POWERUP

The catalyst for social innovation in the energy market

Implementing renewables for social impact. An overview across 4 pilots

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Cover picture: Eduardo Blanco, PV Installations in Campania Pilot.

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Executive summary

The POWER UP project promoted the emergence of local energy market players with a socio-ecological agenda. By providing energy services at the local level in four pilot cities in Spain (Valencia), Czech Republic (Rožnov), Italy (Campania region) and Belgium (Eeklo), the project explored ways to fight energy poverty.

At the heart of the project are the pilot schemes have been implemented on-site. Each scheme combines the production of renewable energy (wind or solar) with energy services (monetary or kWh) to selected vulnerable households. Seven models have been developed and rolled out :

- PV on municipal roofs creating savings that can be used for energy poverty mitigation actions (Campania)
- Creation of an Energy Community with PV on public land, sharing monetary incentives created by energy sharing with vulnerable households (Campania)
- Creation of citizen-led Energy Communities with PV on public roofs, with 25% of the electricity produced dedicated to vulnerable households (Valencia)
- Public Service model allowing vulnerable households to receive free electricity produced by PV on public land, thanks to a solidarity-based contribution (Valencia)
- Social shares of an energy community pre-financed by a municipality, allowing vulnerable households to directly access renewable energy at cost price (Eeklo)
- Social solar panels financed by an energy community social fund for members in energy poverty, creating a sustainable decrease in electricity bills (Eeklo)
- PV on a municipality-owned social housing apartment building benefiting vulnerable households thanks to direct self-consumption (Rožnov)

This document describes the implementation of these pilot schemes, covering four main aspects for each pilot: the technical, legal, and governance aspects of the project, as well as the key challenges encountered during implementation. The diverse approaches and the lessons learned may be inspiring for other initiatives on renewable energy services for vulnerable people. Check out the other public reports of the POWER UP project on www.socialenergyplayers.eu

01

Introduction

This report describes the implementation of the renewable energy production schemes by the POWER UP pilots. It builds further on the preparatory work done in the previous phase of the project, to which we refer the reader for a more complete picture of the work done in the pilots. We sum them up below.

The schemes were defined by the pilots in collaboration with energy-poor households in the initial phases of the project. The co-creation approach ensures the direct involvement of beneficiaries in the schemes and their implementation, including in governance. You can find more information on the co-creation and governance of the schemes in the POWER UP report "Co-creating the pilot schemes with energy poor households" (D3.2).

The co-created schemes have then been refined in more detailed technical, legal and economic analysis. General guidelines on the development of solar plant installations and wind plants have been deducted from these analyses, and together with an overview of the technical, economic and legal developments in each POWER UP pilot have been summarized in the "Guidelines on renewable energy production business case" (D4.1).

The business models defined in the first stage of the POWER UP project (WP2) have been further developed in dedicated business cases for each pilot, including a description of the stakeholders, costs and revenues, monetary flow and costs and benefits for the stakeholders and can be consulted in the report "Financial and commercial business cases of 4 pilot areas" (D4.2).

Finally, to select a financing option that meets the project's needs, an overview of both financing providers and financing opportunities explored has been compiled for general use and specified for each POWER UP pilot separately. This can be found in the report "Funding opportunities for energy efficiency and energy community projects" (D4.3).

Based on all this previous work, this report describes for each pilot the steps taken to implement the schemes. For each pilot, the following aspects are described:

- Technical aspects: including the development of the plants, installations and general management;

- Legal aspects: covering procurement processes, signatures of contracts with suppliers and customers, creation of legal entities, delivery of permits and authorisations;
- Governance aspects: overarching the management of stakeholders, including the involvement of vulnerable households in the schemes' implementation;
- Key implementation challenges: exploring what kept the pilots from implementing the schemes in the initially planned way or timeline, and how they adapted.

02

Campania pilot (Italy)

The Campania pilot consists of two models: one focusing on lowering municipal electricity bills (solar panels on public roofs), allowing them to direct the savings to energy poverty mitigation actions, and one focusing on creating direct benefits for vulnerable households, making use of an energy community model (solar panels on public land).

As concerns the public roofs, existing but unconnected solar installations on the rooftops of nine public buildings in Palma Campania and San Giuseppe Vesuviano have been mapped, assessed, fixed and (re)connected to the grid. While not providing a direct benefit to vulnerable households, these installations will lower the energy bill of the municipalities, allowing local authorities to use savings to support energy poor households, via energy poverty mitigation measures, such as the energy information desk put in place by the municipality of Palma Campania.

