construction Law

Under the Portuguese construction law framework, Decrees that might affect the implementation of the POCITYF solutions have been issued. Construction law in general is divided between public works (and therefore under the scope of the Public Contracts Code)²⁷⁸ and those procured by private entities (and therefore under the scope of the Civil Code).²⁷⁹ However, the, mostly, procedural impositions of the Public Contracts Code, or of the Civil Code are not the ones which might impose direct restrictions on the deployment of the POCITYF solutions. Specific regulations as the Regime of Urbanization and Construction (RJEU) and the General Regulation of Urban Construction (RGEU) are more explicit establishing restrictions and shall be considered for that reason.

5.2.1. Legal Regime of Urbanization and Construction (RJEU)

Per the RJEU,²⁸⁰ municipalities must enact urbanisation or construction regulations, and regulate the fees and guarantees required to pursue those activities,²⁸¹ with the RJEU imposing restrictions on a general level (to be implemented by municipalities). Municipalities are, nonetheless, expected to establish which projects are of reduced urbanistic importance,²⁸² and such projects are exempted from requirements of licenses, authorizations or prior communication. In essence the RJEU establishes general procedural requirements and provides municipalities with the competence to detail and implement the requirements.

Results and possible obstacles caused by what this document translates to in the municipality will be discussed below in the local requirements section. Therefore, analysing this document may be at times abstract, or of relevance only to the implementation procedure.

Under the RJEU, modification works in immovable property classified (or undergoing classification) under the Portuguese cultural Heritage Law, or in protection zones established under the same law and in immovable property subjected to limitations due to their public use; as well as in areas not included in allotment operations - are dependent on a license.²⁸³ Further, less imposing works depend on prior notification.²⁸⁴

²⁷⁸ “Codigo dos Contratos Públicos”, enacted by DL 18/2008, Diário da República, series I, n.º 20/2008, 29 January 2008, p.753 <<https://dre.pt/home/-/dre/248178/details/maximized>>; as of its version after the Portuguese Parliament Parliamentary Resolution 16/2020, Diário da República, series I, n.º 56/2020, 19 March 2020.

²⁷⁹ “Codigo Civil”, enacted by DL 47344, Diário do Governo, series I, n.º 274/1966, 25 November 1966, p.1883 <<https://dre.pt/web/guest/pesquisa/-/search/477358/details/normal?l=1>>; as of its version after Law 85/2019, Diário da República, Series I, n.º 168/2019, 3 September 2019 <https://dre.pt/web/guest/pesquisa/-/search/124392057/details/normal?p_p_auth=5LNJRj3r>.

²⁸⁰ DL 555/99, “Regime Jurídico da Urbanização e Edificação”, Diário da República, series I-A, n.º 291, 16 December 1999, p.8912 <<https://dre.pt/pesquisa/-/search/655682/details/normal?q=Decreto-Lei+n.%C2%BA%20555%2F99+de+16+de+dezembro>>; in its republished version of DL 136/2014, Diário da República, series I, n.º 173, 9 September 2014, p.4809 <https://dre.pt/web/guest/pesquisa/-/search/56501680/details/normal?p_p_auth=XoJL1674>; amendments up to Law 118/2019, Diário da República, series I, n.º 178, 17 September 2019, p.3 <https://dre.pt/web/guest/pesquisa/-/search/124750731/details/normal?p_p_auth=XoJL1674>.

²⁸¹ RJEU, Article 3.

²⁸² RJEU, Article 2(l) - Work of Little Urbanistic Relevance: Edification and demolition works that due to their size, nature or location have a reduced urbanistic impact.

²⁸³ RJEU, Article 4.

²⁸⁴ Ibid.



*The license and approval of prior information is the competence of the Municipality (Câmara Municipal).*²⁸⁵

As the above passage indicates, not only historic and protected buildings, but also those with a public use (such as schools and public services buildings) require a license to be granted before a construction project can begin. This goes far beyond the comparatively simple requirement of prior notification to be given, as it must be established that the plan is made accordingly to the: Municipal and Intermunicipal land use plans; special protection plans; preventive measures; priority urban development areas; priority construction areas; administrative servitudes; public use restrictions; or any other law/regulation applicable.²⁸⁶ However, there are some projects that are exempted from these previous checks. Those of relevance within the context of this project are projects of little urbanistic importance and projects dealing only with the interior of a building (or fractions of a building, thus not implying changes to the building's structure); its façade; mat and tiles or construction of roofs.²⁸⁷ Further, the aforementioned works, when executed outside of the urban areas, are exempted from licensing requirements, provided the building is used for residential use and is not comprised of more than two independent houses.

The installation of renewable energy production installations (including micro-production) associated with the property's main building is considered a project of limited urbanistic importance under the RJEU. This class of project includes:²⁸⁸ the installation of solar PV panels and solar collectors for the heating of water (with an area no larger than the building's roof or 1m taller than the building); the installation of wind turbines (with a maximum height of 4m above the building's highest point, and with a maximum radius of 1.5m); and the reconstruction of outer walls, the roof using materials that provide energy efficiency gains, providing they have the same aesthetic finish.

These stipulations seem to simplify some of the procedures for the installation of the POCITYF solutions, as they ought to be considered of limited urbanistic relevance. However, this 'projects of little relevance' exemption does not apply to buildings which are classified under heritage law (either individually or as part of a group, or are undergoing classification), nor does it sidestep any additional requirements imposed by the municipality.²⁸⁹

The urban construction projects promoted by the municipalities in an area included by the municipal plan are also exempted from previous control.²⁹⁰ This is unsurprising, as competent entity for issuing licenses is the municipality. It will assess urbanisation works and lands' remodelling works in line with the municipal land use plan, considering protective measures, proprietary urban development areas, public utility restrictions and other legal rules applicable before coming to a decision.²⁹¹ Reasons for refusal of a license may thus include: a lack of conformity with the municipal land use plan; negatively affecting the surroundings of a classified sight and/or monument (or the building itself); negatively impacting cultural, historic, archaeological or landscaped heritage (natural or built); and affecting the towns' aesthetics.²⁹² The same holds true in cases where the project may result in existing services and infrastructure,

²⁸⁵ RJEU, Article 5.

²⁸⁶ RJEU, Articles 20(1) and 24.

²⁸⁷ RJEU, Article 6.

²⁸⁸ RJEU, Article 6-A(1) g), h).

²⁸⁹ RJEU, Article 6-A(2)(3).

²⁹⁰ RJEU, Article 7.

²⁹¹ RJEU, Article 21.

²⁹² RJEU, Article 24.



or where granting a license would require the municipality to incur objectionable installation and maintenance costs (as may be the case when the works impact the water and electricity grids).

Under the RJEU, where construction projects do not follow the locally applicable legal regime, they may be stopped or suspended by the competent administrative bodies. Further, the mayor may order the new building (or modifications) to be demolished, or require alterations to the project to ensure that it complies with the law.²⁹³ If the impositions established are not followed, the mayor may establish an administrative possession and coercively execute the impositions at the expense of the owner. After the measures have been fulfilled, the administrative possession lapses.²⁹⁴

The RJEU appears to also give municipalities various grounds to restrict the deployment of the project's solutions. While the RJEU mainly sets out the procedural requirements for a construction project (e.g. obtaining licenses and seeking approval for plans), it also establishes more specific provisions make clear that certain projects (such as the installation of solar panels) should, as a general rule, have a lower bar applied. However, the specific requirements are to be set by the Municipalities.

Charges are to be paid for the issuing of licenses, declarations, and authorisations.²⁹⁵ Charges are liquidated when a license is approved by the mayor in accordance to the regulation approved by the municipal assembly.²⁹⁶

5.2.2. General Regulation of Urban Construction (RGEU)

Although specific requirements are decided at the municipality level, the RGEU²⁹⁷ is relevant as a national source of law. It is applicable to any construction project, including modifications to existing buildings that are subjected by law to an urbanisation plan (while urban perimeter and rural areas subjected to protection).²⁹⁸ Furthermore, it is applicable to industrial or public use buildings, with the municipality retaining the power to increase the scope of the regulation.²⁹⁹

For Municipalities to issue a construction license for the mentioned buildings, they must comply with this regulation and other regulations that the Municipality are responsibility to enforce.³⁰⁰

The RGEU broadly establishes that all buildings must be constructed in a specified manner and using specified materials, as a means of fulfilling hygiene and security conditions.³⁰¹ Further, under the RGEU, buildings must be constructed (or altered) in a manner that satisfies the fundamental requirements of energy saving and thermal insulation.³⁰²

The RGEU also lays out specific requirements for constructions, divided into the following groups:

²⁹³ RJEU, Article 102, 102-A, 102-B, 103, 105, 106.

²⁹⁴ RJEU, Article 107-108.

²⁹⁵ RJEU, Article 117.

²⁹⁶ RJEU, Article 118.

²⁹⁷ DL 38382, "Regulamento Geral das Edificações Urbanas", Diário do Governo, 1st supplement, series I, N.º 166, 7 August 1951 <https://dre.pt/web/guest/pesquisa/-/search/289214/details/normal?p_p_auth=UofgT0ea> ; in its wording subsequent to DL 220/2008, Diário da República, series I, n.º 220/1951, 12 November 2008, p.7903 <https://dre.pt/web/guest/pesquisa/-/search/439866/details/normal?p_p_auth=XoJL1674>.

²⁹⁸ RGEU, Article 1.

²⁹⁹ Ibid.

³⁰⁰ RGEU, Article 3.

³⁰¹ RGEU, Article 15-16.

³⁰² RGEU, Article 17.



Walls must be built in accordance with the rule and exceptions of articles 23 to 34, which establish the minimum thickness of walls constructed in stone or brick, the exceptions applicable, additional rules applicable to concrete and metal walls, amongst other requirements that walls should meet to guarantee their safety, resistance, insulation (from water and heat) and aesthetics.

Articles 35 to 44 establish the rules applicable to roofs. It shows concern with the structural requirements that aim to ensure the long-life of the building and its safety, and mention once again the need for good insulation.

From article 45 until 52 the regulation establishes requirements applicable to staircases. From 65 to 82 establishes the requirements for interiors and open spaces, as the usable areas and its requirements (width of corridors, area of bathrooms, amongst others).

These requirements are extensive, but they do not jeopardise the implementation of solutions envisaged by the project, as multiple exceptions exist. Nonetheless, the regulations must be considered when changes are substantial.

On a positive note, it seems that this regulation shares concerns on energy savings, which is at least a step in the direction of the POCITYF positive energy buildings and districts solution.

The RGEU also covers aesthetic requirements for construction projects. Projects, including building and renovation works both in urban and rural areas must be planned, executed and maintained in a manner that contributes to the aesthetic value of the group of the surrounding buildings, not jeopardising the appearance, proportions and look of the surroundings.³⁰³ As with the RJEU, the RGEU merely establishes the guidelines for specific requirements, but not their exact content.

Municipalities are responsible for inspecting the constructions, and have the power to issue fines where there is a breach of the regulation.³⁰⁴ Regarding monuments and public interest buildings, municipalities cannot authorise any project without prior authorisation from the National Education Minister. Further, in protected zones (established for public buildings), the approval of the Minister of Public Works is required.³⁰⁵ With this stipulation, the RGEU ensures that the competent entities are involved in the decisions that affect culturally relevant properties.

Under the RGEU, the municipality has the ability to classify a building as being 'of interest', thereafter affording the building special protections. The RGEU also establishes that any modifications that might harm the value of buildings or natural elements classified as having municipal value will not be accepted.³⁰⁶ Under the same provision, the municipality may require restorative works to bring the property back to its original state (when the cultural value justifies so).

In short, municipalities play a pivotal role in all the decisions over construction law, but they are not autonomous when their decision affect national cultural heritage.

Article 59 establishes that:

³⁰³ RGEU, Article 121, 122.

³⁰⁴ RGEU, Article 160-164.

³⁰⁵ RGEU, Article 123.

³⁰⁶ RGEU, Article 124.



*Buildings groups are planned in a manner that their height is established so that no element of the buildings, except for chimneys and decorative elements, surpasses a 45° line from the building line at the established height.*³⁰⁷

Per this requirement, any addition to the roof of a building which forms part of a group may not exceed the highest existing point, unless the addition is decorative. However, to consider a RES installation (such as a solar panel) a decorative element is not advisable, both under the RJEU and under municipality requirements which will be seen in the next sections.

It appears that the special conditions for wind generators and solar/PV panels which are present in the RJEU are not replicated in the RGEU. This may create an overlap between both regulations regarding the installation of solar panels or a wind turbine on a building which is part of a group, as while the RJEU provides that it is of reduced urbanistic relevance if it stays within 1 meter of the building's current peak (for solar panels) or 4 meters (for wind turbines), the RGEU states that no element of the building should stand taller than the group's current peak.

5.2.3. Portuguese Regulation on the Energy Performance of Buildings

Directive 2010/31/EU was transposed in Portugal through the passage of DL 118/2013, which was amended 6 times as of July 2019.³⁰⁸ It covers the energy certifications system,³⁰⁹ the regulation for the energy performance of residential buildings,³¹⁰ and the regulation of the energy performance of services and commercial buildings.³¹¹

The Certification System

The aim of DL 118/2013 is to increase the performance of buildings in general, and it does so by imposing requirements that must be met and certified when:³¹²

- a new building is constructed
- An existing building undergoes considerable modifications
- buildings are sold
- buildings which are used for commerce or services:
 - o and have a usable floor area of 1000 m² or more
 - o Includes shopping malls, supermarkets and covered swimming pools with usable floor area of 500 m² or more
 - o Includes publicly owned buildings, buildings occupied by a public entity and frequently visited by the public, with usable floor area of more than 250 m²

DL 118/2013 also lists the buildings that are exempted from having their performance evaluated. This exemption does not cover historic and/or heritage buildings generally, but places of worship, ruins and military bases specifically.³¹³

³⁰⁷ RGEU, Article 59.

³⁰⁸ Diário da República, series I, N.º 159/2013, 20 August 2013, p.4988 <<https://dre.pt/pesquisa/-/search/499237/details/maximized>> lastly republished by Law 52/2018, Diário da República, series I, n.º 159/2018, 20 August 2018, p.4229 <<https://dre.pt/home/-/dre/116108098/details/maximized>>; amended afterwards by DL 95/2019, Diário da República, series I, n.º136, 18 July 2019, p.35 <https://dre.pt/web/guest/analisejuridica/-/aj/123185845/init/normal?p_p_auth=VUFce49G&_AnaliseJuridica_WAR_drefrontofficeportlet_mode=dt>

³⁰⁹ DL 118/2013, articles 3-21.

³¹⁰ DL 118/2013, articles 21-31.

³¹¹ DL 118/2013, articles 32-50.

³¹² DL 118/2013, article 3.

³¹³ DL 118/2013, article 4; Directive 2010/31/EU of the European Parliament and the Council, of 19 May 2010



Beyond providing for certificates to be issued, DL 118/2013 allows for pre-certificates of performance to be issued. These are available for buildings prior to construction commencing, or for considerable works, and takes into account the technical, economic and environmental viability of highly efficient alternative systems, such as:³¹⁴

- decentralised renewable energy installations
- cogeneration
- heat pumps
- collectives or urban networks of heating and cooling (especially when based totally or partially in energy from renewables)

Both certificates and pre-certificates include recommendations on how to improve the energy efficiency of a building.³¹⁵ These are generally valid for 8 years, though for large commercial and service buildings the certificates are valid for 10 years.³¹⁶ Performance certificates are inspected by the Directorate General of Energy and Geology, and the certificates system is managed by the ADENE (the national energy agency).³¹⁷

The certification system is of relevance to the POCITYF project as it incentivises the development of highly energy efficient projects, especially those with the capacity to generate on a small scale. Additionally, DL 118/2013 highlights the need to support buildings with near-zero energy needs that fulfil their needs with renewable energies, namely renewables produced locally or in the vicinities.³¹⁸ This is, in essence, a summary of the positive energy districts objective of the POCITYF project. DL 118/2013 establishes that the construction of such buildings should be incentivised through the adoption of supportive measures, such as granting funding to potentiate the energy performance of buildings and the transition for buildings with near-zero energy needs.³¹⁹ Although this is not a grant of financial support in itself, the measures shows incentives are to be expected to be implemented through law.

Energy performance of residential buildings

DL 118/2013 establishes the minimum standards applicable both to new develops and to those being modified. The minimum standards aim to promote the improvement of the thermal behaviour (ability to conserve heat) and energy efficiency.³²⁰

The construction of new buildings, interventions in the building structure (walls, ceiling, windows or doors), and energy evaluation of new and buildings undergoing major renovations are covered under the certificates' regime.³²¹ The regulation carves out exceptions for non-residential buildings and buildings classified (or undergoing classification) under Portuguese heritage law.³²² This would impact the POCITYF project should developments to historic buildings be pursued. This exception entails that the requirements for energy efficiency of buildings are not applicable to historic buildings classified under Portuguese heritage law.

on the energy performance of buildings, provides for the exception of cultural heritage buildings and places of worship and ruins on article 4.

