




# PRACTICAL GUIDE

Development of renewable energy communities  
by citizens, associations, and local governments



The example of the  
Telheiras/Lumiar  
renewable energy  
community



PARCERIA LOCAL  
TELHEIRAS





PARCERIA LOCAL  
TELHEIRAS

### Local Partnership of Telheiras

geral@vivertelheiras.pt  
www.vivertelheiras.pt



### Lumiar Parish Council

info@jf-lumiar.pt  
https://jf-lumiar.pt



### Coopérnico

coopernico@coopernico.org  
http://coopernico.org



### Energy Poverty Advisory Hub (EPAH)

info@energypoverty.eu  
https://energy-poverty.ec.europa.eu



### Centre for Environmental and Sustainability Research, NOVA School of Science and Technology, NOVA University of Lisbon (CENSE, NOVA-FCT)



cense.secretariado@fct.unl.pt  
https://www.cense.fct.unl.pt

**Authors:** Miguel Macias Sequeira, Evandro Ferreira, Luís Keel Pereira, Luís Cachinho, Helena Martins, João Pedro Gouveia, Ana Rita Antunes, Bartolomeu Bernardes and António Boucinha.

**Design:** Marta Catarino Miguel.

**Reference suggestion:** Sequeira, M.M., Ferreira, E., Pereira, L.K., Cachinho, L., Martins, H., Gouveia, J.P., Antunes, A.R., Bernardes, B., and Boucinha, A. (2024). Practical guide: Development of renewable energy communities by citizens, associations, and local governments – The example of the Telheiras/Lumiar Renewable Energy Community. Available at: <http://vivertelheiras.pt/certelheiras/en>.

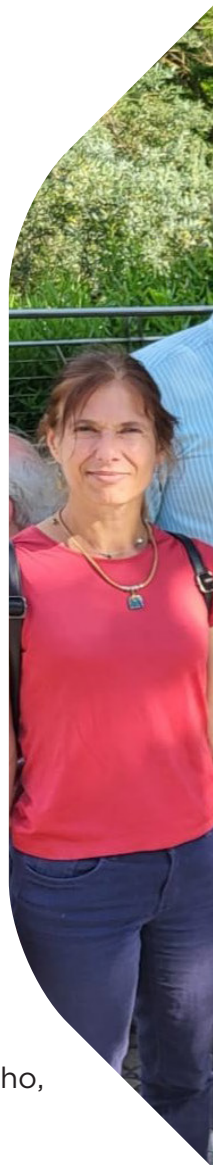
All contents of this document are of the sole responsibility of the authors and do not represent the institutions to which they belong.

For any enquiries, please contact: [m.sequeira@campus.fct.unl.pt](mailto:m.sequeira@campus.fct.unl.pt)

October 2024, Lisbon, Portugal



Miguel Macias Sequeira, João Pedro Gouveia and Evandro Ferreira acknowledge the support provided to CENSE NOVA-FCT by the Portuguese Foundation for Science and Technology (FCT): UIDB/04085/2020. Miguel's PhD scholarship is funded by FCT: 2020.04774.BD.

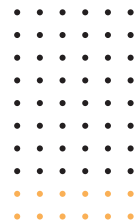






*“The Telheiras/  
Lumiar REC is a project  
that the Lumiar Parish  
Council did not hesitate to get  
involved as a partner, as it  
promotes interaction and  
collaboration between citizens,  
in addition to its social and  
sustainability dimensions.”*

Ricardo Mexia,  
President JF Lumiar



## INTRODUCTION

# THE POTENTIAL OF RENEWABLE ENERGY COMMUNITIES

The European Union's energy transition is underway as part of a long-term strategy to decarbonise society, fuelled by the ever-growing climate emergency and the latest fossil fuel crisis. Improving energy efficiency and massifying renewables are two pillars for a future energy system that should be secure, affordable and carbon neutral. Still, the pace of transformation must accelerate.

**This urgency means deeply and simultaneously involving all segments of society in a tremendous collective effort.** Local actions activating citizens and communities play an essential role, although they are often overshadowed by large energy projects. It is also a question of fairness and leaving no-one behind - even those who, due to vulnerabilities or circumstances, are harder to reach and engage for the energy system's transformation.

In this context, the European Commission recognises the important role of citizens and communities in the energy transition, estimating that by 2050 around half of Europeans will be producing their own renewable energy<sup>1</sup>. According to European law,

**a renewable energy community (REC) is a legal entity based on open and voluntary participation, which must be autonomous and effectively controlled by its members located in the vicinity of renewable energy projects<sup>2</sup>.**

Members can be individuals, small and medium-sized enterprises, and local governments.

**The main objective of a REC is to provide environmental, economic, and/or social benefits to the members or the areas where it operates, rather than financial profits.**

A REC can participate in activities related to renewable energy generation, energy efficiency, aggregation, mobility, energy sharing and self-consumption.

In some European countries, such as Germany, Denmark and the Netherlands, there is a rich history of citizen involvement in the energy system, often in the form of cooperatives. Portugal is at the other end of the spectrum: only recently, after the transposition of European

<sup>1</sup> European Commission (2019). Clean Energy for all Europeans. DOI 10.2833/9937

<sup>2</sup> Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast). Official Journal of the European Union.



×

×



directives in 2019 and, more affirmatively, in 2022, have these ideas started to gain traction<sup>3,4</sup>.

In addition to individual self-consumption (when a consumer produces and uses their own renewable energy), Portuguese legislation now also allows the production and sharing of renewable energy between consumers through collective self-consumption and RECs.

In Portugal, it is the technical concept of collective self-consumption, which simply presupposes the sharing of energy by at least two consumers, without the creation of a legal entity, that is being predominantly implemented.

Although they are incorrectly labelled as energy communities by their proponents, it is rare for these projects to fulfil the requirements for RECs imposed by law. Collective self-consumption projects, often commercially driven, can be important for leveraging decentralised renewable generation. However, with the outsourcing of investment, ownership, and management, and with the pursuit of financial profit, the communal and social nature that should be the cornerstone of a REC may be lost.

Taking stock: European and Portuguese legislation allows for RECs and their benefits are evident. However, four years after the concept was transposed to Portugal, there are still few projects in operation and few good practices from civil society and local authorities.

<sup>3</sup> Portuguese Government (2019). Decree-Law no. 162/2019 - Approving the legal regime applicable to self-consumption of renewable energy, partially transposing Directive 2018/2001. Official Journal of the Republic of Portugal no. 206/2019, Series I of 2019-10-25.

<sup>4</sup> Portuguese Government (2022). Decree-Law no. 15/2022 - Establishing the organisation and operation of the National Electricity System, transposing Directive (EU) 2019/944 and Directive (EU) 2018/2001. Official Journal of the Republic of Portugal no. 10/2022, Series I of 2022-01-14.

## What are the potential benefits of RECs?



On the **environmental** side, the generation of decentralised renewable energy close to consumption (avoiding losses in transmission and distribution), the reduction of greenhouse gas emissions and, possibly, an increase in energy efficiency through the dissemination of sustainable practices among members.




In addition to fostering **citizens'** active participation in the energy system, enabling its democratisation, RECs can promote social inclusion and community empowerment and can contribute to mitigating energy poverty among vulnerable populations by reducing their energy bills.



Finally, in the **economic** component, RECs contribute to local development as an investment with a positive return, reduce energy bills, promote resilience in the face of price volatility and generate employment in green economic activities such as the installation of renewable energy systems.

