

Urban Doers Community

Telheiras Renewable Energy Community

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Imprint

Driving Urban Transitions Partnership

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Design and Layout

Front page: HAUS

Text: Tina Cihal

Photo credit

Front page: In order of appearance: Johannes Riegler, purchased image from iStock, Mariborska kolesarska mreža, Barkarby Science AB, Jan Khur, Julie Hrnčirova, Supergrätzl Lichtental

November 2024

Telheiras Renewable Energy Community

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Abstract

Urban areas are a key arena for climate change mitigation and energy poverty eradication efforts. The ongoing energy transition implies an overhaul of the energy system with deep implications for urban transformation. Renewable energy communities are well-placed to promote renewable energy integration and energy efficiency improvement and to contribute to the Positive Energy Districts pathway. However, these approaches are still kick-starting in the European Union, and it is relevant to share experiences among Member States.

The Telheiras Renewable Energy Community is an initiative promoted by the Local Partnership of Telheiras - a network of non-profit local organisations - and by the Lumiar Parish Council - the local government responsible for the Telheiras and Lumiar territory. Its goals are to contribute to a sustainable, fair, and democratic energy transition through the provision of energy efficiency advice and the local generation and sharing of solar energy. It already has a pilot solar photovoltaic system installed, supplying renewable energy to the Lumiar Council building and to 16 local households of which three are energy-poor families.

Herein, we narrate the Telheiras Renewable Energy Community development process across three key stages.

Inception: How did the energy community idea emerge? Who promoted it? Which partnerships were fostered?

Planning: Where to install the solar panels? What legal structure to use? How to cover the initial investment and the operational costs? How to define rules to manage the energy community?

Implementation: How to recruit members to join the energy community? How to include energy-poor households? What licensing processes must be accomplished? Following, we explore possibilities to further solidify the approach and upscale the energy community so that it can generate more renewable energy and include a larger number of members.

Based on the Telheiras Renewable Energy Community experience, we envisage an energy future aligned with the Positive Energy Districts pathway with multiple energy communities blooming across the European Union, not only increasing renewable energy generation and reducing greenhouse gas emissions but also mitigating energy poverty, strengthening community bonds, and promoting values of energy justice and energy democracy. This pathway remains, however, a mirage, and much more needs to be done to support local communities in developing their own energy-related initiatives. Sharing lessons, building capacity, and inspiring others in the context of European networks can be fundamental to leverage the community energy revolution.

Key Lessons:

1. Identify and engage the right stakeholders

It can be relevant to reach out to local community-based organisations and to the local government as key partners of the initiative with complementary roles. In addition, other external partners can be relevant, such as experts and academia, being able to provide technical and scientific support.

2. Establish contact points with the relevant authorities

Several local, regional, and national authorities may have to be consulted during the planning of the initiative and different licensing processes may need to be completed. It is fundamental to find and establish contact points with these authorities to facilitate implementation and upscaling.

3. Have clearly defined and transparent participatory processes which empower the local community

For the success of a local initiative, it is important to actively involve the local population. Defining transparent and open participatory processes early on is a way to promote co-creation and co-development, empowering community members and strengthening the legitimacy of the initiative.

4. Adapt the funding scheme to the local context, and look for both internal and external funding opportunities

For starting initiatives relying mostly on volunteers, finding sufficient funding for their development may be challenging. It is vital to always be on the lookout for funding opportunities adapted to the local context, including from the members, local, regional and national authorities, and even European sources.

5. Join networks to share experiences and build capacity

Other initiatives may be struggling with similar challenges while finding ways to surpass them. Thus, it is relevant to connect with like-minded projects, for example through national and European networks, to share experiences and build capacity among community members.

Context: Energy communities contributing for urban transformation

A deep and fast energy transition is vital to mitigate the worst effects of climate change and to simultaneously combat persistent energy poverty, implying a complete overhaul of the current energy system. The European Commission (2020) estimates that by 2050 almost 85% of Europeans will be living in cities, increasing their role as hubs of intensive energy consumption. Therefore, cities must tackle the decarbonisation challenge head-on, promoting just energy transitions at the local scale. Urban transformation offers multidisciplinary research opportunities concerning a radical change towards a more sustainable, just, and inclusive urban fabric.