³¹⁴ DL 118/2013, article 5.

³¹⁵ DL 118/2013, article 6.

³¹⁶ DL 118/2013, article 15.

³¹⁷ DL 118/2013, article 10, 11.

³¹⁸ DL 118/2013, article 16.

³¹⁹ DL 118/2013, article 17.

³²⁰ DL 118/2013, article 22

³²¹ DL 118/2013, article 23.

³²² DL 118/2013, article 23.



Buildings are evaluated by their thermal behaviour, their energy needs and their overall energy efficiency.³²³ The specific requirements of DL 118/2013 apply to:

- new buildings - thermal behaviour and energy efficiency of the technical systems, even requiring the use of solar installations for water heating, but opening the possibility for other renewable energy installations to be used as an alternative;³²⁴
- Renovated buildings - thermal behaviour and technical efficiency requirements, including the use of solar power installations (which may be substituted by other renewable energy production installations) when adequate;³²⁵
- existing residential buildings - that are renovated for the introduction of a new technical system or improvement of the existing one must comply with the requirements set forward if that is technically sound, functional and economically viable.³²⁶

Compliance with this regime must be assessed under the *ex-ante* control system established through construction law. Therefore, compliance with this regulation must be analysed when issuing any authorisation or license for modification or construction works.³²⁷

Given the intent and objectives of the POCITYF project, it seems is likely that any building renovated during the course of the project will comply with the requirements of DL 118/2013. Nonetheless, the requirements established by the provisions discussed above may be used as a baseline from which the POCITYF project can compare its results, quantifying its achievements against the statutory marker.

Energy performance of services and commercial buildings.

DL 118/2013 also addresses commercial buildings, while also establishing exemptions for historic and heritage buildings.³²⁸ The regulation also covers aspects relating to the thermal behaviour of and energy efficiency concerning:³²⁹ new builds,³³⁰ renovated and remodelled buildings,³³¹ and (to a more limited degree) existing buildings.³³²

While existing buildings are, in principle, not bound to thermal behaviour or efficiency requirements, (except when they are subject to modification), their energy performance must be evaluated periodically, with the intention of identifying methods of reducing their energy footprint.³³³

As with residential buildings, this is enforced through the *ex-ante* control mechanism of licenses and authorisations for urbanisation or modification works, as established by Portuguese construction law, which monitors compliance with this regulation and any adjacent ministerial orders.³³⁴

Its identical character makes it so that the analysis of these regulations on commercial buildings arrives at the same conclusions that were reached for the residential buildings: The POCITYF

³²³ DL 118/2013, article 24, 25.

³²⁴ DL 118/2013, article 26-27.

³²⁵ DL 118/2013, article 28-29.

³²⁶ DL 118/2013, article 29-30.

³²⁷ DL 118/2013, article 30.

³²⁸ DL 118/2013, article 32, 33.

³²⁹ DL 118/2013, article 34, 35.

³³⁰ DL 118/2013, article 38, 39.

³³¹ DL 118/2013, article 42, 43

³³² DL 118/2013, article 46, 47.

³³³ Ibid

³³⁴ DL 118/2013, article 50.



project will be able to comply with the requirements, and moreover may use them as a reference to quantify its achievements above the legally required baseline.

5.3. Portuguese Heritage Law

To create positive energy districts, it is imperative to build new installations and retrofit existing buildings. Cities which enjoy a rich past will naturally have a considerable number of old and historical buildings. This may pose challenges in the implementation of renewable energy and energy efficiency solutions. Understandably, landmarks enjoy more protection than other buildings. This section will analyse how Portuguese law protects cultural heritage buildings, and investigates whether it acts as an obstacle to the implementation of energy solutions (such as the installation of PV panels).

Special attention must be paid to buildings which, since 2009, have been protected under DL 309/2009.³³⁵ DL 309/2009 established cultural heritage classification procedures for immovable property, and set out the legal regime applicable regarding the protection of such locations. DL 309/2009 includes individual and group classifications (*conjunto ou sítio*), and even allows for other forms of real estate (roads, gardens and squares) to be given the cultural heritage designation.³³⁶

As for its individual classifications, it is possible that a building will be declared a monument. As for the group one, it is possible that a group of buildings or lands will be declared a group (*conjunto ou sítio*) accordingly to how those categories established in international law.

*The classification procedure can result in building or places being categorised as having different cultural interest/relevance being rated as property of notional, public or municipal interest.*³³⁷

*When the immovable property in question has been classified as World Heritage, this will amount to it being classified of national interest with its own special protection zone, and that classification being published in the National Journal (Diário da República).*³³⁸

The classification of a building may affect the implementation of solutions due to the restrictions that put into place to protect its value. Additionally, the protection zones (PZs) and corresponding legal regime set out in DL 309/2009 has the potential to impact how and whether POCITYF solutions can be implemented.

There are three zones specified by DL 309/2009, and these are divided into three groups: General PZs; Provisional Special PZs; and Special PZs.

General Protection Zones

While a building or place is undergoing a classification procedure, it establishes a zone that spans 50m from its external borders.³³⁹ This PZ is the least restrictive of the three, with DL 309/2009 establishing only that such zones are administrative servitudes, and

³³⁵ Decree law 309/2009 ‘Património Cultural Imóvel procedimento de classificação e regime jurídico das zonas de proteção’, Diário da República, 1.st series, N.º 206, 23 October 2009; in its more recente version after Decree Law, 265/2012, Diário da República, 1.st series, N.º 251/2012, 28 December 2012.

³³⁶ DL 309/2009, Article 2.

³³⁷ DL 309/2009, Article 3.

³³⁸ DL 309/2009, Article 72.

³³⁹ DL 309/2009, Article 36, 37.



therefore that licenses cannot be granted by the municipality, or other entities, for construction or works that change the topography, alignment, the distribution of volumes, cover or outer coating of the buildings, without previous positive decisions from the competent cultural heritage administration.³⁴⁰ The effects of this general PZ are merely temporary, and it lasts only until a special protection area that better suits to the building or place is granted.³⁴¹

Provisional Special Protection Zones

This PZ serves as an alternative to the General PZ, and may apply to buildings or places during a classification process when the general zones is seen as insufficient to protect the building. The classification lasts until Special PZ status is granted.³⁴² They are set by the IGESPAR I.P. and have the amplitude required for the protection value of the site. This classification may also be applied to zones where it is not possible to build (zonas non idificandi).

This temporary but strict protection may be repealed when the reasons behind its enactment are no longer verifiable.

Special Protection Zones

Unlike the other zones, the special protection designation is not temporary, and is attributed to property of interest classified under the Portuguese Heritage Law.³⁴³ The procedure giving rise to this designation may be requested by any interested party, or may be initiated autonomously by the IGESPAR, which defined the zone together with the regional culture and territory directorate (Direção Regional da Cultura e Território) and the municipality (Câmara Municipal).³⁴⁴

The Special PZ is of sufficient size and imposes sufficient restrictions to allow it to capably protect and esteem the property, with the nature of these restrictions established on a case by case basis. These might include, inter alia, restrictions or prohibitions on construction within certain zones; the designation of an area as archeologically sensitive, with interventions restricted to safeguarding procedures; prohibiting alterations to buildings or groups which are to be preserved; establishing conditions regarding the regularity of conservation work; and imposing rules regarding advertisements in the area.

This Special PZ is aimed at ensuring the surrounding landscape of a property in the different perspectives from which it is contemplated, as such the special zone may include green areas as gardens or historic parks that are relevant to defend the context of the historical building.

Absent a favourable decision from the IGESPAR I.P., no entity can provide licenses for urbanistic operations, authorisations, or accept prior notices - except for works of mere alteration in the interior of the building, providing these have no archeologic impact and urbanistic operations expressly indicated in portray that established the PZ.³⁴⁵

Special PZs are clearly the most likely to create barriers to the employment of POCITYF solutions, due predominantly to their permanence and specificity regarding the type of protection afforded

³⁴⁰ DL 309/2009, Article 14º; DL 107/2001, Diário da República, series I-A, N.º 209/2001, 8 September 2001, Article 43.

³⁴¹ DL 309/2009, Article 40.

³⁴² DL 309/2009, Article 36, 38, 39, 40.

³⁴³ DL 309/2009, Article 36.

³⁴⁴ DL 309/2009, Article 41.

³⁴⁵ DL 309/2009, Article 51.



a property. Any solution, therefore, will have to be tailored to the building in question, and remain mindful of the restrictions in place.

DL 309/2009 also provides for the specific restrictions that come from a group of properties being classified as ‘culturally interesting’. This is different from the PZs and has different implications for the POCITYF project. In these instances, a wider area is jointly classified as culturally relevant - though this does not mean that individual properties or areas within the group have not also been given protected status.³⁴⁶

Restrictions applicable the area of a place or group

In the delimited area of a place or group (conjunto), the IGESPAR, I.P. in together with the regional culture and territory directorate and the municipality where the building is located, shall establish gradual restrictions on: volume; morphology; height; outer shell colours of buildings; zones where it is not possible to build; zones of archaeological sensibility; buildings or groups of buildings which must be integrally preserved; buildings or groups of buildings which may be the object of modificative works; those which are to be preserved and those bound to the works regime of DL 140/2009.³⁴⁷

The restrictions do not differ from those established by under protection zones and are equally flexible. One of the mentioned classifications, which differs slightly from the others, is the classification of a building as of municipal interest:

First the classification of a building, or group (conjunto ou sítio), as of municipal interest is a competence that rests with the municipality.³⁴⁸ This does not mean that the IGESPAR and the Directorate are not involved, since the IGESPAR will issue an opinion on the classification, and both of them will publicise the municipality’s decision.³⁴⁹

Secondly, while buildings of municipal interest might have PZs, this is only the case when the competent municipality organ decides to act, due to the territorial management tools not being sufficient to guarantee the preservation of the environment in question. This is done in the interest of maintaining the valuation of the property.³⁵⁰

Another possible legal obstacle are safeguarding plans (*Plano Pormenor de Salvaguarda*), initially mentioned in Decree Law 380-99. These may include rural and urban land.³⁵¹ This plan works as a territorial management tool that, establishing restrictions aimed at maintaining the natural and historic value of a property by identifying:³⁵²

- Its occupation and priority use
- the areas to be rehabilitated
- the intervention criteria both on the natural and built elements of the land
- the strategical guidelines of intervention in the social and economic plans of urban and landscape regeneration
- limitations and physical, architectural, cultural-historical and archaeological characterization of the intervention areas

³⁴⁶ DL 309/2009, Article 55, 56.

³⁴⁷ DL 309/2009, Article 54.

³⁴⁸ DL 309/2009, Article 57, 59.

³⁴⁹ DL 309/2009, Article 61.

³⁵⁰ DL 309/2009, Article 58.

³⁵¹ DL 380-99, Diário da República, Series I-A, n.º 222/1999, 22 September 1999: revoked by DL 80-2015, Diário da República, series I, N.º 93/2015, 14 May 2015.

³⁵² DL 309/2009, Article 63-66.



- rules on the changes to the land and buildings taking into consideration the urban management and building characteristics of the area (the chromatics and outer shells)
- specific rules for the protection of the archaeological patrimony
- rules for construction, reconstruction, alteration, conservation and demolition works
- rules on publicity on the site
- identification of buildings or groups that might give rise to right of preference in case of sales or donation
- The elaboration of the safeguarding plan is of the competence of the Municipalities with the IGESPA partnership.³⁵³ The Municipality may also grant licenses for urban planning ventures on safeguarded land upon communication to the IGESPA, but construction works, intervention, demolition and rehabilitation of classified buildings under these DL requires a positive opinion by the IGESPA.³⁵⁴

The mentioned set of restrictions in PZs, buildings or groups of buildings, buildings or groups of buildings of municipal interest, and land covered by a safeguarding plan, mostly propose limitations to alterations of the external parts of buildings. This suggests that they may only restrict solutions that impact the outside aesthetic.

Any consideration of the challenges faced when seeking to create and construct of energy positive districts must include a discussion of DL 140/2009, which established the legal regime for projects, interventions and constructions in goods (immovables and others) of national, public or municipal interest.³⁵⁵

The most important contribution made by DL 140/2009 is the establishment of the principles that must be followed when intervening in goods of public interest: prevention, planning, gradualness, inspection and information.³⁵⁶ The *prevention* aspect implies a requirement that alterations, interventions and acts to be systematically considered, monitored and evaluated as so ensure that they do not affect the cultural goods' integrity or authenticity. *Planning*, in this context, refers to the rigorous projections required from qualified technicians to ensure that the methods and resources employed at the execution phase are the correct ones. *Gradualness* can be seen as a synonym for 'proportional' - the restrictions faced must be proportional to the cultural value. *Inspection* refers to series of inspections that will be carried out on any areas or buildings which are approved as compliant. *Information* also carries its ordinary meaning, and refers to the publishing of intervention data in a systematic manner for historical, documental and statistical purposes.

These principles are not directly applicable, but they are close, as they are restated by requirements for alterations and interventions. They may serve as guidelines regarding what to expect and what conduct to adopt when acting with cultural goods and properties. Some examples of the principles put into practice are:

*That approvals and authorisation of works or interventions in cultural goods require the submission of a preliminary report by a qualified technician with at least 5 years of relevant experience.*³⁵⁷

³⁵³ DL 309/2009, Article 67.

³⁵⁴ DL 309/2009, Article 69-70.

³⁵⁵ DL 140/2009, Diário da República, Series I, n.º 113/2009, 15 July 2009, article 1.

³⁵⁶ DL 140/2009, Article 2.

³⁵⁷ DL 140/2009, Article 4-5.



The competent cultural heritage administration office may demand complementary information. It will also proceed with a preliminary inspection of the good and monitor the alterations or interventions relating to the said goods.³⁵⁸

Those responsible for managing the alteration or intervention shall produce two additional reports. An interim/progress report within the term established by the competent cultural heritage administration office, and a final report upon the conclusion of the works (due within 30 days of the project's conclusion).³⁵⁹

The need for a preliminary report on immovable goods stating the criteria substantiating the reconstruction, modification, augmentation and conservation works: The adequacy of the said interventions regarding the characteristics of the building, its degree of classification as national, public or municipal interest and the foundation of its cultural value (historical, architectural, artistic, scientific or technical interest); Compatibility of the materials and propositions with the existing ones; Risk-Benefit analysis of the proposed works/interventions; Consequences of the works/interventions in the archaeological patrimony; the proposed use for the building; bibliography; photographic or video survey of the whole and details of the interior and exterior of the building.³⁶⁰

In theory, it may seem that any solution implemented in a historic building will be acceptable provided it complies with the stated requirements. In practice, the administrative processes may stifle the implementation of solutions by driving up costs and timeframes with the amount of reasonings, authorizations, justifications, and positive opinions required (not to mention inspections) . As for the restrictions in solutions caused by Portuguese heritage law, it seems that the law mostly establishes a general notion that the integrity of the building must be respected. Anticipating the limitations of the solution without an objective and specific standard may, however, be complicated.

It could be argued that unless the specific solution being employed would potentially destroy the culturally relevant part of a building or place, it should be allowed. For example, while it is not unreasonable to argue that installing a PV panel in a building may only be problematic when the roof to which the panel is connected is an essential for the cultural interest of the building. However, there might be problems if the authorities considered that a sizable structure, even when situated on the roof, will break the harmony of the culturally relevant building or place, reducing its cultural value.

It could be expected that Portuguese heritage law would create some obstacles when installing sizable, visible installations on buildings or in places classified as being of cultural interest. However, while some instances are clear-cut (few would suggest covering a roman temple with solar panels), not all will be, and discovering what is permissible and what is not may use up time and other more finite resources.

5.4. Évora Local Requirements

When it comes to applying construction law and cultural heritage law, municipalities enjoy a prominent role in establishing the specific requirements to be followed in adjusting traditional buildings. When looking at a specific locations, it is possible to find that some municipalities establish requirements that go above and beyond the national legislation, due to the

³⁵⁸ DL 140/2009, Article 6-8.

³⁵⁹ DL 140/2009, Article 9-10.

³⁶⁰ DL 140/2009, Article 15.



characteristics of buildings and their historic and immaterial value. In the specific context of Évora - a city and municipality in southern Portugal - it is necessary to assess what form these specific local requirements take, and whether they might clash with the POCITYF project's solutions.