Through this practical guide, illustrated with the case of the Telheiras/Lumiar Renewable Energy Community (Telheiras/Lumiar REC), we aim to support the development of renewable energy communities by citizens, non-profit organisations, and local governments.





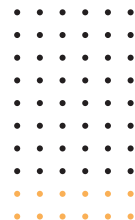
*“Creating energy communities means developing specialised projects with citizens without technical knowledge. This challenge makes the energy transition not only positive from an environmental point of view, but also fairer and more transparent from a social point of view.”*

Ana Rita Antunes,  
Executive Coordinator,  
Coopérnico



# HOW TO BUILD A RENEWABLE ENERGY COMMUNITY?

## The 10 initial steps of the Telheiras/Lumiar REC

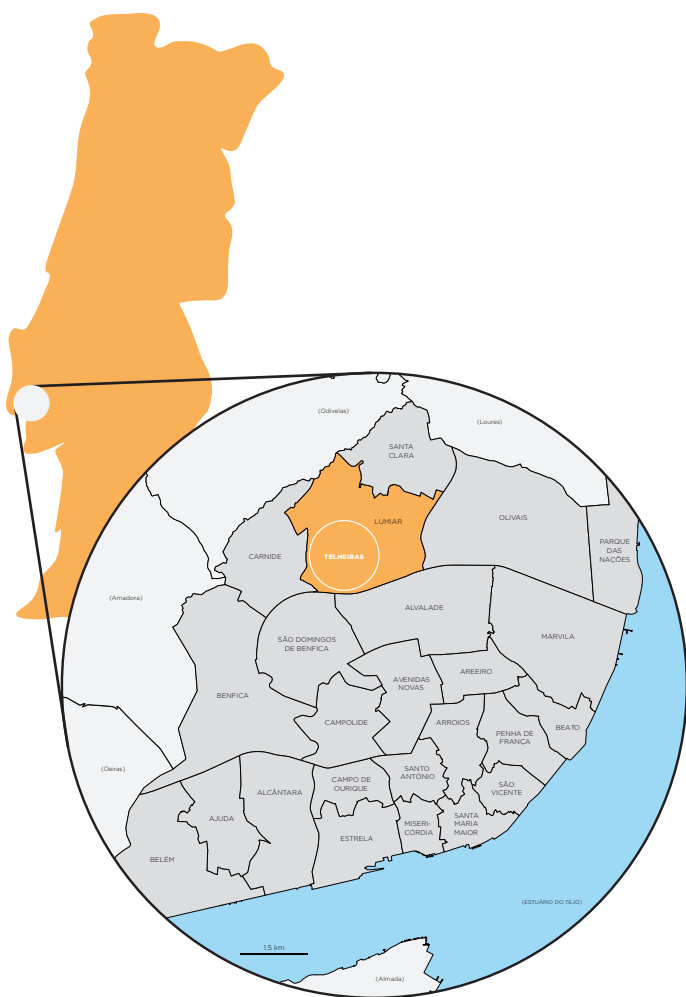


The Telheiras/Lumiar REC is a joint initiative of the Local Partnership of Telheiras - an informal network that brings together more than 20 associations and other organizations from the Telheiras neighbourhood since 2013 - and the Lumiar Parish Council<sup>5</sup>.

With an innovative approach to generating and sharing renewable energy locally, this pilot project aims to contribute to a more sustainable, fair, accessible, and democratic energy system. As part of the technical assistance provided by the Energy Poverty Advisory Hub (EPAH) - the European Commission's main initiative on energy poverty - Coopérnico (renewable energy cooperative) and the Center for Environmental and Sustainability Research of the NOVA School of Science and Technology of NOVA University Lisbon (CENSE, NOVA-FCT) are partners of the project<sup>6</sup>.

5 Viver Telheiras (2024). Telheiras/Lumiar Renewable Energy Community. <http://vivertelheiras.pt/certelheiras/en>

6 EPAH (2024). Energy Poverty Advisory Hub. <https://energy-poverty.ec.europa.eu/>



Location of the Telheiras neighbourhood in Lisbon, Portugal





Although the idea of setting up the Telheiras/Lumiar REC first emerged in September 2020, when the Local Partnership of Telheiras collected ideas from the population, the licence application was only submitted to the Directorate-General for Energy and Geology (DGEG) in June 2023, and the project was considered viable in November 2023. Between October 2022 and July 2023, the project benefited from EPAH's technical assistance, which was instrumental in overcoming the challenges associated with developing an innovative approach.

**Reflecting on this journey, it is now possible to map out 10 initial steps for building a REC in Portugal, which may also be useful in other countries, in the hope of facilitating the implementation of future projects.**

This list is not intended to be definitive, as a REC may be constantly evolving and new challenges may require new steps, while administrative procedures and legal obligations may also change.



**1** Pitching the idea to the local community



**2** Seeking beneficial partnerships



**3** Assessing the legal and regulatory context



**4** Selecting buildings and sizing renewable energy systems



**5** Defining the legal entity



**6** Developing the financial and operational model



**7** Defining internal regulations



**8** Communicating with the local community and recruiting participants



**9** Identifying and including vulnerable families



**10** Licensing the renewable energy community

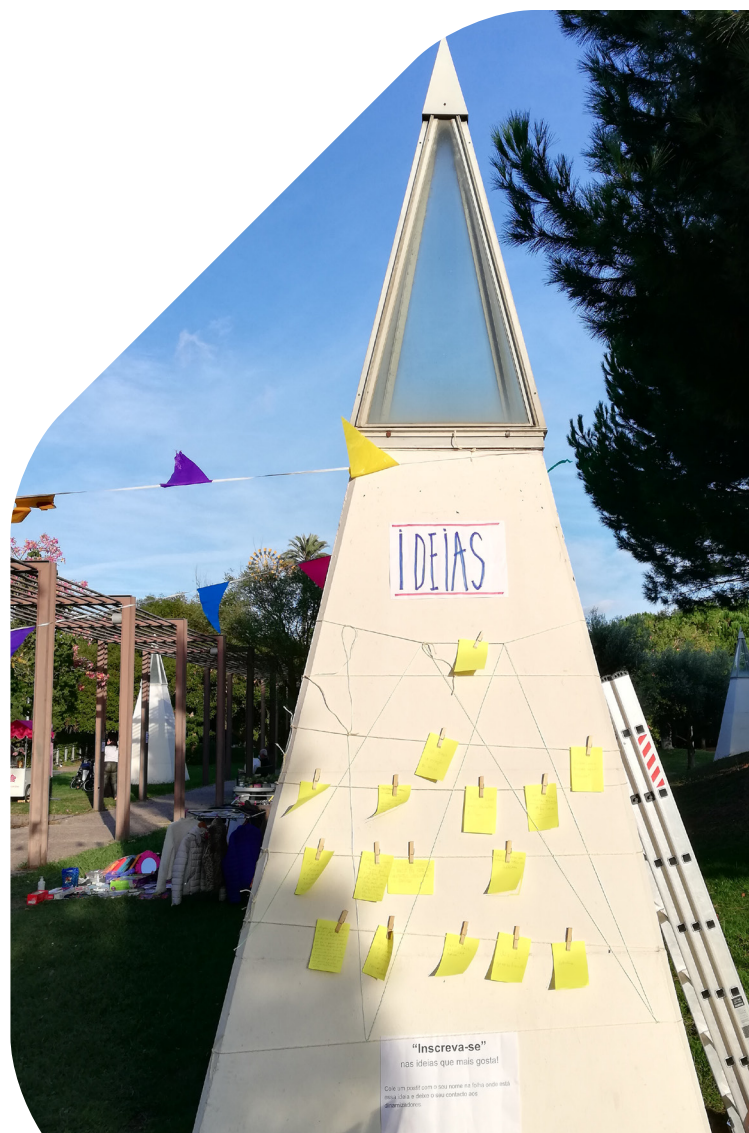


## 1. PITCHING THE IDEA TO THE LOCAL COMMUNITY

The first step in building a renewable energy community is, of course, the dawn of the idea within the local community. **The initiative will be easier to accomplish if it builds on vibrant dynamics that already exist on the ground.** These can be at the level of the municipality or district, non-profit associations, private charities, cooperatives, or even formal or informal residents' groups. Although the topic of energy and sustainability may be new, the experience of community development is essential.

