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**LE COMUNITÀ ENERGETICHE RINNOVABILI IN EMILIA-
ROMAGNA: NORMATIVA, BANDI E OPPORTUNITÀ DI
SVILUPPO**

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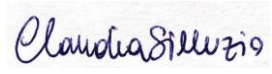
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Introduction

This thesis aims to analyze the theme of Renewable Energy Communities (REC) from an economic perspective, focusing on the funding granted by the Emilia-Romagna Region (Bando per il sostegno allo sviluppo di comunità energetiche rinnovabili). This region is considered one of the most advanced in Italy with regard to sustainable energy initiatives. Although RECs projects are still in development, a number of funding proposals have already been approved, offering interesting examples of practical implementation.

The thesis will be divided into three main chapters, each of which will explore different but complementary aspects of the theme.

In the first chapter, a comprehensive introduction to the topic of RECs will be given, while also examining the efforts of the European Union to promote energy transition towards renewable sources. The European and Italian regulations governing the sector will be analysed, highlighting the objectives and policies adopted to promote the development of RECs. In addition, concrete examples of energy communities already active in Italy during the process of defining national regulations will be presented.

The second chapter will be devoted to the analysis of the Call for Tenders of the Emilia-Romagna Region launched in 2022. Before going into the details of the specific call, an overview of the regulatory situation of energy communities in the various Italian regions will be offered. The chapter will then go into detail on the various elements of the Emilian call, outlining the requirements, eligible subjects, and how to access incentives. The regional law of Emilia-Romagna will be compared with the call, highlighting its peculiarities and differences.

In the third chapter, a quantitative analysis of data collected from the Emilia-Romagna call results will be carried out examining the eligible entities, the amount of funding provided and the economic impact of approved projects. The selection criteria and the scores will be analyzed, and an attempt will be made to establish the reasons for funding decisions.

This work aims to provide a thorough understanding of the economic dynamics influencing the development of RECs in Emilia-Romagna, providing useful input for future sustainable energy initiatives and policies. Through this detailed analysis, it is hoped to contribute to the spread of innovative and sustainable practices in the field of renewable energy, promoting a greener and more resilient energy future.

Chapter I

Energy communities: European and national regulations. A special attention to the Italian case

1.1 An introduction to RECs

Renewable energy communities (REC) support climate resilience strategies by intercepting the most recent community and national policies in a transversal way. This emerging socio-energy system is based on production of energy from renewable sources, exploiting distributed generation and the activation of local communities. Local energy production, long marginalized, regains strategic value in the process of ecological regeneration, becoming a focal point for design experiments that respond to the climate crisis, economic inequality and socio-environmental injustice (Capellaro et al., 2020).

The contemporary “polycrisis” (climate, environmental, socio-economic, pandemic and geopolitical) has deteriorated the shared social imaginary, reducing the community capacity to find creative solutions to current challenges (Cattini 2021). This contribution explores the possibility of broadening the impact of CERs, seeing them not only as a technical response to the energy transition, but also as potential accelerators of cultural changes towards circular and socially desirable development (Langer 1994).

The objective is to explore the potential of CERs to structure new urban facilities that not only produce energy for the community, but represent the new relationship between energy and community, critically addressing the formalization of technical devices to support climate neutrality. The definition of a design prototype is the first step towards the construction of the meanings that such public architecture can convey through its morphological, functional and environmental characteristics, becoming a founding element of a new approach to urban design.

Recent studies highlight that CERs in Italy can help produce 30% of the power envisaged by the Piano Nazionale Integrato per l’Energia e il Clima (PNIEC), with significant economic repercussions on Italian companies active in the renewables sector (Legambiente 2022). However, energy security must also be considered in relation to the growing risk of energy poverty due to the increase in fuel prices and changes in

energy demand induced by climate change, with possible peaks during summer heat waves.

This context paves the way for new models based on social innovations, exploiting the potential of local initiatives as technological development niches outside traditional practices (Bidmon and Knab 2018). These innovations can consolidate thanks to the mobilization of local actors and the consideration of global issues (van der Schoor-Scholtens 2014). However, entrusting the eco-social transition only to technical devices can generate uncritical responses of poor design quality.

Current CER experiences are often limited to simple photovoltaic roofing, incapable of activating communities based on physical and digital collaborative platforms. Imagining CERs as new frameworks for urban communities implies a profound rethinking of the intervention model, with the possibility of spatially representing the new eco-socio-technical paradigm.

New European Bauhaus strategic program promotes an eco-systemic, visionary, innovative and multidisciplinary design approach, capable of carrying out the transformations necessary to achieve the climate, environmental and social objectives set for 2030 and 2050. The project disciplines are called to rethink their approaches, developing common methods and experimenting with paths that enhance methodological differences.

The Intergovernmental Panel on Climate Change (IPCC) AR6 report reiterates the urgency and complexity of the climate crisis, calling for integrated actions that combine mitigation of greenhouse gas emissions and adaptation to climate risks, improving the well-being of people and ecosystems. There is an urgent need to understand the systemic interactions between adaptation and mitigation measures and the Sustainable Development Goals (SDG), challenging conventional approaches in decision-making and requiring profound social and infrastructural transformation.

Regarding the Italian contest, Renewable Energy Communities, also known as CERs , are the most famous of the seven widespread energy self-consumption configurations introduced by the resolution of ARERA, nr. 727/2022/R/ eel with the Integrated Text for widespread self-consumption (TIAD). These are legal entities made up of members such as private citizens, public bodies, companies or small and medium-sized

enterprises who voluntarily come together to share energy produced within a specific geographic area by one or more renewable energy facilities. The “widespread self-consumption” is the objective of this collaboration, i.e. the sharing of the energy that is produced within the community through distribution networks, enabling economic, social and above all environmental benefits for the area in which they operate. CERs are an alternative model for the production and use of energy from renewable sources which is based on the ability of local actors not only to self-organise, but also to understand the needs of the community and to build collective responses capable of enhancing the potential of the territory.

The members of a Renewable Energy Community can be of three types: passive consumers, as owners of an energy withdrawal-only point; producers, owners of a renewable energy production plant or prosumers, that are a mix between producers and consumers, i.e. the latter who have equipped themselves with a production plant aimed at self-consumption. Shareholders of CERs can be, according to the TIAD, only natural persons, local bodies or authorities, small or medium-sized enterprises (SMEs), provided that for private companies it does not constitute the main commercial and industrial activity. The greatest potential of CERs does not arise with the involvement of CERs promoted, created and managed by large energy players; in fact, these have more interest in profit, rather than the environmental and social objectives that these communities have as fundamental points.

The importance and the choice to investigate the Italian context is linked to the history of initiatives which, over the years, have witnessed an evolution of very different organisational typologies, but which share the same objectives as the international experiences of energy communities (De Vidovich - Tricarico- Zunnanello 2021) in addition to a heated debate on the regulatory and political context that will support future developments. In practice, however, Italy is still far from the main holders of RECs in Europe. According to a study by the European Union’s Joint Research Centre dating from 2020, Germany is the country with the largest number of energy communities, at 1750, followed by Denmark with 700 communities and the Netherlands with 500 (Enel Green Power, 2021).

To understand what CERs are and how they are defined, it is also important to understand the concepts of “energy self-consumer”, “energy collective self-consumption” and “renewable energy community”:

- 1) Energy self-consumer, is an end customer who produces electricity from renewable energy sources for his own consumption and who can store or sell this self-

produced energy as long as this activity does not constitute the main commercial activity of the entity (EU 2018/2001, art 2, point 14).

2) Energy Collective self-consumption, represents the extension of the concept of self-consumer, since at the building/condominium level: a group of at least two self-consumers of renewable energy who act collectively and live in the same building or condominium" (EU 2018/2001, art 2, point 15).

3) Renewable energy communities can be considered evolution at the district or neighborhood level. The subjects belonging to this community are shareholders who sign a contract, collectively constituting a legal entity. Their objective must be to pursue economic (non-financial), but above all environmental and social benefits (EU 2018/2001, art 2, point 16).

1.2 Background UE

A first definition of REC at European level was given with the directive on the promotion of renewable sources (EU 2018/2001), introducing them as a new scheme for local self-supply of renewable sources. This directive requires EU countries to commit to providing incentives to achieve the decarbonisation targets set out in the Green Deal. In 2019, the European Union revised its plan for decarbonization and mitigation to renewable energy (COM 2019/285 Bruxelles 18/06/2019). But even before that, since 2016 the EU has marked the way to review its energy policy framework to increase the abandonment of fossil fuels towards cleaner energy and, more specifically, to respect the commitments undertaken by the EU with the Paris Agreement. The agreement on this new energy regulation – called Clean Energy for All Europeans – marked a significant step towards the implementation of the Energy Union Strategy published in 2015 (COM/2015/080). Based on the Commission proposals published in 2016, the package consists of 8 new read (Clean energy package). Countries had 1-2 years to convert the new directives into national law. The aim of the package is to reduce emissions, while favouring energy saving of consumers by putting energy efficiency first. One of the main objectives is to increase energy efficiency, starting in 2019, by at least 32.5% by 2030. At present, in 2030 the energy consumption of the Union must not exceed 1,128 Mtoe of primary energy and 846 Mtoe of final energy (D,Lgs. N. 73/2020, recepimento della Direttiva 2018/2002/UE). As part of this strategy, each EU country was required to establish integrated ten-year PNIEC for the period 2021-2030. The

PNIECs outline how EU countries will achieve their objectives on all five dimensions of the energy union, including a longer-term vision towards 2050.

The act regulating the above issues entered into force on 11 December 2018 (EU 2018/1999). This establishes the 'legislative basis for sound governance of the Energy Union and Climate Action ("governance mechanism"), inclusive, cost-effective, transparent and predictable, ensuring the achievement of the long-term objectives and targets of the Energy Union up to 2030' (EU 2018/1999, point 1). The regulation touches on five points: the internal market, governance actions for the Energy Union, aimed at accelerating clean energy innovation, encouraging building renovations in Europe and public and private investments; energy security; the structure of the electricity market; energy efficiency; the process of decarbonisation and renewable energy; furthermore, fundamental points of the package are innovation, research and competitiveness. "This package offers an opportunity to accelerate both the clean energy transition and growth and job creation. By mobilizing up to an additional EUR 177 billion per year in public and private investment from 2021, the package can generate an increase of up to 1% of GDP and create 900,000 new jobs over the next decade 1, as well as allowing, in 2030, a 43% drop compared to the current figure in the average carbon intensity of the EU economy 2, when electricity from renewable sources will represent approximately half of the Union's electricity production mix" (COM. 2016).

The European Green Deal (Consiglio europeo, 2024) is a very ambitious project, promoted and carried out with commitment by the European Commission led by Ursula Von Der Leyen, who, as she herself said, aims to transform the European Union into a "just and prosperous society, with a modern market economy and where gas emissions will be eliminated, and growth will be decoupled from the use of natural resources" (Misculin 2020). The strategic action plan introduced by the European Commission is made up of a series of objectives, all mainly aimed at limiting the increase in global warming which, in recent years, has greatly alarmed experts and scholars. According to the estimates of the UN IPCC, the global temperature should remain below 1.5°C increase compared to the temperatures recorded in the pre-industrial era, to prevent the human species and the planet earth suffer irreparable gravity damage (IPCC, Chapter 1). The Paris Agreement on the climate was signed in 2015, thanks to which, the European Union, and all the other world countries that have decided to join the plan, have undertaken the emissions should be net zero (De Molli, p. 20) Their polluting emissions by no later than the 2050 limit. To reach the ambitious goal of 2050 with "0 polluting

emissions”, the Paris agreements also provide for intermediate stages, set for 2030 and 2040, for what are the objectives set from the Green Deal they could be defined as preparatory.

The package of actions that make up the European Green Deal is based on a broad and detailed strategy that involves specific sectors and macro-areas and requires an intersectoral approach in which all areas work synergistically to achieve a green and inclusive transition (Consiglio europeo).

The first objective was established for 2030, the year in which the reduction of greenhouse gas emissions in the Union must be at least 55% compared to the levels recorded in 1990: this is a legally established objective for which, that of reaching the climate neutrality is not just a political intention but a real legal obligation for the entire Union. The regulation provides, in fact, that until 2050 the pace of emissions reduction will be systematic and timed to ensure long-term predictability and an efficient and fair green transition towards climate neutrality.

The package, with its guidelines, aims to review the legislation of the Member States on climate, energy and transport to ensure that everyone can align with the European strategy for achieving the climate objectives.

The European Green Deal, with its vision of a sustainable future, is articulated through a series of strategic objectives. The eight fundamental pillars on which this ambitious plan is based each represent a key piece in the mosaic of transformation and in the construction of the "new continent" to come, outlining a roadmap for a more sustainable and equitable Europe.

- renewable energy and energy efficiency: is committed by UE to promoting the adoption of renewable sources and improving energy efficiency through massive investments in clean energy technologies, smart grids and research and development projects to ensure sustainable energy production and consumption;
- sustainable mobility: aims to transform the transport sector, promoting means of transport with low electrical emissions or powered by renewable sources. This involves the creation of infrastructure for electric charging and the strengthening of public transport;
- sustainable agriculture: the plan promotes more sustainable agricultural practices, encourages organic farming and aims to reduce the use of pesticides and chemical fertilizers. These actions are key to preserving biodiversity and protecting soil health;

- sustainable construction: promotes the construction and renovation of buildings with the aim of making them highly energy efficient. These interventions should not only reduce emissions but should also improve the quality of life of citizens;
- Reducing emissions: reducing greenhouse gas emissions is expected to contribute significantly to global efforts to mitigate climate change, protecting and preserving our planet for future generations;
- sustainable economic growth: the transition to a green economy aims to create job opportunities in renewable energy, energy efficiency and other sustainable industries, promoting equitable and sustainable economic growth;
- improvement of air quality: the reduction of polluting emissions should lead to an improvement in air quality, with direct benefits on citizens' health and the reduction of respiratory diseases;
- biodiversity conservation: measures to promote sustainable agricultural practices and the protection of ecosystems should contribute to the conservation of biodiversity by preserving the richness of natural habitats. This second section aims to clarify the regulatory aspects at a European level, providing an overview of the main directives that have encouraged the development of renewable energy communities.

The most important European regulations to achieve the above results are EU Directive 2018/2001 RED II, EU Directive 2019/944 and Regulation (EU) 2021/1060:

- EU Directive 2018/2001 RED II

The legislation dated 11 December 2018 had the objective to promote the use of energy from renewable sources to respect the agreements made in Paris in 2015 (L 282/4/2016) regarding climate change: meet the objectives set in 2030 and reduce emissions by at least 40%, as set in 1990. Topics of the directive are also the development of heating and cooling systems from renewable energy and the development of fuels for transport from renewable energy source.

Point 3 of this directive underlines that: “The greater use of energy from renewable sources can also play an indispensable role in promoting the security of energy supplies, in guaranteeing sustainable energy at affordable prices, in promoting technological development and innovation, in addition to technological and industrial leadership, while offering environmental, social and health advantages, as well as in creating numerous jobs and regional development, especially in rural and isolated areas, in regions or territories with low population density or subject to partial deindustrialization”.

A premise to these measures was Directive 2009/28/EC, which established a regulatory framework for the promotion of the use of energy from renewable sources which set binding national objectives in terms of the share of renewable energy in energy consumption and in the sector of transport to be achieved by 2020. The Commission communication of 22 January 2014 entitled Framework for energy and climate policies for the period 2020 to 2030 set out a framework for future Union policies in the fields of energy and climate and promoted a common understanding on how to develop these policies after 2020. The Commission has proposed as a Union objective a share of renewable energy consumed in the Union of at least 27% by 2030. This proposal was supported by the European Council in its conclusions of 23 and 24 October 2014, which indicated that Member States should be able to set their own more ambitious national targets, to achieve their planned contributions to the Union's 2030 target and go further. The European Parliament, in its resolutions of 5 February 2014, A framework for energy and climate policies towards 2030, and of 23 June 2016, Progress made in the field of renewable energy, went beyond the proposal of the Commission or Council conclusions, underlining that, “in light of the Paris Agreement and recent reductions in the cost of renewable technologies, it was desirable to be much more ambitious” (point, 6). For this reason, more optimistic objectives were hoped for, therefore: the Directive requires the States to collectively ensure that by 2030 the share of energy from renewable sources in the gross final energy consumption of the European community is at least equal to 32% (art. 3, par. 1), the share of energy from renewable sources in transport should be at least equal to 14% of final consumption in the sector (art. 5, par. 1).

To support Member States in their contributions to the Union's objective, it was considered appropriate to establish a financial framework aimed at encouraging investments in renewable energy projects in Member States, including through the use of financial instruments. Indeed, the directive underlined how: “The Commission should focus the allocation of funds on reducing the cost of capital allocated to renewable energy projects, since this cost has a significant impact on the cost of such projects and on their competitiveness, as well as on the development of essential infrastructures that enable increased, technically and economically feasible and sustainable use of renewable energy, such as transmission and distribution network infrastructures, smart grids and interconnections” (point 13).

The Commission is committed to stimulating investments in new clean and flexible technologies and to defining an adequate strategy to manage the phasing out of

technologies that do not contribute to the reduction of emissions or that do not present sufficient flexibility, based on transparent criteria and reliable signals of price.

The types of renewable sources have been established: by Regulation (EC) no. 1099/2008 of the European Parliament and of the Council, Directives 2001/77/EC and 2003/30/EC of the European Parliament and of the Council and Directive 2009/28/EC.

The Directive notes how small-scale plants can be very useful for increasing public acceptance and ensuring the diffusion of projects in the field of renewable energy, particularly at a local level. Therefore, the Directive incentivized Member States' support for local and small-scale initiatives. The Commission proposed to evaluate the compatibility of support for renewable energy with the internal market on a case-by-case basis. According to this Directive, exemptions should "respect the relevant thresholds of the most recent Commission regulations on state aid for the environment and energy" (point 19).

It was here that it was highlighted that Member States should ensure that Renewable Energy Communities can participate in available support schemes on an equal footing with large participants. To this end, the commission pushed for Member States to be allowed to take measures, including: "the provision of information, the provision of technical-financial assistance, the reduction of the administrative burden, including community-focused tender criteria , the creation of tailor-made bidding periods for renewable energy communities or the possibility for such communities to be paid through direct support when they comply with the requirements of small-scale installations" (paragraph 26).

The possibility of achieving economic growth through innovation and a sustainable and competitive energy policy was recognised. There are significant opportunities for local business development, sustainable growth and high-quality employment in Member States and their regions resulting from investments in energy production from renewable sources at regional and local level. The Commission and the Member States were therefore committed to promoting and supporting national and regional development actions in the renewables sector, encouraging the exchange of best practices between local and regional development initiatives on energy production from renewable sources and strengthening the provision of technical assistance and training programmes, to improve regulatory, technical and financial expertise and improve knowledge of available financing possibilities, including a more targeted use of Union funds, such as the use of political funds of cohesion in this sector.