Évora's Municipal Regulation for Construction, Urbanisation and Urbanistic Taxes must first be considered.³⁶¹ Article 3 of the Regulation sets out which constructions are of limited urbanistic importance (accounted for in the Juridical Regime for Urbanization and Construction - RJUE). This type of constructions benefits from the application of a shorter notice requirement and further benefits established in the RJUE. This does not encompass areas containing buildings which are classified as having cultural value, according to the municipal territorial and special planning.³⁶²

Of relevance for the POCITYF project, Article 3 restates the RJEU's support for the implementation of solutions based on PV technology and other technical equipment, establishing that such installations are of limited importance.³⁶³ Nevertheless, the Municipal Regulation imposes additional requirements on the use of panels, demanding that the equipment is not visible from public space. In short, any installation of technical equipment that is not visible from public space and installed in a building that is not classified as having cultural relevance will be a construction of limited urbanistic importance, and is thus able to enjoy a fairly permissive regime.

Within this regulation, the requirements set out in Articles 17, 19 and 24 must be considered:

Article 17

Establishes the general rules of architectonic and urbanistic constraints, establishing that the new constructions and alterations to existing constructions must improve the overall architectural style and surroundings. This must be done by following the provisions of Articles 17 to 27, which may exceptionally be set aside if the municipality is presented with a reasoned justification (due to its functional characteristics or the characteristics of its surroundings), and it agrees to the project.

Article 17 provides for the mandatory application of the forthcoming provisions. It also establishes an exemption for the application of the provisions in exceptional circumstances for building landscape changes. Due to the possibility of exemptions, even if the requirements of this following articles are problematic, there is still an opportunity to bypass them.

Article 19

Provides that inclined roofs should employ traditional construction techniques and covering materials, such as the clay tile in its natural colour, of the Lusa type, Canudo or Romana, except in the case of industrial buildings and equipment. Further, the Article also provides that constructions of limited urbanistic importance (set out in Article 3) may use a different material, providing it adopts the colour of a clay tile.

Article 19 may impose some restrictions that might affect the type of PV shingles used in non-industrial buildings with inclined roofs. Even if the installation of PV units in the building is taken as being of limited urbanistic importance, the colour seems to matter. The use of external equipment, such as PV panels, has its own rules. These are set out in Article 24.

³⁶¹ Évora's Municipality, Public Notice n° 384, "Regulamento Municipal de Edificação, Urbanização e de Taxas Urbanísticas", Diário da República, 2nd series, N.º 79, 23 Abril 2010 <<https://www.cm-evora.pt/pt/site-municipio/atividademunicipio/Regulamentos/Paginas/list.aspx>>.

³⁶² Regulamento Municipal de Edificação, Urbanização e de Taxas Urbanísticas, Article 3(4).

³⁶³ Regulamento Municipal de Edificação, Urbanização e de Taxas Urbanísticas, Article 3(1) K).



Article 24

Establishes the requirements and limitations applicable to solar panels and heating and air conditioning equipment. In essence they should be placed in a manner that ensures they are not seen from public spaces (the street), and when that is not possible, they must be concealed so that their impact on a building's image and its surroundings is limited. When placed in a façade (and visible from public place), they must be concealed by the use of grids or other elements which prevent it from projecting from the façade. Further, when the installation of panels is made onto a surface visible from a public space, the panels must (if technically possible) be at the same level as the remaining coverage.

This requires solar panels to be hidden (or at least obscured) from public as much as possible. This naturally may restrict the POCITYF solutions focused on PV, since the municipal requirements value more the looks of a building than its efficiency, due to the high economic value brought by the overall historic relevance of the city landscape. Even so, it is important to remember that these requirements may be set aside by justifying the interest of the solutions to the municipality - which as a municipality involved in the project - may be more agreeable to lifting some of these restrictions.

Another document of utmost importance is the Évora Urbanization Plan (PUE),³⁶⁴ which establishes rules for construction and renovation works in Évora.³⁶⁵ Within the plan, the city's historical centre is classified as having great cultural value, and is subjected to specific urbanistic rules which cover the green areas within the historical centre.³⁶⁶ The view of the city landscape, especially the historic centre, must be protected.³⁶⁷ Further, within the historical centre of the city, green areas and buildings which enjoy the following additional protection requirements, which must be observed:³⁶⁸

- Interventions on the green areas must be carefully landscaped and treasure the biophysical value of these areas, adjusting to the biodiversity and human use of the areas.³⁶⁹
- Regarding the buildings, the interventions must safeguard and value the property, aiming to endow all with good housing conditions.³⁷⁰ Modifications works should keep the alignment and volume of classified buildings, and even non-classified buildings must have their pre-existing volumes, structural elements of value and decoration elements of value, being respected.³⁷¹
- The restrictions on the historic centre (within the city walls) specifically cover limitations to roofs, wall coverings, window frames and solar panels.
 - o Regarding roofs, the PUE requires red ceramic tiles in the *Canudo* style, or the Roman with edges in *Canudo*.³⁷²

³⁶⁴ Plano de Urbanização de Évora (PUE), Évora's Municipal Assembly 22 January and 29 October 1999, ratified by Council of Minister's Resolutions n.º13/2000, Diário da República, series 1-B, n.º 74, 28 March 2000 - Modified by Évora's Municipality, notice 12113/2011, Diário da República, 2nd series, N.º 107, 2 June 2011; (and) Évora's Municipality, Rectification Declaration n.º1970/2011, Diário da República, 2nd série, N.º 246, 26 December 2011 <<http://www.cm-evora.pt/pt/site-viver/Habitar/ordenamento-do-territorio/>>

³⁶⁵ PUE, Articles 1 and 3.

³⁶⁶ PUE, Article 8.

³⁶⁷ PUE, Article 9.

³⁶⁸ PUE, Article 8 (2).

³⁶⁹ PUE, Article 36.

³⁷⁰ PUE, Article 66.

³⁷¹ PUE, Article 68.

³⁷² PUE, Article 73.



- Regarding wall's coverings and window frames, the PUE establishes requirements of colour and material - e.g. window frames may not be made from anodized aluminium.³⁷³
- Regarding the use of solar energy panels, they are only to be admitted if fixed to terraces, or roofs exposed to the south quadrant, with their top painted in tile colour or grey, and in any case not visible from public areas.³⁷⁴

As mentioned, these specific requirements may limit the solutions applicable to the building. The plan greatly restricts the possibilities of installing a large number of PV panels, not only due to the required characteristics but also due to the placement requirements.

Other locations in the city also deserve special protection, such as urbanisation zone 1 (an area with constructions of urbanistic and architectural value), Malagueira (a singular area of urbanistic and architectural value urbanised following architect Siza Vieira's plan), and the Monumental Green Area (a rural area between the historical centre and Alto de S. Bento, which encompasses 12 elements of patrimonial value).³⁷⁵ The most stringent of protections, however, is reserved for buildings classified as having cultural value - national monuments, immovable property with a public interest, immovable property of value to the municipality. For these buildings, only works of conservation and repair are accepted (and exceptionally, restorative work may be approved).³⁷⁶

In the annex to the Urbanization plan the buildings, façades, areas or archaeological relevance, green areas and specific elements of value that are not classified are identified in accordance to their value as heritage (E₁, E₂, E₃, F₁, F₂, V₁, A, P).³⁷⁷

- In the Buildings E₁ and E₂, conservation, restoration, and rehabilitation works are possible with integral preservation of façade³⁷⁸
- In E₃ the works mentioned might also include the façade
- Facades F₁ must be integrally preserved
- F₂ buildings may be altered, providing the alterations do not result in a significant transformation of the previous lines or the profile of the building group³⁷⁹
- Green Areas (V₁) must see their characteristics relevant to the time period when they were constructed preserved³⁸⁰
- Areas of archaeological relevance (A) and areas in the historical centre require all interventions in the subsoil to be monitored for historic/archaeological purposes³⁸¹
- Specific elements of value, marked with P, should be conserved and esteemed - the demolition or deformation of elements such as chimneys, frizzes, bands, trims, metal bars on balconies, lookouts, flat roofs (or any other element recognised by the municipality) is forbidden³⁸²

This shows that even property (and its constituent elements, such as roof tiles and chimneys) which are not classified under Portuguese cultural heritage legislation can be protected by local obligations. The aforementioned distinctions and restrictions to construction work require a special level of care to be taken when devising and implementing solutions for buildings spaces

³⁷³ PUE, Articles 74, 75.

³⁷⁴ PUE, Articles 76

³⁷⁵ PUE, Articles 10-12.

³⁷⁶ PUE, Articles 6 and 13.

³⁷⁷ PUE, Article 6.

³⁷⁸ PUE, Article 14.

³⁷⁹ PUE, Article 15.

³⁸⁰ PUE, Article 16.

³⁸¹ PUE, Article 17.

³⁸² PUE, Article 18.



identified under a city's urbanisation plan, however there are potential spots which may overcome such limitations. Naturally, not all restrictions are capable of paralysing the deployment of solutions under the POCITYF project, and the municipality's participation in the project, specifically in deciding which buildings are used - could well be an indication that applications for licences to retrofit those buildings will be granted.

Évora's local requirements seem to focus on maintaining the harmony of the city, protecting its sights and surroundings. This preoccupation becomes increasingly clear the closer one gets to its historic city centre, particularly, near monuments and historic buildings. The concerns with disguising PV panels seem to be the one with the most potential to be troublesome, as conditions relating to their installation, operation and maintenance might result in sub-optimal energy generation. The additional concerns with tiles and window frames may also affect the use of solar-based technology, such as PV shingles and glass. Even if the municipality does not oppose to their use, the imposition of additional requirements relating to the installation's characteristics complicate matters. The local requirements seem as to be extension of the cultural heritage law requirements, defining specifically the exact level of care to be taken with those buildings.



5.5. Interim Conclusion

From the review of Portuguese Law, it is possible to see that some of the solutions proposed by the POCITYF project could benefit from a more comprehensive framework. The need for a framework of that sort spans mostly over three of the topics discussed above: Energy Law, Construction Law and Tax Law.

Regarding energy law, the efforts to encompass the technical solutions that envisage utilising electric cars for electricity storage, and envisage consumers being able to act in a market environment, may require to specifically address additional uses of the technologies and simplification of procedural aspects. Regarding electric vehicles specifically, it may be expected that a specific regulation addressing alternative uses for them and their components will become a priority only when it becomes common practice to use them that way. For self-consumers, one might expect to see the procedure becoming more streamlined in the coming years, either because the legal requirements (of licenses) are simplified to incentivise self-consumption, or because some of the required technologies are becoming widespread (e.g. smart meters) and thus more economically viable with lower investment cost or with specific financial products available to households.

On the construction law side, it will be interesting to see whether the pressing environmental concerns will justify a change of perception towards the use of renewables production installations. The debate regarding how the regulations evolve - and whether they become more concerned with efficiency of the buildings and their electricity consumption-production balance than on aesthetics - will surely be a lively one.

Regarding tax law, there are two issues that need to be resolved. First, it needs to be identified what tax benefits would be beneficial for (and need to be enacted to help) self-consumers. Secondly, it is necessary to keep track of whether there will be additional incentives in the use of electric vehicles, or if the government is expecting the lower market price of electricity used as a 'fuel' to incentivise the transition to electric cars.



6. Regulatory Challenges in the Following Cities

This section will shortly elaborate on the regulatory challenges, found in the different Fellow Cities (FC), that might affect the deployment of solutions by the POCITYF project. The problems considered are categorized similarly to the previous analysis of the Dutch and Portuguese Legal regimes as those arising from construction requirements, energy law, local obligations and especially cultural heritage regulations.

The input for this section is provided by the project partners from the different fellow cities: RINA-C (from Bari); ZAG (from Celje); DIPGRA and ITeC (from Granada); European Green Cities (from Hvidovre); Mol (from Ioannina); EMI (from Ujpest).

Therefore, the type of analysis and the level of detail differs per FC. In the 2022 update of this Deliverable, this section will also be renewed with additional findings from the FCs, based on the project findings in the coming years.

6.1 Bari

The legal framework applicable in Bari shows support for renewable energies as Italy seeks to achieve the 2030 renewable energy targets. The analysis on the compatibility between the POCITYF project and the different legal obligations will be analysed below by discussing the applicable energy law (focusing specially on the positive energy buildings objective), construction law, heritage law both at a national and local level. The analysis at a local level focuses on the specific details of Bari regarding the implementation of solutions in potential areas of interest and the possible constraints.

6.3.1. Energy Law

This section illustrates the framework of regulations, standards, policies and process of the Italian energy sector with reference to the POCITYF Energy Transition Tracks. A specific focus on buildings is included in the “Innovative Solutions for Positive Energy (CH) Buildings and Districts” subsection.

The Italian electricity sector is evolving rapidly due to the effects of the profound energy transition, focused on achieving sustainability goals and improving system security. The most significant elements of the new model are the integration and management of renewable energy, energy efficiency, grid digitisation and storage systems. In 2017, the Italian government approved the National Energy Strategy setting out future policy goals for the electricity sector. The objective is to make the national energy system more competitive, sustainable and secure. Italy has already achieved its 2020 renewable energy targets, with energy from renewable energy sources accounting for 17.5 per cent of total energy consumption in 2015, in comparison with the 17 per cent target to be reached by 2020. The main new priority goals are set as follows:

- to achieve the target of a 28 per cent share of renewable energy sources on total energy consumption by 2030;
- to foster low energy-consumption initiatives having the best cost/benefit ratio, to achieve 30 per cent of energy savings by 2030 to their trend in 2030, and give impetus to the Italian energy efficiency industry (e.g., construction of energy-efficient buildings and installation of energy-efficient facilities);
- to speed up the decarbonisation of the energy system, starting from the use of coal in power generation, and to introduce progressive measures spanning the entire energy



- process, thereby achieving significant environmental and health benefits, and contributing to the attainment of European targets;
- to launch the capacity market to guarantee system adequacy, maintaining the necessary gas-fired capacity (with priority to flexible capacity) and integrating new resources into the market (e.g., cross-border renewable-energy power-generating units, storage systems, active demand-side management), further strengthening interconnections with neighbouring countries, increasing the capacity of storage systems, implementing grid projects to integrate renewables, and increase the resilience of the system;
 - to decrease primary consumption of oil products by 13.5 Mtoe (Millions of tonnes of oil equivalent) by 2030 when compared with 2015 levels; and
 - to double investments in clean-energy research and development, from €222 million in 2013 to €44 million in 2021.

The process towards smart grids is a prerequisite for the achievement of the National Energy Strategy (SEN) targets in 2030. The objectives of the Italian energy policy for the next ten years, set precisely by the SEN 2017, provide for a significant development of Renewable Energy Sources (RES) and GD with an expected integration of about 35-40 GW of new photovoltaic plants, mainly attested at the level of distribution networks, to reach, in 2030, 70 TWh (Terawatt-hour) of electricity from photovoltaic plants (+180% compared to 2017), or 39% of the entire gross production of electricity from renewable sources (equal to 184 TWh). It is clear that, for the reasons set out above, the adjustment of the distribution networks from an SG perspective becomes crucial to accommodate the significant increase in estimated GD (about additional 3GWh/year by photovoltaics alone).

The regulatory authorities in the electricity sector in Italy are the Ministry for Economic Development, ARERA, GSE and GME.

- The Ministry for Economic Development oversees Italy's energy policy and has regulatory powers to implement legislation passed by the Italian Parliament.
- ARERA is an independent body that regulates, controls and monitors the electricity and gas sectors and markets in Italy.
- GSE is a publicly owned company promoting and supporting the use of renewable energy sources in Italy. The sole shareholder of the GSE is the Ministry of Economy and Finance, which gives guidance on the activities of GSE in consultation with the Ministry for Economic Development
- GME is a company established by GSE for the purpose of organising and economically managing the Italian electricity market, following the principles of neutrality, transparency, objectivity and competition between producers.

The Italian Wholesale electricity market started to operate as an exchange in 2005 with the liberalization of the demand side bidding. In 2018 gross national production amounting of 295 TWh was satisfied for 70% by thermoelectric production, for 16% by hydroelectric production and the remaining 14% by geothermal, wind and photovoltaic sources. It is worth noting that, starting from 2010, the huge National incentives on renewable energy led to a significant increase in the share covered by renewable sources in the Italian electricity production.