Typically, these local organisations are already active among the population, have a well-structured and validated communication network with the community, provide essential services to vulnerable families, and promote social inclusion on a solid foundation of trust. **First and foremost, a REC is a “community”: a small group of people and/or entities - who come together to work towards a more sustainable, inclusive, and democratic energy system in their neighbourhood and city.**

**“Let’s produce our own renewable energy and share it among neighbours?”**





# THE LOCAL PARTNERSHIP OF TELHEIRAS

The Local Partnership of Telheiras is an informal network of around 25 organisations, including non-profit associations, public bodies, and informal groups<sup>7</sup>. Set up in 2013, its main objectives are to share resources and information, and jointly organise events.

**Over the network's 10 years of existence, the strengthening of inter-institutional relations and the proximity between institutions and the population have had extremely beneficial impacts on the territory and community.**

These include the development of various projects between entities bringing together diverse audiences (children, young people, the elderly, people with disabilities, among others), access to

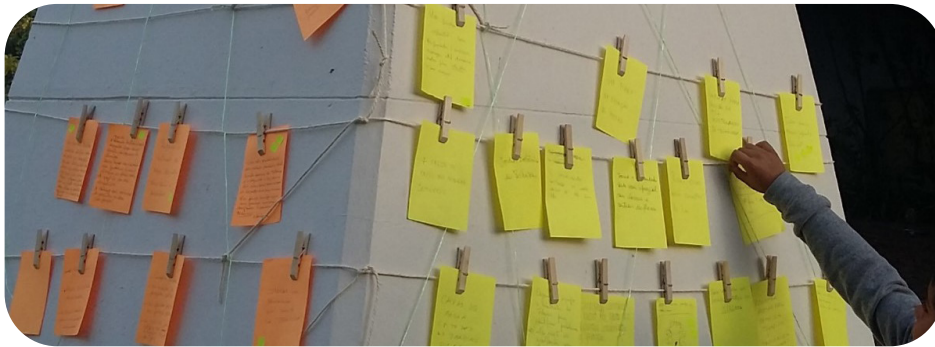
funding through applications for national and international funds, optimising the use of local resources, improving responses to the needs of the community by coordinating the work of various entities, increasing the participation of the population in the local dynamics, whether as volunteers, members or users, promoting civic awareness and active citizenship, and strengthening a shared local identity.

Experience shows that the existence of strong community networks creates an environment that fosters and facilitates all kinds of initiatives, whether environmental, social, economic, cultural, sports, or other. The Partnership's formal needs are taken care of by the Viver Telheiras Association, a non-profit association set up for this purpose.

<sup>7</sup> Viver Telheiras (2024). Local Partnership of Telheiras. <https://vivertelheiras.pt/tipo/parceria-local/>



Some of the organisations participating in the Local Partnership of Telheiras



The several stages of the Network of Ideas process (2020-2021)

In Telheiras, the impetus for the creation of a REC came from the “Network of Ideas” process - a face-to-face and online collection of ideas carried out by the Local Partnership of Telheiras with the population in September 2020, which aimed to find out what projects people would like to implement in the neighbourhood<sup>8</sup>. In person, the ideas were collected during a festival by placing sticky notes on a structure. The Sustainable Telheiras working group (coordinated by the Local Partnership) refined these ideas and, in September 2021, during the Telheiras Festival, organised a public brainstorming session to start implementing them<sup>9</sup>.

**In November 2021, a working group was launched with open participation to residents and friends of Telheiras, which had the participation of around 10 members in its initial phase. With different levels of involvement, these members have been collaborating on a voluntary basis towards a more sustainable and fair energy system in their neighbourhood.**

<sup>8</sup> Viver Telheiras (2020). Network of Ideas 2.0: what would you like to see (and do) in Telheiras? <http://vivertelheiras.pt/ideias-em-rede-2-0-o-que-gostava-de-ver-e-fazer-em-telheiras/>

<sup>9</sup> Viver Telheiras (2021). Let's implement the network of ideas? <https://vivertelheiras.pt/vamos-concretizar-a-ideias-em-rede/>



Telheiras/Lumiar REC Working group meeting (June 2023)





X

Meeting at least once a month, online or in person, three lines of action have been established:

- Communication and awareness-raising on sustainable energy and energy poverty;
- Free counselling for families, condominiums, and local businesses on energy saving, renewable energy, and public funding;
- Development of a pilot project to produce and share solar photovoltaic energy.

In addition to the Telheiras/Lumiar REC, several other local initiatives have blossomed from the Ideas Network in the fertile ground of the Local Partnership of Telheiras, showing how people can take part in their neighbourhood's sustainable transformation, even in difficult times such as the Covid-19 pandemic, for example:

- **ReCoopera**: community space to learn, repair, share and donate<sup>10</sup>;
- **"Made in Lumiar"**: creation of a brand for local handicrafts<sup>11</sup>;
- **Biodiverse Telheiras**: building shelters for birds, bats, and pollinators<sup>12</sup>.

<sup>10</sup> Viver Telheiras (2021). Telheiras wins Lisbon's Participatory Budget! <http://vivertelheiras.pt/telheirasvence-orcamento-participativo-de-lisboa/>

<sup>11</sup> Viver Telheiras (2022). This Saturday come to the "Made in Lumiar" market! <http://vivertelheiras.pt/este-sabado-ha-feirafeito-no-lumiar/>

<sup>12</sup> Viver Telheiras (2021). "Biodiverse Telheiras" aims to "house" the neighbourhood's birds, pollinators, and bats. <http://vivertelheiras.pt/telheiras-biodiversa-pretendealojar-passaros-polinizadores-e-morcegos-do-bairro/>





## 2. SEEKING BENEFICIAL PARTNERSHIPS

Once the idea has emerged and work has begun, it is essential to look for beneficial partnerships to support the development of the REC. **Local authorities and non-profit organisations are natural and complementary partners.** Usually, the local authority can contribute with its institutional capacity, its range of public buildings and its proximity to the population, while local associations have a close relationship with residents, are active in the social, cultural and sports areas and seek to implement initiatives to strengthen the local community and often to solve its problems.

Other relevant partners can include local energy agencies, universities, cooperatives or even individual residents who may contribute with technical knowledge about energy issues. There are also a few private companies active in the area of collective self-consumption, but it is necessary to carefully evaluate the trade-offs of this collaboration in order to ensure that the benefits stay in the local community.