One of the main points of the Directive turned out to be the incentive of RECs' initiatives "in encouraging the development of the energy market from renewable sources, it is necessary to take into account the positive impact on development at regional and local level, on export prospects, on social cohesion and job creation, in particular as regards SMEs and independent energy producers, including self-consumers of renewable energy and renewable energy communities" (paragraph 63).

It was in this Directive that the concepts of "self-consumers of renewable energy" (art. 2, point 14) and "self-consumers of renewable energy acting collectively" (art. 2, point 15) were introduced, in light of the increase in the incidence of self-consumption of renewable energy. To this end, a regulatory framework has been established to allow such self-consumers of renewable energy to produce, use, store, and sell electricity without incurring disproportionate costs. Furthermore, Renewable Energy Communities have begun to be referred to as legal entities.

One of the main points of the Directive is to reduce inequalities, both within the community and outside; in fact, granting rights to self-consumers of renewable energy who act collectively should allow renewable energy communities to increase the energy efficiency of households and contribute to fighting energy poverty by reducing energy consumption and supply tariffs. "To this end, in principle, Member States should not apply charges on electricity produced and consumed individually by self-consumers of renewable energy on the same sites. Nonetheless, to avoid affecting the financial stability of renewable energy support schemes, this incentive could be limited to small-scale plants with an electrical capacity not exceeding 30 kW" (point 69).

"The participation of local citizens and local authorities in renewable energy projects through renewable energy producing communities has brought significant added value in terms of local acceptance of renewable energy and access to additional private capital, which translates into: investments at local level, more choice for consumers and greater citizen participation in the energy transition" (Direttiva EU 2018/2001, point 70). The Directive underlined that such local involvement is all the more important in a context characterised by increasing renewable energy capacity. Measures to enable renewable energy communities to compete on an equal footing with other producers also aim to increase local citizen participation in renewable energy projects and therefore increase acceptance of renewable energy. To avoid abuse and ensure broad participation, the Directive underlined that renewable energy communities should be able to maintain their autonomy from individual members and other traditional market

actors who participate in the community as members or shareholders, or who they cooperate through other means, such as investments.

The Directive emphasises that participation in renewable energy projects should be open to all potential local members on the basis of objective, transparent and non-discriminatory criteria. The measures aimed at overcoming the disadvantages associated with the specific characteristics of local communities that produce renewable energy, in terms of size, ownership structure and number of projects, also include the possibility for energy communities to operate in the energy system and facilitate its integration in the market.

The articles 21 and 22 are the parts of Directive which has as their specific object the self-consumer and the CERs. In point 1 of Article 22: “Member States shall ensure that final customers, in particular household customers, have the right to participate in renewable energy communities, while maintaining their rights or obligations as final customers and without be subject to unjustified or discriminatory conditions or procedures that would prevent their participation in a renewable energy community, provided that, with respect to private enterprises, their participation does not constitute their principal commercial or professional activity”.

In point 2, Member States ensured, among other things, that renewable energy communities have the right to: produce, consume, store and sell renewable energy, including through renewable electricity purchase and sale agreements; as well as exchanging, within the same community, the renewable energy produced by the production units held by that renewable energy producing/consuming community.

- EU Directive 2019/944

Published on 5 June 2019, it relates to the common rules for the internal electricity market and modifies previous EU Directive 2012/27. It highlights the need to organise electricity markets in a more flexible way and to fully integrate all market players, "including producers of energy from renewable sources, new energy service providers, storage providers of energy and flexible demand" (point 6). The issue of the internal electricity market is raised, in order to resolve the problem of fragmented national markets. This situation and the state of the legislation have represented an obstacle "to the supply of electricity on an equal basis and have increased costs compared to solutions based on cross-border cooperation and market principles" (point 8). The directive focuses on the role of consumers and technological progress. “Thanks to technological progress in the management of networks and in the generation of electricity from renewable sources, many opportunities await consumers” (point 10).

Furthermore, it discusses the concept of a free market of advantageous trade between the countries of the Union, also by standardising market prices. “The main objectives of this directive should include ensuring common rules for a true internal market and a broad supply of electricity accessible to all. To this end, undistorted market prices would constitute an incentive for cross-border interconnections and investments in new electricity generation, leading, in the long term, to price convergence” (paragraph 19).

The regulation establishes that the European Regional Development Fund (ERDF) and the Cohesion Fund must contribute respectively 30% and 37% of the Union's contribution to the expenditure incurred in achieving the climate objectives set for the Union budget.

- Regulation (EU) 2021/1060

The regulation establishes the financial provisions applicable to the ERDF and other funds, not related to the subject of this thesis.

The objectives of this regulation are: a more competitive and intelligent Europe by promoting consequential economic transformation and regional information and communication technologies (ICT) connectivity; a resilient, greener and low-carbon Europe but transitioning to a net-zero carbon economy by promoting a clean and fair energy transition, green and blue investments, the circular economy, adaptation to climate change and its mitigation, risk management and prevention as well as sustainable urban mobility. The regulation aims for a more social and inclusive Europe through the implementation of the European Pillar of Social Rights; furthermore, “a Europe closer to citizens through the promotion of sustainable and integrated development of all types of territories and local initiatives” (point e).

1.3 Italian regulations

In Italy, the energy transition towards renewable sources is anything but a new phenomenon, despite the dual process of decentralisation and localization of energy co-production and consumption having only recently achieved political relevance.

The Italian regulation on photovoltaics began to take shape in 2005. Between 2005 and 2013 the sector was supported by government incentives for twenty years, which meant a growth and a particular spread of photovoltaics. The Energy Account (GSE) is a European plan designed to support the development of electricity production plants from solar sources permanently connected to the electricity grid . As of 6 July 2013, although incentives are no longer in place, there are tax deductions that can reduce the

economic impact of the initial investment and the commissioning of the same plant. In 2024, a 50% deduction can be expected on the purchase cost of the photovoltaic system, but in the case where it is simultaneous to building renovation of a property or extraordinary maintenance. This bonus has a maximum expenditure ceiling of 96 thousand euros, but only for works carried out between 26 June 2012 and 31 December 2024 (Agenzia Entrate). In addition, there is the possibility of using the 10% VAT reduction, not only for the purchase of the system but also batteries to equip as storage system for energy not consumed (Agenzia entrate, P.d. n. 15).

Italy has worked to comply with EU directives, now also on CERs. After the initial Directive and the start of the application activities in charge of the management of the GSE , the latest Italian initiatives was “the platform of the GSE, the energy services manager for requesting access to subsidised tariffs and contributions for the production and the self-consumption of electricity produced by photovoltaic systems provided for by the so-called Cer Decree (Renewable Energy Communities)”, in force from 24 January 2024.

The new system not only concerns the CERs but also the individual owners of single-family buildings and apartments in condominium that constitute a self-consumption group. “The possibility of creating widespread self-consumption configurations without necessarily establishing a CER is foreseen”. In the case of a Group, a notarial deed is not needed as for the establishment of a CER, a private agreement is sufficient, i.e. a contract between the interested parties, which it doesn't even have to be registered. The CER and virtual self consumption are two very closely related concepts but there are some key differences: CERs are legal entities formed by citizens, businesses, local authorities and other actors who work together to produce, share and consume renewable energy, whereas virtual self-consumption refers to the sharing of energy produced by renewable installations through the electricity distribution network, without consumers being physically connected to the production installation, This means that anyone can benefit from renewable energy even if you do not own a production facility (EU 2018/2001, art 2).

The incentives are generated using renewable resources of electricity at the same time as its production, based on a virtual self-consumption scheme. Virtual self-consumption does not require any direct access to the production plant as it uses the distribution network to balance energy consumption and production within the same portion of the network.

The self-consumption groups are obliged to be made up of all residents in the same building. It does not necessarily have to be a condominium, as long as there are different apartments, even if they belong to a single owner, with utilities registered to different individuals. The production plant must also be registered in the name of one of the residents in the same building. The group must then appoint a contact person who has the task of submitting the application and managing the procedure with the GSE. Self-consumption groups are granted the same incentive rates provided for CERs. It is therefore recognised: "An incentive tariff for a period of 20 years, between 60 and 120 euro MWh, depending on the size of the plant (higher for smaller ones) and the market value of the energy" (Donati, 2024). For photovoltaic systems, a further increase of up to 10 euros per MWh is foreseen depending on the geographical location.

A further amount is added to the incentive tariff as a valorisation fee for self-consumed energy, defined by ARERA, the Regulatory Authority for Energy, Networks and the Environment, equal to approximately 8 euros per MWh. The sums due are paid every month by the GSE, based on the consumption communicated by the managers. For this reason, there is no need to install ad hoc meters or make changes to the system or change energy provider. All you need is an active user.

Given the latest updates regarding the legislation, it is important to see how the Italian state has acted to comply with European directives. However, the next section will focus mainly over the time horizon ending in 2022, since in the next chapter, this work will focus on the analysis of one of the Calls for Proposals for transposition of national legislation, published in that year, specifically the Call for Tenders of the Emilia-Romagna.

1.3.1 Laws transposing Directive (EU) 2018/2001:

On the implementation of EU indications in Italy, on 8 July 2019, the Italian environmentalist and politician Rossella Muroli wrote in The Italian press (Repubblica, 2019): "The Italian energy policy envisaged by the National Energy and Climate Plan (Pnec) is not adequate", furthermore she defines the Italian proposals at the European level: "A Plan in absolute continuity with the past which sets insufficiently ambitious objectives, even for renewables and the reduction of emissions the targets are lower than the European ones, and continues to assign gas a role excessive considering that we are always talking about a fossil source". Muroli sustains that The initiatives were also defined as confused by the EU Commissioner who demanded greater clarity from Italy regarding the ways in which they intend to achieve the objectives set by the European

Community, and then rejected the Italian document: "For the European Commission as a whole, the proposals of the national plans currently present insufficient overall contributions for both renewable sources and energy efficiency: for renewable sources the gap to be filled is approximately 1.6 percentage points; for energy efficiency by 6 percentage points (considering final consumption)" (Muroli 2019).

The EU commission advised Italy to adopt policies to raise the ambition for renewable sources in the heating and cooling sector, as well as to present measures that would allow the country to achieve the emissions reduction target in transport and decrease the complexity and regulatory uncertainty also by specifying frameworks favourable to the self-consumption of energy from renewable sources and to renewable energy communities.

Italy has therefore undertaken to return transposition legislation that is in accordance with the European directives. The following is a description of these:

1) DL 162/2019: "thousand extensions" decree

The Legislative Decree of 30 December 2019 n. 162, so-called Milleproroghe, later converted into Law 28 February 2020 n. 8, with art. 42-bis regulated the institutions of collective self-consumption from renewable sources and renewable energy communities in Italian law. This is a rule that has a declared experimental purpose, having been issued pending the complete transposition of Directive EU 2018/2001 of the European Parliament and of the Council and in implementation of the articles. 21 and 22 of the same Directive, concerning the promotion of the use of energy from renewable sources. The experimental purpose of the provision was further confirmed by the desire to monitor the application of the aforementioned institutions, in order to acquire useful elements for the definitive implementation of the aforementioned Directive (EU) 2018/2001, as well as of Directive (EU) 2019/944 relating to the internal electricity market. Both Directives constitute fundamental elements of the European project which intends to proceed with the transformation of its energy system to achieve, by 2030, a reduction of at least 30% in its greenhouse gas emissions and growth of at least 32% in the share of energy produced from renewable sources. and the reduction of primary energy consumption by at least 32.5%.

To achieve these objectives, the European Union put more effort on the active participation of citizens and small-scale entrepreneurs, called upon to simultaneously play the role of producers and consumers of electricity (prosumer). An energy system, almost sixty years after 1962, which in Italy was the year of the nationalisation (and

therefore centralisation) of electricity production, reversed course and today aims at its decentralisation.

2) Legislative Decree 199/2021

The D.Lgs. 199/2021 entered into force on 15 December 2021, with full application after 180 days and its effects were made visible from 13 June 2022. This legislation updates and partially repeals the D.Lgs. 28/2011, which had introduced a consistent set of requirements for the use of renewable sources in new buildings and those subject to major renovations. The D.Lgs. 28/2011 provided that a minimum percentage of the energy needs of buildings with renewable sources should be covered, which also included the installation of photovoltaic systems with minimum power proportional to the building surface. It also provided for a gradual increase in the minimum requirements to encourage the use of renewable sources.

While the new decree maintains these principles, it introduces important changes to the minimum requirements. The following table 1 illustrates the new requirements, compared with those of Legislative Decree 28/2011, in particular with the last bracket of 01/01/2017.

Requisiti per la copertura del fabbisogno di energia da fonti rinnovabili
<ul style="list-style-type: none"> • 60% di copertura da fonti rinnovabili per il servizio di acqua calda sanitaria; • 60% di copertura da fonti rinnovabili per l'insieme dei servizi di riscaldamento, raffrescamento e acqua calda sanitaria.
<i>Per gli edifici pubblici le percentuali salgono al 65%</i>
Requisiti relativo all'installazione di impianti fotovoltaici
Obbligo installazione Impianti FV di potenza pari a: $P=k*S$ Dove: S=Superficie in pianta dell'edificio senza pertinenze k=0,025 per edifici esistenti k=0,05 per edifici nuovi
<i>Per gli edifici pubblici la potenza è incrementata del 10%</i>

Table 1: New requirements introduced by D. Legs. 199/2021 (Amore, 2022)

It is important now to compare the new requirements with those provided for by the previous Legislative Decree. 28/2011 and specifically with the last and most restrictive bracket, which came into force on 01/01/2017. This will be done in Table 2:

Confronto requisiti	
D.Lgs. 28/2011	D.Lgs. 199/2021
50% ACS	60% ACS
50% Risc+ACS+Raff	60% Risc+ACS+Raff
Fotovoltaico $P = S/K$	Fotovoltaico $P = S \cdot k$
S= superficie in pianta edificio K=50	S= superficie in pianta edificio k= 0,025 (edificio esistente) k= 0,05 (edificio nuovo)

Table 2: comparison between the past and current Legislative Decree. (Amore, 2022)

The current requirements are to increase the percentage of RES (Requisiti Essenziali di Sicurezza) needs covered by up to 60%. For photovoltaic systems, the requirement varies between new buildings and existing ones subject to significant renovations. For example, for a building with a surface area of 100 m², the minimum power required is, for Legislative Decree 28/2011 was $P = 2$ kWp, while regarding the Legislative Decree 199/2021 refers to $P = 2.5$ kWp, with an increase for new building of a $P = 5$ kWp.

The result shows an increase of 25% for major renovations, while it is 150% for new buildings. Both decrees provide for derogations from the minimum requirements, based on alternative verifications of the energy performance index of the building, which are applicable only if there is a documented technical impossibility.

Existing buildings are required to use RES only in the case of major renovations, defined in D.Lgs. 28/2011 and maintained unchanged in D.Lgs. 199/2021. A renovation is relevant if it concerns a building with a useful surface area of more than 1000 m² and involves the whole of the envelope, or in case of demolition and reconstruction regardless of the surface.

Faced with increased requirements, the use of more advanced solutions is needed as well as efficient plant systems. In Table 3 some examples developed with the software Namirial Termo (Amore, 2022) to compare the results with the requirements of both decrees. Initially a residential building of new construction of 120 square meters is considered, with efficient housing and only heating and domestic hot water services, using initially a condensing boiler:

Risultati verifica													
Dati energetici edificio e relativi limiti													
Certificazione	EPHnd	EPHnd lim	EPCnd	EPCnd lim	EPgl,tot	EPgl lim	UM EP	etaH	etaHlim	etaW	etaWlim	etaC	Verificato
Subalterno	27,5	29,1	48,7	62,1	47,5	64,6 kWh/m ²		0,8768	0,7329	0,8779	0,5667	---	<input checked="" type="checkbox"/>

Esito della verifica per la certificazione

L'area solare equivalente estiva per unità di superficie utile (0,021) è inferiore al valore limite (0,030)
L'EPHnd (27,549 kWh/m²) è inferiore al limite (29,067 kWh/m²) calcolato per l'edificio di riferimento
L'EPCnd (48,710 kWh/m²) è inferiore al limite (62,073 kWh/m²) calcolato per l'edificio di riferimento
L'EPgl,tot (47,538 kWh/m²) è inferiore al limite (64,634 kWh/m²) calcolato per l'edificio di riferimento
L'efficienza dell'impianto di riscaldamento (0,8768) è superiore al limite (0,7329) calcolato per l'edificio di riferimento
L'efficienza dell'impianto di acqua calda sanitaria (0,8779) è superiore al limite (0,5667) calcolato per l'edificio di riferimento
La massa superficiale delle strutture verticali opache è superiore a (230 kg/m²) oppure la trasmittanza termica periodica è inferiore a (0,10 W/m²K)
La trasmittanza termica periodica delle strutture orizzontali o inclinate è inferiore a (0,18 W/m²K)
L'edificio è realizzato in zona C, D, E o F. Le trasmittanze dei divisori tra edifici o unità immobiliari confinanti o le strutture esterne dei locali non riscaldati sono inferiori al limite di 0,8 W/m²K

L'utilizzo di fonti rinnovabili per la produzione di energia termica non è in grado di coprire almeno il 50,0% del fabbisogno annuo di energia primaria per la produzione di acqua calda sanitaria (copertura del 0,3%)
L'utilizzo di fonti rinnovabili per la produzione di energia termica non è in grado di coprire almeno il 50,0% del fabbisogno annuo di energia richiesta dall'utente per il riscaldamento, il raffrescamento e la produzione di acqua calda sanitaria (copertura del 1,0%)
La potenza elettrica degli impianti alimentati da fonti rinnovabili (0,0 kWp) è inferiore al valore limite (2,4 kWp)
Copertura fonti rinnovabili NON VERIFICATA. Segue verifica alternativa fonti rinnovabili
L'indice di prestazione energetica dell'edificio (47,538 kWh/m²) è superiore al valore limite (32,639 kWh/m²)
Criterio alternativo fonti rinnovabili NON VERIFICATO
L'edificio non è ad energia quasi zero (nZEB)
Verifica bonus volumetrico NEGATIVA

Generale nZEB Trasmittanze Verifica termoisometrica Verifica estiva

Table 3: Results of an energy audit of a building according to the Legislative Decree 28/2011 and Legislative Decree 199/2021 (Amore, 2022)

- Legislative Decree 28/2011: FER requirements are not respected.
 - kWp photovoltaic system and solar thermal collectors, the requirements of Legislative Decree 28/2011 are satisfied, but not those of Legislative Decree 199/2021.
- According to Legislative Decree 28/2011:

Risultati verifica

Dati energetico edificio e relativi limiti

Certificazione	EPHnd	EPHnd lim	EPCnd	EPCnd lim	EPgl,tot	EPgl lim	UM EP	etaH	etaHlim	etaW	etaWlim	etaC	Verificato
Subalterno	27,5	29,1	48,7	62,1	50,8	119,4	kWh/m ²	0,8607	0,6247	0,7536	0,1942	---	<input checked="" type="checkbox"/>