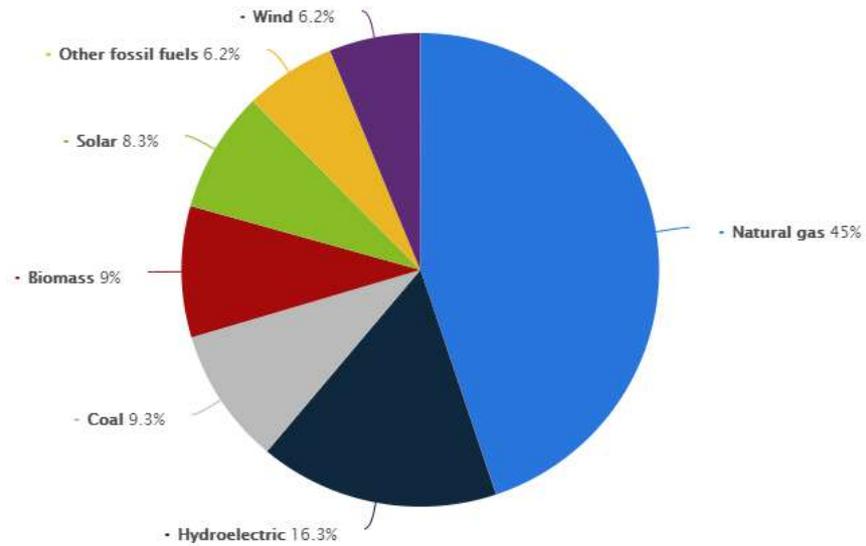


Figure 3: Italian Energy Mix in 2018, source: Statista.com.

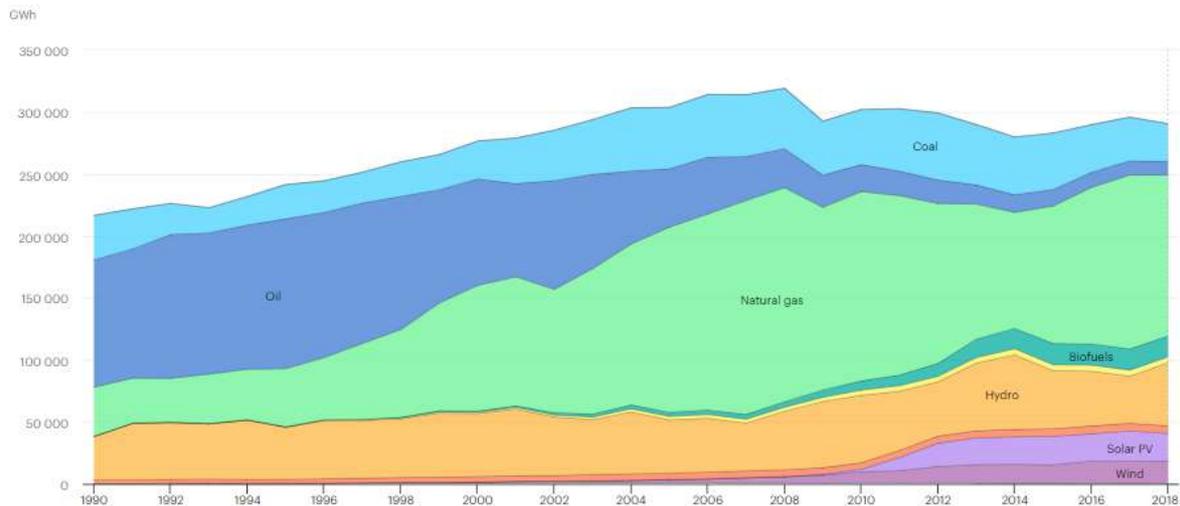


Figure 4: Italian electricity generation by source from 1990 to 2018, source: IEA.

Terna Rete Elettrica Nazionale SpA (Terna) is the transmission system operator, while Terna Rete Italia owns and manages most of the transmission assets. Terna deals with high-voltage electricity transmission (380kV-220kV-150kV). Electricity is transmitted by transferring the power produced in plants to consumer areas. For this to occur, power lines and transformers, elements that make up the transmission system, are necessary. A total of over 72,000 km of power lines are owned and managed by Terna.



This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement N° 864400.



		Who regulates the service	Who provides the service
Permissions		Regions or State (only for power plant with thermal power higher than 300 MWt and offshore wind farms)	Regions, local entities or State(only for power plant with thermal power higher than 300 MWt and offshore wind farms)
Access to system service	Connections	ARERA	Grid Manager (Terna or distribution operators)
	Transport and dispatching	ARERA	Transport: Terna or distribution operators Dispatching: Terna
	Measure	ARERA	Grid Manager (Terna or distribution operators)
Energy selling	Energy selling	ARERA	Free market or GSE in case of dedicated pickup
	On-site exchange	ARERA	GSE

Table 1: Italian grid management and actors.

Distribution is the delivery of medium- and low-voltage electricity to users. The main distribution companies in Italy are e-distribuzione, Unareti, Areti, and Ireti.

The activities of production, import, export, purchase and sale of electricity are free, so that producers, sellers and importers are increasingly growing and competing. The transmission and dispatching activities are reserved to the State and assigned under concession to the National Transmission Grid Operator (Terna). Electricity distribution activities are carried out under concession.

It is possible to define two different kinds of producers:

- Producers: the persons who produce electricity independently of the ownership of the plant or the production unit (UP). The producers are the owners of the electrical workshop and the necessary authorisations for the construction and operation of the production plant.
- Prosumers: are subjects who, at the same time and concerning the same site, are both producers and final customers.

The final costumers can be divided into three categories:

- The final customer is the natural or legal person who purchases electricity exclusively for his own use, regardless of the ownership of the assets.
- An eligible customer is a natural or legal person who has the ability to enter into supply contracts with any producer, distributor or wholesaler, both in Italy and abroad. From July 1 2007, all final customers are eligible.
- The customer with the greatest protection is the final customer who, while falling within the category of eligible customers, is entitled to enter into supply contracts, under conditions defined by the Authority, with the sales company with the greatest protection that provides the service in the area where the user is located. A domestic low-voltage customer or a small low-voltage company with less than 50 employees and an annual turnover of up to 10 million euros may be in greater protection. Sales company for greater protection is a retail company connected to the distribution companies (or integrated into



them in the case of distributors with less than 100,000 users) that sells electricity to customers with greater protection. It cannot be chosen by the customer. In 2000, the most protected electricity sold (then captive market, wider) was 209.4 TWh, down to 63.8 TWh in 2013 and less than 50 TWh in 2017.

The Italian electricity market operates in three different periods

- Daily market (MGP), which trades most of the electricity purchase and sale transactions;
- Intra-day market (MI), consisting of seven sessions which allow market participants to modify the programs defined in the daily market by sending additional sales or purchase offers;
- The market for continuous trading of daily products (MSD).

Market	Aim	Characteristics	Manager	Buyer	Seller	Price Decision
MGP	buying and selling of input and output programmes	Zonal and hourly (selling side) National and hourly (purchasing side)	GME	final customers and their agents (wholesale companies acting as dispatching users)	producers and their agents (wholesale companies acting as dispatching users)	System Marginal price
MI	buying and selling of adjustments to input and output programmes	Zonal and hourly	GME	final customers and their agents (wholesale companies acting as dispatching users)	producers and their agents (wholesale companies acting as dispatching users)	System Marginal price
MSD	supply of resources to solve congestion, to build reserve margins and to balance the network	Nodal	Terna	Terna	producers and their authorised agents	Pay as bid

Table 2: The Italian electricity market operates in three different periods.

The daily market MGP is a marginal market in which the price and volume of each hour are established from the point of equilibrium between supply and demand. Matched purchase offers to refer to units of consumption belonging to Italian geographical areas are valued at the single national price (PUN). The PUN price is equal to the average of the prices of the zones, by zonal consumption and represents the purchase price for end customers. In the last years, due to the increase of RES and to a reduction of the natural gas price, the PUN in all the Italian zones (Northern Italy (NORD), Central-Northern Italy (CNOR), Central-Southern Italy (CSUD), Southern Italy (SUD), Sicily (SICI) and Sardinia (SARD)) decrease consistently.

Currently, all production units (UP) and consumption units (CU) participate in MGP and MI. More in detail:

- the relevant production units (at least 10 MVA) participate individually through their BRP (Balance responsible party). Each relevant UP identifies a dispatching point;
- non-relevant generating units participate in an aggregate form on a zonal basis, by dispatching user and by type. Each aggregate identifies a dispatching point;
- Consumption units participate in an aggregated form on a zonal basis per dispatching user. Each aggregate shall identify a dispatching point.

Only the relevant programmable generating units (thermoelectric and hydroelectric) are obliged to participate in MSDs individually via their BSP (Balance service provider). All other units could not access MSDs until the recent introduction of pilot projects. The dispatching services market, indeed, was created to be the prerogative of conventional programmable plants and has been tailored to their characteristics: to open MSDs, the Authority launched a reform process in 2017 with Resolution 300 aimed at involving new resources to offer services, including renewables, through pilot projects useful to give guidance for an organic reform of dispatching. They have all more or less given the same indication: including new players in this market is very complex, and in cases where there has been effective active participation in the market, it has still been scarce.



ENERGY TRANSITION TRACK - Innovative Solutions for Positive Energy (CH) Buildings and Districts: Overview of the regulations and policies of the Italian energy market

The Italian government has introduced several schemes to support power generation based on renewable energy sources.

To promote and increase the use of renewable energy sources in electricity production and to create demand for electricity from renewable energy sources, the Italian government introduced in 1999 an annual obligation for electricity producers and importers to input a minimum quota of energy produced using renewable energy sources into the national electricity system. An energy operator could discharge its obligation by either producing the entire minimum quantity of energy from renewable sources by itself or by purchasing the whole or part of an equivalent amount, or the related rights (green certificates), from other producers. Green certificates evidence the renewable attributes of the electricity generated. They provided a benefit to the producer in that they could be traded separately from the underlying electricity at a national and international level. From 1 January 2016, green certificates were replaced by a feed-in premium mechanism known as GRIN. The new mechanism guarantees the payment of a tariff in Euro by the GSE on the net production of energy, in addition to the revenues deriving from the valorisation of energy (which can take place through RID or the use of the Free Market by the operator).

In 2005, an incentive system specifically dedicated to solar photovoltaic plants, known as Conto Energia, was introduced. Conto Energia consisted of the payment of fixed incentive tariffs for 20 years starting from the date of entry into operation of the relevant photovoltaic plant (depending upon the capacity of the plant and the level of integration of the plant). Conto Energia is no longer in place for new photovoltaic plants because the budget was reached in July 2013.

Projects aimed at increasing energy efficiency may be eligible to obtain white certificates (also known as energy efficiency certificates). White certificates are tradable instruments that give proof-of-end-use energy savings. The scheme aims at supporting the production of thermal energy from renewables and high-performance cogeneration units as well as small-scale interventions of energy efficiency for private persons and the public administration.

A simplified sale and purchase arrangement is another tool offered by the GSE under which producers are paid a minimum guaranteed price for every kWh. Producers with small-sized plants and a nominal electrical capacity up to 1MW may benefit from this scheme for the first 2 million kWh per year fed into the grid, with the possibility of receiving more if the hourly zonal prices prove to be more advantageous.

Through the net metering service, producers or users may feed into the grid the electricity that they generate on-site, but do not consume immediately, and take from the grid part or all of the electricity that they need at a different time. This system applies to renewable energy plants having a capacity up to 200kW commissioned after 31 December 2007 and to high efficiency combined heat and power plants with a capacity up to 200kW. Under this service, the producer receives a yearly net metering contribution in euros from GSE. This contribution refunds the producer or user for part of the costs incurred for importing electricity from the grid. The energy produced by renewable energy plants has interconnection and dispatch priority. Moreover, the operator of the national transmission grid (i.e. Terna) and the operators of the local distribution grids, have the obligation to connect every plant that makes a connection request to the grids that they operate. A request to be connected to the power grid can be filed before the construction of the plant is completed, or even started because no time limit is set as to how long before the start of operations the request can be filed. The request to be connected to the power grid must be filed with either the operator of the local distribution grid if the capacity requested is below 10GW, or Terna, if the capacity requested is equal to or more than 10GW.



Support to municipalities for investments in energy efficiency and sustainable territorial development

Decree-Law no. 34 of 30 April 2019 (Growth Decree-Law) established economic support in favour of municipalities, up to a maximum of € 500 million for the year 2019 from the Development and Cohesion Fund (FSC) for interventions related to investments in the field of energy efficiency and sustainable territorial development.

The contributions referred are intended for public works in the field of:

- energy efficiency, including public lighting, energy saving in public buildings and public housing, and the installation of installations for the production of energy from renewable sources;
- sustainable territorial development, including work on sustainable mobility, adaptation and safety of schools, public buildings and municipal heritage and the removal of architectural barriers.

Starting from the year 2020, for the above-mentioned projects, the D.L. Crescita has authorized the implementation of a multi-year funding program, whose actual resources are distributed among municipalities with a population of fewer than 1,000 inhabitants, assigning to each municipality a contribution of an equal amount.

Support to Municipalities for Investments in Energy Efficiency and Sustainable Territorial Development:

Decree-Law no. 34 of 30 April 2019 (Growth Decree-Law) established economic support in favour of municipalities, up to a maximum of € 500 million for the year 2019 from the Development and Cohesion Fund (FSC) for interventions related to investments in the field of energy efficiency and sustainable territorial development.

The contributions referred are intended for public works in the field of:

- energy efficiency, including public lighting, energy saving in public buildings and public housing, and the installation of installations for the production of energy from renewable sources;
- sustainable territorial development, including work on sustainable mobility, adaptation and safety of schools, public buildings and municipal heritage and the removal of architectural barriers.

Starting from the year 2020, for the above-mentioned projects, the D.L. Crescita has authorized the implementation of a multi-year funding program, whose actual resources are distributed among municipalities with a population of fewer than 1,000 inhabitants, assigning to each municipality a contribution of an equal amount.

ENERGY TRANSITION TRACK- P2P Energy Management and Storage Solutions for Grid Flexibility

The deeper presence of Distributed Generation system requires more flexibility in the grid system, to do that smart management of the network is required.

Currently, in Italy, 100% HV/MV substations (> 2000) and only the 25% MV/LV Secondary Substations (> 100.000 MV/LV SS) are remotely controlled. Several thousand pole-top MV Switches are remotely controlled few installations of remote control of LV breakers.

The regulator's approach to innovative projects is to precede a stage experimental to the regulation phase at full throttle. A key element of the "pilot projects" is to carry out tests on real and limited cases.

Experiences of regulation through "pilot projects":

- smart grid (resolution ARG/ elt 39 10)



- electric mobility (Resolution ARG/ elt 242 10)
- storage systems (Resolution ARG/ elt 199 11)
- participation of distributed generation in the dispatching services market (Resolution 300/2017/ eel)

The Legislative Decree no. 28 of March 3, 2011 "legislated" the initiative of the authority, providing that:

- "Electricity distributors that carry out modernization works according to smart grid concepts are entitled to a higher return on invested capital for the distribution service, limited to the above-mentioned modernization works " (article 18, paragraph 1)
- Smart grid interventions "consist primarily of systems for the control, regulation and management of loads and production units, including electric car charging systems ".

The current Italian regulations on grid connection standards, for all voltage levels, are subject to the approval of the Regulatory Authority for Energy, Networks and Environment (ARERA). The connection of users to the Transmission Networks, in particular, is subject to the requirements of the Grid Code, which is issued by the Italian TSO, TERNA, with the approval of ARERA. The connection of users to the MV and LV Distribution Networks is instead subject to the prescriptions of the CEI regulations. In particular:

- Technical standard CEI 0-16 is the reference for the connection of active and passive users to the HV and MV networks of electricity distribution companies;
- Technical standard CEI 0-21 establishes the modalities for the connection of active and passive users to the LV networks of electricity distribution undertakings.

Referring to Del. AEEGSI 574/2014 e 642/2014 a Storage system is defined as a set of devices, equipment and management and control logic, functional to absorb and release electricity, designed to operate continuously in parallel with the grid with the obligation to connect third parties or capable of causing an alteration of the exchange profiles with the electricity grid (input and/or withdrawal). The storage system may or may not be integrated with a production plant (if any). This does not include systems used in emergency conditions which, therefore, only come into operation when the power supply from the electricity grid is interrupted for reasons beyond the control of the person who has the availability.

- Bidirectional Storage system: can absorb electricity both from the production plant and from the grid with the obligation to connect third parties.
- One-way Storage system can only absorb electricity from the production plant
- Production side Storage system: installed, either in the DC electrical circuit (possibly also integrated with the inverter) or in the AC electrical circuit, in the part of the plant between the production plant and the electricity meter produced
- Post-production Storage system: installed in the part of the plant between the electricity produced and the electricity meter taken and injected

A storage system is considered to be a production plant (or generation group of a plant) powered by non-renewable sources. As a transitional measure, the procedural and economic conditions for high-efficiency cogeneration plants shall apply. From the point of view of the connection to the grid with the del. 642/2014/R/eel it has been established that the technical requirements of V1 to the 3rd edition of CEI 0-16 and V1 to the 2nd edition of CEI 0-21 must be obligatorily met by all storage systems.