The Telheiras/Lumiar REC working group quickly realised that this topic

**“Who can support us in developing and implementing this idea?”**





was complex and novel in Portugal, and that it would need partners to implement this project. However, it was also understood that the original idea, i.e. **renewable energy production ‘by the people of Telheiras, with the people of Telheiras and for the people of Telheiras’**, should be maintained, and that there was capacity and willingness in the working group to maintain a high degree of autonomy.

The idea of the Telheiras/Lumiar REC was immediately cherished by the Lumiar Parish Council, which, in its role as local government, became one of the promoters of the project in collaboration with the Local Partnership of Telheiras. In February 2022, a thematic session was organised with Coopérnico and CENSE NOVA-FCT to introduce the initiative to the whole community and explore possibilities for its development<sup>13</sup>.

**Following an application to EPAH’s first call for technical assistance, the Telheiras/Lumiar REC was one of 23 projects selected at European level in 2022.** This formalised Coopérnico and CENSE NOVA-FCT’s technical support for the development of the REC as an innovative project with a strong social and environmental component.<sup>14</sup>.

<sup>13</sup> Viver Telheiras (2022). Telheiras has good energies: read about the session on energy communities. <https://vivertelheiras.pt/telheiras-tem-boa-energia-foi-assim-a-sessao-comunidades-de-energia-renovavel/>

<sup>14</sup> EPAH (2024). Technical Assistance. <https://energy-poverty.ec.europa.eu/our-work/technical-assistance>



Public session ‘Renewable energy communities: Why? How? And in Telheiras?’ (May 2022)

*“EPAH’s technical assistances in multiple European countries have created a basis of knowledge about energy poverty and supported the development of innovative projects at the local level.”*

João Pedro Gouveia,  
Principal Researcher, CENSE  
NOVA-FCT & EPAH



Kick-off meeting for EPAH’s technical support with the various partners (October 2022)



### 3. ASSESSING THE LEGAL AND REGULATORY CONTEXT

Right at the start of the work, it's important to understand the legal and regulatory context that enables the implementation of RECs. The concept first appeared in Portuguese legislation in 2019, transposed from European legislation that had been heavily influenced by the European energy cooperative movements<sup>15</sup>.

**However, it wasn't until 2022 that it was made clearer in Decree-Law 15/2022 of 14 January, which defines collective self-consumption and RECs<sup>16</sup>.** Both concepts allow for the production and sharing of renewable energy among their members, differing mainly in that a REC is a legal person, with open and voluntary participation, legal personality and with the right to perform other services in the energy system in addition to producing and sharing energy.

**A key aspect is the proximity between the renewable energy production units and the REC members,** connected via an internal electricity grid (for example, in the same building where the renewable production is installed, even if it's a condominium) or via the public service electricity grid (for example, between several buildings in the same neighbourhood). If the connection between production and consumption is made through the existing public grid, the REC must pay grid access tariffs for sharing the energy. At the moment, RECs benefit from some exemptions compared to other energy users (in the costs of general economic interest, during the first seven years of operation, and in the high-voltage tariff component). In low-voltage projects, the concept of proximity to members is limited by current legislation to a radius of two kilometres drawn from the renewable energy production system.

**The sharing of the renewable electricity generated can follow two main types of coefficients:** fixed (i.e. a percentage for each member that can be the same for all or differentiated) and variable (e.g. by hierarchising the members or in proportion to what

<sup>15</sup> Portuguese Government (2019). Decree-Law no. 162/2019 - Approving the legal regime applicable to self-consumption of renewable energy, partially transposing Directive 2018/2001. Official Journal of the Republic of Portugal no. 206/2019, Series I of 2019-10-25.

<sup>16</sup> Portuguese Government (2022). Decree-Law no. 15/2022 - Establishing the organisation and operation of the National Electricity System, transposing Directive (EU) 2019/944 and Directive (EU) 2018/2001. Official Journal of the Republic of Portugal no. 10/2022, Series I of 2022-01-14.





each is consuming in each measurement period)<sup>17</sup>. It is important to clarify that, according to the current indications of the distribution system operator (which is E-Redes in most of Portugal), when the production unit is placed in an existing building and connected to its meter, all the electricity is first consumed on site and only the surplus is divided among the other REC members according to the coefficients. Once the renewable electricity has been injected into the grid, it is digitally metered and shared every 15 minutes by the smart meters of the production point and of each REC member. If the member does not have a smart meter, E-Redes must install one at no extra cost. If the electricity allocated to each of the participants is not consumed, then it constitutes a surplus and can be sold by the REC.

## **“Why a renewable energy community pilot project in Telheiras?”**



<sup>17</sup> ADENE and DGEG (2022). Self-consumption and Renewable Energy Community - Legislative Guide. <https://www.adene.pt/adene-e-dgeg-elaboram-manual-digital-autoconsumo-e-comunidade-de-energia-renovavel-guia-legislativo/>

In 2020, when the idea of producing and sharing renewable energy first emerged in Telheiras, the concept of REC was still very recent in Portugal. It was only in 2022, with the entry into force of the new legislation (DL 15/2022), that this term began to enter the common lexicon. However, on the one hand, it was still very restricted to the energy sector and, on the other hand, had few practical results.

In this context, the Local Partnership of Telheiras and the Lumiar Parish Council realised that they were breaking new ground in the production and sharing of renewable energy with the direct involvement of residents, local associations, and the local government. In addition, from the outset, the initiative sought to combine the environmental aspect of reducing greenhouse gas emissions with the social aspect of including families living in energy poverty. **Being an innovation, the promoters decided to start with a small pilot project to test approaches, build knowledge, and disseminate the lessons learnt.**



Participation of the Telheiras/Lumiar REC in national and international dissemination events





## 4. SELECTING BUILDINGS AND SIZING RENEWABLE ENERGY SYSTEMS

In Portugal, it probably makes sense for a REC to invest in the production and sharing of solar energy as its first formal activity, mainly due to the high solar irradiation values in most of the country. Solar photovoltaic technology makes it possible to generate electricity from panels installed on the roofs of buildings, other rooftops or structures fixed to the ground. Its costs have fallen in recent years, and it can be implemented on both a small and large scale.

**Therefore, an important step is to survey available buildings and areas with the potential to receive the REC's photovoltaic panels.** Public buildings, non-profit organisations or private charities may be a good option, since the decision to install solar panels usually rests with a single organisation. During this preliminary phase, the main points to analyse are:

- Available area: it is vital to quantify the area available for fixing the panels, also considering the shading of the site;
- Building conditions: if the system is to be installed on existing roofs, it is important to assess their state of preservation and identify possible deterioration;

- Conditions of the electrical installations: check the maximum power of the installation with the distribution system operator (the installed power of the photovoltaic system must be below this value) and carry out any required repairs or grid capacity reinforcement.

Based on these items, a solar installer will be able to make an initial sizing, identifying the number of panels, the power generated and the annual electricity production. This data makes it possible to estimate the number of participants to be included in the REC, combining electricity production with the average daytime consumption of each participant. Alternatively, the total consumption of the participants can also be estimated first and then the photovoltaic system sized to meet this need.

**“Where are we going to install our community's solar photovoltaic system?”**

After surveying relevant buildings in the neighbourhood, the Local Partnership of Telheiras and the Lumiar Parish Council decided that **the solar photovoltaic system for their pilot project would be installed on a community centre.** This is a central building in the neighbourhood, which is already well known by the local community and used for various activities. In addition, it has the right orientation, conditions, and size to test the approach.