Esito della verifica per la certificazione

Non si verificano condensazioni superficiali o interstiziali nelle strutture opache
 Il coefficiente medio globale di scambio termico HT (0,39 W/m²K) è inferiore al valore limite (0,53 W/m²K)
 L'area solare equivalente estiva per unità di superficie utile (0,021) è inferiore al valore limite (0,030)
 L'EPHnd (27,549 kWh/m²) è inferiore al limite (29,067 kWh/m²) calcolato per l'edificio di riferimento
 L'EPCnd (48,710 kWh/m²) è inferiore al limite (62,073 kWh/m²) calcolato per l'edificio di riferimento
 L'EPgl,tot (50,785 kWh/m²) è inferiore al limite (119,407 kWh/m²) calcolato per l'edificio di riferimento
 L'efficienza dell'impianto di riscaldamento (0,8607) è superiore al limite (0,6247) calcolato per l'edificio di riferimento
 L'efficienza dell'impianto di acqua calda sanitaria (0,7536) è superiore al limite (0,1942) calcolato per l'edificio di riferimento
 La massa superficiale delle strutture verticali opache è superiore a (230 kg/m²) oppure la trasmittanza termica periodica è inferiore a (0,10 W/m²K)
 La trasmittanza termica periodica delle strutture orizzontali o inclinate è inferiore a (0,18 W/m²K)
 L'edificio è realizzato in zona C, D, E o F. Le trasmittanze dei divisori tra edifici o unità immobiliari confinanti o le strutture esterne dei locali non riscaldati sono inferiori al limite di 0,8 W/m²K
 L'utilizzo di fonti rinnovabili per la produzione di energia termica è in grado di coprire almeno il 50,0% del fabbisogno annuo di energia primaria per la produzione di acqua calda sanitaria (copertura del 76,4%)
 L'utilizzo di fonti rinnovabili per la produzione di energia termica è in grado di coprire almeno il 50,0% del fabbisogno annuo di energia richiesta dall'utenza per il riscaldamento, il raffrescamento e la produzione di acqua calda sanitaria (copertura del 51,8%)
 La potenza elettrica degli impianti alimentati da fonti rinnovabili (3,0 kWp) è superiore al valore limite (2,4 kWp)
 L'edificio è ad energia quasi zero (nZEB)

Modifica lista di sub-certificazioni

Generale nZEB Trasmittanze Verifica termoisometrica Verifica estiva

Table 4: Results of an energy audit of a building according to the Legislative Decree 199/2021 (Amore 2022)

According to Legislative Decree 199/2021:

Risultati verifica

Dati energetico edificio e relativi limiti

Certificazione	EPHnd	EPHnd lim	EPCnd	EPCnd lim	EPgl,tot	EPgl lim	UM EP	etaH	etaHlim	etaW	etaWlim	etaC	Verificato
Subalterno	27,5	29,1	48,7	62,1	50,8	119,4	kWh/m ²	0,8607	0,6247	0,7536	0,1942	---	<input checked="" type="checkbox"/>

Esito della verifica per la certificazione

Il coefficiente medio globale di scambio termico HT (0,39 W/m²K) è inferiore al valore limite (0,53 W/m²K)
 L'area solare equivalente estiva per unità di superficie utile (0,021) è inferiore al valore limite (0,030)
 L'EPHnd (27,549 kWh/m²) è inferiore al limite (29,067 kWh/m²) calcolato per l'edificio di riferimento
 L'EPCnd (48,710 kWh/m²) è inferiore al limite (62,073 kWh/m²) calcolato per l'edificio di riferimento
 L'EPgl,tot (50,785 kWh/m²) è inferiore al limite (119,407 kWh/m²) calcolato per l'edificio di riferimento
 L'efficienza dell'impianto di riscaldamento (0,8607) è superiore al limite (0,6247) calcolato per l'edificio di riferimento
 L'efficienza dell'impianto di acqua calda sanitaria (0,7536) è superiore al limite (0,1942) calcolato per l'edificio di riferimento
 La massa superficiale delle strutture verticali opache è superiore a (230 kg/m²) oppure la trasmittanza termica periodica è inferiore a (0,10 W/m²K)
 La trasmittanza termica periodica delle strutture orizzontali o inclinate è inferiore a (0,18 W/m²K)
 L'edificio è realizzato in zona C, D, E o F. Le trasmittanze dei divisori tra edifici o unità immobiliari confinanti o le strutture esterne dei locali non riscaldati sono inferiori al limite di 0,8 W/m²K
 L'utilizzo di fonti rinnovabili per la produzione di energia termica è in grado di coprire almeno il 60,0% del fabbisogno annuo di energia primaria per la produzione di acqua calda sanitaria (copertura del 76,4%)
 L'utilizzo di fonti rinnovabili per la produzione di energia termica non è in grado di coprire almeno il 60,0% del fabbisogno annuo di energia richiesta dall'utenza per il riscaldamento, il raffrescamento e la produzione di acqua calda sanitaria (copertura del 51,8%)
 La potenza elettrica degli impianti alimentati da fonti rinnovabili (3,0 kWp) è inferiore al valore limite (5,9 kWp)
 Copertura fonti rinnovabili NON VERIFICATA. Segue verifica alternativa fonti rinnovabili
 L'indice di prestazione energetica dell'edificio (24,497 kWh/m²) è inferiore al valore limite (39,095 kWh/m²)
 Criterio alternativo fonti rinnovabili VERIFICATO. Dettagliare l'impossibilità tecnica di ottemperare agli obblighi sulle fonti rinnovabili.
 L'edificio è ad energia quasi zero (nZEB)

Modifica lista di sub-certificazioni

Generale nZEB Trasmittanze Verifica termoisometrica Verifica estiva

Table 5: Results of an energy audit of a building according to the Legislative Decree 28/2011 and Legislative Decree 199/2021 (Amore 2022)

The new requirements need doubling of the photovoltaic system's power, as well as increasing the surface area of solar collectors, which are a very expensive and also poorly functional solution. What might be useful is to employ more efficient generators such as hybrid systems or heat pumps. In Table 6, the case is presented where the boiler and solar thermal are replaced by a hybrid generator. This seems to produce a satisfactory result:

Risultati verifica														
Dati energetici edificio e relativi limiti														
Certificazione	EPHnd	EPHnd lim	EPcnd	EPcnd lim	EPgl,tot	EPgl lim	UM EP	etaH	etaHlim	etaW	etaWlim	etaC	etaClim	Verificato
Subalterno	27,5	29,1	48,7	62,1	55,4	105,4 kWh/m ²		0,8569	0,6867	0,9552	0,6355	5,7799	1,5221	<input checked="" type="checkbox"/>

Esito della verifica per la certificazione
<p>Non si verificano condensazioni superficiali o interstiziali nelle strutture opache</p> <p>Il coefficiente medio globale di scambio termico HT (0,39 W/m²K) è inferiore al valore limite (0,53 W/m²K)</p> <p>L'area solare equivalente estiva per unità di superficie utile (0,021) è inferiore al valore limite (0,030)</p> <p>L'EPHnd (27,549 kWh/m²) è inferiore al limite (29,067 kWh/m²) calcolato per l'edificio di riferimento</p> <p>L'EPcnd (48,710 kWh/m²) è inferiore al limite (62,073 kWh/m²) calcolato per l'edificio di riferimento</p> <p>L'EPgl,tot (55,390 kWh/m²) è inferiore al limite (105,373 kWh/m²) calcolato per l'edificio di riferimento</p> <p>L'efficienza dell'impianto di riscaldamento (0,8569) è superiore al limite (0,6867) calcolato per l'edificio di riferimento</p> <p>L'efficienza dell'impianto di acqua calda sanitaria (0,9552) è superiore al limite (0,6355) calcolato per l'edificio di riferimento</p> <p>L'efficienza dell'impianto di raffrescamento (5,7799) è superiore al limite (1,5221) calcolato per l'edificio di riferimento</p> <p>La massa superficiale delle strutture verticali opache è superiore a (230 kg/m²) oppure la trasmittanza termica periodica è inferiore a (0,10 W/m²K)</p> <p>La trasmittanza termica periodica delle strutture orizzontali o inclinate è inferiore a (0,18 W/m²K)</p> <p>L'edificio è realizzato in zona C, D, E o F. Le trasmittanze dei divisori tra edifici o unità immobiliari confinanti o le strutture esterne dei locali non riscaldati sono inferiori al limite di 0,8 W/m²K</p> <p>L'utilizzo di fonti rinnovabili per la produzione di energia termica è in grado di coprire almeno il 60,0% del fabbisogno annuo di energia primaria per la produzione di acqua calda sanitaria (copertura del 98,6%)</p> <p>L'utilizzo di fonti rinnovabili per la produzione di energia termica è in grado di coprire almeno il 60,0% del fabbisogno annuo di energia richiesta dall'utenza per il riscaldamento, il raffrescamento e la produzione di acqua calda sanitaria (copertura del 96,3%)</p> <p>La potenza elettrica degli impianti alimentati da fonti rinnovabili (5,0 kWp) è superiore al valore limite (5,9 kWp)</p> <p>L'edificio è ad energia quasi zero (nZEB)</p>

Generale nZEB Trasmittanze Verifica termoigrometrica Verifica estiva

Table 6: Results of an energy audit of a building according to the Legislative Decree 28/2011 and Legislative Decree 199/2021 (Amore 2022)

3) Piano Nazionale Integrato per l'Energia e il Clima (PNIEC)

The PNIEC, italian acronym for "Integrated National Plan for Energy and Climate", is a strategic document that defines a country's long-term energy and climate policy. In particular, the PNIEC provides a strategic vision for the energy transition and climate action, identifying the objectives, policies and measures necessary to achieve these objectives. The PNIEC was adopted in implementation of Regulation 2018/1999/EU and sent to the European Commission in 2020. A first version was sent on 8 January 2019, which was discussed and adopted only in December of the same year (Camera dei deputati, 2021).

The PNIEC is developed in accordance with international obligations undertaken by the country, such as European Union agreements or commitments established under the

Paris Climate Agreement. It includes a number of key policy areas, such as energy efficiency, renewable energy, sustainable transport, climate change adaptation, technological innovation and governance energy. The PNIEC is the tool with which Member States identify policies and measures to achieve the energy and climate objectives for 2030.

In practice, this is the framework of national implementation measures for European emissions reduction commitments. The Plans arise from the need for a somewhat shared overall vision for the framework and verification of the Member States' path towards emissions reduction commitments.

The submission of the PNIEC is an obligation deriving from the European Regulation (EU) 2018/1999 on the Governance of the Energy Union. The Regulation defines the timing, methods and minimum elements for preparing the Plans which constitute the synthesis of the energy and climate policy of the Member States and, in fact, of the European Union, with a ten-year horizon (2020-2030, 2030-2040, etc.).

4) ARERA Resolution 2022/727

With this resolution, the Integrated Text of Widespread Self-Consumption (in Italian TIAD) was approved by ARERA in 2022, implementing the provisions of legislative decrees 199/2021 and 210/2021 regarding renewable energy communities, citizens' energy communities, groups of self-consumers of renewable energy who act collectively, groups of active customers acting collectively, individual "remote" renewable energy self-consumers with a direct line and individual renewable energy self-consumers. With ARERA resolution 727/2022/R/ eel, the new rules for widespread self-consumption were defined, which complete the regulatory framework relating to self-consumption of electricity understood in the broad sense. In practice, in the national electricity system it is possible to carry out self-consumption: both at a local level through the establishment of simple production and consumption systems (SSPC) also including the case in which the production system is located outside the consumption sites and now connected through a system of direct connections; and at a widespread level using the public network in compliance with certain conditions. ARERA defines consumed electricity as shared electricity, for each hour, the minimum between the electricity injected and the electricity withdrawn relating only to the connection points located in the portion of the distribution network underlying the same primary substation. In January 2024, ARERA modified some points of the resolution with 15/2024/R/ eel.

1.4 Examples in Italy

Until 2020, the energy community sector in Italy was still a niche sector, characterised by small initiatives largely dependent on national policy support for the photovoltaic sector (Candelise -Ruggeri 2021). But as the incentives have come into being, a number of projects have been taking shape in recent years. However, regulatory and bureaucratic delays have negatively affected the final number of active CERs.



Table 7: La rappresentazione grafica delle Comunità Energetiche attive in Italia (Baronchelli 2024).

However, the development of community businesses in the energy sector is not recent, in fact it dates back to the early twentieth century, when some historical cooperation experiences were developed in the Alpine area (ARERA 2020).

An example is the Cooperativa dell'Alto Bût, founded in 1911, which is the first company in Friuli for the production and distribution of hydroelectric power. This first form of energy community provided home lighting to the capital of Paluzza in the early

hours of the night. In 1925 the community expanded to include other municipalities such as Sutrio, Treppo Carnico, Ravascletto, Ligosullo, Paluzza and Cercivento. From the first plant, others have been built that now extend over the entire area, meaning a decisive step towards energy self-sufficiency (SECAB). However, since the early 2000s, also thanks to the introduction of incentives dedicated to the implementation of photovoltaics, energy communities have begun to emerge as a new paradigm capable of encouraging the participation of end users (individual citizens, but also public administrations and small-medium enterprises) in the international energy transition process (Pennisi 2024).

However, the most significant initiatives were launched after the legislation took on a little more substance. The Energy and Solidarity Community of East Naples represents one of the first entities compliant with Law 8/2020, thanks to a local agreement between actors rooted in the San Giovanni a Teduccio neighborhood and in the city of Naples. The Fondazione Famiglia di Maria, a philanthropic organization of religious origin and now a private foundation, manages a socio-cultural center and focuses on social services for minors. It is supported by Fondazione con il Sud, a body with a social vocation rooted in Campania, and Legambiente Campania, which provided the technical expertise for the development of the CER. 3E and Italia Solare contributed by providing photovoltaic panels installed on the roof of the headquarters of the Fondazione Famiglia di Maria. The project did not receive economic and organisational support from local and regional administrations.

The deed of incorporation of the Energy and Solidarity Community of Naples East identifies a dual objective:

- Cultural: Energy education with training activities on the ecological transition for families in socio-economic difficulty in a neighbourhood with a working-class past and plagued by organised crime.
- Operational: Production of renewable energy in a sharing logic, overcoming the use of fossil energy and replacing the energy supply in homes with difficult structural conditions for energy efficiency solutions.

The project involves families in awareness campaigns for sustainable and virtuous energy consumption. The energy community was founded by installing a photovoltaic system on the roof of the Family di Maria Foundation building.

The implementation of the photovoltaic system, with a power of 55 kW, was made possible by an investment of €100,000, divided equally between two funding sources, namely, the Fondazione per il Sud, with a contribution of 50% (of which €10,000-€15,000 for training workshops on energy and environmental issues) and remaining 50% through a discount on the invoice and the transfer of credit to the companies involved according to the Eco-bonus national support.

The photovoltaic system produces energy distributed among forty families via the distribution network connected to the same electrical substation. The Fondazione Famiglia di Maria plays a key role in the organization and dissemination of the project, recognized for its social inclusion and cohesion activities.

The project was initiated mainly through workshops on the meaning and purpose of an 'energy community' and environmental education courses on municipal waste. The foundation of the CER on 17 March 2021 as an unrecognized association, and not as a Third Sector body, faced technical and urban planning complications related to the installation of the photovoltaic system. Despite difficulties with regional environmental authorization on landscape constraints, the project overcame these obstacles thanks to legislation that allows the installation of photovoltaic panels on flat roofs without landscape authorization.

The main benefits concern community consolidation and economic savings for families. Participation in a CER implies a personal interest in environmental sustainability, fueled by the training and educational activities of the Fondazione Famiglia di Maria. Furthermore, families save around €300 per year on energy costs. The goal is to involve another twenty families by 2024, continuing the work started by President Ricciardi, even in the event of a change in the direction of the Foundation.

Another relevant project is RECOCER (Coordinated Management of the Processes for the Constitution of Renewable Energy Communities in the Territory, 2021-2023). It represents a multi-year strategic initiative for the creation of Renewable Energy Communities in the Autonomous Region of Friuli Venezia Giulia. This project involves, from an administrative point of view, the Friuli Hill Community, a local authority made up of 15 Municipalities, and, from a technical and scientific point of view, the Energy Center of the Polytechnic of Turin. The idea was born with the

intention of replicating the approach of the CER of Magliano Alpi in Piedmont, using inter-municipal governance.

In the area involved, which is home to around 50,000 people, a first operational context has been identified in the municipality of San Daniele del Friuli, where a school is equipped with a 55 kW photovoltaic system. The Friuli Hill Community has started an energy transition process to promote the entire region.

The RECOCER project intends to provide an organizational basis for implementing territorial energy governance, using renewable energy sources with systematic benefits for all participating municipalities. By 2022, the objective was to make coordination and management capabilities available to all the Municipalities of Friuli Venezia Giulia, using the approach tested in the Friuli Hill Community. Historically, this community has acted as an interface between Municipalities and the energy supply network, especially for gas, with the ultimate goal of negotiating cheaper energy prices.

The Autonomous Region of Friuli Venezia Giulia allocated €5,400,000 for the Hill Community, to be spent by 2023. The RECOCER project was defined thanks to a feasibility study commissioned by the Hill Community to the Energy Center in the period 2019-2020. RECOCER's first activity took place in the Municipality of San Daniele del Friuli on 14 October 2021, with the installation of a 55 kW photovoltaic system in a school building, which now serves as a prosumer.

The Energy Center of the Polytechnic of Turin is not limited to technical-scientific consultancy for the launch of CER, but involves all territorial stakeholders to establish sustainable and inclusive governance. Founded in 2016, the Energy Center of the Polytechnic of Turin launched the Energy Center Initiative (ECI) to scientifically and strategically support local authorities, national and transnational bodies on energy policies and technologies aimed at decarbonisation. The Energy Center develops business plans, feasibility studies and offers support in the transposition of directives and reference standards, identifying territorial pilot contexts.

The official recognition of the first CER in Friuli Venezia Giulia dates back to 2018, with the first feasibility studies of the RECOCER project starting in the summer of 2019. The organization of the project followed the experience of Magliano Alpi, with

the creation in 2021 of the TTC (Community Technical Team) to ensure effective control in the initial stages. GO-CER, a network of Energy Community Operational Groups, was founded to plan, implement and manage CERs, maximizing local added value for sustainable development.

The RECOCER project has five main objectives:

- Creation of value through innovation: generate, consume and manage energy in an innovative way, reinvesting the benefits in the territory.
- Reduction of electricity bills: create savings by exploiting self-produced energy from renewable sources.
- Sharing of standards: design, installation and management of systems to ensure interoperability between public and private nodes of the territorial energy system.
- Developing local supply chains: collaboration between builders, installers, maintainers and designers to provide high-quality services, create jobs and stimulate the post-pandemic economy.
- Coordinated acquisition of goods and services: create economies of scale, encourage good practices and avoid duplicate costs.