The EU Network Code on Requirements for Generators,³⁸³ in art. 13.6, introduces the important concept of remote control of generation groups, also specifying the maximum time frame within which the signal of active power interruption must be received by the operator of the generation plant. The creation of a logical interface for remote control enables generators to participate in the management flow; the possibility of interruption, in fact, provides the grid operator (e.g. the DSO) with the possibility of compensating for any critical local or generalized situations by intervening on the generator so as to preserve grid security. The CEI 0-16 and 0-21 standards indicate that for the tests (respectively All. E and All. A) it is required that the trip takes place within 50ms and, therefore, they already comply with the 5s requirement required by the RfG.

According to the RfG (art. 15.5) transposition document consulted and sent to ARERA: "For type C (6MW < Power < 10MW and Voltage < 110kV) generation groups connected to distribution networks, as regulated in standard CEI 0-16, island operation is normally allowed on the network of the owner of the generation plant; island operation on the network of the system operator is not allowed, except in regulated cases upon specific request and according to agreements with the relevant system operator and/or Terna". The implementation of the indications of article 15.5.b of the RfG was carried out with a view to adapting the standard to the typical problems of Italian networks, also taking into account the spread of accumulation systems in distribution networks. In the version under consultation it was established that the Distributor may temporarily (for example for maintenance reasons, or for the rapid restoration of the electricity service) maintain in operation, on an intentional island, portions of the MV network pertinent to it and that, in the event of problems that continue over time, temporary supply may be carried out by entering into agreements between owners of production plants, connected distributors, the National Transmission Grid Operator and any passive Users (e.g. disturbing loads or significant power) connected to the portion of the MV network concerned.

According to the text of the RfG on the exchange of data (topic dealt with in Par. 8.10 of CEI 0-16): "concerning the exchange of information:

- generating installations shall be able to exchange information with the relevant system operator or the relevant TSO in real-time or periodically ... as specified by the relevant system operator or the relevant TSO;
- the relevant system operator, in coordination with the relevant TSO, shall specify the content of the information exchanges, specifying the exact list of data to be provided by the generating installation".

In line with the two resolutions issued by the Authority, e-distribution has planned the replacement, as of 2017, of the 32 million 1G meters in the Italian meter fleet with the new 2G electricity meter: Open Meter. The functionalities of the 2G meters are certainly a fundamental element for the smartization of networks; however, many critical issues still need to be solved, in terms of communication infrastructure of an SG, in order to move definitively from experimentation to the production of SGs on a large scale. If we want to mention some open points, think about the problem of open protocols necessary to facilitate interfacing between devices. Open meter, for example, is based on a theoretically "open" communication protocol but, to date, no user has the possibility to interface with it.

ENERGY TRANSITION TRACK - e-Mobility Integration into Smart Grid and City Planning
The state of the art of electric vehicle charging station in Italy is:

³⁸³ Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators.



- 420 EV public charging stations installed in 60 provinces (out of these 300 are installed by ENEL); Quick/Slow charging (3 KW and 22 KW) and fast charging (43 KW) have been developed
- Fast charging (AC 43 KW and DC 50 KW) under test (to be initially used in gasoline filling station);
- 2500 EVs introduced in 2012 (mostly light-duty quadricycles);
- Agreements with regions and municipalities to foster electric mobility (infrastructure);
- Focus on interoperability between energy operators.

Law 190/2014: a gradual ban on the circulation of category M2 and M3 motor vehicles fuelled with petrol and diesel (Euro 0) from 1 January 2019 and provision for a ban on the circulation of category M2 and M3 motor vehicles fuelled with petrol and diesel (Euro 0 and Euro 1) in-service contracts from 1 January 2018.

In the 2017 Stability Law, the Government launched a substantial financing plan for the renewal of the road rolling stock used for Local Public Transport for the period 2019-2033. These include electric and natural gas buses for the integration and replacement of the existing bus fleet. During discussions with Regions and local authorities, it was also decided to proceed with the establishment of an interinstitutional political table for discussion and consultation on transport, composed of the Ministries of Infrastructure, Economic Development and Environment, as well as Regions and local authorities.

It is proposed to accelerate the provisions of paragraph 10 of Article 18 of the Legislative Decree. 257/2016 (transposition of the Alternative Fuels Directive)³⁸⁴ providing that public administrations, bodies and institutions dependent or controlled by them, Regions, local authorities and utilities for activities carried out in provinces with high PM10 particulate matter pollution, at the time of replacement of their car fleet, buses and public utility vehicles, including those for municipal waste collection, are required to purchase at least 30% by 2022, 50% by 2025 and 85% by 2030 of electric and hybrid vehicles with external charging, methane and hydrogen, and electric or methane in the case of buses.

First measures in this sense have already been introduced, with effect from March 2019 to December 2021, and consist in granting a contribution to those who purchase a vehicle with CO2 emissions of less than 70 g/km and an official price of less than €50,000. The contribution is differentiated by emission classes (0-20 g/km and 21-70 g/km) and depending on whether or not a vehicle approved in classes from Euro 1 to Euro 4 is scrapped, and ranges from €1,500 to €6,000. The same law provides for the experimentation of innovative means of transport for personal mobility with mainly electric propulsion, such as segways, hoverboards and scooters. On the other hand, the law provides, for the same period, the payment of a tax for the purchase of M1 category vehicles, if the CO2 emissions are higher than 160 g/km. The tax varies from €1,100 to €2,500 depending on emissions.

In addition, the Decree-Law n.34 of April 30, 2019 (Legislative Decree no. Growth) established that those who, in 2019, purchase, also under financial lease, and register in Italy a brand new electric or hybrid vehicle of categories L1e, L2e, L3e, L4e, L5e, L6e and L7e and who deliver a vehicle for scrapping, belonging to one of the above categories, of which they have been the owner or holder for at least twelve months or of which a cohabiting family member has been the owner or holder for at least twelve months, are entitled to a contribution equal to 30% of the purchase price, up to a maximum of 3.000 euros if the vehicle delivered for scrapping is in the Euro 0, 1, 2 or 3 category.

³⁸⁴ Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure



ENERGY TRANSITION TRACK - Citizen-Driven Innovation in Co-creating Smart City Solutions

In general, the implementation of Smart Grids (SGs) requires the active involvement of end consumers who must accept a new way of energy management based on data sharing. The active user of an SG, for example, will certainly have to share their consumption data with other subjects involved in the management of the SG (e.g. Distribution System Operator or third-party companies) that only after a detailed consumption profiling can implement optimized management logics and propose ad hoc and customer-specific participation mechanisms. It is clear, therefore, that consumers' willingness to integrate into an SG will depend strongly on a real understanding of both the economic and environmental benefits of active participation. In these premises, the promotion of social acceptability will have to be considered:

- a. regulatory interventions aimed at defining possible mechanisms to encourage participation;
- b. communication campaigns aimed at illustrating the usefulness of active participation in SG projects;
- c. search for technological solutions that enable a user-friendly way of participation (e.g. through Apps or Web-oriented tools now widely used in other sectors).

Smart Networks Regulation and Market Constraints

This is one of the two main topics identified, under this analysis, as potential barriers yet to be completely resolved, and that might affect the POCITYF approach in Italy.

The approach chosen by the Italian legislator to test the experiences of regulation in a really limited environment (pilot projects) before issuing general measures, has certainly made it possible to effectively frame intervention actions to implement a gradual demarcation of electricity networks. Nevertheless, the process of “smartization”, involving multiple subjects with different interests, makes it difficult to identify a single business model for all the actors involved and still presents many critical points that require the intervention of the regulator both in technical and social acceptability.

With regard to the technical criticalities, the studies carried out have shown that, although the technological solutions preparatory to demarcation (e.g. communication devices, sensors, etc.) are generally available and mature in their sector of reference (e.g. ICT), they are not always effectively interoperable and therefore cannot be easily integrated into SGs due to lack of homogeneity or languages and mechanisms of communication and cooperation.

Of a different nature from the previous point, but equally relevant to concretely promote the “smartization” of current electricity networks, is the criticality related to social acceptability. The implementation of smart networks requires the active involvement of end consumers who must accept a new way of energy management based on sharing their data and consumption habits. Only after a detailed consumption profiling, for example, will the distribution companies, or third-party companies involved in the management of the SG, be able to implement management logics optimised and propose customer-specific participation mechanisms or charging systems. On the other hand, it is easy to see that consumer willingness to participate will be highly dependent on an effective understanding of both the economic and environmental benefits of active participation. Therefore, regulatory interventions aimed at defining possible incentive mechanisms for participation and national communication campaigns will certainly be fundamental tools for the success of SG projects.

6.3.2. Construction Requirements

Construction activities generally require a specific permit issued by the competent local administration. Depending on the type of intervention, four types of licences exist in Italy:



- building permit: an administrative licence issued by the competent local administration committee to allow the construction in compliance with the relevant town planning provision. A project with all the technical specifications required must be prepared by a technician (e.g. engineer or architect) registered with the competent professional board and submitted for approval;
- certified notice of commencement of works (SCIA - Segnalazione Certificata di Inizio Attività): a simplified type of building licence with a shorter procedure. The competent authorities checks the notice within 30 days from the submission.
- formal notice of commencement of works (CILA - Comunicazione di Inizio Lavori Asseverata): used for minor construction works without making a substantial alteration to the property surface area and to the structures. The formal notice must be submitted by a technical registered with the competent professional board and submitted for approval.
- notice of commencement of works (CIL - Comunicazione di Inizio Lavori): used for minor construction works (e.g. finishing renovation). The notice can be submitted directly by the owner.

Energy Performance of Buildings:

Interventions involving the external envelope of the building and/or the HVAC system require the fulfilment of specific energy performance requirements. The minimum requirements for energy efficiency and energy needs in buildings, in compliance with Directive 2010/31/EU, are defined by the Ministerial Decree 26/05/2015. The Decree sets and regulates:

- the building minimum energy performances, drawn up during the design phase of the building. In the design phase both non-renewable and renewable primary energy must be taken into account;
- the energy performance certification, drawn up upon completion of the building and/or the retrofitting interventions. Only non-renewable primary energy must be taken into account.

Additionally, in Italy, the competence to legislate on energy efficiency is delegated to the Regions and therefore in many cases there are rules and obligations different from the national ones, which still serve as a basic reference. In the case of Bari and Puglia Region any additional requirements are in force in addition to what is required at national level.

A specific report including all the checks required by the national law must be provided to the competent authority together with all the design documents. The energy performance limits of buildings and the related checks depend on the intended use of the building (limits for public buildings are usually more restrictive) and the type of building intervention to which it is subjected. The Italian regulation (Ministerial Decree 26/05/2015) classifies all the interventions as following:

- new construction or first level renovation of existing buildings;
- second level renovation of existing buildings;
- energy refurbishment of existing buildings.

D.M. 26/05/2015 classification	Type of intervention	Main checks required
New construction or 1 st level renovation of existing buildings	- Construction of new buildings including demolition and reconstruction and extension of the gross volume > 15%	1. Average global transmission heat exchange coefficient (H'_T) for the entire



	<ul style="list-style-type: none"> - Building renovations that involve envelope with an incidence > 50% of the total gross surface area of the building and the heating/cooling system 	<ul style="list-style-type: none"> portion of requalified structure 2. Summer equivalent solar area ($A_{sol,est}$) 3. Overall energy performance index ($EP_{gl,tot}$) 4. Average seasonal efficiencies of the systems (heating, dhw, cooling) 5. Thermal production from renewable energy sources 6. Electricity production from renewable sources
2nd level renovation of existing buildings	<p>Building renovations that involve envelope with an incidence > 25% of the total gross surface area of the building and may affect the heating/cooling system</p>	<ul style="list-style-type: none"> 1. Thermal transmittance (U) of the requalified structures 2. Average global transmission heat exchange coefficient (H'_T) for the entire portion of requalified structure 3. Energy efficiency of the new generator
Energy refurbishment of existing buildings	<p>All the operations that have an impact on the energy performance of the building and that:</p> <ul style="list-style-type: none"> - involve an area \leq 25% of the total gross dispersant surface of the building; - consist in the new installation, or in the renovation of a thermal plant serving the building 	<ul style="list-style-type: none"> 4. Thermal transmittance of the requalified structures 5. Energy efficiency of the new generator

Table 3: Classification of interventions and checks required under Italian Ministerial Decree 26/05/2015.

In particular, regarding the production from renewable energy sources, the national law (D.lgs 28/2011) sets the following specifications for new constructions or major renovations (equivalent to the 1st level renovation of D.M. 26/06/2015):

- 50% of the energy requirement for the production of domestic hot water must be produced from renewable energy sources;
- 50% of the energy requirement for heating + cooling + domestic hot water must be produced from renewable energy sources;
- Installation of electricity production plant from renewable sources with a minimum power higher than the ratio between the roof surface of the building and the coefficient 0.5



6.3.3. Heritage Law

Italy has in place a very strict legislation to protect its national cultural heritage. The relevant Italian law on the protection of cultural heritage is the Legislative Decree n. 42/2004 “Code of Cultural Heritage and Landscape” and subsequent amendments that was designed to reinforce the importance of Italy’s cultural heritage and collect all the pre-existing codes.

The Code regulates the procedure for the issuance of a “Declaration of Remarkable Public Interest” procured to protect real estate and other areas with cultural value throughout the country. In particular, the Code protects landscape assets, defined as territory that is expressive of the Italian identity and whose character derives from both natural and man-made factors, and historical buildings.

In order to prohibit owners, possessors, or holders of real estate and areas that have a landscape interest from destroying or harming them, it sets forth stringent rules for the approval of building refurbishment projects and landscape planning projects and activities and establishes the procedure for the approval of “Landscape Plans” affecting certain territories with cultural value in the country, a procedure that includes public participation and consultation mechanisms. In particular, it is required to submit a proposal of intervention to the respective authorities and ask for an authorisation. Certain minor interventions, however, do not require government authorization. It also grants legal recognition to the profession allowed to of intervenors in cultural property and regulates penalties for the violation of the protective provisions.

Limitations in refurbishment of cultural heritage districts and buildings

This the second potential barriers that is to be completely resolved and might affect the POCITYF approach in Italy.

In Italy, listed historic buildings and districts fall under the control of the Ministry of Cultural Heritage and must be treated in compliance with the Cultural Heritage Code. This code imposes considerable limitations on the type of alteration and refurbishment of this class of buildings. Each intervention requires the approval of the government department responsible for monuments and artistic treasures (Soprintendenza per I Beni Architettonici).

The interventions usually allowed are limited to those that will not significantly alter the building appearance, that will be reversible and fall within the principle of minimum intervention (minimal intervention or conservative repair). The main objective is the preservation of the historic buildings and districts ensuring that the original dignity of the building is maintained. Therefore, interventions on cultural heritage districts and buildings require in-depth studies.

The success of the intervention on the historical asset depends on the coordination between different professionals (engineers, architects, conservators and art historian for the most complex cases) confident with the thematic areas of restoration and energy efficiency (with reference to POCITYF innovative solutions for Positive Energy building and districts).

In addition, for listed building with specific architectural constraints the installation of elements affecting the original fabric of the buildings requires a direct approval of the responsible of the Heritage Building Office. Such kind of approval depends on the approach and personal evaluation of the responsible and can slow down the refurbishment process, reduce the installed elements or, at some point stop it completely.

6.3.4. Local Obligations

Local obligation in Italy refers mainly to the urban development and local building regulations. In this section an overview of the local regulatory framework and relationship with POCITYF project is illustrated for the following city Bari. In addition, specific consideration at local level are



provided for the construction and operation of generation facilities which are generally regulated at national level, but can be regulated by regional law for the permitting and authorising procedures.

Urban Development and Local Building Regulations

Bari's potential areas of interest in

The main potential application areas with regard to the interventions (hard infrastructure) falling into the Energy and Construction categories including their application in areas of cultural and landscape constraints, are identified within the PRG of Bari in following macro categories:

1. Areas of public use
2. Areas intended for productive activities
3. Residential areas

The pictures below identify the administrative borders of Bari municipality and the three macro categories



Figure 5: Bari administrative borders and: areas of public use; areas intended for productive activities; residential areas.

Within these macro categories, the legislative articles (Defined by the PRG) that are to define which areas could be implementing project's intervention (further brake-down of the zoning classification) can be discerned.

Regulatory framework

The Italian law regarding urban and rural development is largely delegated to the regions (having the role of coordinator) and to the municipalities (having an operational role).

The Regional and Territorial Plans "Piani di coordinamento" describe guidelines of the overall aims and strategic choices regarding road infrastructures, areas of environmental interest to be safeguarded and the hypotheses of urban development.