Location of the Telheiras/Lumiar REC pilot solar photovoltaic system







The sizing of the solar photovoltaic system for this building revealed the potential to install 7.15 kWp (i.e. 13 panels). After accounting for the electricity consumption of the building itself and based on the average electricity consumption of a Portuguese family, it was considered that the system's output would be sufficient for the building itself and for 16 additional participants. Using a fixed and equal sharing coefficient for these 16 members, each participant is entitled to one sixteenth (around 6%) of the electricity that is injected into the grid. The choice of the number of participants was aimed at maximising self-consumption in the REC and minimising surpluses. Thus, the electricity allocated to each participant corresponds to the domestic consumption base that is almost always consumed.

**The 17 participants in the Telheiras/Lumiar REC pilot project, who must be located less than two kilometres from the photovoltaic system installation site, are the building itself (managed by the Lumiar Parish), 13 families who signed up for the project and 3 vulnerable families selected by the Lumiar Parish.** The production guarantee of a solar photovoltaic system, i.e. at least 80% of the original electricity generation, is 25 years.



Radius of action of the Telheiras/Lumiar REC pilot project

### Technical characteristics of the solar photovoltaic system

Area	50 m <sup>2</sup>
No. of panels	13
Installed power	7.15 kWp
Electricity power	11.5 MWh/year
No. of participants	17



## 5. DEFINING THE LEGAL ENTITY

A REC must be set up as a legal entity, which is the main feature that differentiates it from collective self-consumption. **There are several options for setting up legal entities - association, cooperative, foundation or commercial company - and the most suitable one will depend on each specific case and the type of management intended.** The formal procedure for setting up a legal entity will depend on the type of organisation chosen<sup>18</sup>.

Whatever legal form is adopted, it will be important to respect the basic principles of energy communities - namely, open and voluntary membership, local and autonomous, controlled by its members who are in the vicinity of renewable energy production with the objectives of generating environmental, social and economic benefits rather than financial profits. A good option might be to adapt an existing legal entity in the territory so that it can house the REC, thus, avoiding the costs of setting up a new entity.

**“Who will be legally responsible for our energy community?”**



<sup>18</sup> ADENE and DGEG (2022). Self-consumption and Renewable Energy Community - Legislative Guide. <https://www.adene.pt/adene-e-dgeg-elaboram-manual-digital-autoconsumo-e-comunidade-de-energia-renovavel-guia-legislativo/>





*“Adapting an existing legal entity, the Viver Telheiras Association, reduced bureaucracy and sped up the creation process, guaranteeing an open, voluntary and autonomous representation of the community and its members”.*

Bartolomeu Bernardes,  
Telheiras/Lumiar REC member

In Telheiras, an existing non-profit association was chosen to serve as the incubator for the REC pilot project. The Viver Telheiras Association is part of the Local Partnership of Telheiras and is well known by residents, especially due to its social media platforms and organisation of local events. **To take on this new role of managing the REC, the association had to transform itself.** This included updating its statutes to incorporate the aim of producing renewable energy for the benefit of the local community, creating a group within the association for the REC members with semi-autonomous management and specific rights and duties, and adopting a secondary economic activity code (CAE 35113: Production of electricity from wind, geothermal, solar and other sources).

Respecting the principles of democratic management, all REC members, by paying their annual membership fee, are automatically members of the Viver Telheiras Association with the right to vote on REC-related themes.



ASSOCIAÇÃO  
VIVER TELHEIRAS

**The association has the following responsibilities:**

- Licensing the renewable energy community;
- Collecting the initial investment from members and installing the photovoltaic system;
- Defining and collecting the annual membership fees paid by the members;
- Paying grid access tariffs and other applicable fees;
- Carry out preventive maintenance on the photovoltaic system;
- Take out civil liability insurance for the photovoltaic system;
- Inform members about the production and distribution of solar energy;
- Organise general assemblies with members;
- Sell any surplus production not consumed by the members.



## 6. DEVELOPING THE FINANCIAL AND OPERATIONAL MODEL

One of the most complex tasks is to define how the REC will be financed and managed by its members to guarantee its long-term sustainability.

**Firstly, it is necessary to secure funding for the purchase and installation of the photovoltaic system, either internally through the members and/or externally with public or private investment.** It will be particularly important to define a financing model that is inclusive, so as not to exclude economically disadvantaged families.

During the operation of the REC, there are various operating costs that will need to be covered, including maintenance, civil liability insurance (and damage insurance if deemed necessary), M2M (machine-to-machine) card for monitoring, and grid access tariffs for sharing energy on the public grid. This last component, which represents the cost of transporting the electricity generated on the distribution grid (the amount paid for each kWh shared through the grid) can be particularly difficult to predict, as it is established annually by the Energy Services Regulator (ERSE).

In the case of Telheiras, a financing and operating model was developed that is as simplified as possible, divided into two distinct phases - the installation phase and the operational phase.





## “How are we going to finance and manage the renewable energy community?”

**In the installation phase**, once the participants have been identified, the Telheiras/Lumiar REC is licenced. After licensing, the initial investment is collected among the participants,

according to the sharing coefficients and the first membership fee is paid. In the pilot project, the entry of 3 families as social participants is covered by the Lumiar Parish Council (2 families) and the other 13 members (1 family). With the upfront investment collected, the Viver Telheiras Association purchases and installs the photovoltaic system.

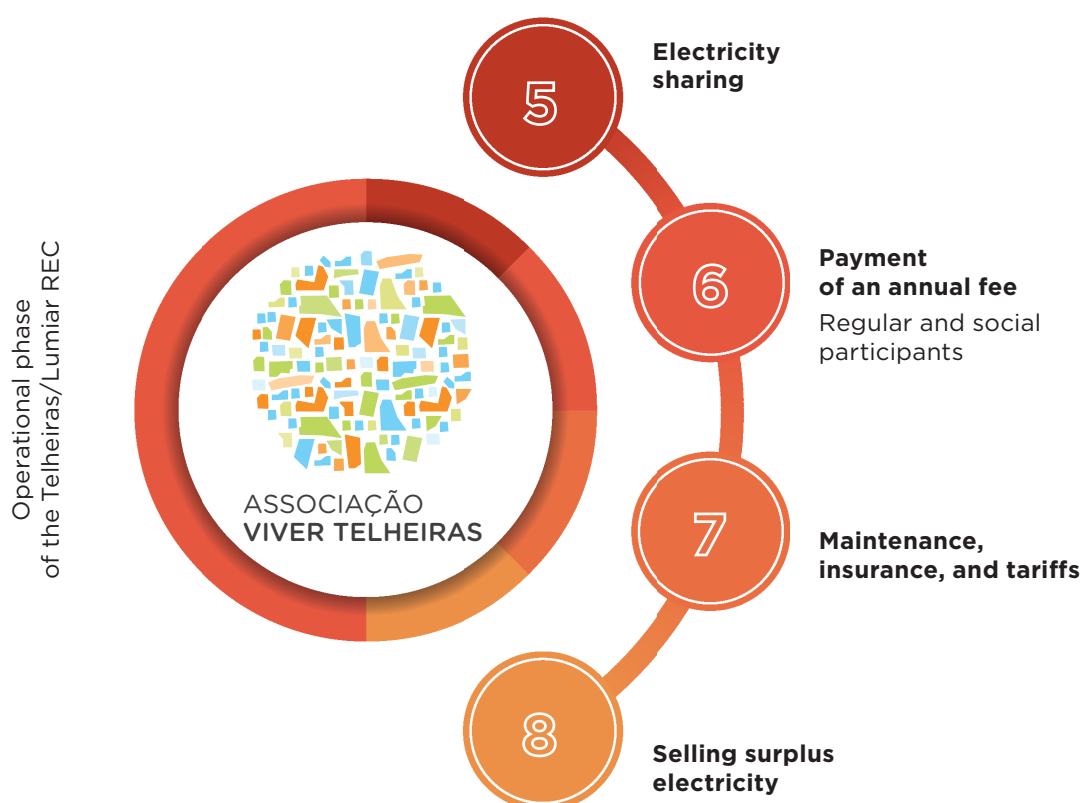
**In the operational phase**, with the photovoltaic system up and running, each participant has the right to enjoy their portion of the energy injected into the grid (i.e. after self-consumption in the building itself) at no associated cost, as established in



the sharing coefficients. The electricity is transported on the existing public electricity grid and metering and sharing is done digitally every 15 minutes by the smart meters at the production site and for each member. Telheiras/Lumiar REC members receive a discount on their electricity bill, which remains contracted with the supplier of their choice, corresponding to the amount of energy consumed that comes from the photovoltaic system.