The Energy Center of the Polytechnic of Turin intends to systematise a technical-scientific approach to guarantee long-term stability to CER business models.

CommOn Light is the first energy community project implemented in Sicily, born from the collaboration between the Municipality of Ferla (Province of Syracuse) and the University of Catania, as part of the interdepartmental research project TREPESL (Energy transition and new participation models and local development). The project involves the installation of a 20 kW photovoltaic system on the roof of the Municipality of Ferla, integrated into the landscape thanks to the consultancy of the Superintendency of Cultural Heritage.

One initiative involving a local authority is The CER of Ferla. It is established as an unrecognised association, with members including the Municipality of Ferla and four citizens (two natural persons and two legal persons). The main objectives of the project are:

- Energy production and storage: use and store energy produced from renewable sources.

- Environmental, economic and social benefits: reduce emissions, achieve financial savings for members and promote sustainability.
- Promotion of the culture of sustainability: through training, participation in conferences and civic education activities.
- Inclusivity: open structure that welcomes interested new members.
- Economic and technological Investments

The project is financed through the ERDF operational plan for Sicily 2014-2020, with additional resources from municipal funds. The University of Catania managed the administrative and compliance aspects, while the Municipality of Ferla took care of communication and engagement with citizens. As stated by the mayor, the sums allocated for energy efficiency in central-southern municipalities are often integrated into municipal resources without considering the objectives linked to the ecological transition.

The CER was created official between March and May 2021, with the installation process of the photovoltaic system starting in 2017-2018. After the approval of the municipal resolutions, a communication campaign was launched in March 2021 to involve citizens, collecting around 9-10 expressions of interest. However, further memberships have been temporarily suspended to avoid overloading the low voltage system.

The economic benefits of the CER are based on a system of incentives for community members, with a division of the proceeds:

- 20% incentives: Paid to all members to encourage adoption of renewable energy.
- 30% of incentives: Paid in proportion to the energy shared, encouraging consumption during daylight hours.
- 50% of the incentives: intended for energy producers, with the possibility of allocating resources to new producer members through assembly decisions.

Currently, the Municipality of Ferla is the only energy producer, but the benefits can be redistributed with the membership of new members. Part of the revenues is allocated to a fund for operating costs and further green initiatives, thus promoting sustainable development.

The CommOn Light project represents an innovative model of energy community in Sicily, with a strong focus on environmental sustainability, community involvement and

the promotion of a sustainable energy culture. The initiative, despite starting with limited resources, demonstrates how collaboration between local authorities and universities can lead to significant economic, social and environmental benefits, while promoting the adoption of renewable energy.

Chapter II

The Call for Proposals to Support the Development of Renewable Energy Communities

2.1 Road Trip in the Italian legislation: towards CERs

As noted in the last part of Chapter 1, several initiatives have already been launched to exploit the new opportunities offered by CERs. The Italian context is made up of a varied compendium of regions, which have had the opportunity to act autonomously, initiating - over time - a series of funds aimed at supporting national and European provisions. In recent years, CERs have undergone various evolutions and developments in the different Italian regions, although the national reference legislation was only standardised in 2021.

Regions have often adopted slightly different approaches and ways of implementing CERs, especially with regard to controls and issuing methods.

In general, CERs in Italy represent an important tool for promoting the energy sustainability of buildings, incentivising improvements in their energy efficiency and raising awareness among both owners and end-users on the environmental impacts of buildings' energy consumption. If from a national point of view, from 2005 to 2020 there were several regulations that attempt to transpose European directives, it is also important in this chapter to address the role played by the regions in complying with the legislation and drawing on the contributions made available. In fact, the Italian regions have competence in the field of energy efficiency in buildings, and can therefore issue additional or supplementary regulations to the national ones. The most relevant are:

- Tuscany, which has Regional Law 39/2005 and subsequent amendments regulating the energy efficiency of buildings. It also introduces the obligation of periodic energy audits for certain types of buildings.
- Lombardy, one of the most advanced regions in terms of energy efficiency. It adopted Decree 6480/2015, which introduces specific standards for energy certification and stringent requirements for new buildings and renovations.

- Emilia-Romagna has issued Resolution 967/2015, which establishes criteria for the energy certification of buildings, with particular attention to the quality of installations and the use of renewable sources.
- Veneto region issued Resolution 1193/2016, which establishes guidelines for energy certification, including technical specifications for assessments.

While national regulations establish general criteria and guidelines, regions can adopt more restrictive or specific regulations, according to their climatic and territorial needs. This system allows energy efficiency policies to be adapted to different local realities, while maintaining a consistent approach at national level.

Differences between regional regulations may concern various aspects, including:

- Technical requirements: some regions require higher standards for thermal insulation, use of renewable energy and efficiency of installations.
- Administrative procedures: the way applications are submitted and APEs (Attestati di Prestazione Energetica) are issued may vary, with some regions offering online portals to simplify the paperwork.
- Incentives and sanctions: regions may provide additional incentives for energy requalification interventions and establish sanctions for non-compliance.

These regulations show the central role of the regions with respect to the initiation of practices indicated by Europe and Italy.

As regards CERs, in fact, in the Lazio region, Regional Law No. 14 was issued on 11 August 2021. The law envisaged financial support of €1.85 million for the three-year period 2021-2023 to cover the expenses incurred in setting up self-consumer groups and renewable energy communities and the preparation of contractual documentation as well as the design, purchase and installation of electricity production plants, or smart energy measurement and management systems or storage systems.

Regional Law No. 13 of 5 August 2022 was enacted in Friuli-Venezia Giulia. The law grants public entities contributions of up to 80% of the recognised eligible expenditure and up to a maximum amount of €500,000 and, in any case, within the limits of the

State aid rules, where applicable, to support the design and construction of photovoltaic systems and the related connection works, also aimed at setting up renewable energy communities. In addition, it published the FVG Development Fund Call for Energy Communities. This call allocated €300,000 to support the development of Renewable Energy Community Cooperatives (RECs) through design assistance, entrepreneurial accompaniment, and support for the purchase of equipment, facilities, and consultancy.

Campania's Regional Council Resolution No. 451 of 01/09/2022 allocated a total of 1 million euro for the establishment of energy communities in small municipalities under 5,000 inhabitants. The contribution foreseen for each project was set at a maximum of €8,000 to cover the expenses for the technical-economic feasibility project and the acquisition of the administrative and legal services needed to set up the legal entity.

Regional Law No. 2 of 23 February 2022 was enacted in Lombardy. This wanted to take action for the promotion and development of a system of Renewable Energy Communities (RECs) in the region, which allocates €22.3 million for their implementation and monitoring. The aim is still to accompany the municipalities through the analysis and evaluation of the proposals submitted so that the initiatives in the area actually become active and functioning energy communities. From the outcome of the analyses and the potential emerging from the candidatures proposed in this first phase, a financial support action will be subsequently developed for the participating municipalities, to be declined by a specific provision of the Regional Council.

In the Emilia-Romagna region, Regional Law No. 5 was enacted on 27 May 2022. This law envisages that €450,000 be allocated for the two-year period 2022-2023 (€200,000 for 2022 and €250,000 for 2023) to support the creation of energy communities and in particular for the preparation of projects, the purchase and installation of energy production and storage systems and the technologies necessary for the implementation of related services.

In Veneto, Regional Law No. 16 is dated 05 July 2022. The Law makes available for the two-year period 2023-2024 €500,000 (€250,000 for 2023 and €250,000 for 2024) in favour of municipalities and public housing managers for activities related to the diffusion and implementation of CERs and AERACs; for the promotion, facilitation and

diffusion of CERs and AERACs; for the realisation of tangible and intangible infrastructures serving CERs and AERACs.

To sum up the Italian approach through the different regions, there have been different and specific approaches to financing and supporting Renewable Energy Communities (RECs):

- Lombardy and Friuli-Venezia Giulia provide comprehensive and specific details on funding sources, including start-up premiums, contributions for consultancy and mentoring, and interest-free financing for material and technological investments. In addition, they offer specific contributions for consultancy, mentoring, facilities, and interest-free financing for tangible and technological investments.
- Campania: offers a specific contribution for small municipalities under 5,000 inhabitants to set up ERCs, offering contributions for technical-economic feasibility projects and administrative and legal services.
- Emilia-Romagna and Veneto allocate funds to support the creation and dissemination of CERs, with a focus on the purchase and installation of equipment.
- Lazio provides financial support for the establishment of self-consumer groups and CERs, design, purchase and installation of equipment, energy measurement and management systems, and storage systems.

The Italian regions use a combination of funds from:

- Regional Budgets: resources directly allocated by regional governments.
- National Funds: contributions from national programmes and incentives for ecological transition and renewable energy.
- European Funds: including the European Structural and Investment Funds (EIS), the European Regional Development Fund (ERDF), and other European programmes to support sustainable energy and carbon reduction.

It seems that some regions, rather than others, have taken steps to better transpose the Italian legislation, but more importantly, have taken steps to access the funds provided in order to start the energy transition. In this context, the Emilia-Romagna region seems to be one of the Italian regions where the state of advancement of regulatory transposition has progressed.

The Emilia-Romagna Region has committed itself to publishing a Call for Proposals to implement the regional legislation, but more importantly, it has drawn its funds from the 2021/2027 ERDF Regional Programme, which refers to the regional operational programme co-financed by the European Regional Development Fund (ERDF) for the period 2021-2027. This programme is an integral part of the European Union's cohesion policy, the main aim of which is to promote balanced economic and social development among European regions.

The ERDF supports investments in EU regions to improve business competitiveness, promote employment, foster innovation, green transition, digitisation, accessibility and environmental sustainability. The programme is designed and managed by the regional and national authorities of the Member States, in cooperation with the European Commission.

Actions financed by the ERDF Regional Programme 2021/2027 can include infrastructure projects, research and development programmes, vocational training and qualification initiatives, measures to improve energy efficiency, measures to reduce carbon emissions, support for SMEs and much more. Each EU Member State prepares its own regional ERDF programme in line with the priorities set by the EU and with the aim of reducing economic and social disparities between the different European regions. Action 2.2.3 of the 2021/2027 ERDF Regional Programme therefore provides financial and technical support for the start-up and development of these energy communities, facilitating access to funding, sharing of best practices and networking among them. In short, the programme promotes the energy autonomy of local communities through collaborative and sustainable projects supported by European funds in order to achieve the European Union's energy transition and sustainability goals.

In addition delving into Italy's state of advancement with respect to the energy transition, the Emilia-Romagna region was chosen as one of the few projects to be at a sufficiently advanced stage to carry out numerical analyses in this regard. This, as will be seen, has already reached the second stage of its work, and at the end of October, the projects that have already started should be published.

2.2 The Emilia-Romagna regional call for tenders

The Emilia-Romagna regional Call (Bando per il sostegno allo sviluppo di comunità energetiche rinnovabili. PR-FESR 2021-2027) is outlined in twelve articles. The objectives' aim at promoting sustainable and fair energy in line with the European ones and national implementations already discussed. The reference regulations discussed in the first article have been analyzed in the last paragraph, while the following discussion will focus on the analysis of the specifications of the call that concern the factual and implementation scope of the document in order to better understand the economic context in which it is placed, the areas it aims to finance, as well as understanding the parameters that were followed by the commission in the steps following the implementation of the various phases of the call.

The financial allocation envisaged by the document is € 2,000,000.00. (art. 1.4).

Art. 2 focuses on the beneficiaries of the contributions, underlining that these are the Renewable Energy Communities (CER), established in accordance with Dir. 2018/2001/EU and with the national provisions implementing it (Legislative Decree 162/2019 converted into Law 8/2020 and Legislative Decree 199/2021). The application for the contribution can be submitted by who, pursuant to art. 2 par. 1 point 16 letter b), art. 42-bis Legislative Decree 162/2019 converted into Law 8/2020 and Legislative Decree 199/2021, can be members of a CER, with the condition that at the time of its establishment the applicant is formally part of the Community. It should be noted that, in accordance with the provisions of art. 2 par. 1 point 16 letter b), b) of Dir. 2018/2001/EU, neither the applicant nor any member of the CER whose project is a candidate for the call can be a Large Enterprise.

Art. 3 is entitled Characteristics of the contribution: type, measure, aid regime and cumulation rules. It therefore includes various aspects of the contribution characteristics. The first point out that the contribution provided for by the Call is granted as a non-repayable grant up to a maximum of 80% of the expenditure deemed eligible. This contribution may be increased by 10% if one or more of the following conditions occurs: the energy community is located in mountainous and internal areas of the regional territory, in order to combat abandonment and encourage population growth. To verify this condition, at least one of the plants serving the Community must be located in the territory of one of the municipalities that are part of the mountain areas pursuant to Regional Law 2/2004 and subsequent amendments (Law for the Mountain),

identified by the Regional Government Decisions. n.1734/2004, 1813/2009, 383/2022 and 1337/2022 (see attachment 2 to the Notice) and the internal areas as identified by D.G.R. 512 of 4/04/2022 (see attachment 3 to the Notice).

Furthermore, the contribution may be increased if one or more of the following entities participate in the Community: economically disadvantaged entities, in order to combat energy poverty (entities with an ISEE of up to €15,000.00); third sector entities, entities that own and manage public or social housing; local entities that have approved integrated plans or strategies for adaptation and mitigation of climate change, or that have made roofs of public buildings or public areas available to build systems serving the CER pursuant to art. 3 paragraph 5 of Regional Law 5/2022. The energy community may also benefit from an increase in the contribution if it carries out projects of social inclusion and solidarity, including through collaboration with local entities and third sector entities. The three points that follow, however, underline that the contribution cannot exceed the maximum amount of €50,000.00. It is also important to explain why the contributions provided for by the call for proposals do not constitute state aid. These are excluded from this classification as they exclusively support the planning and constitution phase of the Communities. Furthermore, these contributions cannot be cumulated, for the same expenses and for the same expenditure titles, with other contributions, incentives that can be configured as state aid and other public benefits.

Art. 4 deals with the characteristics of the fundable projects, in fact it configures as eligible for a contribution the proposals that concern the design and establishment of CERs compliant with Dir. 2018/2001/EU and subsequent national transposition provisions (art. 42-bis DL. 162/2019 conv. L. 8/2020 and Legislative Decree 199/2021). The expenses eligible for contribution are:

- a) Expenses for the technical-economic feasibility project of the Renewable Energy Community (Preliminary studies, professional consultations, market analyses, engineering projects, administrative and training costs).
- b) Administrative/legal expenses functional to the establishment of the Renewable Energy Community (Registration costs, legal consultations, management and administration costs, compliance and training costs).
- c) General costs for the definition and management of the project (operating costs, plant maintenance costs, monitoring and control costs, member management). This expense is recognized by applying, pursuant to art. 54, paragraph 1, letter a) of Regulation (EU)

2021/1060, a flat rate equal to 5% of the sum of expenditure items a) and b). Therefore, during the reporting phase, the beneficiary of the contribution is exempted from presenting accounting documentation for this expenditure item.

In order to be considered eligible, the expenses envisaged for the implementation of the projects must also be:

- strictly linked to and relevant to the activity that is the object of the contribution;
- proven by invoices, debit notes or other fiscally valid accounting documents, specifically excluding those under item c.
- recorded in accordance with the laws and accounting principles in force, using one or more current accounts in the name of the energy community or the applicant for the contribution as a future member;

Expenses that do not fall within the categories referred to in paragraph 1 of this article or that do not comply with the specific conditions of the notice are not eligible. For example, expenses relating to the following are not eligible: value added tax (VAT) if it is recoverable, in compliance with the relevant national legislation; self-invoicing; the purchase of tangible and consumable goods; professional training courses.

Art. 5 defines the terms and conditions for submitting the application to receive the contribution. The latter are expected to be filled in, validated and sent to the Emilia-Romagna region exclusively electronically, via the web application “SFINGE 2020”. The methods of access and use of the application would have been made available on the ERDF website of the region, in the section dedicated to the call for proposals. Submitting the application using other methods will result in exclusion.

The application for contribution and the related project may be submitted, in the event of submission of the application by a legal entity, or by the legal representative of the applicant who intends to make the investment or by another entity to whom the legal representative has conferred, with a special power of attorney, a mandate with representation for the compilation, signature and submission of the application as well as for all the consequent acts and communications relating to the forwarding of the same. Applicants are required, at the time of submission of the application (phase 1 of the Call for Proposals), to pay the stamp duty of € 16.00. Since the application is transmitted electronically via the SFINGE 2020 web system, in order to demonstrate payment of the aforementioned tax, applicants may alternatively: purchase a revenue stamp for an amount equal to €16.00, indicate in the contribution application the date of issue of the

revenue stamp, the identification number of the revenue stamp, keep the revenue stamp and show it, during the control phase, to the regional officials responsible for on-site checks; or make the electronic payment of the revenue stamp for an amount equal to €16.00 when filling out the application via SFINGE 2020. In this case, the system will automatically report the payment details, identification number and date, in the contribution application.

Paragraph 1 of the article explains the general contents of the application for a contribution, which will be made in the form of a declaration in lieu of certification/deed of notoriety, pursuant to articles 46 and 47 of Presidential Decree no. 445/2000 and is therefore subject to liability, including criminal liability, pursuant to articles 75 and 76 of the same decree in the event of false declarations. The application for a contribution is divided into two phases:

1. Phase 1: Submission of the application and reservation of the amount of the contribution by the applicant.
2. Phase 2: Completion of the request for a contribution after the energy community has been established.

In the first reservation phase, the following essential elements must be indicated:

- The identification data of the applicant.
- The name and contact details of a contact person for the proposal, if different from the applicant.
- The active Certified Email address to which the Regional Administration will send all communications both in the selection and evaluation phase of the proposals and in the implementation phase of the investment plan.
- The number and type of subjects identified as potential members of the Energy Community to be established.
- A summary sheet of the proposal that will be subject to publication pursuant to Articles 26 and 27 of Legislative Decree 14 March 2013 n. 33, regarding the publication of acts of granting subsidies, contributions, subsidies and attributions of economic advantages.
- The cost plan with the detail of the expenditure items envisaged by the Call.
- For the purposes of recognition of the bonuses, the call provides that the applicant must also declare the possible existence of one or more of the conditions envisaged by art. 3 paragraph 1 and which entail an increase in the contribution of 10%.

When booking the contribution, the following must be attached:

- The descriptive sheet of the renewable energy community according to the model Attachment 1) to the Notice.
- A general plan showing the properties and/or areas on which the renewable energy systems will be built and the electrical cabin on which the consumption and production points are located.

The timing dictated by the notice required that the contribution application be sent to the Region starting from 10:00 on 9 February 2023 and until 13:00 on 9 March 2023. It is also indicated that the SFINGE 2020 web application will be made available for the sole compilation and validation of the application two days before the opening of the terms indicated above.