On the other hand, the municipal general regulatory plan "Piano Regolatore Generale" (local planning), in the Italian legal system, is the urban planning tool that regulates building activity within a municipal territory, which every Italian municipality must adopt, in accordance with the law. It contains indications on the possible use or preservation of the portions of the territory to which it refers.



At last, at the operative local level, the building regulation “regolamento edilizio” is drawn up, which describes normative within the context of the intervention. The building regulation is a non-urbanistic instrument that therefore regulates the construction methods of the building at the municipal level, guaranteeing compliance with the technical-aesthetic, hygienic-sanitary, safety and general regulations of the buildings.

The compound of the Urbanistic tools at regional and municipal level with the building regulation, sets the legal framework that should be referred to with regard to potential interventions related to the POCITYF project.

Regulatory Constraints

There are several constraints over the investigated area which are associated with a geomorphological, landscape and historical / cultural characteristics. The pictures below visualize the restraints classified by their peculiarity within the study area.

<p>Constraints of a historical and cultural nature (areal and punctual)</p>	
<p>Constraints related to the landscape and geomorphology of the territory (areal and punctual)</p>	

Table 4: Regulatory constraints of historic and cultural nature, and constraints related to the landscape and geomorphology of the territory.

Energy Framework

Considering structural interventions that go beyond the context of the building per se (which have to be undertaken in line with the building regulation), potential interventions within the thematic of Energy can be envisaged within the macro-category Zones of Public Use in the areas defined by the article 32 of the PRG³⁸⁵:

- Areas for use by regional or urban public service equipment, areas for technological equipment (defined in Art. 32 -of the PRG). These areas for the use of service equipment are intended, to activities aimed at ensuring the community both services related to social

³⁸⁵ Variante Generale al Piano Regolatore Generale Adottata con Delibera di Consiglio Comunale N. 991 del 12/12/1973 ed Approvata con Decreto del Presidente della Giunta Regionale N.1475 del 08/07/1976.



and cultural life, and technical services or aimed at ensuring control of the environment. In particular, the areas identified as "areas for technological equipment" (art 32. (f)), are areas in which the construction of plants and relative housing services is allowed, such as tramways, automotive lines, including exchange points, pertaining to the sector of energy production and transformation such as thermal and electrical power plants as well as the sectors of radio diffusion, telephone, urban and regional sewerage, water and combustion needs for domestic use, and waste treatment.

Areas Identified	
Within public use areas: Art. 32 - Areas for the use of regional or urban public service equipment (f) areas for technological equipment	
Normative Constraints³⁸⁶:	
Regional Level (PPTR DGR 176-2015):	
Identified Constraints: Cultural Settlement Components, Components of perceptual values, Components of protected areas and naturalistic sites	
PAI: Identified Constraints: Areas with Hydraulic and Geomorphological Danger, and high Risk Classes present in the area	
Variante PUTT- Agg. Nov. 2015	
Identified constraints: Areas subject to protection according to Legislative Decree n.42 / 04, Ancient settlements, Buildings and areas of considerable public interest, Architectural Heritage Reported, Archaeological Constraints, Architectural Heritage.	

Table 5: Public use areas, normative constraints.

- Construction Framework

Potential interventions involving components related to constructions within the Public Use Zones include the following areas:

- Railway, port and airport areas (Art. 29 of the PRG). The railway, port and airport areas are intended for the maintenance or expansion of the respective plants and services, according to detailed plans that the authorities concerned draw up in agreement with the Municipality.
- Areas for use by regional or urban public service equipment (Art. 32 of the PRG). The areas for the use of service equipment are intended, as a whole, to activities aimed at ensuring the community both services related to social and cultural life, and technical services or aimed at ensuring control of the environment.

³⁸⁶ The normative constraints are to be intended as restrictions that could be in force in one or more areas where project related physical interventions are envisaged. However, there it might be the case where none of these constraints are to be encountered.



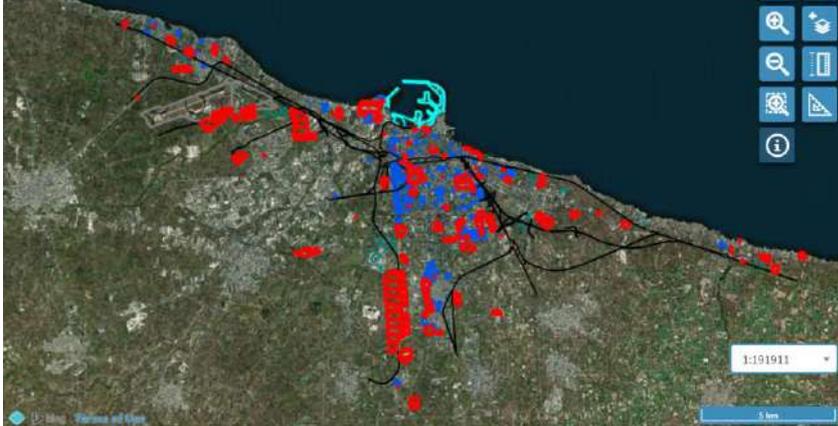
<p>Areas Identified</p> <p>Public Use Zones: Areas for use by regional or urban public service equipment. (b) publicly owned areas for higher grade school equipment). c) areas for state university equipment. d) areas reserved for public intervention for health and hospital locations and equipment. f) areas for technological equipment</p>	
<p>Normative Constraints³⁸⁷:</p>	
<p>Regional Level (PPTR DGR 176-2015): Identified constraints: Settlement Cultural Components, Components of perceptual values, Components of the produced areas and naturalistic sites</p>	
<p>PAI: Identified Constraints: Areas with Hydraulic and Geomorphological Danger, and high Risk Classes present in the area</p>	
<p>Variante PUTT- Agg. Nov. 2015 Identified constraints: Areas subject to protection according to Legislative Decree n.42 / 04, Ancient settlements, Buildings and areas of considerable public interest, Architectural Heritage Reported, Archaeological Constraints, Architectural Heritage.</p>	

Table 6: Public use zones, normative constraints.

Potential interventions involving components related to constructions within the areas intended for productive activities include the following areas:

- Areas for secondary activities of type A- (Art. 36 of the PRG). The areas for secondary activities of type A are intended, mainly, for industrial production activities of a non-harmful type and related services.
- Areas for secondary activities of type B (production areas B) relating to crafts, storage and trade (Art 37 of PRG). The areas are intended to allow the concentration of local units operating in connection with industrial activities.
- Zones for secondary activities of type C (productive zones C) related to annual activities (Art. 38 of PRG). In the areas chosen for annual activities, the installation of plants, including private ones.
- Zones for tertiary activities (Art. 39 of the PRG). The areas for tertiary activities determine the concentration of local units and Administration bodies operating in the tertiary sector at urban and metropolitan level. Following the approval of the detailed plan interventions with building projects that respect its urban and architectural characteristics will be allowed in these areas.

³⁸⁷ The normative constraints are to be intended as restrictions that could be in force in one or more areas where project related physical interventions are envisaged. However, there it might be the case where none of these constraints are to be encountered.



Areas Identified	
<p>Zones for productive activities: Art. 36 - Zones for secondary activities of type A. Art. 37 - Areas for secondary activities of type B (production areas B) relating to crafts, storage and trade Art. 38 - Areas for secondary activities of type C (production areas C) relating to annual activities and the like. Art. 39 - Areas for tertiary activities.</p>	
Normative Constraints³⁸⁸:	
Regional Level (PPTR DGR 176-2015): Identified Constraints: Landscape Heritage Components of perceptual values, Cultural and settlement components	
PAI: Identified Constraints: Areas with Hydraulic and Geomorphological Danger, and medium Risk Classes present in the area	
Variante PUTT- Agg. Nov. 2015 Identified constraints: Areas subject to protection according to Legislative Decree n.42 / 04, Buildings and areas of considerable public interest, Architectural Heritage.	

Table 7: Zones for productive activities, normative constraints.

Potential interventions involving components related to constructions (and cultural heritage) within the Residential zone include the following areas:

- Residential Areas (Art. 42 - of the PRG). The residential areas are defined through a code in the PRG and all of them could be object of project applications; historic center A1, areas of environmental interest A2, type B1 completion areas, type B2 completion areas, type B3 completion areas, type B4 completion areas, type B5 completion areas, urban renewal areas type B6, urban renewal areas type B7, urban renewal areas of type B8, areas of urban renewal of type B9, of a managerial tertiary nature, expansion areas of type C1, expansion areas of type C2, expansion areas of type C3.
- Areas for residence services and neighbourhood greenery (Art. 43 -of the PRG). The areas for the services of the residence are areas for nursery schools, kindergartens and compulsory schools, areas for equipment of common interest, religious, cultural, social, welfare, health, administrative, for public services, areas for parks and games and area parking areas.

³⁸⁸ The normative constraints are to be intended as restrictions that could be in force in one or more areas where project related physical interventions are envisaged. However, there it might be the case where none of these constraints are to be encountered.



Areas Identified	
<p>Residential zone: Art. 42 - Residential Areas. Art. 43 - Areas for residence services and neighborhood greenery.</p>	
Normative Constraints³⁸⁹:	
Regional Level (PPTR DGR 176-2015): Identified Constraints: Landscape Heritage Components of perceptual values, Cultural and settlement components	
PAI: Identified Constraints: Areas with Hydraulic and Geomorphological Danger, and medium/high Risk Classes present in the area	
Variante PUTT- Agg. Nov. 2015 Identified constraints: Areas subject to protection according to Legislative Decree n.42 / 04, Ancient settlements, Buildings and areas of considerable public interest, Architectural Heritage Reported, Archaeological Constraints, Architectural Heritage.	

Table 8: Residential zone, normative constraints.

Building Regulation on Cultural Heritage (and Environmental Restrictions)

The Code of Cultural Heritage and Landscape, approved by the Council of Ministers on January 16, 2004 identifies the need to preserve the Italian cultural heritage. It defines objects that present artistic, historical, archaeological or ethno-anthropological interest, collections of cultural institutions, naturalistic and historical assets considered of cultural interest. The code is the main Italian regulatory reference which attributes to the Ministry of Cultural Heritage the task of protecting, conserving and enhancing Italy's cultural heritage. By means of a code, the Ministry has the right to prescribe distances, measures and other rules aimed at preventing the integrity identified cultural heritage from being endangered or damaged or the environmental conditions from being altered. The territorial public authorities subject to the regulation have on duty the implementing of these provisions into building regulations and urban planning instruments.

The regulation establishes which procedures to follow and which types of authorizations must be issued for works such as ordinary, extraordinary maintenance, restoration or conservative rehabilitation, building renovation, urban restructuring or new construction interventions (articles 14,15,16,18, 20 of the building regulation). Furthermore, the articles listed below (from *Bari's Building regulation*) are of relevance for potential issues concerning the restrictions on Cultural Heritage real estate and potential Environmental restriction and they account for the procedure to follow according to possible restrictions.

³⁸⁹ *The normative constraints are to be intended as restrictions that could be in force in one or more areas where project related physical interventions are envisaged. However, there it might be the case where none of these constraints are to be encountered.*



The main articles of the building regulation that are relevant in the context of potential impediments for the project are the following:

Art. 4- Area of the historic city (old town)

1. *The historical areas, or adjacent to them, in which a unitary aspect is recognizable, this must be preserved, protected and valued.*
2. *The interventions carried out on buildings located in this area must pursue the purposes of protection and enhancement of the historical context.*
3. *For the purpose of a correct assessment of the mitigation of the impact of the works, in addition to the project documents established with management decisions, the intervention proposal, regardless of its modality, must be accompanied by the following documents:*
 - a. *contextual study of materials;*
 - b. *contextual study of masses and volumes;*
 - c. *contextual study of alignments;*
 - d. *detailed chromatic study.*

Art. 32- Works subject to Landscape Authorization.

Works that modify the physical state or the external appearance of the territories and properties declared of considerable public interest, or directly bound, or included among those subjects to protection pursuant to the Code of Cultural Heritage cannot be object building permit, or certified notification of commencement of the activity, without the prior issue of the landscape authorization.

Art. 170- Interventions in the Historic Center (old town) and/or on buildings identified as Cultural Heritage.

1. *In the historic center (old town), as delimited by the general urban planning instrument and / or on buildings identified in accordance with the Code of Cultural Heritage, it is not allowed to install these systems on the slopes of the sloping roofs facing the street front or on the facades.*
2. *It is forbidden to insert panels, both on the facade and on the roof, on the buildings identified by the current general urban planning instrument as "buildings or artefacts of specific historical-artistic interest".*
3. *Instead, their installation is allowed if:*
 - a. *they are positioned on flat roofs so that they are not visible from the road surface below;*
 - b. *they are positioned on the internal flaps of the roofs which have suitably separated parts for their conformation, so that their presence does not alter the perspectives visible from the most significant neighboring optical cones. To this end, the systems must be placed exclusively adjacent to the sloping roof or better integrated into it;*

Moreover, the storage tanks attached to these systems must be positioned inside the building, when technically possible.



4. *When panels are not integrated into the roof, they must be placed in support of the roof pitch chosen for the installation, without the use of supports that make them assume slopes and orientations different from those of the roof itself. In the historic center (old town) they should be placed possibly on the side opposite the public road or in any case in areas that limit their visual impact.*

6. *For all types of renewable energy production plants: connecting cables must be made between the technical room and the roof covering for the passage of the power lines of a possible photovoltaic system, suitably sized; all the covers provided must have a trend as straight as possible and appropriate openings on non-private spaces from which to facilitate the insertion of the pipes.*

7. *In the uncovered areas there are no specific limitations relating to the visual impact.*

8. *The systems must be designed and built in compliance with current laws and technical standards in order to ensure the electrical and static safety conditions of the tenants and the building.*

9. *For this purpose, a specific technical report must be prepared by a qualified professional certifying the compliance of the system with the electrical and static safety conditions of the building and certifying the existence of the systems and their suitability to ensure the above requirements.*

10. *The authorizing aspects of the installation of the aforementioned systems will be those indicated by the specific regulations on the matter.*

11. *The various determinations of the authority in charge of supervision and the results of the Landscape Authorization procedure where necessary are reserved (subject to evaluation).*

12. *The superordinate legal requirements subsequent to the entry into force of this regulation are reserved (subject to evaluation).*

Art. 56 Precautions for the protection of archaeological finds

1. *The responsible of intervention who should find objects of presumed archaeological, historical or artistic interest during the execution of the works, must inform the Mayor and the authority in charge of cultural heritage supervision.*

2. *The responsible of intervention that comes across these findings, must suspended the works and leave the status of the places unchanged.*

Authorisation to Construct and Operate Generation Facilities

The general principles governing authorisation procedures for the construction and operation of generation facilities are set out under national law, notwithstanding each region may implement regional laws regulating the authorising procedure within the national framework. Generally, the authorising procedures for the construction and operation of generation facilities depend upon the type of source (e.g. conventional or renewable), the capacity of the plant, the type of installation (i.e., ground-mounted or rooftop mounted), and the area where the project is supposed to be built (e.g. an area safeguarded from a landscape perspective).

From an environmental perspective, generation facilities having a capacity above certain thresholds are subject to an environmental pre-screening procedure, which is a preliminary, streamlined assessment of the impact a project may have on the environment. When the pre-



screening procedure has a negative outcome, the project is required to undergo a full environmental impact assessment procedure. Furthermore, projects that are to be built within certain areas of high landscape and environmental value, owing to the presence of specific flora or fauna, must undergo an additional assessment, the 'environmental incidence assessment', which evaluates the impact the project may have on the flora and the fauna living within that area or zone.

Combustion plants with a thermal capacity of more than 50 MW and combustion plants for the production of electricity with a thermal capacity of more than 300 MWe, are also required to obtain an integrated environmental authorisation to operate. This authorisation sets out certain threshold limits for emissions of pollutants and noise by the plant.

Since 2004, as a general principle, a single authorisation issued by the competent region (or the province if it is so empowered by the region) is required to construct and operate any renewable energy plant having a capacity higher than a certain threshold (i.e. 60kW for wind, 20kW for solar photovoltaic, 100kW for hydroelectric, 200kW for biomass, and 250kW for gas from waste and depuration treatments and biogas). For generation facilities fuelled by non-renewable energy sources having a capacity higher than 300MW, the single authorisation is issued by the Ministry for Economic Development.

The single authorisation, when issued, substitutes all the authorisations, licenses and permits that would otherwise be required to build and operate the generation facility under applicable laws (except for the environmental assessments). The single authorisation is issued upon the completion of a single administrative procedure, during which all the positions of the interested public authorities are jointly evaluated.