To cover the costs of maintenance, insurance, M2M card, and grid access tariffs, members pay an annual

membership fee which is approved each year at the general assembly. Social participants pay a reduced fee, and the remaining costs are covered by the other members. The annual fee includes a safety margin to cover any unforeseen circumstances. The value of grid access tariffs was estimated based on 2021 data (i.e. around € 0.02-0.03 per kWh transported on the grid), representing a conservative scenario.





Defining this financing and operating model made it possible to calculate the initial investment, operating costs and energy bill savings for REC members. Naturally, this estimate has some uncertainties because it is not possible to predict the future evolution of electricity prices and grid access tariffs, among other aspects. However, the medium and long-term benefits of the REC are clear, regardless of this uncertainty.

*"It's essential that each community finds the best financing model for its case, so that the investment can be covered, as much as possible, by the community and so that citizens own the energy they produce and see their bills reduced."*

Ana Rita Antunes, Executive Coordinator, Coopérnico

### Key economic indicators of the Telheiras/Lumiar REC pilot project

Indicator per member	JF Lumiar (n=1)	Regular member (n=13)	Social member (n=3)	Viver Telheiras (n=1)	Total
Sharing coefficient (%)	Not applicable	6.25	6.25	0	100
Investment (€)	1550	460	0	1300	8900
Estimate for shared electricity (kWh/year)	570	570	570	0	9695
Annual saving (€)	240	115	81	0	1960
Annual fee (€)	20 - 60	8 - 30	8	0	150 - 450
Annual balance (€)	180 - 215	85 - 105	72	6 - 25	1530 - 1800
Cumulative savings - 25 years (€)	3900	2000	1800	500	36000
Return on investment (years)	7.3 - 8.9	4.4 - 5.4	0	0	4.9 - 6.0



## 7. DEFINING INTERNAL REGULATIONS

×

×

**A REC must be governed by a set of rules established and approved by its members.** These internal regulations must define, as clearly as possible, multiple aspects of the REC's operation, including types of members and their rights and duties, access requirements for new members, rules for members' departure, ways of sharing electricity, payment of tariffs and other operating costs, destination of surplus production, general assemblies and methods of deliberation, among other provisions. Fortunately, ADENE has produced a model version of internal regulations for collective self-consumption and RECs that can be adapted to each specific case according to its needs.<sup>19</sup>

<sup>19</sup> ADENE (2023). Internal regulations template. <https://poupaenergia.pt/energia-verde/>

With the support of the partner organisations, the Local Partnership of Telheiras and Lumiar Parish Council developed the internal regulations based on the model published by ADENE. However, several aspects had to be adapted to better meet the needs of the initiative.

Firstly, the non-profit nature of the project was clearly framed by enshrining its main objective of providing environmental, social and economic benefits to its members and the local community. Besides including producer and non-producer members, the internal regulations also define social members as energy-poor members benefiting from subsidised conditions. **The internal regulations were unanimously approved by the participants at the Telheiras/Lumiar REC's first general assembly, which took place on the 18th of November 2023 in Lisbon.**

**“What rules should govern the operation of our energy community?”**



First general assembly of the  
Telheiras/Lumiar REC  
(November 2023)



## The internal regulations of the Telheiras/Lumiar REC, among other aspects, answer the following questions:

### **How do new members join?**

By replacing a current member or when installing a new photovoltaic system, if there is no change to the conditions for existing members. By approval at the general assembly, if the entry constitutes a change to the conditions in force for the remaining members.

### **How do current members leave?**

When annual membership fees are not paid until the applicable deadline. The Viver Telheiras Association cannot refund any amount previously paid. On their own initiative, the departing member can nominate a replacement to transfer their position.

### **How is the electricity shared?**

Through fixed sharing coefficients established when members join and which can be revised, if approved, at the general assembly.

### **How are the annual membership fees determined?**

At the general assembly, the fee for the following year is proposed and voted on, based on the forecast of maintenance, insurance, grid access tariffs, and other running costs.

### **What is the decision-making process like?**

According to the internal regulations, each participant is entitled to one vote and decisions are taken by qualified majority in the context of the general assembly.

### **How does the Lumiar Parish Council participate in the REC?**

The Council's participation as one of the 17 members of the pilot project is done through a specific protocol signed with Viver Telheiras Association. This solution made it possible to overcome the challenge of making the Council a member of the association. The participation of local authorities through dedicated protocols is safeguarded by the REC's internal regulations.



## 8. COMMUNICATING WITH THE LOCAL COMMUNITY AND RECRUITING PARTICIPANTS

**It is essential for a REC to integrate itself into the existing dynamics of the local community, positioning itself as a project developed by the residents and for their benefit.** It is therefore recommended to take part in local events to publicise ongoing activities and inform the population about the advantages and possibilities of participating.

In addition, online media, such as social networks of local organisations, and physical media, such as posters and flyers, can be used to increase the initiative's reach. Within a neighbourhood or city, the best method of communication will probably be word-of-mouth between neighbours, family, friends and acquaintances, which can be encouraged through simple messages to promote the project and keep the community informed.

**In addition to this regular interaction with the local community, it will be crucial to reinforce communication during key periods of formal recruitment of new members.** All information about the project should be made available in a transparent way, to allow potential participants to make an informed decision, including the data of the photovoltaic system, the financing and operational model,

the internal regulations, and how to enrol. The identification of members and the collection of their data are mandatory steps prior to licensing.

**“How are we going to communicate with our community and attract members?”**

The Telheiras/Lumiar REC was born out of the community dynamics of the Local Partnership of Telheiras, with the collaboration of volunteers from the neighbourhood. From the outset, regular participation in local events was promoted, for example, through stalls at festivals and presentations at participatory sessions. There was also a focus on online communication with the publication of materials on the social media of the Viver Telheiras Association and the Lumiar Parish Council, which are platforms well recognised by residents. At specific times, the project was promoted through physical materials, namely leaflets and posters.





×

×



In May 2023, with the solar photovoltaic system already sized, the financing and operating model established, and the preliminary internal regulations defined, the Telheiras/Lumiar REC partners decided to move on to formally attracting participants. To this end, the first step was to publish an information guide with key information about the pilot project presented in a simplified way<sup>20</sup>. **For transparency's sake, all documents and calculation tools were made open access for interested parties.** Online and physical communication was strengthened during this period, and two public sessions were organised with the participation of the project partners. More than 100 people attended these sessions and the participative Q&A moments revealed the great interest in this project.