Renewable energy communities can be an important component of the urban transformation towards more sustainable and resilient energy systems. In the European Union's Renewable Energy Directive, energy communities are defined as "a legal entity that [...] is based on open and voluntary participation, autonomous, effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities". Their main purpose should be "[...] to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits". Energy communities can contribute significantly to the development of Positive Energy Districts - generally defined as energy-efficient and energy-flexible urban areas with an annual surplus of renewable energy and net-zero greenhouse gas emissions (European Commission, 2018).

Energy communities are at different development stages across European countries, but there is a clear goal of increasing their contribution towards just energy transitions. Portugal transposed the applicable European Directives early on, but it is still a challenging context where these projects are scarce. Furthermore, most energy generation and sharing projects are being promoted by energy companies, not fitting the European nor Portuguese definition of energy communities and without the active participation of citizens.

Our project: Telheiras Renewable Energy Community in Lisbon, Portugal

The Telheiras Renewable Energy Community (Telheiras REC) is a locally based energy project, managed by the people of the neighbourhood of Telheiras and of the Lumiar civil parish. It provides free advice on energy efficiency and invests, produces, and shares renewable energy with its members. This innovative project aims to contribute to a sustainable, fair, accessible, and democratic energy transition. It is promoted by the Local Partnership of Telheiras (through the Viver Telheiras Association) and by the Lumiar Parish Council since 2021.

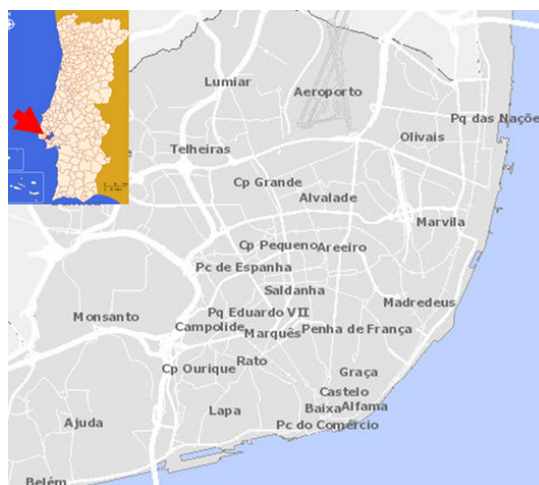


Figure 1: Location of the Telheiras neighborhood and the Lumiar civil parish in Lisbon, Portugal

The Lumiar Parish Council is the local governmental body responsible for the area where most of the Telheiras neighborhood is located. It has responsibilities and management duties in most topics related to urban areas, such as public space, green spaces, waste management, social development, education, sports, health, commerce and economic activities, and sustainability and environmental issues. In recent years, there has been a reinforced commitment by the Lumiar Parish Council regarding sustainability and environmental issues and the Telheiras REC has been one of the lighthouse projects developed in this context.

Viver Telheiras is a non-profit organisation that coordinates the Local Partnership of Telheiras: a community network with 24 members created in 2013, bringing together local authorities (Lumiar Parish Council), institutions (social support and solidarity), associations (parents, cultural, retired, disabled, residents), organisations (scouts, religious groups), local commerce, and informal groups, to share information and resources and to organise events. It seeks to contribute to the urban transformation of the Telheiras neighbourhood in different aspects, such as culture, education, active citizenship, social support, and environment. In 2020, it launched the “network of ideas” process that has actively engaged around 300 residents in suggesting and co-developing sustainability-oriented projects. Eight volunteer working groups were created through open calls, addressing circular economy, green spaces rehabilitation, neighbourhood clean-ups, urban biodiversity, community energy, cultivating abandoned plots, local craftwork, and public swings

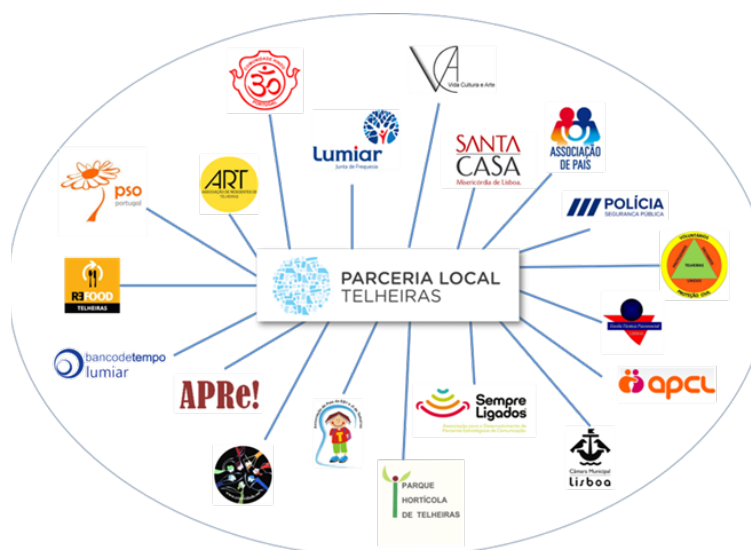


Figure 2: Some of the organisations participating in the Local Partnership of Telheiras. Source: Viver Telheiras