As concerns the solar installations on public land, the Municipality of Palma Campania explored the possibility of producing solar energy through an energy community initiated by the UCSA municipalities on a public area confiscated from the mafia along the A30 motorway (Caserta–Salerno). The final technical and economic feasibility study for a 441 kWp ground-mounted PV system has been completed, and the Municipality approved and published the public call for proposals for the construction and management of the plant, expecting the installation of the solar park by the end of 2026. Once operational, the surplus energy produced will be shared within the Renewable Energy Community (REC), involving vulnerable local households. The REC will generate a monetary incentive to support families experiencing energy poverty.

2.1

Technical aspects

Existing photovoltaic systems on public roofs

The first location of RES production comprises nine existing photovoltaic systems installed on different public buildings in the UCSA territory (San Giuseppe Vesuviano and Palma Campania), with a total combined capacity of 156 kWp. At the beginning of the POWER UP project, none of these systems were connected to the electricity grid due to technical and administrative issues. During the project, all systems were technically assessed and several underwent extraordinary maintenance.

In particular, five installations - totalling 83 kWp - were refurbished and reconnected to the grid, following the interventions carried out by A.G.A. Impianti Solari between October and December 2024 and documented in the final technical report. These include interventions such as inverter replacement, reconstruction of AC/DC electrical panels, cabling updates, and successful operational tests. The remaining four installations (Plesso Ceschelli, Plesso Via Macello, Plesso Via San Nicola and Plesso Via Trieste, totalling 73 kWp) required more substantial refurbishment such as cables, connection, inverter and other hardware or procedural costs (22.000 euro). These works have now been completed, as confirmed in the October 2025 final report, and the systems are now under the connection procedures with the grid operator. One exception is the PV system at the Municipal Building of Palma Campania, which was already connected and is fully operational, generating savings and reducing electricity bills. The connection procedures for the last four systems is being carried out by A.G.A. Impianti Solari, with a cost of 3.599 euro.

The total expenditure for the refurbishment and (re)connection of the nine PV systems amounts to 31.487 euro broken down as follows:

- 3.000 euro for the preliminary technical assessment;

- 24.888 euro for extraordinary maintenance works aimed at restoring full operability;
- 3.599 euro for grid connection procedures.

Figure 1 - Existing assets (re)connected in the Campania pilot.

Ground-based photovoltaic system

The second site selected for RES production concerns an area along the A30 Caserta–Salerno motorway (coordinates 40.84849 – 14.542273) in the municipality of Palma Campania, confiscated from organized crime. The final feasibility studies confirmed the potential for installing a ground-mounted photovoltaic system with a capacity of approximately 441 kWp, reduced from the earlier 600 kWp estimate due to a more conservative safety buffer relative to the high-speed road and to facilitate grid connection. The final technical and economic feasibility study was approved by the City Council on 31 January 2025, and on 28 May 2025 the local DSO issued a favourable opinion for grid connection in the proposed configuration.

A key procedural milestone was reached on 05 July 2025, when the Municipality obtained the official Medium Voltage grid connection estimate from e-distribuzione S.p.A. (code 483753681), for a requested injection capacity of 450 kWp. The connection estimate, amounting to 20.000 euro, was formally accepted by the Municipality, which also paid the required 30% advance (6.000 euro) to secure the connection process. In parallel, on 12 November 2025, the Municipality submitted a funding request through the official GSE online platform to access the financial incentive under the PNRR Mission 2, Component 2 (M2C2), Investment 1.2, requesting a contribution of 200.000 euro to support the implementation of the photovoltaic plant.

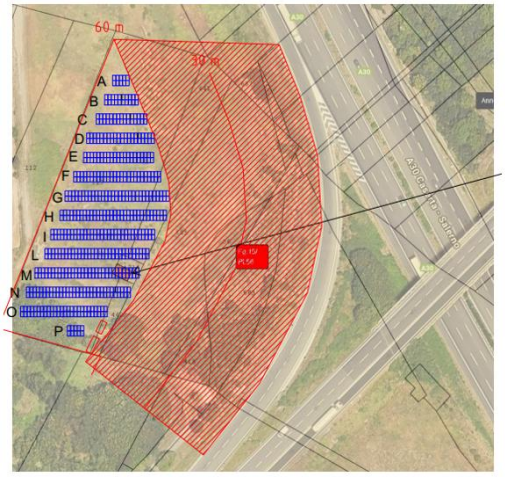
Following these technical and administrative steps, the Municipality published the public call for proposals on 20 November 2025 to select an operator responsible for financing, constructing and managing the installation. According to the tender specifications, the selected operator must complete construction and commissioning within 12 months from the signing of the agreement. Based on the expected timing of the procurement procedure, the indicative implementation timeline is:

- operator selection and contracting: early to mid-2026;
- start of construction: immediately after contract signature;
- completion and commissioning: within 12 months;
- expected finalisation: by the end of 2026.

Once operational, the photovoltaic plant will be integrated into the REC Vesuvio Est, with its surplus energy shared among vulnerable households in the area as part of the community's

energy poverty mitigation actions. The final project designs were drawn up for an installation of 441 kWp, with a total cost of investment at 720.054,69 euro.