Communication with the community in local events (2022-2023)

<sup>20</sup> Viver Telheiras (2023). Informative Guide of the Telheiras Renewable Energy Community. <http://vivertelheiras.pt/certelheiras/>



Public session “Telheiras Renewable Energy Community: What is it? What are the benefits? How can I join?” (May 2023)



As widely publicised, the online registration form for the REC was available for one week. **The selection criteria had been established as first-come-first-served. The recruitment of members was a success, with the 13 available spots being filled in 13 minutes<sup>21</sup>.** Following, informal meetings and workshops have

been organised for Telheiras/Lumiar REC members and partners. These are important social moments to strengthen the community ties that are the cornerstone of the project, promoting active participation and social inclusion in addition to the local production and sharing of renewable energy.

21 Viver Telheiras (2023). Telheiras Renewable Community recruits its first members and enters licensing. <https://vivertelheiras.pt/comunidade-de-energia-renovavel-detelheiras-angaria-primeiros-membros-e-entra-emprocesso-de-licenciamento/>





## 9. IDENTIFYING AND INCLUDING VULNERABLE FAMILIES



A REC should be a local project that promotes social inclusion and participation. However, there will probably be members of the local community who do not have the economic means to make the upfront investment to participate. **The Portuguese Government estimates that 3 million people are in a situation of energy poverty**, i.e. a lack of access to essential energy services caused by a combination of factors, including high energy prices, insufficient disposable income, high energy expenditure and poor energy efficiency in homes<sup>22</sup>.

RECs can be important tools for mitigating energy poverty by facilitating vulnerable households' access to renewable electricity. To this end, bonified conditions should be defined to overcome financial barriers

to participation. **A rigorous procedure should also be established to facilitate the identification and integration of vulnerable families into the REC, as they are often hard-to-reach with conventional approaches.** This interaction could be facilitated by local organisations that already provide social support and that have a relationship of trust with their beneficiaries.

**“How are we going to promote the inclusion of vulnerable families in the project?”**

<sup>22</sup> Presidency of the Council of Ministers (2024). Resolution of the Council of Ministers no. 11/2024 - Approves the National Long-Term Strategy to Combat Energy Poverty 2023-2050. Official Journal of the Portuguese Republic, 1st Series. No. 5, pg. 69-121.



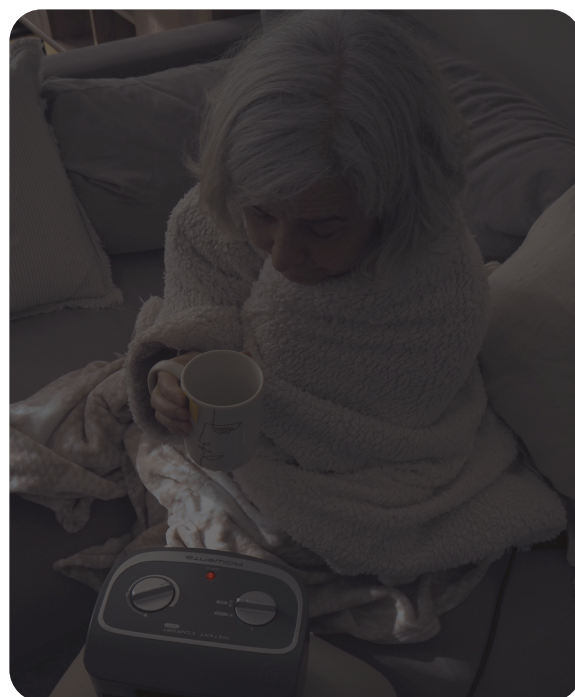
The Telheiras/Lumiar REC aims to be an inclusive project with a strong social support component for vulnerable families. Therefore, the project's promoters established that, in the pilot project with 17 participants, 3 participants must be vulnerable families who join the community benefiting from special conditions.

**They enter the REC with no need for initial investment - which is paid for by the Lumiar Parish Council**

**(2 families) and the other 13 participants (1 family) - and benefit from a reduced annual fee.**

Apart from the conditions described above, social members have the same rights and duties as other participants, including the right to vote at general assemblies.

In this context, the challenge arose of identifying, communicating and selecting the REC's beneficiary participants, which required a different approach to the one used to recruit other members. It was also considered important that participants made a proactive decision to join the project.





## The following process was therefore tailored for identifying and recruiting vulnerable families:

- 1** The Lumiar Parish Council identifies vulnerable families to whom some kind of social support is already provided, in the territory covered by the REC, and validates this mapping with other organisations active in the social area.
- 2** The main criterion for families to apply was for them to be beneficiaries of the social electricity tariff or of the support for the purchase of gas bottles. In addition, families who have a member of their household receiving one of the following minimum social benefits could also apply: solidarity supplement for the elderly; social insertion income; disability pension; social inclusion benefit supplement; old age pension; or unemployment benefit. Depending on the criteria usually used in each territory, other approaches can be defined, such as using the Social Security's reference for being in a situation of economic insufficiency, using the value of the National Minimum Wage for each adult in the household as a reference or using the Social Emergency Fund calculation table. It will be up to each organisation to define the method to be used in their specific case.
- 3** Social workers contact these households and pass on the information about the project, its benefits and its conditions. This contact is made both directly to the families supported by the Council and through the networks of partner organisations in the social area.
- 4** Vulnerable families register for the project using the registration form by the applicable deadline and, if necessary, may request the support of a social worker.
- 5** The Lumiar Parish Council and the Local Partnership of Telheiras validate the applications and carry out a random draw to allocate the available spots to social members.

*“The social aspect is one of the fundamental issues for us, as it allows us to intervene in the energy poverty situation of some of the most vulnerable families in our territory, also counting on the contribution of the other REC members.”*

Ricardo Mexia,  
President JF Lumiar.



## 10. LICENSING THE RENEWABLE ENERGY COMMUNITY

The last step before installing the renewable energy production system and implementing the REC is to licence it with the national authority (DGEG in Portugal). It may also be necessary to licence the project with local authorities or regulators. **In Portugal, it should be noted that, currently, licensing will be easier for small systems with an installed capacity of 30 kW or less.** For these, in the case of individual self-consumption, the licensing procedure is limited to prior notification. However, in the case of an energy-sharing project, licensing is much more complex<sup>23,24</sup>.

To begin this procedure, the organisation must register and fill in the form available on the DGEG portal<sup>25</sup>, with the technical information on the solar photovoltaic system - peak power and nominal power - and the participants' details - name, tax identification number, address, contact details, and delivery point code. This code can be found on each

participant's electricity bill. Based on the address of each participant, you must obtain the latitude and longitude coordinates of the point of consumption. Finally, the person responsible for the organisation must digitally sign and submit the application for registration of the REC. Requests for clarification can be made in person or by e-mail to DGEG, which will also contact if any corrections are needed (acc.cer@dgeg.gov.pt).

**After the first licensing phase, in which DGEG will confirm the viability of the REC and assign it a reference number, the following steps will take place:**

- Installation of the self-consumption unit (photovoltaic system);
- Taking out civil liability insurance for the production unit;
- Registering the self-consumption unit with DGEG (normally this is done by the installer);
- Sending the REC's statutes and internal regulations, when required;
- Communicate the energy sharing coefficients to the distribution system operator and sign the contract for the use of the grid.