Stemming from this well-established community engagement background, both by the Viver Telheiras Association and the Lumiar Parish Council, the Telheiras REC is a citizen-led renewable energy community focused on the installation of solar photovoltaic systems and sharing of electricity among members. Secondary goals include raising awareness and providing free advising services on energy efficiency and renewable energy to the population, small businesses, and associations.

Regarding the main goal, a pilot project has already been implemented, encompassing the installation of solar photovoltaic panels in a public building supplying renewable electricity to 17 members, including the Lumiar Parish's building itself, 13 families that signed up as investors/prosumers, and 3 energy-poor families identified by social services. Energy-poor families join without investment and pay a reduced annual fee; however, equal voting rights are ensured for all. The Telheiras REC is promoting greenhouse gas emissions reductions, energy poverty mitigation, and urban transformation while at the same time strengthening the local shared identity and community bonds through a fully non-profit energy community that is managed democratically.

Apart from this pilot-project, the Telheiras REC also aims to raise awareness and provide free advisory services on energy efficiency and renewable energy to the population, small businesses, and associations. To achieve these goals, the project has undertaken multiple initiatives:

- Communication campaigns about the pilot project and renewable energy in general, through the use of social media, website, flyers and posters on the streets;
- Participation in local, regional, national, and international events, with a focus on direct citizen engagement in local community-based events;
- Engagement with nation-wide media, such as newspapers and online publishers;
- Public sessions in a local auditorium, with the participation of the Telheiras REC team, the Lumiar Parish Council, and invited guests from academia and other organisations;
- Direct free energy-related advising to the population, condominiums, small businesses and associations who seek the Telheiras REC for ad-hoc counseling;
- Guided tours to the solar panel installation and presentation of the project to groups, mostly stemming from academic consortia (both national and European), organisations involved in renewable energy projects, and youth summer schools;
- Participation in projects that promote networking with other actors addressing the same issues, such as the European Union Energy Poverty Advisory Hub (EPAH), the Urban Doers network of the Driving Urban Transitions Partnership, the European project CEES Community Energy for Energy Solidarity, and the Sun4All Community of Practice.



Figure 3: Workshop about energy bills during a community event. Source: Viver Telheiras

Through these different approaches, the Telheiras REC has not only been able to contribute to a more aware, informed and knowledgeable local community, but also to bring the importance of this topic to a wider national and international audience. For instance, the Telheiras REC pilot project was one of the inspiring examples mentioned in the Staff Working Document of the latest European Commission (2023) Recommendation on Energy Poverty.

In this context, the Telheiras REC piloted a novel full-chain approach for developing energy communities from the grassroots with the direct involvement and empowerment of citizens, non-profit associations, and local governments. From October-2022 to July-2023, the Lumiar Parish Council and the Local Partnership of Telheiras received support from the European Union's Energy Poverty Advisory Hub, the European Commission's key energy poverty initiative, through the technical expertise of Coopérnico (renewable energy cooperative) and the scientific expertise of the NOVA University of Lisbon (EPAH, 2024).

With a pilot solar photovoltaic system already installed and the upscaling of the energy community underway, the project can share key experiences regarding the inception, planning, and implementation of one of the first citizen-led renewable energy communities in Portugal which may potentially provide important lessons to other urban areas. A more detailed breakdown of the development of the Telheiras REC into 10 "easy to follow" steps can be consulted in the practical guide published by Sequeira et al. (2024a).

Inception: Let's produce our own energy and share it among neighbours

When you pitch the energy community idea to your local community - be it your neighbours, local associations, or local government - you might be surprised by their innate interest in the topic. Climate change is a prevalent concern across Europe, and citizens and organisations everywhere feel the burden of rising energy bills. To be able to produce your own energy locally and derive environmental, social, and economic benefits will be seen as a highly attractive and respectable goal. In the Telheiras REC case, the seed for the energy community appeared from within the local community itself through suggestions from residents in a collection of ideas organised by the Local Partnership of Telheiras. Following, this idea was publicly presented and further co-developed in a working group with citizens, associations, and local government.