Renewable energy plants with an installed capacity lower than the above-mentioned thresholds are exempt from the single authorisation requirement and benefit from a simplified 'deemed consent' procedure (known as the PAS procedure). Regions can increase the thresholds for the simplified authorisation procedure up to 1MW. Certain categories of construction works that have a minor impact on the surrounding environment, can be carried out in a deregulated regime by filing with the competent municipality a notice of the planned start of the works.

Authorisations to construct and operate transmission networks or distribution networks

At a national level, the authorisation for the construction of electric lines is issued by either the Ministry for Infrastructures for electric lines with a voltage above 150 kV or by the competent province for electric lines with a voltage up to 150kV.

An application for the authorisation must also be filed with the Ministry for Economic Development and with any other authority responsible for areas crossed by the interconnection facilities (eg, military sites, rivers, forests, mines, telecommunications lines, railways and public ways) for their approval. Only after the approval of all other interested authorities has been obtained can the authorisation be issued.

In urgent cases, the start of construction works can be authorised under a temporary authorisation, conditional upon the applicant providing a guarantee as security for the fulfilment of any obligations that may be set forth by the final authorisation, or the demolition of the works constructed under the temporary authorisation where the definitive authorisation is denied. Temporary authorisation can be issued only with the prior approval of the Ministry for Economic Development.



- Access to the distribution grid

The electricity transmission grid operator (ie, Terna) and electricity distributors must grant equal access to every operator requesting it (provided that it complies with technical requirements), without prejudice to the continuity of service and in compliance with technical and economic conditions for access. Grid operators must also provide sufficient information to ensure the efficient and safe functioning of the grid.

- Government distribution network policy

The Ministry for Economic Development has recently published a call for tender addressed to the concessionaires of the public service of distribution of electrical energy, operating in the regions of Basilicata, Calabria, Campania, Puglia and Sicilia, for the public financing for projects for the construction, improved energy efficiency and expansion of distribution networks (eg, smart grid).

- Rates and terms for distribution services

ARERA sets out the tariffs for the distribution of electricity. Distribution costs are covered through distribution fees, which are charged to end-users in their bills (except for low voltage domestic users).

6.2. Celje

The deployment of the POCITYF project solutions on smart buildings with energy storage is mostly possible under Slovenian energy and construction law. Restrictions may, however, appear when considering cultural heritage, as the Institute of the Republic of Slovenia for the Protection of Cultural Heritage might impose restrictions regarding the renovation of the cultural heritage. These heritage limitations, the construction requirements, local obligations and energy law will be discussed more thoroughly discussed below.

6.2.1. Energy Law

The *Regulation on self-supply of electricity from renewable energy sources (2019)* does not allow the trading of RES produced electricity. The owner of a self-supply device may not market or sell the electricity produced on that device. If during the accounting period the amount of electricity delivered is greater than the amount of electricity received, the customer shall hand over the surplus to his supplier. However, the regulation promotes and regulates the use of electricity generated from RES also for multi-dwelling buildings, buildings with mixed-use and communities; energy is primarily intended for self-consumption. An energy storage device may also be connected to the installation or the network to which the self-consumption device is connected. Further, district-level electricity storage is allowed.

6.2.2. Construction requirements

The Slovenia building code, *Construction Act* regulates the conditions for the construction and renovation of buildings and other issues related to the construction of buildings. The purpose of this Act is to protect the public interest, including the protection of cultural heritage and the promotion of sustainable construction.

In general, the buildings must meet the essential requirements: mechanical resistance and stability, including earthquake safety (as Slovenia is in an earthquake-prone area), fire safety, hygiene, health and environmental protection, safety in use, noise protection, energy-saving and heat conservation, universal construction and use of buildings, and sustainable use of natural resources.

There is an interplay between construction law and cultural heritage law as well as energy law. Regarding construction law for protected buildings or cultural heritage buildings, the designed or



implemented solutions may or may not meet the prescribed essential and other requirements of the Construction Act, if this is based on the opinion or conditions of the competent cultural heritage assessor. However, the derogation must not directly endanger the safety of the property, the life and health of the people, the neighbouring property or the environment. As for the *Energy Act (2019)*, which implements the transposition and enforcement of EU law in the legal order of the Republic of Slovenia, and the *Rules on the efficient use of energy in buildings*: the rules also apply to the renovation of a building or its individual parts, where this is technically feasible.

6.2.3. Heritage Law

The *Cultural Heritage Protection Act* states that integrated heritage preservation is implemented in the planning and actions of the state, provinces and municipalities by incorporating the heritage into sustainable development, respecting its special nature and social importance. Integrated heritage preservation is a set of measures to ensure the continued existence and enrichment of the assets: Its maintenance, restoration, renovation, use and revival. The Institute of the Republic of Slovenia for the Protection of Cultural Heritage (IPCHS) issues cultural protection conditions and consents for undertakings to immovable heritage. Usually, there are quite severe restrictions regarding the renovation of the cultural heritage buildings; particularly the appearance of, amongst others, front (street) façades, windows, roofs. Solutions must always be agreed on a case-by-case basis. Installation of technologies that do not visually disturb is possible in minimal intervention. Some technologies may be installed on specific micro-locations, which are not visually exposed (such as backyard, roof, and attic).

To some extent, this poses an impediment to the POCITYF plans. Careful consideration will need to be given to the technologies, and the possibilities of installation in ways that, are both, permitted and allowed for their integration and joint operation for several buildings.

6.2.4. Local Obligations

The public utility company Energetika Celje Ltd., owned by the local community, is a public service provider of the heat energy distribution and operator of the natural gas distribution network in the area of the municipality of Celje. How this and other obstacles of municipal nature may rise and impact the POCITYF project solutions will be assessed by the FC partners in the course of the project.

6.3. Granada

The Spanish legal framework becomes increasingly specialised and directly applicable the closer it gets to the local level. However, most of the local competences do not come directly from national legislation but from disposition of the autonomous communities, in this case Andalucía. Thus, the legal system with regard to for example cultural heritage buildings is based on two sources: national and community-based (Andalusian) legislation. This combination results in a building-protective system which might be able to impose requirements, of compliance with their building preservation objective, to be observed when entering in technical modification.

6.3.1. Energy Law

The Law 24/2013, of December 26, on the Electricity Sector is the main regulatory standard for “Red Eléctrica”³⁹⁰ activities, attributing to it the exercise of transport activities and operation of the system, and the function of the transmission system operator (TSO).

Article 48 of the law 24/2013, describes energy recharge service as having as a primary function the delivery of energy through vehicle charging services and storage batteries in conditions that

³⁹⁰ Red Eléctrica: Spanish corporation which operates the national electricity grid.



allow charging efficiently and minimum cost for the user and the electrical system. The energy recharging services will be provided by the corresponding companies that must submit to the Ministry of Industry, Commerce and Tourism (or, where appropriate, to the Autonomous Community in whose territory they will exclusively carry out their activity), communication of the beginning of activity accompanied by a responsible statement on compliance with the requirements determined by regulation.

At the moment, in Spain, the suppliers sell the final consumer the electrical energy they buy from the generators in the wholesale electricity market, the so-called “electric pool”, or through bilateral agreements with the producers. However, the new energy model, based on Royal Decree 244/2019, of April 5, is based on decentralised generation. It regulates the administrative, technical and economic conditions of self-consumption of electrical energy. At its basis is the fact that each Spanish citizen is: free to produce its own energy, to obtain compensation for its surpluses, able to share it, and may install energy storage systems to store any surpluses.

The main aspects included are the following:

- Self-consumption modalities
- Regulation of collective self-consumption
- For photovoltaic installations, the installed power will be the maximum power of the inverter.
- The consumer and the owner of the facility are allowed to be different.
- Simplification of processing
- Set the measurement equipment to install
- Establishes the economic regime. Various possibilities are found depending on the type of self-consumption.
- Automatic registration in the Self-Consumption Register for certain cases.

There are different modalities of Self-consumption:

1. Self-consumption without surpluses: in this case, the installation does not inject surpluses to the network. For this purpose, it will be necessary to install an anti-discharge system (also called injection 0).
2. Self-consumption with surpluses: In this case, the injection of the surplus into the electrical network is allowed. This is further divided into two sub-categories:
 - 2.1. Modality with surpluses accepted for compensation: When you have the right to a mechanism for compensation for surpluses.
 - 2.2. Modality with surpluses not subject to compensation: When you do not have the right to a compensation mechanism for surpluses, or voluntarily choose not to avail yourself of compensation.

All photovoltaic self-consumption installations with a power of less than 100 kW will be entitled to receive compensation for surpluses (that is, the Net Balance).

Regarding Collective Self-consumption, it is allowed and regulated. In this case, a single photovoltaic installation can serve several consumers, under the following conditions:

1. Nearby indoor network facilities. When consumers and the photovoltaic installation are directly connected to the same indoor network, this would be the case of neighbouring communities.



2. Nearby facilities through the network. Which would be those that meet any of the following requirements:
 - 2.1. They derive from the same transformation centre.
 - 2.2. They are less than 500m apart.
 - 2.3. Their cadastral references coincide in the first 14 digits.

For the allocation of energy, it will be necessary to install a generation meter in the photovoltaic installation or installations to be shared. The allocation of energy will be according to the allocation agreements freely agreed upon by the different consumers who have subscribed to collective self-consumption.

About energy storage, Article 5 of the same RD 244/2019, point 7 says:

- Storage elements may be installed in the self-consumption facilities, regulated in this royal decree, when they have the protections established in the safety and industrial quality regulations that are of application.
- The storage elements will be installed in such a way that they share measurement equipment that records the net generation, measurement equipment at the border point or measurement equipment of the associated consumer.

And according to the Fifth Transitional Provision: Storage elements.

There are some storage facilities to which the provisions of the Complementary Technical Instruction ITC-BT-52 on special-purpose facilities and infrastructure for recharging electric vehicles,³⁹¹ and the Complementary Technical Instruction ITC-BT-40(on low-voltage generating facilities)³⁹², do not apply. Until the approval of the industrial safety and quality standard defining the technical and protection conditions for storage elements installed in facilities for self-consumption, which are not covered by these additional technical instructions, these storage elements shall be installed in such a way that they share measurement and protection equipment with the generation installation.

6.3.2. Construction requirements

The Technical Building Code (in Spanish CTE)³⁹³ is the regulatory framework that establishes the requirements buildings must meet concerning basic safety and habitability, established by the Law on Building Ordinances (LOE).³⁹⁴

The CTE aims to respond to the demand of society regarding the improvement of the quality of the building while seeking to improve user protection and promote sustainable development, applying both to new buildings and interventions on existing ones. It can, as established by the LOE, be completed with the requirements of other regulations issued by the competent Administrations, in other words, the regional and local rules apply in a case by case basis.

The **DB-HE** is the primary document whose purpose is to establish the rules and procedures that allow compliance with the requirements of energy saving. With the new DB-HE, the quality of the thermal enclosure of buildings will be improved, and the use of the most efficient and sustainable technologies for their conditioning will be promoted. These objectives will allow adequate comfort conditions to be achieved with minimal energy expenditure.

³⁹¹ *Approved by Royal Decree 1053/2014, of December 12, on the infrastructure for recharging electric vehicles*

³⁹² *of the Royal Decree 842/2002, of August 2, which approves the electrotechnical regulation for low voltage*

³⁹³ <https://www.codigotecnico.org/index.php/menu-ahorro-energia.html>

³⁹⁴ Law 38/1999 of November 5, on Building Ordinances, Article 15.



In December 2012, within the Spanish Association for Standardization (UNE), the Technical Committee for Standardization CTN 178 “Smart Cities” was launched, chaired by SESIAD (Secretary of State for the Information Society and the Digital Agenda) and secretariat by UNE.

The CTN 178 SMART CITIES is the standardization of requirements, guidelines, techniques, indicators and tools that contribute to the development of communities towards smart communities, covering the concept of community any finite unit of a local entity.

Its structure is as follows:

- SC 1 Infrastructures
- SC 2 Indicators and semantics
- SC 3 Mobility and transport platforms
- SC 4 Energy and environment
- SC 5 Touristic smart destinations
- SC 6 Public Services 4.0

Specifying the technical requirements, two key standards in CTN 178 must be addressed:

- UNE 178104 Standard establishes the minimum requirements to guarantee the interoperability of the city platform (which will ensure the proper functioning of the Smart City services that it supports) in addition to their efficiency, performance, security and scalability, focus on the requirements of the information exchange mechanisms and transversal operation of the city.
- UNE 178301 establishes the way to evaluate the publication of Open Data or Open Data of a City. It is determined in the form of metrics and an indicator, which allows to measure the level of maturity of the opening of data prepared or guarded by the public sector to facilitate its reuse, in the field of Smart Cities. Additionally, a list of data sets that are considered a priority in open data initiatives is established, accompanied by a series of recommended vocabularies to be used in their publication.

By using the UNE standards, developed by consensus among all interested parties and following the procedures of the Spanish Association for Standardization - which include a period of public consultation on projects - errors are avoided, priorities closer to problems are formulated, and the uncertainty of administrations and industry is reduced.

6.3.3. Heritage Law

To establish the main difficulties when working on the historic urban centre, it's necessary to clear the Spanish legislative characteristics. Urbanism legislation is complex, due mainly to territorial decentralization, (State, Region, and municipality), the complexity in approval law procedures and the current distribution of competences. Besides, to be affected by the heritage protection act, increase the complexity.

Basic competences structure:

- Land uses and its regulation (legislative competences) is a nationwide basis competence (State Ground Law)
- According to the Spanish Constitution (Art. 148), among exclusives competences belonging to the Autonomous Community,³⁹⁵ are Land Planning, Urbanism and housing. Andalucía is

³⁹⁵ Spanish Constitution, Chapter 3.



the competent authority which approves the General Urban Development Plans (PGOU) of local municipalities (legislative and executive competences) located within its area.

- Local Government does not have legislative competences, but it has a strong role in planning and management, particularly thorough General Plans (PGOU) and other law figures as “Special Protection Plans”.
- In respect of heritage, despite the fact exist a national law, the protection role is given to the Autonomous community, which develops its Heritage Protection Act.

The basic scheme of Urbanism legislation and Heritage protection:

- Spanish Estate:
 - o Constitution: Competences sharing, art. 148 and 149
 - o Estate ground Law.
 - o Sustainable Economy Law
 - o Law 16/1985 on Spanish Historical Heritage (LPHE)
 - o Heritage Catalogue
- Autonomous Community- Andalusia
 - o Law 7/2002, Urban planning (LOUA)
 - o Law 14/2007, on Andalusian Historical Heritage
 - o Heritage Catalogue
- Local - Granada Town
 - o General Planning: PGOU- 2001 (adapted according to LOUA- 2009)
 - o Special Protection Planning:
 - PEPRI Alhambra y Alijares- 1989 (Especial Plan for Internal protections and renovation) under revision. There is too a Master Plan for the Alhambra, non-binding.
 - PEPRI Albayzín- 1990 (under revision, which advance was released in 2019)
 - PEPC Centro- 2002

Considerations of the Steering Committee for Cultural Heritage and Landscape of the Council of Europe

About historic buildings, the tension between conservation and existing regulations to achieve certain public good objectives, such as improving energy efficiency, which might erode heritage value, is highlighted. However, the conclusion is that these heritage buildings tend to suffer less from these tensions due to special exemptions, in some cases on a discretionary base. To overcome this situation, it is proposed to replace these exemptions with a parallel control system that allows a reasonable fulfilment of objectives, where the related system should be based on the scientific analysis (greater analysis and understanding of performance and energy in traditional buildings) of buildings. This allowed to integrate them into contemporary uses and needs and thus contribute to their maintenance.³⁹⁶

6.3.4. Local obligations

Considerations of the Junta de Andalucía legislation

With the development of the Andalusian Government’s competences, it is established in the Statute of Autonomy:

- Art. 37.18.º “Public policies will be oriented to guarantee and ensure [...] the conservation and enhancement of the Andalusian cultural, historical and artistic heritage;
- Art. 68.3.1.º” the Autonomous Community has exclusive jurisdiction over heritage protection, without prejudice to the provisions of article 149.1.28.º of the Constitution.”

³⁹⁶<https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016806a56d9>



Such competences lead to the Andalusian Heritage Law (Law 14/2007, of November 26):

- Art. 6 the Constitution of the General Catalog of Andalusian Historical Heritage “as an instrument for the safeguarding of the assets, their consultation and disclosure”.
- Art. 7. Its structure, which includes Assets of Cultural Interest, Assets of General Cataloguing and those included in the General Inventory of Movable Assets of the Spanish Historical Heritage.

Delegation of competences regarding Historic Complexes.