The contribution application and the related attachments are explained in art. 6, whose title is Selection and evaluation procedure of applications.

The call, therefore, indicates that for the selection of applications and the evaluation of projects, a one-stop evaluation procedure is foreseen with a minimum score, as foreseen by article 5, paragraph 3 of Legislative Decree 123/1998 and taken into consideration according to a chronological presentation criterion.

The application selection process is divided into the following phases:

1. Formal admissibility investigation of the applications for funding.
2. Substantial admissibility investigation of the proposals.
3. Evaluation of the merit of the proposals and related attribution of the score.
4. Assignment of the rewards through the application of an increase in the contribution, as defined in art. 3 of this call.

The formal admissibility investigation is carried out by the Sustainable Innovation, Businesses, Production Chains Sector of the General Directorate for Knowledge, Research, Work, Businesses, possibly supported by other internal and/or external entities.

The formal admissibility investigation is carried out to verify:

- Compliance with the reference activation procedure and the rules set out in the legislation in force on administrative procedures.

- The correctness of the administrative process for submitting the application for funding (compliance with deadlines).
- The eligibility of the applicant as provided for by the activation procedure (calls for tenders, expression of interest), by the applicable national and EU legislation and by the scope of the ERDF.
- Compliance with national and EU rules on procurement and state aid as well as specifics of the ESI funds.
- Compliance with applicable law, in the case of projects started before the submission of the application for funding.
- The completeness of the application, with particular reference to the required attachments and without prejudice to the right to activate the investigative assistance.
- Possession, by the applicant, of the subjective eligibility requirements provided for in this call for tenders.

The applications submitted are considered inadmissible and, therefore, excluded from the substantive and merit eligibility assessment phase, in the event that they lack at least one of the formal eligibility requirements provided for in the call for tenders.

Only applications that have passed the formal investigation phase will be subject to a substantive and merit-based admissibility assessment. This assessment will be carried out by considering the documentation submitted in both Phase 1 and Phase 2, as described in paragraph 5.1.

The substantive and merit-based admissibility assessment will be carried out by an Evaluation Unit, appointed by order of the Director General of the Directorate General for Knowledge, Research, Work, Business.

The substantive admissibility assessment will verify the following aspects:

- Consistency with the strategy, contents and objectives of the ERDF 2021/2027 regional programme.
- Consistency with the Integrated National Plan for Energy and Climate (PNIEC) and the regional energy strategies contained in the current sectoral planning tools, such as the Regional Law on Energy Communities, the Regional Energy Plan and the related three-year implementation plan, and the Integrated Regional Plan for Air Quality.
- Consistency with the categories of operations associated with the implementation procedure in accordance with the provisions of art. 73, paragraph 2, letter g) of Regulation 1060/2021.

- The guarantee of immunity from the effects of the climate of investments in infrastructure.
- Compliance with the DNSH (Do No Significant Harm) principle.

According to the call for proposals, the admissibility of the request for funding will be determined on the basis of these substantial criteria.

The evaluation of the merits of the proposals will be carried out only for the funding applications that have successfully passed the substantial admissibility evaluation phase, i.e. the second.

The evaluation will consider the following parameters:

- Quality of the proposal: in terms of definition of the objectives, methodology and procedures for implementing the intervention.
- Management model envisaged for the Energy Community.
- Capacity for aggregation and involvement of the subjects participating in the Community.
- Contribution to the carbon neutrality of the project.
- Economic-financial quality of the project in terms of the cost-effectiveness of the proposal (ratio between the amount of support, the activities undertaken and the achievement of the objectives).

The scores awarded by the evaluation unit are established on the basis of these criteria:

1. Clarity and precision with which the objectives, methodologies and operating procedures of the CER are outlined MAX 20 POINTS;
2. Management model envisaged for the Energy Community MAX 20 POINTS;
3. Capacity for aggregation and involvement of the subjects participating in the Energy Community MAX 20 POINTS;
4. Capacity of the project to contribute to carbon neutrality MAX 25 POINTS;
5. Economic and financial quality in terms of the cost-effectiveness of the proposal (ratio between the amount of support, the activities undertaken and the achievement of the objectives) MAX 15 POINTS.

The preliminary investigation procedure of the first phase will be concluded within 90 days from the closing of the window for the submission of requests, as indicated in art. 5.3. It is expected that this term will be interrupted in the event that it is necessary to

request additional documentation and/or clarifications relating to the documents submitted. In this case, the term will start again from the date of receipt of the documentation or clarifications requested.

Paragraph 3 of art. 6 deals with rankings and exclusions:

The administrative measures that the Head of the Sustainable Innovation, Businesses, Production Chains Sector must follow at the end of the investigation of the documentation presented in phase 1 are:

1. Following the formal investigation of the grant applications, he/she will approve the list of applications that are inadmissible due to a lack of formal requirements.
2. Following the substantive admissibility investigation and the merit examination carried out by the evaluation unit, and taking into account the proposals put forward by the latter, he/she will adopt the following administrative measures:
 - Approval of the ranking of admissible proposals (which have achieved a score of at least 50), formulated in chronological order of arrival, with an indication of those that can be financed and those that cannot be financed due to a lack of resources.
 - Approval of the list of applications that are inadmissible with an indication of the related reasons.

After the ranking is approved, the second phase will begin with the completion of the grant application, following the instructions given in the following points.

- Grant applications that are deemed admissible must be completed through the establishment of Energy Communities within 12 months from the date of the provision approving the ranking of admissible proposals. Applicants will receive a communication via certified email (PEC in Italian) with the results of the investigation and the operating instructions for completing the grant application.
- Failure to complete the grant application within the indicated deadlines will result in the forfeiture of the grant application, as provided for in paragraph 11.1.

In the phase 2 (Completion of the grant application), the applicant will have to access the SFINGE 2020 system again to provide the data of the CER to be established and the declarations necessary for the granting of the grant.

It will also be mandatory to attach the following documentation:

- a. The technical-economic feasibility study.
- b. The deed of incorporation of the energy community.

The declarations and documentation submitted in this phase will be verified according to the methods described in paragraphs 6.1 and 6.2, with results defined within 90 days of receipt of the aforementioned documentation.

In particular, it must be clearly demonstrated that:

- The applicant who submitted the application in phase 1 is a member of the Energy Community.
- The Energy Community established complies with Dir. 2018/2001/EU and the national implementing provisions.
- The conditions that determined the recognition of the 10% bonus of the contribution at the booking stage, as provided for in art. 3 paragraph 1, are confirmed.
- The structure of the community that will emerge at the end of the application refinement phase may differ from the model contained in the documentation attached to the application for contribution in light of the in-depth design studies carried out in the meantime.

However, if following any changes the overall score assigned in this second phase is less than 50 (minimum score), the application will be considered inadmissible and the contribution cannot be granted.

Furthermore, the announcement indicates that if the conditions for the recognition of the bonus are not respected, the contribution will be calculated by applying the percentage of 80% instead of 90% of total admissible expenses.

According to art. 7, which deals with extensions and variations, extensions are not permitted for the establishment of the CER and the submission of the documentation referred to in art. 6.4.

The variations compared to the first phase may concern technical or economic aspects or the involvement of the members of the CER. These variations will be assessed by the Evaluation Unit in the second phase, following the rules set out in paragraph 6.4.

Art. 8 deals with the reporting of expenses, which specifies that the beneficiary of the contribution must send the reporting of expenses in the form of a declaration in lieu of a sworn statement, pursuant to articles 46 and 47 of the Presidential Decree of 28

December 2000, no. 445, and with the criminal responsibilities provided for by articles 75 and 76 of the same decree in the event of false declarations.

Point 1 of this article indicates the methods and terms according to which the expense reporting must be submitted:

- The expense reporting must be completed and transmitted exclusively electronically via the SFINGE 2020 web application, the methods of access and use of which will be available on the FESR website of the Region. Reports submitted using other methods will not be accepted. All documentation requested in the application or following requests for integration must be uploaded and transmitted via SFINGE 2020.
- The expense reporting must be sent within 2 months of the grant being awarded. Failure to submit the reporting within this deadline will result in the forfeiture and revocation of the grant.

According to point 2, the expenditure justifications (electronic invoices, in xml format) and the payment receipts relating to the eligible expenditure referred to in paragraph 3.2 must be attached to the reporting.

Furthermore, according to point 3:

- Verification of the expenditure reporting will be carried out by the Area for the Settlement of Economic Development Programs, which also supports the ERDF Management Authority of the Directorate-General for Knowledge, Research, Work and Enterprises.
- Following the examination of the expenditure documentation, the Sector will determine the expenditure reported that is eligible for financing, based on the rules defined in the call for proposals.
- If the amount of the expenditure reported and admitted is lower than the investment admitted at the time of the grant, the contribution to be paid will be calculated proportionally. An amount of expenditure reported that is higher than the approved amount does not entail an increase in the contribution granted.
- If the supporting documents submitted are not considered valid or relevant to the activity that is the subject of the contribution, the competent Area will revoke the contribution.
- The contribution will be paid in a single solution within 80 days from the date of registration of the expense reporting, except for interruptions of the procedure as provided for by Article 74, paragraph 1, letter b) of EU Regulation no. 1060/2021. The request for documentary integration suspends the 80-day deadline for a period of 15

days, extendable up to a maximum of 30 days, starting again from the date of registration of the supplementary documentation.

- For the purposes of adopting the contribution liquidation measure, in the cases provided for by the Law, the beneficiary's contribution regularity towards INPS and INAIL (DURC) will be verified. In the event of irregularities, the procedure will be carried out in accordance with Article 4, paragraph 2 of Presidential Decree no. 207/2010 (Substitute intervention by the contracting authority in the event of non-compliance with contributions by the contractor and the subcontractor).

According to art. 9 of the call for proposals, the beneficiaries of the contributions are required to comply with the following obligations, under penalty of forfeiture and revocation of the contributions.

The general obligations of the beneficiaries are contained in point 1, which are:

- Comply with all the requirements contained in the call for proposals. Failure to comply with them may result in the revocation of the contribution granted.
- Provide all the collaboration and assistance necessary to allow the Region to obtain all the information and data relating to the financed project. This includes facilitating all the necessary controls to guarantee the correctness and legitimacy of the financed operations, as well as collecting the data and information necessary for the monitoring and evaluation activities of the results of the interventions admitted to financing.
- Keep the supporting documentation of the expenditure relating to the financed project for a minimum period of 5 years, starting from 31 December of the year in which the balance of the contribution was paid, in accordance with art. 82 of Reg. (EU) 2021/1060. Documents must be kept in the form of originals, certified copies, or on commonly accepted data carriers, including electronic versions of original documents or documents existing exclusively in electronic format. When documents are available only in electronic format, the IT systems used must meet the security standards required by national legislation.

According to point 2 of the article, any specifications on the obligation to comply with the "stability of operations" referred to in art. 65 of Regulation (EU) 2021/1060 will be provided to beneficiaries at the time of notification of the grant.

Point 3 deals with communication and visibility obligations

- Beneficiaries of contributions are required to comply with their communication and visibility obligations set out in Regulation (EU) No. 2021/1060.

In particular, if the funded projects have a total cost equal to or less than 500,000.00 euros, beneficiaries of the contributions must, :

- a) Display in a place clearly visible to the public at least one poster in A3 format or larger, or an electronic display of equivalent dimensions, highlighting the support received from the European Union with the national logo for the 2021-2027 cohesion policy, the emblem of the European Union, the State and the Region. Details and guidelines are available on the ERDF website.
- b) Provide on their website and social media a short description of the project, including aims and results, highlighting the financial support of the European Union with the logos mentioned.
- c) Include a statement highlighting the support of the European Union, with the logos mentioned, on all documents and communication materials intended for the public relating to the funded project.

If the funded projects have a total cost exceeding 500,000.00 euros:

- a) Display, as soon as each project relating to material investments or purchases of equipment has started, permanent plaques or billboards clearly visible to the public with the national logo for the 2021-2027 cohesion policy, the emblem of the European Union, the State and the Region. These plaques must be maintained as long as the physical object, infrastructure or construction for which they were funded physically exists and is used for the intended purpose, except if the support is for intangible assets.
- b) Provide on the energy community website and social media a short description of the project, including aims and results, highlighting the financial support of the European Union with the logos mentioned.
- c) Insert a statement highlighting the support of the European Union, with the logos mentioned, on all documents and communication materials intended for the public relating to the funded project.

The Emilia-Romagna Region has offered assistance to beneficiaries to fulfill their obligations through the Business Desk.

If the beneficiary does not fulfill its obligations and does not correct the necessary actions, the Programme Management Authority may apply proportional measures up to 3% of the contribution granted.

The text describes the obligations to be fulfilled by beneficiaries. The Programme Management Authority may request that communication materials relating to funded projects be made available to the European Union, granting a free, non-exclusive and permanent licence for their use, as set out in Annex IX to Regulation (EU) No. 2021/1060. In addition, the beneficiaries agree to the publication on the institutional portals of the Region, the State and the European Union, of data in open format concerning themselves and the co-financed projects, in line with Article 49 of the same regulation and to facilitate the prevention of fraud and irregularities. Finally, for contributions exceeding 10,000 euros, the beneficiaries are obliged to disclose information on public funding received in the previous financial year, as required by Law n. 124 of 4 August 2017, amended by Legislative Decree n. 34/2019 and converted by Law n. 58/2019.

These obligations are essential to ensure transparency and correct communication of projects funded by the European Union and the Emilia-Romagna Region.

Point 4 of this article deals with the obligations related to compliance with the DNSH principle. With the call for tenders, the Emilia-Romagna Region undertakes to respect and comply with the principle of “do no significant harm” (DNSH) as established in Article 9, paragraph 4 of Regulation (EU) 2021/1060, in relation to the environmental objectives defined in Article 9 of EU Regulation no. 852/2020.

The objectives indicated include:

1. Mitigation of climate change;
2. Adaptation to climate change;
3. Sustainable use and protection of water and marine resources;
4. The transition to a circular economy;
5. Prevention and reduction of pollution;
6. Protection and restoration of biodiversity and ecosystems.
7. The DNSH principle, applied to these six environmental objectives defined in the context of the sustainable activities taxonomy, aims to assess whether or not a measure could cause significant harm to the aforementioned objectives under the Paris Agreement (European Green Deal).

The DNSH principle ("Do No Significant Harm") states that economic activities must not cause significant damage to six specific environmental objectives, as defined in Article 17 of EU Regulation No. 852/2020. In particular, an activity is considered harmful to climate change mitigation if it causes significant greenhouse gas emissions. It can also compromise adaptation to climate change if it increases the negative impacts of current and future climate on people, nature, activities or property.

As regards water and marine resources, an activity is harmful if it degrades the status of water bodies, whether surface, groundwater or marine waters, by compromising their quality or ecological potential. It can also damage the circular economy, including waste management, if it leads to significant inefficiencies in the use of recycled materials, increases the use of natural resources, generates large amounts of waste or causes long-term environmental damage.

An activity is considered to be harmful for the prevention and reduction of pollution if it increases the emission of pollutants into air, water or soil. Finally, for the protection and restoration of biodiversity and ecosystems, an activity is harmful if it compromises the health and resilience of ecosystems or worsens the conservation status of habitats and species of interest to the European Union.

The call takes into account the intangible nature of the above-mentioned expenses, in this context the ex-ante assumption of compliance with the DNSH principles is presumed for all eligible expenses. This assessment is based on a simplified approach as described in sections 2.2 and 3 of the Commission Communication on the "Technical guidance on the application of the "do no significant harm" principle" in accordance with the Regulation on the Recovery and Resilience Facility (2021/C/58/01).

The call would like to pointed out that these provisions are essential to ensure that the financed activities not only contribute to the achievement of the strategic environmental objectives of the European Union, but also that they do not undermine these objectives through significant negative impacts.

Point 5 of this article indicates the obligations related to the monitoring of operations.

In point one of this paragraph, the cohesion policy, according to Community Regulation no. 1060 of 2021 (art. 22, paragraph 3, letter d), is oriented towards a results-oriented approach. In this context, the Operational Programme of the Emilia-Romagna Region provides specific objectives to be achieved, summarized through result indicators with defined targets, and the related actions, represented by output indicators, also equipped with intermediate and final objectives over time. It is the task of the Managing Authority to guarantee the accuracy, reliability and quality of the indicator data, as provided for by art. 69 of the same regulation, through a dedicated monitoring system for the operations financed by the Operational Programme.

In the second point of the paragraph, within the actions included in measure 2.2.3 of the ERDF Regional Programme 2021-27, the following indicators are envisaged to be detected both at the time of submitting the application (forecast value) and at the end of the project (actual value):

- Output indicator RC097: “Communities benefiting from support”, in number;
- Result indicator R03: “Total investments activated for renewable energy” in euros. This indicator considers the total investments activated for renewable energy within the funded project, including design costs relating to interventions to support energy communities.

In the third point it is indicated that to ensure a correct evaluation of the RC097 indicator, the number of energy communities supported by the funded project will be detected. For the R03 indicator, the total amount of the cost plan approved at the time of the application and the amount resulting from the invoices and payment receipts uploaded by the beneficiary to the PR ERDF 2021-2027 information system at the end of the project will be taken into account.

In the fourth point, it is recalled that pursuant to Regulation (EU) 2021/1060, the Region, also through external agents, carries out necessary checks at each stage of the 2021/2027 programming. These checks, conducted on 100% of the applications or on a sample, are aimed at verifying the correctness and legitimacy of the financed operations. The main types of checks include:

- Ex ante controls for the granting of contributions: documentary checks to ensure the admissibility of the applications and the granting of contributions;

- Ex ante controls for the liquidation of contributions: documentary checks and field checks to evaluate the expenditure reports and proceed with the liquidation of contributions;
- Ex post checks on the payment of contributions: aimed at verifying the maintenance of the requirements for admission to contributions, the actual implementation of the financed interventions and compliance with the approved project, in addition to compliance with the obligation of stability of the supported operations.

The four points indicate that the beneficiaries of the contributions are required to facilitate and allow the control activities, including on-site inspections by the Region, and to make available all the necessary information and documents relating to the expenses eligible for the contribution; in the event that a beneficiary is not available for on-site checks or does not provide the requested documents within 30 days of receiving the notification of the inspection, the contribution will be automatically revoked. If irregularities or shortcomings with respect to the requirements of the call are detected during the checks, corrective measures will be applied which could include the total or partial revocation of the contributions paid and the recovery of the sums already paid, increased by legal interest, as established by art. 70 of Reg. (EU) 2021/1060. Furthermore, the European Commission has the right to carry out documentary and on-the-spot checks on operations co-financed by the ERDF Regional Programme 2021-27, in accordance with the provisions of the same regulation.

These monitoring obligations are essential to ensure the correct implementation and success of the financed operations, as well as to guarantee transparency and compliance with the regulations in force.