Figure 4: The “network of ideas” process - collection of ideas (left) and co-development (right) - by the Local Partnership of Telheiras . Source: Viver Telheiras

Put your seatbelt on! Building an energy community is a complex endeavour, and the journey may seem daunting during this initial phase. Thus, it is key to surround yourselves with adequate partners that can support the planning and implementation of the initiative while keeping the ownership of the renewable energy assets and the benefits of the generated energy within the local community. In the Telheiras REC, it was found that the local associations and the local government were a perfect match to jointly develop the project contributing with different but complementary roles. Furthermore, a beneficial partnership was established with an already established Portuguese renewable energy cooperative and with a specialised research centre, helping to build capacity and to empower the volunteers steering the project.

Planning: Exploring uncharted territories and emerging with a map

The planning phase is key and needs to encompass and clearly define several aspects of the energy-community-to-be, namely technical, legal, regulatory, financial, and operational. An energy community may desire to produce and share its own renewable energy, thus needing to define the technologies to be used, the locations to install them, and the number and type of energy consumers to be involved. For instance, the Telheiras REC decided to start producing solar energy and sharing it with its members, thus needing to select suitable rooftops to install solar photovoltaic panels to convert sunlight into electricity. In the pilot project, this was accomplished in a community centre managed by the Lumiar Parish Council with the installation of 13 solar panels (7.15 kWp) to generate electricity for the building itself and 16 local households, of which three are energy-poor households. According to Portuguese law, energy community members need to be located within a two-kilometre radius of the solar photovoltaic system.

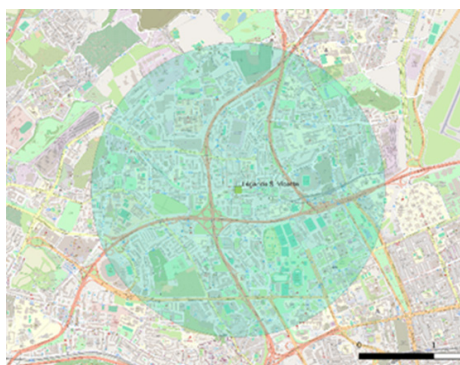


Figure 5: Radius of action of the Telheiras REC pilot project. Source: Viver Telheiras

An energy community usually needs to be formalised as a legal entity, for instance, as an association, cooperative, or foundation. In short, this legal entity is responsible for the licensing and management of the energy community. Whatever legal form is adopted, it is important to respect the principles of open and voluntary membership, autonomy and democratic control, and generation of environmental, social and economic benefits rather than financial profits. For example, the Telheiras REC is set up as a non-profit association called Viver Telheiras Association which predates the energy community. The adaptation of an already existing association sought to capitalise on an already established brand in the territory and avoid the burden of creating a novel legal entity. Keeping with the principles of democratic control, a one-member one-vote mechanism is ensured, and all members are registered as associates of the association.



Figure 6: Viver Telheiras Association - the legal structure housing the Telheiras REC. Source: Viver Telheiras

Beyond being established as a legal entity, an energy community also needs clear rules for its management. These should include the types of members and their rights and duties, member access and exit requirements, methods of sharing electricity, payment of tariffs and other operational costs, destination of production surpluses, and periodicity of meetings and modes of deliberation. The Telheiras REC defined its internal regulations and approved them in its first general assembly with the founding members - this was also the first time that all members were together in the same room which is a vital component for the social aspects of an energy community. These regulations can be considered as a living document which may be adapted throughout the life of the energy community to better fit the member's needs.



Figure 7: First general assembly of the Telheiras REC in November 2023. Source: Viver Telheiras

Money does not grow on trees: an energy community needs a solid financial model as the initial cost of the solar photovoltaic system can be significant even if the return on investment occurs in a few years. These upfront costs may also exclude a significant number of local households from joining the energy community, particularly vulnerable and energy-poor families, and specific conditions should be established to ensure inclusive participation. In the Telheiras REC, the local government, families, associations, and small and medium enterprises jointly invest in the solar panels. In turn, this gives them the right to use a fixed share of the generated electricity and obtain savings on energy bills. A number of membership spots is reserved for energy-poor households that join the energy community without upfront costs since their share of the investment is covered by the local government and the other members.