23 DGEG (2024). Self-consumption and Renewable Energy Communities. <https://www.dgeg.gov.pt/pt/areas-setoriais/energia/energia-eletrica/producao-de-energia-eletrica/producao-descentralizada-autoconsumo-e-upp-mp-mn/autoconsumo-e-cer/>

24 ADENE and DGEG (2023). Prior checking - Instructions for completion. <https://poupaenergia.pt/energia-verde/>

25 DGEG Portal: <https://apps.dgeg.gov.pt/DGEG/index.jsp>





## **“How are we going to licence our renewable energy community?”**

The information for licensing the Telheiras/Lumiar REC was promptly collected during the recruitment of its first members. To validate the data, a recent electricity bill was also requested, the holder of which must be the individual signing up to the REC. This is also the ideal time for members to sign the participation forms, which should be attached to the internal regulations. The application form was duly signed by the Viver Telheiras Association. The characteristics of the solar photovoltaic system had already been dimensioned in advance.

The licence request for the Telheiras/Lumiar REC was sent to DGEG in June 2023, thus concluding the planning phase of the project. Following DGEG's 'viable' technical opinion in November 2023, the pilot photovoltaic system was installed in May 2024 and began producing renewable energy for the community.

## WHAT NOW?

## AND AFTER THE 10 STEPS: WHAT'S NEXT?

**While awaiting the final stages of licensing and start-up, the Telheiras/ Lumiar REC is already planning the next steps, namely expanding the approach to other buildings.** At the same time, communication with the local community continues to be promoted, including through training and advice on energy bills, energy efficiency and public funds, which takes place monthly in conjunction with ReCoopera's repair café in Telheiras<sup>26</sup>.

Once the pilot begins operating, it is expected that the day-to-day management procedures of the REC will be fine-tuned, including understanding how the distribution system operator makes data available, how shared energy is deducted from members' electricity bills, how grid access tariffs are paid, among other crucial aspects for optimising operation. Finally, it will also be possible to gauge the tangible benefits of participating in the energy community and compare them with the forecast made during the planning phase. Standardising all these tasks and the conditions for participation in the energy community is fundamental to enable the installation of new renewable energy production units and increase the number of members.

*"The Lumiar Parish Council sees this innovative project and this Guide as a first step that will allow others to follow this path more smoothly."*

Ricardo Mexia,  
President JF Lumiar



<sup>26</sup> Viver Telheiras (2023). Telheiras em Movimento is back on the 16th of September, with mobility, circular economy and cinema! <https://vivertelheiras.pt/telheiras-em-movimento-esta-de-regresso-a-16-de-setembro-com-mobilidade-economia-circular-e-cinema/>

Training on energy bills as part of ReCoopera: community space to learn, repair, share and donate (September 2023)



Following on from this, the Local Partnership of Telheiras and the Lumiar Parish Council have already started planning a second solar photovoltaic system, replicating the approach outlined in the pilot project and reflected in this guide. This will be a larger system, planned to be installed on the rooftop of a sports pavilion, with around four times the annual electricity production of the pilot. The costs will be proportionally lower than those of the pilot due to scale effects. In addition to the building itself, local families and social beneficiary families, the possibility of small and medium-sized companies, associations, condominiums, and other local organisations entering the scheme is also envisaged. To allow more flexibility in the electricity allocated to each member, in this second project, it is planned that members will be able to choose between various options for sharing coefficient and investment.

**Considering the lessons learnt during the pilot project, the Telheiras/ Lumiar REC hopes to expand its approach to more buildings in the Telheiras neighbourhood and Lumiar parish, allowing it to increase renewable energy production and involve more citizens and local organisations in transforming our energy system.**



## CONCLUSIONS

### LET'S DO IT?



The Telheiras/Lumiar REC grew out of an initiative by the local community, in conjunction with its local government, with the aim of producing and sharing renewable energy and thus contributing to a more sustainable, fair, accessible and democratic energy system.

**The 10 initial steps mentioned in this guide represent, on the one hand, the challenges that were encountered until it was possible to install the solar photovoltaic system and, on the other hand, the solutions that were developed in response.**

#### **Main challenges and solutions encountered during the planning phase of the Telheiras/Lumiar REC:**

- Little proactivity on the part of civil society in energy topics, dependence on volunteers and lack of energy literacy → work with a network of local partners already active in the territory with close contact with citizens and organisations.
- Maintaining the participation of citizens involved in the process → foster a set of active leaders by promoting the participation of the various members in the process.
- Lack of information and technical knowledge about RECs → define a well-structured communication plan to inform about the benefits and, if necessary, seek support

from organisations with greater knowledge on the subject.

- Authorisation to install photovoltaic systems on roofs → partner with local authorities and other entities to access suitable roofs and facilitate licensing.
- Financing for the project and especially for the inclusion of energy-poor families → seek own financing among REC members, as an investment with a positive return in the medium term and seek public or private financing to support the entry of disadvantaged families.
- Lengthy and bureaucratic licensing process → wait for the licence to be issued while continuing to develop community activities (e.g. energy advice) and plan the next steps.
- Electricity distribution grid capacity → size the photovoltaic system according to grid capacity and/or request its reinforcement.

In Portugal, renewable energy production and sharing projects are still at a very early stage and there are several barriers to the active participation and empowerment of citizens. In this context, the case of the Telheiras/Lumiar REC shows that it is possible to develop energy communities, and that the technical, financial and administrative challenges are surmountable.





With the publication of this practical guide, we hope to encourage other local communities to actively respond to the challenges of the energy transition and take part of the benefits of producing and sharing local renewable energy, contributing to more resilient, inclusive and sustainable neighbourhoods and cities. In the absence of other forms of local-scale technical and financial support, which would make it easier for citizens, associations and local authorities to develop their projects, the Telheiras/ Lumiar REC is available to share its knowledge and lessons learnt with anyone who would also like to follow this path.

*“Due to its multidimensionality and interconnection with different areas of society, energy poverty mitigation actions must integrate different partners, promote a coherent approach and consider local needs, so that they reach the most vulnerable.”*

João Pedro Gouveia,  
Principal Researcher,  
CENSE NOVA-FCT & EPAH.



×

×

# Practical guide: Development of renewable energy communities by citizens, associations, and local governments

## THE EXAMPLE OF THE TELHEIRAS/LUMIAR RENEWABLE ENERGY COMMUNITY

In Portugal and in several other European countries, it is already possible for citizens, small and medium-sized enterprises, NGOs, and local governments to set up renewable energy communities. These energy communities can produce and share renewable energy locally, among other activities, with the aim of providing environmental, social and economic benefits for their members rather than financial profits.



## Get to know these 10 steps and start working on them with your community:



**Pitching the idea to the local community**



**Developing the financial and operational model**



**Seeking beneficial partnerships**



**Defining internal regulations**



**Assessing the legal and regulatory context**



**Communicating with the local community and recruiting participants**



**Selecting buildings and sizing renewable energy systems**



**Identifying and including vulnerable families**



**Defining the legal entity**

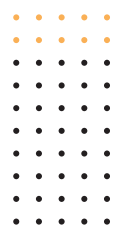


**Licensing the renewable energy community**

Renewable energy communities can be an important instrument for the transition to a more sustainable, fair and democratic energy system, contributing to climate change mitigation and energy poverty eradication. For this to happen, it is essential that citizens, NGOs, and local authorities accept this challenge:

## ... Let's do it?





October 2024, Lisbon, Portugal



PARCERIA LOCAL  
TELHEIRAS