The causes for forfeiture and revocation of contributions are contained in art. 11 of the call for proposals: In the event that the beneficiary wishes to renounce the contribution, he/she is required to promptly send a declaration of renouncement. This communication must preferably be made via the SFINGE 2020 web application or via.

The request for contribution submitted in phase 1 lapses if it is not completed within 12 months from the date of approval of the list of eligible applications, by sending the documentation requested in phase 2 which certifies the establishment of the Energy Community (CER). The forfeiture of the application is equivalent to a renouncement by the beneficiary, with the effect that the contribution cannot be granted. No extensions

beyond the 12-month deadline are envisaged. Furthermore, the application for contribution is considered inadmissible if the overall score assigned in phase 2 is less than 50 (minimum score).

In general, the forfeiture of the contribution and its consequent revocation occurs if the requirements and obligations set out in the call for proposals are not respected.

In particular, the revocation of the contribution occurs in the following cases:

1. Failure to submit the report within the terms set out in paragraph 8.1.
2. Submission of expenditure receipts that are not considered valid or relevant for the financed activity, as indicated in art. 8.3.

In the event that the revocation of the contribution occurs after its liquidation, due to failure to comply with the obligations set out, the call for tenders provides that the sums already paid will also be recovered, increased by the legal interest applied at the rate in force on the date of issue of the management determination requesting the repayment of the contribution, for the period from the date of disbursement to the deadline for repayment.

These provisions are crucial to ensure the correct management and success of the financed operations, as well as to ensure compliance with current regulations and the correct use of public funds.

Art. 12 has an informative function, indicates where to find any clarifications and communications and the organizational units responsible for the expected procedure, namely:

The Sustainable Innovation, Businesses, Production Chains Sector of the General Directorate for Knowledge, Research, Work, Businesses is responsible for:

- Investigation and evaluation of applications for contributions;
- Adoption of provisions for granting contributions and, if applicable, rejection of applications for contributions;
- Any revocation provisions prior to the submission of the reporting and subsequent to the payment of contributions, if the revocation falls within its jurisdiction.

The Area for the Liquidation of Economic Development Programs and Support to the ERDF Management Authority of the General Directorate for Knowledge, Research, Work, Businesses is responsible for:

- Investigation and evaluation of expense reports;
- Adoption of provisions for the liquidation of contributions;
- Any revocation measures following the submission of the report and prior to the payment of the contributions, as well as after the payment following checks with negative results or upon notification by the beneficiary, with consequent recovery.

The Community and National Funds Sector of the Directorate-General for Knowledge, Research, Work and Business is responsible for the procedure relating to on-site checks.

2.3 Comparison between legislation and regional call

As has already been mentioned several times, in compliance with the national legislation (Legislative Decree 199/2021), Regional Law no. 5 of 2022 was issued by Emilia-Romagna. In compliance with the indications of Legislative Decree no. 199 of 2021, in which financial support is allocated differently based on Kilowatts, the Emilia-Romagna region published the Call for support for the development of energy and renewable communities in 2022. This initiative does not completely cover the reference subjects of the regional legislation. In fact, the substantial differences between the two documents will be outlined below, with possible reference to the points of contact.

The purposes of the Regional Law are in continuity with the national legislation, that is, to promote and support CERs and self-consumers of renewable energy who act collectively, in order to provide environmental, social and economic benefits, but without making financial profits. Its objectives coincide with those of the call for tenders, but this does not refer to self-consumers, as it refers only to CERs.

The regional law supports through contributions and financial instruments, including revolving funds: public bodies, Energy Agencies operating in the regional territory, territorial and trade associations. The region, in addition to supporting "renewable energy communities and collective self-consumption of renewable energy in the regional territory, in the constitution phase, in the preparation of projects, in the purchase and installation of energy production and storage systems and technologies necessary for the implementation of services" (Regional Law art. 3, paragraph 1, letter 4), also wants to finance entities that want to implement communication initiatives: "On the topic of renewable energy, self-consumption and energy sharing and on forms of energy efficiency, also through the design, drafting and dissemination of educational

and informative material, adapting its contents and purposes also to the peculiarities of the territory" (Regional Law, no. 5/2022, art. 3, paragraph 1, letter b).

In the regional call (art. 9.4, point 3), however, only expenses for the technical-economic feasibility project of the Renewable Energy Community are eligible; administrative/legal expenses functional to the establishment of the Renewable Energy Community and the general costs for the definition and management of the project.

Following this law (Regional Law 5/2022), a technical table was established, with the aim of analysing the results of the energy communities in terms of climate and their coherence with the objectives established from time to time by national and European programming, the same one that will have the task of approving the initiatives of those who respond to the call for proposals to receive funding.

With regard to the funds made available by the region, Law 5/2022 indicates that: "The Region will cover the costs arising from the implementation of this law, quantified at €200,000 for the 2022 financial year and €150,000 for the 2023 financial year, by establishing specific chapters in the expenditure part of the regional budget [...]. The Regional Council is authorised to provide, with its own act, for the budget changes that become necessary" (art. 9, paragraph 1). This underlines the estimate of the need for additional funds.

Therefore, note the discrepancy in funds, given the financial allocation provided by the Call of € 2,000,000.00. In fact, the resources of the European structural funds assigned to the Emilia-Romagna Region can also contribute to the expenses deriving from the implementation of the Regional Law. The funds of the Regional Call are not allocated directly by the region, but as explained in the aforementioned, derive from the ERDF Regional Program 2021/2027.

The Call is intended as a partial tool to achieve the announced objectives, as it aims to support only the initial part of the process. From a long-term perspective, it aims to lay solid foundations for broader initiatives in the future. In the next chapter, we will proceed to analyse the data collected following the response of the interested parties to the Call, based on both a quantitative and qualitative analysis of the results, we want to give a clearer picture of what the results of this first rotation of incentives were.

Chapter III

Numerical analysis of the regional call for proposals for Emilia-Romagna

3.1 Results of the call for proposals

Once the PR FERS 2021-2027: Call for proposals to support the development of renewable energy communities was issued, the deadline was set for March 9, 2023. The timing dictated by the call for proposals required that the application for funding be sent to the Region starting from 10:00 on February 9, 2023 and until 1:00 pm on March 9. It was also indicated that the SFINGE 2020 web application would be made available for the sole compilation and validation of the application two days before the opening of the terms indicated above.

The process of the application selection procedure was divided into the following phases:

- Formal admissibility investigation of the contribution applications.
- Substantial admissibility investigation of the proposals.
- Evaluation of the merit of the proposals and related attribution of the score.
- Awarding of bonuses through the application of an increase in contribution, as defined in art. 3 of this call for proposals.

The formal admissibility investigation was carried out by the Sustainable Innovation, Businesses, Production Chains Sector of the Directorate-General for Knowledge, Research, Work, Businesses, possibly supported by other internal and/or external entities. The applications submitted were considered inadmissible and, therefore, excluded from the substantive and merit admissibility evaluation phase, in the event that they failed to meet at least one of the formal admissibility requirements set out in the call for proposals.

141 applications were submitted. These applications were subjected to an initial formal admissibility check by a working group that examined them in accordance with paragraph 6.1 of the call for proposals:

- Compliance with the reference activation procedure and the rules set out in the legislation in force on administrative procedures.
- The correctness of the administrative process for submitting the application for funding (compliance with deadlines).
- The eligibility of the applicant in accordance with the activation procedure (calls for proposals, expression of interest), the applicable national and EU legislation and the scope of application of the ERDF.
- Compliance with national and EU rules on procurement and state aid as well as specifics of the ESI funds.
- Compliance with applicable law, in the case of projects started before the submission of the application for funding.
- The completeness of the application, with particular reference to the required attachments and without prejudice to the right to activate the investigative assistance.
- The applicant must possess the subjective eligibility requirements set out in this announcement.

Following this check, all applications were accepted for the subsequent evaluation: substantial and on the merits (6.2). This took into account many aspects, including consistency with the objectives of the regional ERDF 2021/2027 program, but also more specific aspects with respect to climate impact and social inclusion.

This last check excluded 17 proposals, therefore the number of accepted applications dropped to 124. However, in the Administrative Acts of 07/13/2023 n. 15375, two proposals were examined: PG/2023/123106 and PG/2023/123378. In fact, these, after the initial investigation results, and subsequently to a further meeting of the Evaluation Unit, were re-evaluated. For one, the exclusion was not revoked, while the project PG/2023/123106 was finally found to be compliant with the awarding of the bonus. This made the accepted applications 125.

The total amount of contributions to which the 125 accepted applications would have been entitled was €4,601,346.49. It should be noted that the contribution foreseen and originally financed by the call amounted to a total of €2,000,000.00. In order to attribute the contribution to all those entitled, other resources were therefore identified to be allocated to the Call. In fact, with Regional Council Resolution no. 979 of 06.12.2023, the financial allocation for this Call was ascertained and increased up to a maximum of

€4,900,000.00 using the resources available for the implementation of the measures contained in the ERDF 2021-2027 regional programming, to cover all the proposals that would have been eligible and fundable.

Following the reformulation of the number of admitted applications, the total bonus was increased up to a total of €4,651,345.99. In accordance with Phase 2, the applications should be finalized by 10/31/2024. Initially, the time allowed was 12 months, but this deadline was later extended by Regional Council Resolution no. 1351 of 07/01/2024. In any case, by the deadline, it is expected that the CERs will be formally established.

By conducting more in-depth analyses of the grantable contributions, it was found that, out of 125 applicants, an average grant of €37,210.77 was granted. The median grant was €42,525, the maximum grant was €50,000, while the minimum was €3,307.5. Finally, the standard deviation was €13,906.47.

The same calculation was made on the eligible cost. The average was €43,008.1, while the median was €47,250. The maximum eligible cost recorded was €73,500, while the minimum was €3,675. As for the standard deviation, a value of € 17,029.6 was recorded. But before assigning the expected contribution, a further phase took place, that of the merit evaluation.

3.2 The evaluation and merit phase: numerical analysis

The merit evaluation phase was structured as a scoring system. In fact, this was characterized by an individual evaluation for each of the 5 criteria defined in the tender notice (see Chapter 2, page 40). These evaluations were then added together; the result of the sum is a score that allows the proposals to be classified from best to worst. This ranking, in the event of insufficient funds, would also have been used to decide which projects to award funding to.

It should be remembered that each of the 5 criteria corresponds to a substantial objective, as follows:

- Quality of the proposal: in terms of definition of the objectives, methodology and procedures for implementing the intervention.
- Management model envisaged for the Energy Community.
- Capacity for aggregation and involvement of the subjects participating in the Community.

- Contribution to the carbon neutrality of the project.
- Economic-financial quality of the project in terms of the cost-effectiveness of the proposal (ratio between the amount of support, the activities undertaken and the achievement of the objectives).

The sum of these scores represented the evaluation received by each project. The maximum achievable evaluation was 100, while a score lower than 50 meant exclusion from funding. By examining the individual scores of each accepted project, it was possible to have a clearer vision of the trend of the evaluations. These, in fact, presented an average of 66.94, with a large quantity of applications that reached a positive, but not optimal, score. The histogram below represents the distribution of the observed scores: it is immediate to observe how the frequency decreases as the scores increase, bordering on zero in the highest range, that of 90-100 points.

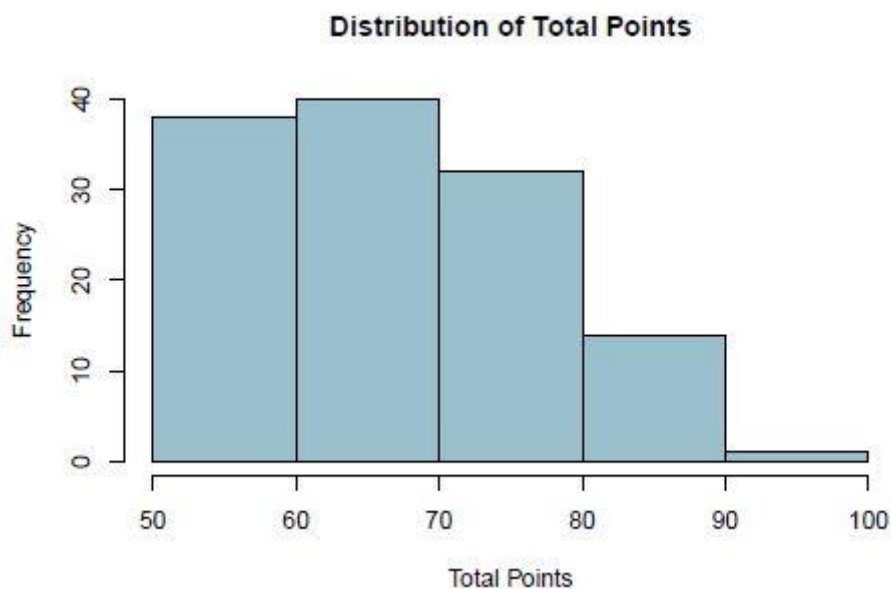


Table 8: Distribution of scores, Histogram

Following a more detailed analysis it was possible to deduce that:

Variable	Mean	Median	std. deviation
Total Points	66.94	66	10.44
Points A	13.14	13	3.59
Points B	10.48	10	4.54
Points C	14.58	15	3.4
Points D	17.86	19	4.09
Points E	10.88	10	3.36

Table 9: Mean, median and standard deviation of Total Points

According with the Table 9, with a total of 125 observations, the mean score is 66.94. The standard deviation of 10.44 suggests a moderate level of variability in the scores, implying that while many projects scored around the mean, there are notable differences among them. The median score is 66, which is very close to the mean, however being a trimmed distribution to be considered symmetrical we should observe a mean of 75 and this is not the case. The scores range from a minimum of 50 to a maximum of 92. Additionally, the median absolute deviation (MAD) of 13.34 provides further evidence of variability, suggesting that the scores are spread out across a substantial range. Overall, this distribution analysis underscores the competitive nature of the evaluated projects, reflecting a variety of approaches and effectiveness in meeting funding criteria.

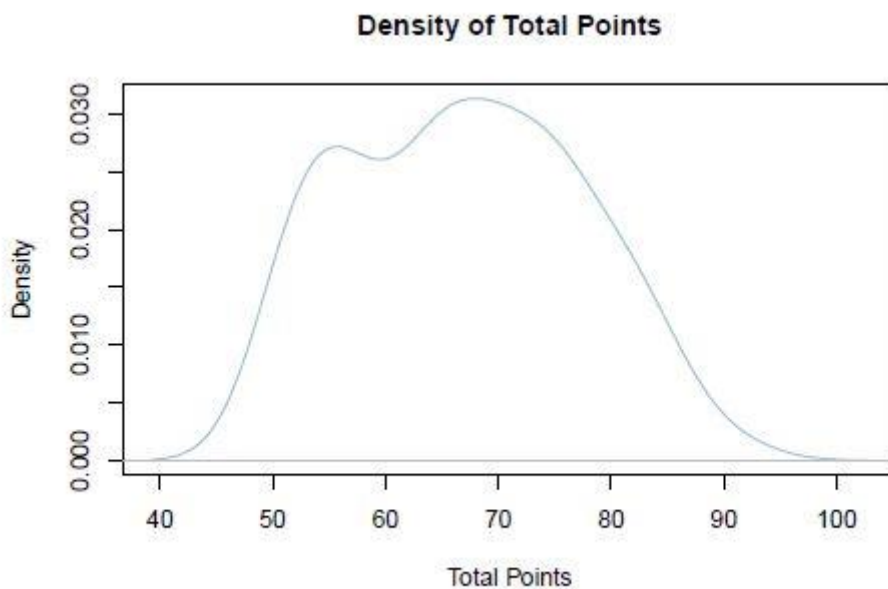


Table 10: Density of total points, density plot

The density plot of total points illustrates the distribution of scores across the evaluated projects, providing valuable insights into their performance. The curve indicates a multimodal distribution, with peaks observed around the scores of 60 and 70, suggesting that a significant number of projects received scores in these ranges. Conversely, the density tapers off gradually beyond 80, indicating fewer projects scoring in the higher range. The density plot of total points not only illustrates the distribution of scores across the evaluated projects but also raises important considerations regarding the normality of the distribution.

The observed multimodal shape, with peaks around scores of 60 and 70, deviates from the characteristics of a normal distribution, which typically presents a single peak. Moreover, the spread of scores demonstrates a right-skewed tendency, as the density gradually tapers off towards higher scores, indicating fewer projects achieving the maximum scores.

The interquartile range (IQR) would also give a clearer sense of variability within the central bulk of the data, especially since the dataset does not conform to a normal distribution. Therefore, while the mean score offers one perspective, the median and IQR should be emphasized for a more accurate summary of the project's performance distribution. To conclude, the average score (mean) of the dataset is 67.18, but given the skewed distribution observed in the histogram, the median score of 66 may provide a more reliable measure of central tendency. The interquartile range (IQR) of 13.34 indicates substantial variability in the scores. Therefore, while the mean suggests a typical score, the median and IQR should be considered for a comprehensive understanding of the data's distribution.

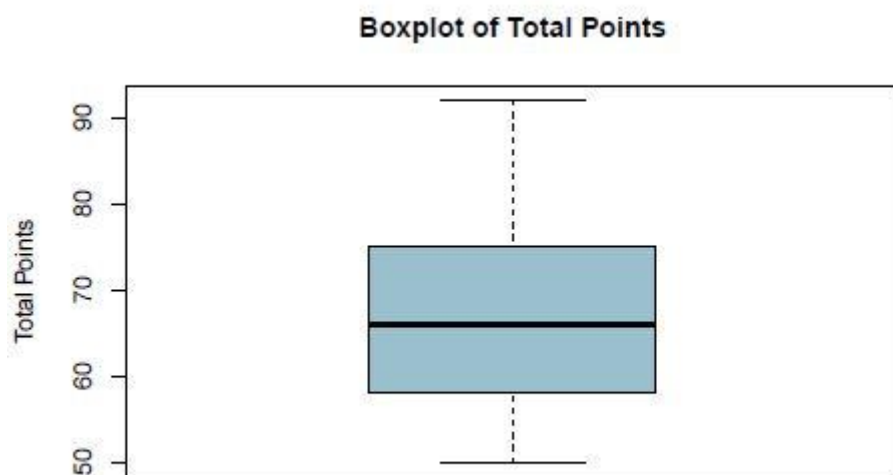


Table 11: Focus on the median of the total points, Boxplot

Here, Table 11 clearly shows how the median point is very close to the total average of the scores.

After analyzing all the scores, we proceeded to do an analysis from a territorial point of view. Questions for participation in the tender come from all nine provinces of Emilia-Romagna.