Finally, several operational expenses need to be factored in, for instance, insurance costs, maintenance, grid access tariffs, and machine-to-machine SIM card. To ensure long-term financial sustainability, these must be covered by the energy community members in an effective and fair way. Furthermore, specific provisions may be put in place to reduce these costs for vulnerable households to magnify the energy community's impact on energy poverty mitigation. In the Telheiras REC, the operational costs are met through an annual fee paid by the members to the association; energy-poor members pay a reduced annual fee.

Implementation: Our solar panels shine on, and licensing struggles

Ready, set, go: with the planning stage complete it's time to actually implement the energy community. At this stage, two interlinked aspects are fundamental, namely, recruiting energy community members and installing solar panels. The size of the photovoltaic system influences the number of members necessary, or vice versa. In the case of the Telheiras REC, the inception and planning were performed directly by the local community and the local government, with plenty of moments to present the project and engage citizens (for instance, through local festivals, flyers and posters, social media publications, and word-of-mouth). Prospective members signed up enthusiastically for the pilot project, with the membership spots being assigned in less than 13 minutes on a first-come-first-served basis.



Figure 8: Informal meeting of the Telheiras REC members during a local festival in June 2023. Source: Viver Telheiras

Vulnerable, hard-to-reach, and energy-poor families require targeted and tailored approaches for their participation in urban transformation through energy systems transition (Sequeira et al., 2024b). Barriers such as high upfront costs, lack of knowledge, and general mistrust can hinder their engagement in energy communities. A community that excludes the most vulnerable is not a community. Acknowledging the need and the challenges in creating an inclusive energy community, the Telheiras REC defined energy poverty mitigation as a key goal from its onset and designed specific mechanisms to facilitate the participation of energy-poor households. While the Telheiras REC financial and operational model seeks to be inclusive, that is not enough, as the communication and engagement strategies must also be adapted. The Telheiras REC defined a targeted approach to identify and engage energy-poor households, namely through the intermediation of the local governments' social services and other social solidarity institutions with whom vulnerable households already have a well-established trusted relationship.

Bureaucracy is the art of making the possible impossible: with all pieces in place, it is time to license the energy community. In Portugal, this is performed by proposing the location and technical characteristics of the solar photovoltaic system, providing the data on the prospective members of the energy community, and indicating the legal entity responsible for its management. This can be a lengthy and complex process - it definitely was a rollercoaster for the Telheiras REC, which tested its resilience and patience. Depending on each specific case, other types of licensing may be necessary regarding, for example, municipal authorities or heritage departments. Eventually, the Telheiras REC managed to obtain a "viable" notice for its pilot project and proceeded with the installation of the solar photovoltaic system. Still, licensing was not over, and additional steps were necessary with the national authorities and distribution system operator to certify the energy community and, finally, to get the renewable electricity flowing to the members.



Figure 9: The pilot solar photovoltaic system of the Telheiras REC viewed from a drone. Source: Viver Telheiras

Keep growing: Solidifying and upscaling the energy community

The Local Partnership of Telheiras and the Lumiar Parish Council previous experiences in citizen-led initiatives for urban transformation were vital for the development of the Telheiras REC. Still, there is room for improvement toward wider outreach and more effective and speedier implementation. The management of the Telheiras REC by the Viver Telheiras Association is strongly based on volunteer work, and, in the future, these organisational structures and processes can be more professionalised while also capacitating volunteers.

The Telheiras REC was designed for easy implementation and a local network was already in place to foster trust and engagement both with the general population and with vulnerable families. Nevertheless, this model can still be improved toward financial self-sustainability, electricity-sharing optimisation, and more effective communication. Public and private funds can be leveraged to increase the support to energy-poor families. In this context, joining national and international networks and projects has been fundamental to share experiences and capacitate the Telheiras REC for further development.

The real test: can the Telheiras REC be upscaled? In the pilot project, local interest was high, with full rooms for the public sessions and the limited membership spots quickly filled. This served as motivation for the Local Partnership of Telheiras and the Lumiar Parish Council to assess future solar photovoltaic installations in the territory, which may allow the participation of an increasing number of members (a technical analysis was performed by Ferreira et al., 2024).