- This protection content can be instantly incorporated into the General Urban Planning or through the mandatory preparation of Special Protection Plans or development planning with the same content.
- After the definitive approval of the protection planning, with the binding report of the Ministry of Culture, the municipalities can request the delegation of competences for the authorization of projects regulated by the said plan, under article 40 of Law 14 / 2007, of November 26, the Historical Heritage of Andalusia.
(This issue is of relevance to POCITYF subsequent proceedings)

General Considerations on Protection Planning:

In summary, the relevance of the protection activities is established in the plans. According to the level assigned to each building, different interventions can be carried out, with the appropriate approval of the competent authority. At the same time, special emphasis is fixed on the landscape issue and/or consistency aspect of the entire area, which implies taking special attention with visual perception, and would require most environmental impact studies.

Despite this protectionist nature, these planning figures also aim at transforming the historical complexes. They are precisely the way to work exceptionally, as long as this intend an improvement in their connections with the territorial or urban environment or avoid degrading uses establishing an action framework. Historically, there have been activities by the Andalusian Government in the historical centres, called Integrated Rehabilitation Areas, which, although having a very protectionist character, it meant a strong physical and socio-economic intervention. If there is currently any intervention of this type, it can be a good channel to establish synergy with the POCITYF project.

Circumstances of the historical city centres of the province of Granada:

There are only four historical centres with protection planning approved by the Andalusian Government, which implies that they have delegated the competences to their municipalities, three of them are in the capital (the three plans mentioned). This delegation of competences, at least formally, avoids the delay of the works authorization processes



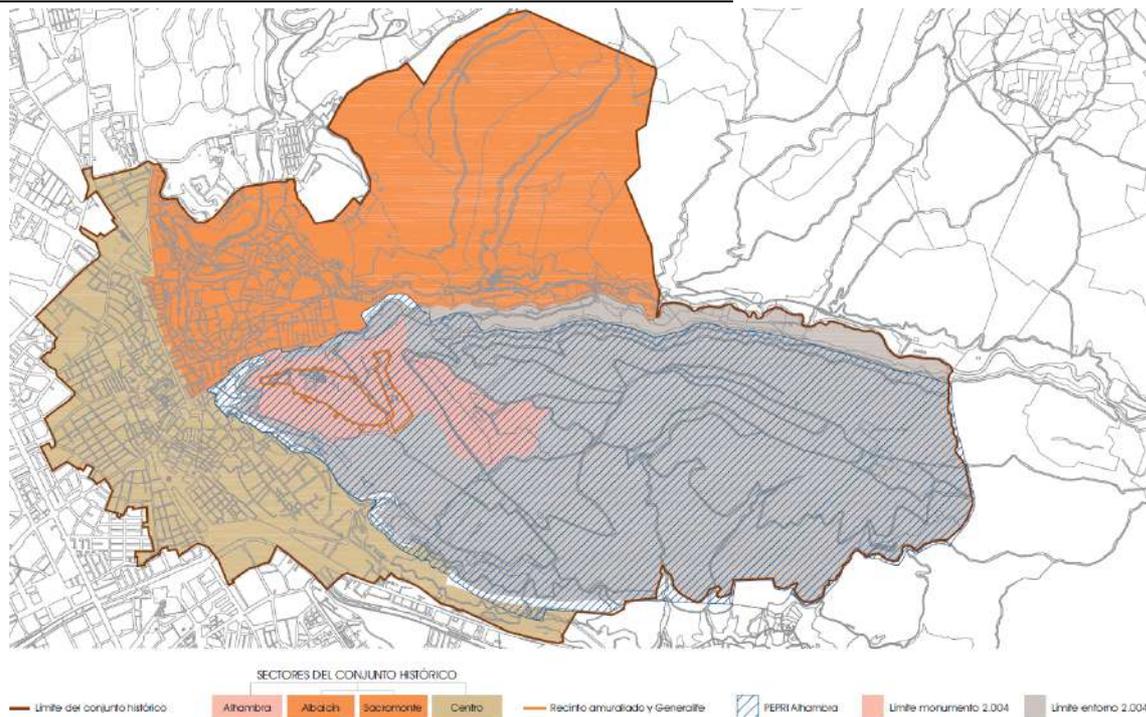
SUMMARY PLAN OF THE SECTORS OF THE HISTORICAL SETS

Figure 6: Sectorization of the historical complex of Granada, monument and environment 2004, source: Master plan of the Alhambra.

Any other issue that may impact the POCITYF project solutions will be assessed by the FC partners in the course of the project.

Typology of Protected Assets:

The following classification could be made:

- BIC: Assets of Cultural Interest- Under the tutelage of the state administration
 - o It is the most relevant administrative Heritage figure and with the highest protection level.
 - o It is considered by the regional laws identically than national law does
 - o There is an obligation to define the environments of the BIC
- Inventoried assets:
 - o They are those that are easily below the BIC
 - o They can be included by the autonomous communities.
 - o Without having the relevance or social value of a BIC, consider it valuable enough (historically or socially) for its special protection.
- Properties listed in the protection catalogues of the Special Plans:
 - o Buildings that the municipalities designate with a protection degree.
 - o They include from those mentioned above (BICs ...) to those with environmental or landscape protection, in which any type of intervention is easier.

As a summary, it can be assured that there is a link between urban planning legislation and Historical Heritage regulations, where planning is tacitly recognized as the valid instrument to



respond to historical centres, it is in the Special Protection Plans where are collected much of the law for rehabilitation

Reflections and problems

The first challenge for intervention in the historical complex of Granada is that it is “truffled” with properties registered with different protection figures, which together with the special protection of a landscape nature makes specific actions extremely complex. As an example, almost the entire area of the Albaicín is affected by BIC environments.

Currently, there are several urban plans under review. This may delay the management of licenses, although officially this service is not paralyzed.

There is a new classification of the whole of the Alhambra that, within the BIC category, adopts a new modality, going from “Historical Complex” (made up of real estate) to “Monument”, which means altering the limits of the complex, a new delimitation that should be consistent with those established in the PEPRI review.

When acting in historical complexes which have approved protection planning, such as the case of Granada city, getting building licenses would initially be easier, provided that it is not considered a BIC. BICs require the mandatory authorization of qualified authority, in this case, Regional Cultural Ministry. Both the approval committees and the heritage catalogues are usually very restrictive, hindering many interventions that could have positive effects. It is essential to improve coordination between administrations and for our part a very intense communication work.

If the building is not to be protected, all kinds of solutions are possible. But as long as the objective of preserving the building dominates, the degree of compliance with the Technical Code will not be entirely possible. This doesn't mean that it cannot be fulfilled in part. All technical knowledge must be oriented towards maximum compliance, determining the level of legal responsibility for deficiencies.

6.4. Hvidovre

6.4.1. Energy Law

Regarding the energy Law in Denmark, it is regulated by the **Act of Electricity Taxes**. Electricity consumption from plants over 6 kW can no longer be offset in the collective electricity supply without having to pay taxes. This is a problem for social housing companies. How this and other obstacles in energy law may rise and impact the POCITYF project solutions will be assessed by the FC partners in the course of the project.

6.4.2. Construction Requirements

Buildings to be preserved (cultural heritage buildings) are covered by the Building Regulations 2018, including energy efficiency - exempt from the provisions of the Building Regulation only under exceptional circumstances. This is not expected to be the case in the FC of Hvidovre, but the Danish Building Protection Act will be addressed below.

6.4.3. Heritage Law

Danish Building Protection Act

Cultural heritage sites can be covered by a *conservation urban plan statute*, a local conservation plan or *designated following Section 19 (appointed by the Minister) of the Building Protection Act*. In these cases the planning has sought to preserve the external appearance of the buildings



in question - as part of a building whole. The State administers protected buildings, while the municipalities are responsible for the cultural heritage.³⁹⁷

Hvidovre has around 900 listed buildings, and although there are no “conservation urban plan statute” or “conservation plan” for any of the buildings, the FC plans to involve a local institute, Forstadsmuseet (Suburban Museum) in the development plans to secure that the history and values of a typical South of Copenhagen suburban municipality, preserving its values. This plan will include buildings especially from the fifties and the seventies, but also some older areas of historical importance - a former military camp with fascinating architectural cultural heritage and a village with old peasant houses.

6.4.4. Local obligations

Heating supply has been centralized for many years, which has resulted in high prices. The FC expect to run an experiment in Hvidovre with decentralized low-temperature district heating in an “Energy Island” in Avedøre (part of Hvidovre). How this and other obstacles of municipal nature may rise and impact the POCITYF project solutions will be assessed by the FC partners in the course of the project.

6.5. Ioannina

In Ioannina the limitations to the deployment of solutions under POCITYF stems from the heritage law limitations and although the might be solved this would imply a very time-consuming boreoarctic procedure.

6.5.1. Energy Law

The possibility of energy exchange between different buildings is provided only if the natural or legal persons who own the property, jointly participate in an energy community for the production of electricity from RES (Renewable Energy Sources). The stored energy is stored in the HEDNO (Hellenic Electricity Distribution Network Operator S.A.) network and is offset on an annual basis (produced - consumed). Photovoltaic panels can be installed either in the buildings themselves (Net Metering) or in a remote field (virtual Net Metering).

6.5.2. Construction Requirements

The regulatory framework for constructions does not show likely of being a barrier for POCITYF.

6.5.3. Heritage Law

Cultural heritage Act (N3028/2002), article 10, prohibits changes of the protected buildings, such as façade changes, or even certain uses of the building, enforcing the use of certain materials in some situations.

The law also requires approval for every technical work of change of use to a protected building, from the Ministry of Culture and Sports. The Minister approves any work after the opinion of the Central Archeological Council. These restrictions may forbid some kind of energy solutions to some buildings or may force alterations to the chosen solution to be made. In most cases, an applicant solution could be found, but concerning cultural heritage protected buildings, it will be very bureaucratic and time-consuming processes to get permission for any intervention.

³⁹⁷ <https://www.retsinformation.dk/Forms/R0710.aspx?id=199864>



6.5.4. Local Obligations

Currently, no legal obligations are identified. Whether, and how, local obligations may affect POCITYF FC projects will be assessed by the FC partners in the course of the project.

6.6. Ujpest

Restrictions to the adoption of the POCITYF solutions in Ujpest can be found in construction requirements, heritage law and energy law. These will be elaborated below, by showing what kind of requirements are set in place and how they might be problematic. In some cases, it may even be required to change the legal framework in order to realise the projects planned in the context of POCITYF.

6.6.1. Energy Law

There are considerable restrictions that might affect the implementation of the POCITYF project solutions in Hungary.

First, it is not possible for a commonly owned solar PV installation on the roof or façade of a shared ownership building to be used directly by the tenants (lowering their electricity consumption). This sort of communitarian installation can only be used to offset the consumption of common property/areas of the building (e.g. elevators, lighting of staircases, etc). This limits the amount of capacity that is placed on apartment buildings as residents cannot engage in self-consumption in the same way that resident detached houses can.

Secondly, Peer to Peer trading of electricity (between buildings or citizens) via public distribution systems in Hungary is not allowed so far. This limits the possibilities for Positive Energy Districts.

Thirdly, some technologies are not prohibited but still limited to certain requirements. For example, in the case of a hybrid system (such as PV and storage) they require special requirements and certification by the electric service providers. There is no differentiation between PV converters and battery/storage converters from the point of view of connection rules. This type of indiscriminate requirements (even to situations which are materially different) also exist regarding the connection process and technical requirements: they are the same for 300W PV panels, micro PV systems and 40 kW PV systems. However, if the PV installation produces more than 50 kWp, it should be treated as small power plant and should be attested by the service provider in the design and the installation phase.

Further, the installation of a PV system below 50 kW requires a replacement of the original meter by a bi-directional electric meter. This requirement will naturally prolong the installation procedure. Such PV installations follow a yearly balance accounting system. This allows consumers to use the electricity network as a free of charge storage unit, which is beneficial for these consumers. However, it is less advantageous for the DSO, which bears the costs of this system. Moreover, a side-effect of this accounting rule is that it disincentives consumers from investing in a battery or storage system.

All hybrid installations (PV and storage) and smart grids should be certified by the electricity service provider. Further, installation of V2G charging stations follows the same requirements as the PV system installation in regard to plans and permitting processes.

6.6.2. Construction Requirements

The following problems related with construction requirements might be found in Ujpest in the context of POCITYF.



First, it is good practice to use the step by step renovation guidelines with implementation of extra thermal insulation on the solid walls without windows, there are separate windows changing at the apartment. However, this process is not included into the national renovation grant & loan system.

Secondly, under Hungarian Law, private residential houses and offices are free to decide on their heating/cooling systems. In practice, this means that they are mostly using gas -based systems, which have lower investment costs than utilisation of renewable energy sources such as biomass or geothermal energy. This may reduce the willingness to participate in a transition to renewable sources. Considering the investment prices, it also matters to say that there are strong regulations for using ground source heat pumps in the urban areas creating a complicated technical system and increase the investment prices. In this context, it is also relevant that the local District Heating company has a long-lasting contract with a commercial power plant. This limits the use of renewable sources for the district heating system.

As an alternative heat source for the district heating system, geothermal energy could be considered. However, this would involve expensive deep drillings and would have strong regulatory frameworks applicable to it. These two factors make the use of geothermal sources economically less appealing.

Another possible problem is the fact that installations of PV panels at rooftop of apartment houses sometimes require the approval of majority of the owners, which may limit the capacity to conduct such alterations in apartment buildings with multiple owners.

In order for installing a collective energy system with potential to captivate the Hungarian citizens there must be an emphasis put into transparency of information regarding the real costs that such investments may entail.

6.6.3. Heritage Law

Regarding the barriers and opportunities to deploy solutions in cultural heritage buildings, renovation works might be restricted in the project area. In this regard, special attention must be given to renovation works in the Town Hall and building alongside the Main Square of Újpest. The use of thermal insulation on façade; changes to windows using certain materials; and the installation of PV panels on the roof and façade (if it can be seen from public spaces) is restricted and needs to be permitted by the Committee of City Appearance.

Such requirements require PV installation to be treated using a common guideline and best practice. Further, extra thermal insulation on the façades that may be seen from public spaces should be authentic with the building circumstances and formal feature of the details. These two requirements show to be the most fundamental obstacles to the deployment of the POCITYF project solutions in Újpest related to cultural heritage buildings.

6.6.4. Local Obligations

Some regulatory issues spring from the division of competences between different authorities. Two examples, related to public lighting and to school buildings, are highlighted below.

As the public lighting system is the domain of the Municipality of the Capital (Budapest), there is only a limited role of the Local Government of Újpest to foster a smart public lighting system, even in the form of an ESCO financing by technology provider. Further, as the energy consumption of the public lighting is not measured, all smart solutions, lowering the energy consumption of the public lighting system, require the installation of a connection box for accounting meters in order to make sure that the energy savings are well registered.



Secondly, specific issues exist with regard to school buildings: the Primary and secondary schools belong to the Klebesberg Centre of Education, a national institute, so the Local Government of Újpest has limited influence introducing energy efficient solution for these buildings.

Further problems that may rise from the implementations of solutions at a local level will be reported by the FC in the course of the POCITYF project.



7. Conclusion and (Preliminary) Take-Aways

Next to specific findings, laid down in the interim conclusions for Alkmaar and Evora, the analysis of the legal and regulatory frameworks applicable to POCITYF shows some interesting findings of a more general nature. A first finding is that although all national regulatory systems are based on EU law, there is still a large diversity in how the EU-based rules are implemented. Moreover, it can be concluded that in every legislature, there are elements of the legal framework which are holding back positive energy building/district innovations. It differs per national legal framework which elements are holding back innovation and which elements are stimulating innovation. This shows the value of the POCITYF project, where these elements can be identified and regulatory solutions from one country can be introduced to the other.

A second finding relates to monumental buildings, protected city areas etc. These buildings and areas are often well protected under the national regulatory framework, with a view to conserve their features for future generations to enjoy. However, this protective legal framework holds back, in some perspectives, and among other reasons, renovations with a view to make the buildings more energy efficient, as envisaged in POCITYF. Often, the standards for renovation are so high, that it becomes very costly to renovate the building in such a way that the energy efficiency targets are also reached. This calls for creativity and innovation at the side of the project developers, to take the next step, when they own a market-ready, mature technology, to make the energy solutions fit with the historic features of the buildings.

A third finding is that some innovations (such as peer-to-peer trading and vehicle-to-grid services), envisaged in the POCITYF project, are just not yet fully covered in national legislation. Therefore, it is not yet clear how such innovations would be treated from a regulatory point of view. As the energy sector is changing at a rapid pace now, this also means that several of the laws that are currently in place will be outdated by the time the POCITYF projects are realised. Therefore, it is necessary that this Deliverable is updated in 2022. It also provides an opportunity that the laws change so often: this also means that regulatory issues that are currently holding back innovative developments can be addressed in the next legislative revision, taking away barriers in the legal framework and facilitating innovative solutions.



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