The average scores received per province were:

Bologna (BO): 62,2

Forlì-Cesena (FC): 70,6

Ferrara (FE): 63,1

Modena (MO): 69,9

Piacenza (PC): 63,8

Parma (PR): 73,3

Reggio Emilia (RE): 61,9

Ravenna (RA): 65,3

Rimini (RN): 64,2

The following graph visually highlights the trend of scores in each Emilian region:

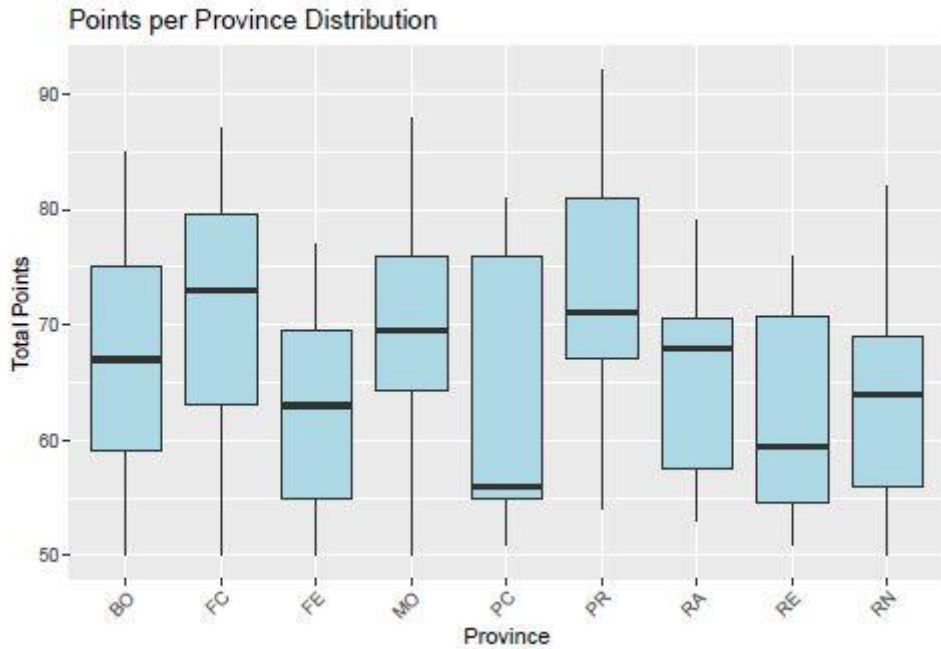


Table 12: Point per Province Distribution

The analysis of mean scores by province provides insight into the funding outcomes for various projects. The province of Parma (“PR” in the graph) leads with the highest average score of 73.27, reflecting strong project proposals that have met the funding criteria effectively. Following closely are Forli-Cesena (“FC” in the graph) and Modena (“MO” in the graph) with mean scores of 70.58 and 69.89, respectively, indicating a solid performance in securing funding. In contrast, the provinces of Reggio Emilia (“RE” in the graph) and Ferrara (“FE” in the graph) have the lowest average scores, at 61.86 and 63.09, respectively.

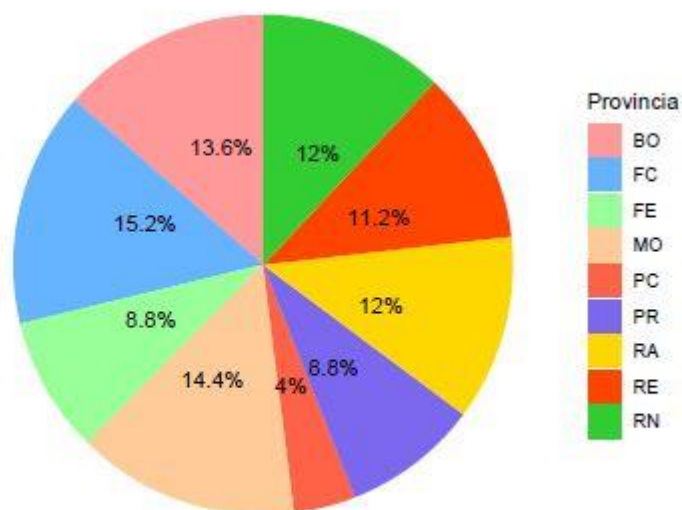


Table 13: Decomposition of sample by province, pie chart

Subsequently, the distribution of the sample by province was observed. The data analyzed aimed to detect an association between the number of applications submitted and the score obtained.

FC is the most represented province with 15.2% of observation, while PC holds the lowest share of 4%. In the middle there are, in order, MO (14.4%), BO (13.6%), RN and RA at the same level with 12%, RE (11.2%), PR and FE at the same level with 8.8%. Interesting is the significant gap between this last data and the percentage reported in PC. However, this is not a predictive variable to assess the total score, as inspected in a linear regression model in the following piece of code. The model suggests that there is no strong evidence that the province in which the intervention takes place significantly influences the total score, given by the high p-values. This is because, from the checks carried out, the values were all higher than 0.1.

To achieve the scores discussed so far, each candidate had to take into account the criteria evaluated by the evaluation team. These are divided into five fields, each marked with a letter. As already highlighted, the maximum score that could be received was 100. However, for each criterion there was a specific maximum score that could be achieved.

A. Clarity and precision with which the objectives, methodologies and operating procedures of the CER	MAX 20 POINTS
B. Management model envisaged for the Energy Community	MAX 20 POINTS
C. Capacity for aggregation and involvement of the subjects participating in the Energy Community	MAX 20 POINTS
D. Capacity of the project to contribute to carbon neutrality	MAX 25 POINTS
E. Economic and financial quality in terms of the cost-effectiveness of the proposal (ratio between the amount of support, the activities undertaken and the achievement of the objectives)	MAX 15 POINTS

Table 14: Scores for each criteria

To better understand which criteria had the most significant impact on the final project scores, we conducted a series of regression analyses, regressing the total score on each individual criterion score. Although these results are not fully comprehensive - particularly as scores from projects below the minimum threshold of 50 are not included - they provide valuable insights. Specifically, this analysis gives an overview of which criteria were prioritized by both the evaluation team and the applicants.

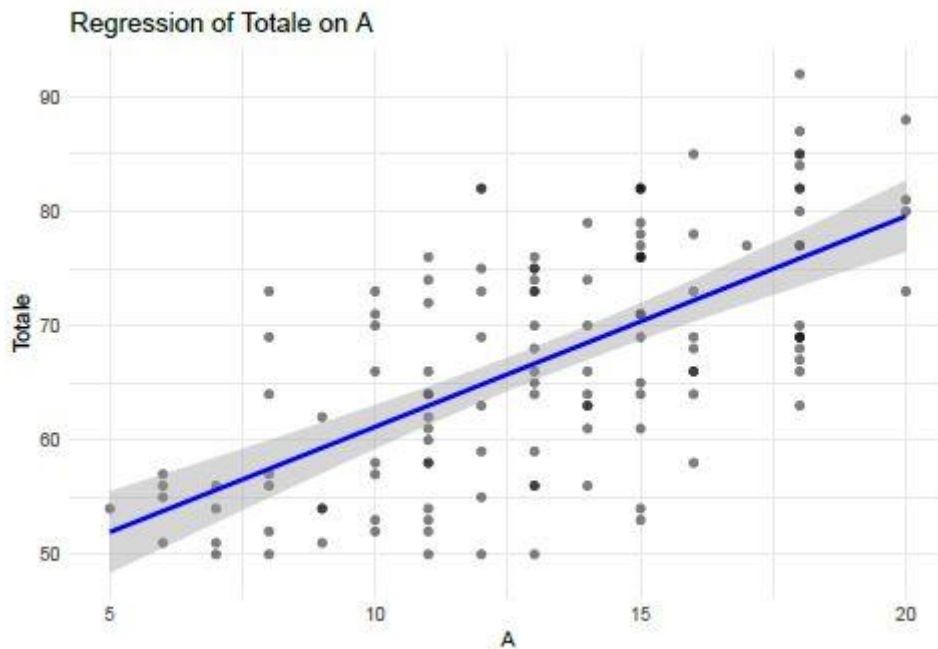


Table 15: Regression of the total of A

The first regression graph (Table 15) represents the association between the total score obtained and the one obtained in the category “A” alone, that is, the quality of the proposal in terms of definition of the objectives, methodology and procedures for implementing the intervention. The maximum score for this category was 20 points. The analysis shows how this category provided a decisive contribution to the final score. In fact, the graph shows a growing situation, in which, taking a low score in this category, one ended up among the lowest results recorded and, gradually, rising.

From a more in-depth analysis, it can be seen that out of 125 participants, the average of the scores received compared to the A score was 13.14. The median was 13, therefore not too far from the general average. There were full scores, but not lower than 5 compared to the maximum score for this criterion. As regards the standard deviation, the recorded value was 3.59. This score reflects the trend found in the total score, as well as the variability of the average value.

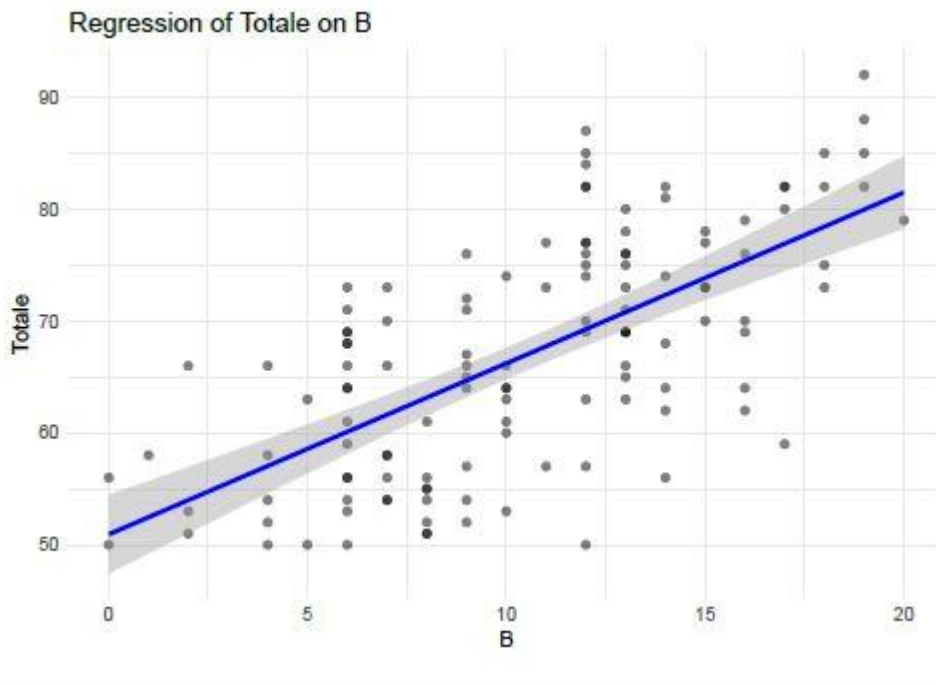


Table 16: Total regression of B

Category B concerns the management model envisaged for the Energy Community. The maximum perceivable score for this category was 20 points. In Table 16, it seems that this criterion had the greatest impact on the total score, with a line that progressively rises to show that those who received a total score with respect to the management of the plant are those who managed to climb the ranking of those entitled. From a more in-depth analysis, it can be seen that out of 125 participants, the average of the scores received with respect to the B score was 10.48. The median was equal to 10, therefore not too far from the general average. There were full scores, but also scores equal to 0 compared to the maximum score for this criterion. As regards the standard deviation, the recorded value was 4.54. This score reflects the trend found in the total score, as well as the variability of the average value.

The strong weight that this criterion had on the total score of the participants can be explained by the fact that the general average was very low. This could mean that those who received a score above the average are also those who were able to distance themselves from the general classification.

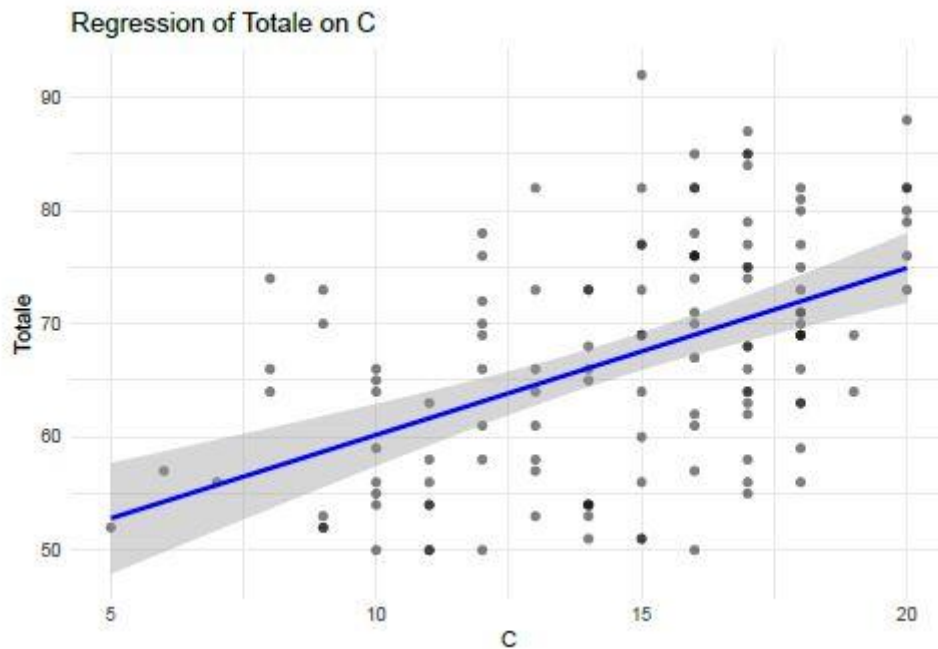


Table 17: Regression of the total of C

Category C is interested in the aggregation and involvement capabilities of the subjects participating in the Energy Community. This criterion, like the previous ones, also provides a maximum score of 20 points. This seems to have had a lesser impact on the total score, considering criteria B and A.

From a more in-depth analysis it can be seen that out of 125 participants, the average of the scores received compared to the C score was 14.58, while the median was equal to 15, therefore higher than the average and in contrast to the previous results. What is more interesting, however, is that these values are almost equal. Furthermore, there were full scores, but not lower than 5 compared to the maximum score for this criterion. As regards the standard deviation, the recorded value was 3.4. This score reflects the trend found in the total score, as well as the variability of the average value.

The average score for this criterion was higher than the previous ones. This, connected to the fact that the impact of criterion C was lower than the previous ones, could support the thesis presented with respect to criterion B. In fact, taking a higher score in this category did not result in a significant gap compared to the other participants.

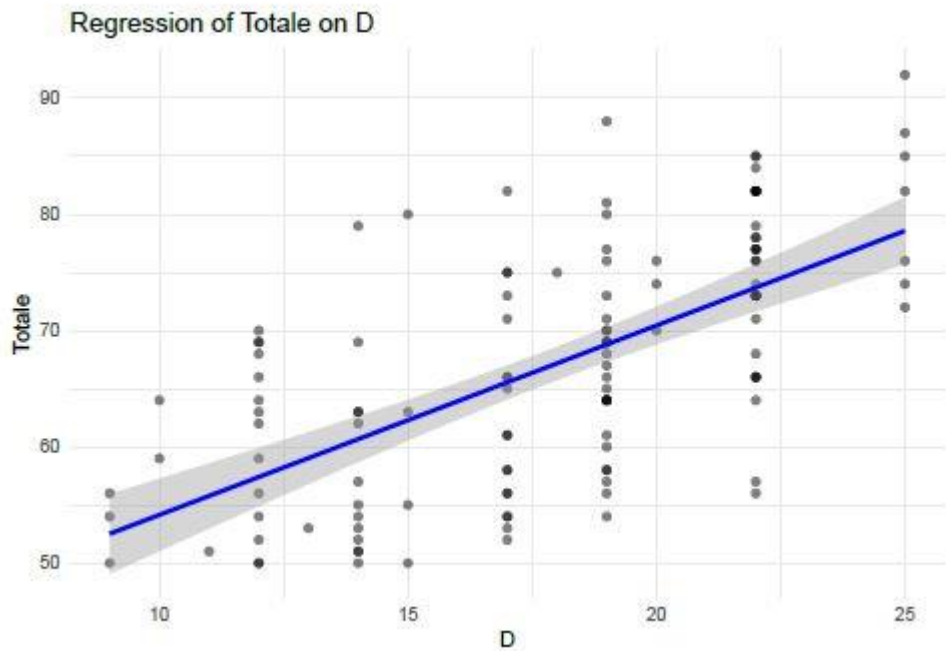


Table 18: Regression of the total of D

Category D concerns the project's ability to contribute to carbon neutrality. One of the fundamental points on which the entire European project is based. In fact, the maximum score achievable was 25 points. This seems to have had a similar impact to category A. From a more in-depth analysis it was possible to deduce that out of 125 participants, the average of the scores received compared to the D score was 17.86, while the average was much higher - compared to the general trend -, equal to 19. There were full scores, but not less than 9 compared to the maximum score for this criterion. As regards the standard deviation, the value recorded was 4.9. This score reflects the trend found in the total score, as well as the variability of the average value.

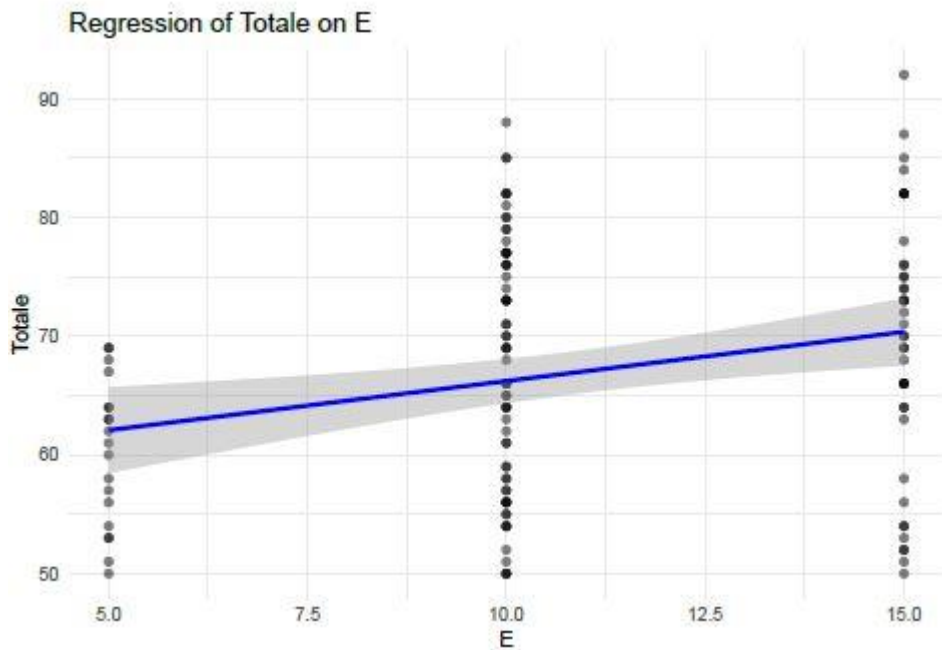


Table 19: Regression of the total of E

Category E focuses on the economic and financial qualities in terms of the cost-effectiveness of the proposal (ratio between the amount of support, the activities undertaken and the achievement of the objectives). Up to now, from the previous regression graphs it has been possible to deduce that the management model envisaged for the Energy Community has had more impact with final score, given that there are higher scores, and those who have been among these have generally had above-average results. Although this can be said to be true, more or less, for all the criteria, category E represents an exception; in fact, as can be seen from Table 19, the reference category has had less impact on the total score and, as can be clearly seen, the line in the graph is practically flat. Even just visually, very different compared to the other criteria. From a more in-depth analysis, it can be seen that out of 125 participants and with a maximum achievable score of 15, the average of the scores received with respect to the E score was 10.88, while the average was 10. There were full scores, but not less than 5. As for the standard deviation, the recorded value was 3.36. This score reflects the trend found in the total score, as well as the variability of the average value. Its lower impact can be explained not only by the overall value attributed to the criterion, but also by the average of the score, which had a very neutral trend, recording very similar scores between them, unlike the previous ones that seem to have been more varied.