The expansion through a second solar photovoltaic system is already ongoing, aiming to install around 34 kWp in a sports pavilion managed by the Lumiar Parish Council. A few innovations and improvements were added in this replication process: i) to include not only households and the local government as members, but also local small and medium enterprises, condominiums, and non-profit associations, ii) to define three different packages of investment with a corresponding electricity sharing coefficient, and iii) to perform a random lottery if there are more registrations than membership spots. Nevertheless, the goal of mitigating energy poverty is still high up the agenda, with around 17% of the electricity injected into the grid being reserved for energy-poor families, which will be identified and engaged through a similar approach as deployed for the pilot project. Furthermore, transparent and open participatory processes and decision-making will continue to be the cornerstone of the energy community, fostering energy democracy.



Figure 10: Public session for the launch of the second solar photovoltaic project of the Telheiras REC in May 2024. Source: Viver Telheiras

The sky is the limit: with the energy community fully operational and high interest from local families, businesses, and associations the future can be as bright as the Lisbon sun. Multiple buildings of the Lumiar Parish Council can be equipped with solar panels, with the local government aiming to become a net energy producer instead of consumer and sharing the generated energy with other community members. Furthermore, other types of buildings, such as condominiums, can also take part in collective self-consumption schemes, further boosting the renewable energy output in the territory. A comprehensive local-scale energy support and advice service can help local households and businesses to improve their energy efficiency, renovate their buildings, and adopt more flexible energy consump-

tion practices. A growing number of energy-poor households can join the energy community, taking an active part in energy sharing and in other benefits such as enhanced social inclusion, community participation, and empowerment. All these roads may ultimately lead to a Positive Energy District.

A thousand flowers blooming: Inspiring the community energy revolution

The road not taken... As energy transitions speed up, several pathways emerge, leading to what may be very different energy futures. One of these is the Positive Energy Districts transition pathway which aims to optimise the local energy system through energy efficiency, flexibility, and local renewable energy generation towards urban transformation and climate-neutrality. Energy communities can play a relevant role in this path, contributing to the decentralisation of energy generation, the involvement of citizens and local stakeholders, and the inclusion of energy-poor households. In some cases, energy communities can promote values of energy justice, such as the fair distribution of the benefits of energy systems, and energy democracy, such as the right to informed and active participation in decision-making processes.

The example of the Telheiras REC shows that, while there is a rocky path ahead, citizen-led energy communities can take root and flourish at a local scale. In the somewhat arid Portuguese landscape, the fertile ground provided for the energy community seed by the Local Partnership of Telheiras and the Lumiar Parish Council proved to be an oasis while the support of Coopérnico and CENSE, NOVA-FCT were important (organic) fertilisers. The question now is: can energy communities sprout in other locations and make a relevant contribution to the energy transition?

From the Telheiras REC privileged experience, citizen-led energy communities will not spontaneously germinate without targeted and tailored support, including local-scale information, technical expertise, and dedicated funding. By sharing knowledge and inspiring others, established energy communities can support the growth of emerging initiatives while joining forces to advocate for better conditions across Europe. A community energy revolution would contribute to a more sustainable, just, and democratic energy system.

References

EPAH (2024). Energy Poverty Advisory Hub – Technical Assistance. Available on https://energy-poverty.ec.europa.eu/get-support/technical-assistance_en

European Commission (2018). SET-Plan ACTION n°3.2 Implementation Plan – Europe to become a global role model in integrated, innovative solutions for the planning, deployment, and replication of Positive Energy Districts. June 2018. Available at: https://setis.ec.europa.eu/system/files/2021-04/setplan_smartcities_implementationplan.pdf

European Commission (2020). Proposed Mission: 100 Climate-neutral Cities by 2030 – by and for the Citizens. Report of the Mission Board for climate-neutral and smart cities. Luxembourg: Publications Office of the European Union, 2020. ISBN 978-92-76-21542-4. <https://doi.org/10.2777/46063>

Ferreira, E, Sequeira, M.M., and Gouveia, J.P. (2024). Sharing Is Caring: Exploring Distributed Solar Photovoltaics and Local Electricity Consumption through a Renewable Energy Community. Sustainability, 16, 2777. <https://doi.org/10.3390/su16072777>



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

Sequeira, M.M., Gouveia, J.P., and Melo, J.J. (2024b). (Dis)comfortably numb in energy transitions: Gauging residential hard-to-reach energy users in the European Union. *Energy Research & Social Science*, 115, 103612. <https://doi.org/10.1016/j.erss.2024.103612>