Since only the results for the selected projects are known, the regression cannot explain whether there is a relationship between the score for each criterion and the eligibility for funding.

However, some general considerations can be made:

1. criteria A, B, C, D are strongly correlated with the score, while criterion E is not;
2. this means that those who were good at the first four criteria were also good at the general formulation of their proposal;
3. among these criteria, B was the one that proved to be fundamental;
4. while E was the one that proved to be of little importance. Criterion E had a lower weight because the overall quality and sustainability of the project depend more on the clarity of objectives, methodology, management capacity and environmental impact. These factors are essential to ensure the long-term success of CERs. In fact, criteria A, B, C, D evaluate fundamental aspects such as the clarity of objectives, methodology, management and environmental impact, which are crucial for the overall success of Renewable Energy Communities. These criteria ensure that the project is well planned, manageable and able to effectively engage the community.

The long-term sustainability of CERs depends not only on economic viability, but also on the capacity for aggregation, management and environmental impact. A well-managed project with clear objectives tends to be sustainable and, therefore, economically advantageous.

Those who excel in criteria A, B, C and D demonstrate an integrated and coherent vision of the project, which also implies a good economic formulation.

5. Finally, it is interesting to note that only criterion B had some scores of 0. The effective management of a Renewable Energy Community is crucial to the success of the project. If a project does not present a clear and detailed management model, it could be assessed negatively. The lack of a solid management plan can lead to low scores, including 0. Furthermore, projects that do not provide sufficiently clear or complete information risk being penalized. This could explain why some projects received very low scores. Scores of 0 in criterion B indicate that the proposed management models were considered insufficient or inadequate to ensure the success of the project, while in the other criteria, projects had probably demonstrated sufficient competence and clarity not to fall below a score of 5. However, it is not clear how these projects which have been awarded 0 managed to make up the deficit. Infact, this

criterion is very important from an economic point of view because a weak management model can lead to operational inefficiencies and, consequently, higher costs for the management and maintenance of the facilities, but also because the inability to properly manage the resources can negatively affect the economic viability of the project.

Finally, the quality of the management model is closely linked to the economic viability of the project. Its importance is such that, in the absence of an adequate management plan, auditors may assign a score of 0 to reflect the associated economic risks.

	A	B	C	D	E
A	1	0.212833	0.271974	0.195789	0.099504
B	0.212833	1	0.256894	0.373367	-0.22866
C	0.271974	0.256894	1	-0.05072	-0.09456
D	0.195789	0.373367	-0.05072	1	0.10314
E	0.099504	-0.22866	-0.09456	0.10314	1

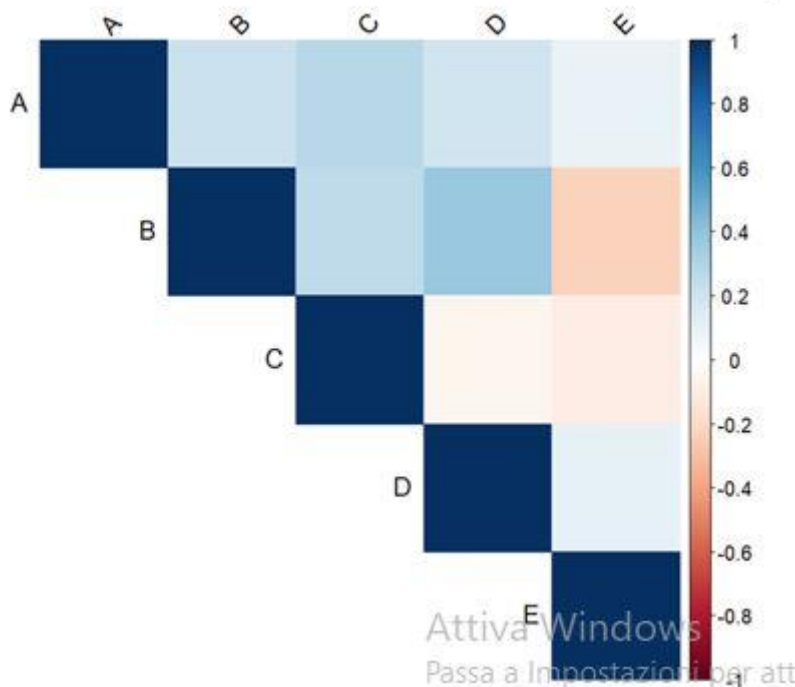


Table 20: correlation matrix

The correlation matrix (Table 13) shows the relationships between the points categories A, B, C, D, and E in terms of correlation coefficients, which range from -1 (perfect negative correlation) to +1 (perfect positive correlation). Most correlations are relatively weak, with values close to zero. This suggests that each variable operates fairly independently, meaning that a change in one variable is unlikely to predict changes in another. None of the pairs have a particularly strong positive or negative correlation.

However B and D have the strongest positive correlation (0.373), suggesting a mild positive association between these two variables. This implies that when scores in B increase, scores in D also tend to increase, although this relationship is not strong. This can be the case as projects like energy communities with lower carbon footprint often need effective management models in place to achieve these goals, as the management model determines how resources are allocated, how operations are optimized, and how stakeholders engage in sustainability practices.

Going further, A and C also show a moderate positive correlation (0.272), indicating a mild relationship where higher scores in A are somewhat associated with higher scores in C. This might imply that clearly defined objectives, methodologies, and operating procedures make it easier for participants to understand the mission, goals, and operational structure of the Energy Community. When members understand these aspects well, they are more likely to feel engaged, aligned with the community's goals, and motivated to participate actively.

All in all, the correlation analysis reveals a low level of interdependence among the criteria, suggesting that each of these factors contributes uniquely to the overall results. For descriptive analysis, this independence means we can look at each variable individually without expecting substantial overlap or interaction effects, building the ground to accept the previous regression analysis.

3.3 Rewarding of special categories

As provided for in art. 3 of the call for proposals: Characteristics of the contribution: type, measure, aid regime and cumulation rules, in addition to the contribution provided for in the Call for Proposals, granted as a non-repayable grant up to a maximum of 80% of the expenditure deemed eligible, the contribution could have been increased by 10% if one or more of the following conditions had occurred:

- the energy community is located in mountainous and internal areas of the regional territory (this, in order to combat abandonment and encourage the population of such areas);
- situations of economic disadvantage;
- targeted programs for decarbonization.

To verify the first condition set out, at least one of the plants serving the Community must be located in the territory of one of the municipalities that are part of the mountain

areas pursuant to Regional Law 2/2004 and subsequent amendments (Law for the Mountain), identified by Regional Government Decisions no. 1734/2004, 1813/2009, 383/2022 and 1337/2022 (see Annex 2 to the Notice) and the internal areas as identified by Regional Government Decision no. 512 of 4/4/2022 (see Annex 3 to the Notice). With regard to the second condition set out, the notice provides that the contribution could have been increased if one or more of the following subjects had taken part in the Community: economically disadvantaged subjects, in order to combat energy poverty (subjects with an ISEE of up to €15,000.00); but also third sector entities, entities owning and managing public or social housing; local entities that have approved integrated plans or strategies for adaptation and mitigation of climate change, or that have made roofs of public buildings or public areas available to build systems serving the CER pursuant to art. 3 paragraph 5 of Regional Law 5/2022. The energy community could also have benefited from an increase in the contribution if it had implemented projects of social inclusion and solidarity, including through collaboration with local entities and third sector entities.

Following what has been said, we proceeded to verify how many of the projects had access to the additional 10% bonus. The result was very interesting. From the data reported, it was possible to calculate that the number of those who had access to 90% financing was much greater than those who received only 80%. The data found were the following: only 11.2% of the admitted financing did not fall into the categories with the increase. In fact, 111 applications out of 125 were entitled to 90% financing.

Specifically, with respect to the analyses carried out:

- 20% of the fundable projects are located in mountain areas, specifically, 25 applications out of 125.
- A significant number of fundable projects proved to be part of the category of third sector entities, but also housing owners and management entities. In fact, there were 69 of these, compared to the remaining 56, representing 55.2% compared to the remaining 44.8%.
- As regards local authorities with integrated strategies for adapting to and mitigating climate change, 84 fundable projects were found to be attributable to this category, representing 67.2% of the applications.
- As regards economically disadvantaged subjects, the number of fundable projects was 16.8%, with a total of 21 applications, compared to the 104 that did not fall into the category.

- Those who proposed projects of social inclusion and solidarity were also a considerable number, slightly lower than third sector bodies. In fact, the percentage was equal to 65.6% compared to 34.4% of the counterpart. These were 82 out of a total of 125.

On the one hand, it is clear that the objective of attracting specific categories of candidates has had its effect: this is evident when looking at the participation of subjects in mountain areas. On the other hand, the lower presence of disadvantaged subjects raises the question of how widespread the information has been. In fact, this does not seem to have reached the regional population equally. It seems that companies and institutions were mostly included. However, it seems that the problem of inclusion was an element of strong impact among the participants in the call for proposals since the percentage of those who included inclusion projects in the proposal is high. This could mean a great awareness in this regard or a large quantity of projects that will have little effect from the point of view of social inclusion.

Predictor	Estimate	Std. Error	t value	PR(> t)
Intercept	60.961	1.82	33.488	<2e-16***
Mountains area	4.785	3.547	1.349	0.179893
Internal area	-4.12	3.844	-1.072	0.286025
Economically disadvantaged subjects	-1.402	2.024	-0.692	0.490047
Third sector entities	-3.443	2.023	-1.702	0.091479
Local authorities with integrated strategies for adapting to and mitigating climate change	4.171	1.969	2.119	0.036194*
Projects of social inclusion and solidarity	7.956	2.292	3.47	0.000727***

Table 21: Regression Table bonus categories and total result

The intercept is 60.961, which represents the mean total score for the baseline level (likely "No") of each predictor. So, when all predictors are at their baseline level (all equal "No"), the average total score is approximately 60.96.

The coefficient for the mountain area is 4.785. This means that if the project is in the category total score increases on average by 4.79 points, though this effect is not statistically significant ($p = 0.18$).

The coefficient for internal area is -4.120, suggesting that total score would decrease by 4.12 points when internal area is "Yes". This effect also lacks statistical significance ($p = 0.29$), so we can't confidently conclude that internal area impacts total score.

The coefficient for economically disadvantaged subjects is -1.402, indicating a 1.4-point decrease in total score when projects have this feature. However, this effect is not statistically significant ($p = 0.49$).

The coefficient for third sector entities is -3.443, which suggests a 3.44-point decrease. This effect is marginally significant with a p-value of 0.091, meaning it may be worth exploring further with additional model refinement.

The coefficient for local authorities with integrated strategies for adapting to and mitigating climate change is 4.171, indicating that for this kind of entity the total score increases by about 4.17 points. This effect is statistically significant ($p = 0.036$), suggesting that this category is likely associated with higher scores. This makes perfect sense as the points category “Capacity of the project to contribute to carbon neutrality” (Category D) assigns the highest number of points per category equal to 25. This highlights the focus and the attractiveness of the project for environmentally sustainable solutions.

The coefficient for Projects of social inclusion and solidarity is 7.956, showing that these projects influence the total score with an associated increase of nearly 8 points. This effect is highly statistically significant ($p = 0.0007$), indicating a strong positive relationship between social inclusion and total score. Even in this case it is perfectly aligned with the evaluation system of the call for proposal, since “Capacity for aggregation and involvement of the subjects participating in the Energy Community” (Category C) assigns 20 points, further highlighting the importance to be attractive for social inclusive projects.

At the moment, 11 proposals have completed PHASE 2, the phase that in the Call for proposals provides for the completion of the application for a contribution. At this stage, in addition to the granting of the established contribution, the spending commitments were recorded. Of these projects, 10 have had access to the bonus. For a total eligible contribution of €410,206.78. On average, therefore, the eligible funding for each candidate is €37,291.53.

It seems that the percentage shares of the spending chapters are divided into three parts between the European Union, the Italian State and the Emilia-Romagna region. These are six:

- The first spending chapter (U22657) is €102,138.2, while the fourth (U22859) corresponds to €61,944.5, both EU shares with a 40% distribution percentage.

- The second expenditure chapter (U22659) is equal to € 107,245.12, while the fifth (U22861) is € 65,041.73, both State shares with a 42% distribution percentage.
- The third expenditure chapter (U22661) is € 45,962.2, while the sixth (U22863) is equal to € 27,875.02, both Emilia-Romagna region shares, with a 18% distribution percentage.

It therefore seems that the contribution is mostly financed by the State, but the contribution granted by the European Union seems to be slightly lower. As expected, the lower percentage is from the region, which is far behind the other two contributors.

Conclusions

The contemporary “polycrisis” (climate, environmental, socio-economic, pandemic and geopolitical) has deteriorated the shared social imaginary, reducing the community capacity to find creative solutions to current challenges. This thesis has explored the possibility of broadening the impact of CERs (Comunità Energetiche Rinnovabili), seeing them not only as a technical response to the energy transition, but also as potential accelerators of cultural changes towards circular and socially desirable development.

In Europe and, consequently, also in Italy, the Renewable Energy Communities have become a concrete response to the climate and economic crisis, being standardized by a series of directives and legislation to which both private and public entities have responded. In this thesis we wanted to analyze specifically the situation at regional level in Emilia-Romagna, which responded to the law promulgated in the region through a call for proposals (Call for proposals for support to the development of renewable energy communities) who is still seeing his course.

If in the first chapter of the thesis we have described the regulatory environment in Europe and Italy, in the second chapter we discussed the merits of the Italian regional context, and we then focused on a specific region: the Emilia-Romagna, and a recent call that region enacted to promote the creation of CERs. The aim was to provide a description of the call, highlighting the selection criteria for the candidates and the objectives of the document, and finally comparing the regional legislation in Emilia-Romagna with the call for proposals, Finding differences with reference candidates' subjects and the categories funded by them.

In the third chapter, a numerical analysis was carried out against the results currently available on the various phases of the call. The total amount of contributions to which the 125 accepted applications would have been entitled was €4,601,346.49. The contribution foreseen and originally financed by the call amounted to a total of €2,000,000.00. With Regional Council Resolution no. 979 of 06.12.2023, the financial allocation for this Call was ascertained and increased up to a maximum of €4,900,000.00 using the resources available for the implementation of the measures contained in the ERDF 2021-2027 regional programming. To receive funding, participants were judged on the basis of five criteria, which had as their objectives: quality of the proposal, management model envisaged for the energy community, capacity for aggregation and involvement of the subjects participating in the

Community, contribution to the carbon neutrality of the project. And also economic-financial quality of the project in terms of the cost-effectiveness of the proposal. The maximum achievable evaluation was 100, while a score lower than 50 meant exclusion from funding. With a total of 125 observations, the mean score was 66.94. But the distribution analysis underscores the competitive nature of the evaluated projects, reflecting a variety of approaches and effectiveness in meeting funding criteria.

After analyzing all the scores, we proceeded to do an analysis from a territorial point of view. Questions for participation in the tender come from all nine provinces of Emilia-Romagna. The analysis of mean scores by province provides insight into the funding outcomes for various projects. The province of Parma (“PR” in the graph) leads with the highest average score of 73.27, reflecting strong project proposals that have met the funding criteria effectively. Following closely are Forli-Cesena (“FC” in the graph) and Modena (“MO” in the graph) with mean scores of 70.58 and 69.89, respectively, indicating a solid performance in securing funding. In contrast, the provinces of Reggio Emilia (“RE” in the graph) and Ferrara (“FE” in the graph) have the lowest average scores, at 61.86 and 63.09, respectively. However the analysis suggests that there is no strong evidence that the province in which the intervention takes place significantly influences the total score, given by the high p-values. This is because, from the checks carried out, the values were all higher than 0.1.

To achieve the scores discussed so far, each candidate had to take into account the criteria evaluated by the evaluation team. The five fields are each marked with a letter, for each criterion there was a specific maximum score that could be achieved. To better understand which criteria had the most significant impact on the final project scores, we conducted a series of regression analyses, regressing the total score on each individual criterion score. Although these results are not fully comprehensive - particularly as scores from projects below the minimum threshold of 50 are not included - they provide valuable insights. Specifically, this analysis gives an overview of which criteria were prioritized by both the evaluation team and the applicants.

One of the first things we can say is criteria A, B, C, D are strongly correlated with the score, while criterion E is not. This means that those who were good at the first four criteria were also good at the general formulation of their proposal, among these criteria, B was the one that proved to be fundamental. While E was the one that proved to be of little importance. Criterion E had a lower weight because the overall quality and sustainability of the project depend more on the clarity of objectives, methodology, management capacity and environmental impact. These factors are essential to ensure

the long-term success of CERs. In fact, criteria A, B, C, D evaluate fundamental aspects such as the clarity of objectives, methodology, management and environmental impact, which are crucial for the overall success of Renewable Energy Communities. These criteria ensure that the project is well planned, manageable and able to effectively engage the community.

The long-term sustainability of CERs depends not only on economic viability, but also on the capacity for aggregation, management and environmental impact. A well-managed project with clear objectives tends to be sustainable and, therefore, economically advantageous. Finally, the quality of the management model is closely linked to the economic viability of the project. Its importance is such that, in the absence of an adequate management plan, auditors may assign a score of 0 to reflect the associated economic risks. The fact that a project may have been given such a low score and still receive funding is explained by the fact that the correlation analysis reveals a low level of interdependence among the criteria, suggesting that each of these factors contributes uniquely to the overall results. For descriptive analysis, this independence means we can look at each variable individually without expecting substantial overlap or interaction effects, building the ground to accept the previous regression analysis.

Finally, the analysis shows a large participation by projects related to mountain areas and inclusion initiatives. They were awarded a 10% premium, in addition to the initial 80%. This may indicate that the aim of the call to address both environmental and economic disadvantage has been well-received by the parties involved. However, statistically, projects with integrated strategies for climate change adaptation and social inclusion scored significantly higher, while other factors such as the mountain area, the inland area and economically disadvantaged entities did not show significant levels.

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Regolamento del Parlamento Europeo e del Consiglio, n. 1999 dell'11 dicembre 2018.