FONDAZIONE DI PARTECIPAZIONE
CER VESUVIO EST



Summary table - generators of the Plant					
Num. Gen.	No. of modules	Module power	Peak power	Orient. compared to the South	Incline. with respect to the horizontal plane.
1	630	700 Wp	441 kWp	0°	30°

Summary table – emissions avoided as a result of the Plant	
Annual producible energy	622.028 kWh
Amount of emissions avoided per year	156,7 tonn di CO_2

A30 Caserta – Salerno (Coordinate 40.84849 - 14.542273)

Figure 2 - Key information and plans for the ground system in the Campania pilot

Summary of technical implementation

Table 1 - Summary of current technical implementation status in Campania pilot

Scheme/system	Investment triggered	Total kWp installed
9 existing PV installations	31.487,00	156 kWp
PV on land system	720.054,68	441kWp

2.2

Legal aspects

Creation of legal entity

In October and November 2023, five co-creation sessions were held in the UCSA region to define the governance model for the future Renewable Energy Community (REC). The model was shaped primarily by the nature of its members, particularly the involvement of municipalities as founding members. In Italy, this excludes cooperative or corporate forms, leaving only associations or foundations as viable options. Initially, a non-legal association was preferred due to its low setup costs.

On November 8, 2023, the four UCSA municipalities decided during a Council of Mayors meeting to jointly establish a REC, led by the municipality of San Giuseppe Vesuviano. On November 15, this municipality approved the REC creation pathway and launched a public call to identify ten citizens, without profit motives, to join the four municipalities as founding members. Only one citizen responded.

On December 21, 2023, the municipalities approved the draft of the founding act and statute, opting for an association with horizontal governance, where each member has one vote. The legal entity was scheduled to be established by March 2024.

In early 2024, national regulations evolved significantly. The publication of D.M. MASE No. 414 (December 2023) and D.D. MASE No. 22 (February 2024) ended the experimental phase and launched the official REC regime. In April 2024, the REC registration portal opened, completing the legal framework.

Meanwhile, local elections in June 2024 brought political changes to the pilot area, including in San Giuseppe Vesuviano. New administrators were less familiar with the POWER UP project and the REC concept, leading to delays and revisions of earlier decisions.

The most significant change was the shift from an association with horizontal governance to a foundation with vertical governance, ensuring long-term control by the founding municipalities. However, this structure entails higher legal costs. In the Campania region, these costs amount to €50,000, compared to €25,000 in regions like Emilia-Romagna.

On June 20 2024, the municipality of Palma Campania approved the new statute and legal documents. San Giuseppe Vesuviano initially raised concerns about the costs and risks, but after clarifications from AESS and UCSA, the city council approved the foundation on May 28, 2025, allocating €50,000 for its establishment.

Another significant development was the withdrawal of San Gennaro Vesuviano and Striano as founding members. This required renewed approvals from San Giuseppe Vesuviano and Palma Campania, as the original plan included four founding municipalities.

Both councils reaffirmed their commitment: San Giuseppe Vesuviano funded the legal foundation, while Palma Campania provided resources to repair existing PV systems, build a new ground-based system, and open an energy desk point for vulnerable households.

The foundation act of the Renewable Energy Community *"Comunità Energetica Rinnovabile Vesuvio Est"* was officially signed on 29 July 2025. The act formalises the establishment of the foundation by the Municipalities of Palma Campania and San Giuseppe Vesuviano and includes the approval of the full statute and the appointment of the first Board of Directors, while ensuring open participation to all residents, with specific provisions for vulnerable households.

The first installation to be integrated into the REC will be a ground-mounted PV system in Palma Campania. Additional renewable energy systems will follow. Existing PV systems on public roofs, reconnected through the POWER UP project, will not be included in the REC due to current regulatory restrictions.

Delivery of permits, authorisations and procurement processes

Existing photovoltaic systems on public roofs

In the Municipalities of San Giuseppe Vesuviano and Palma Campania nine existing photovoltaic systems on different public roofs were found during a technical assessment conducted . The municipalities of San Gennaro Vesuviano and Striano, also members of UCSA, have the same issues regarding existing PV systems that are offline. However, the technical assessment performed so far didn't include these two municipalities. Some preliminary analyses performed by UCSA and AESS in 2023 point out a total offline capacity of 119.1 kWp in five buildings at San Gennaro Vesuviano. The table below indicates the situation found in the first assessment of the PV systems of San Giuseppe Vesuviano e Palma Campania in December 2024.

System	Municipality	Estimate Peak Power [kWp]	System status	Total cost [€]	Electrical status of PV panels	Inverter status	Switchboard status	Structural status	Incentive mechanisms	Capital contribution exceeding 40%?
Plesso Belvedere	San Giuseppe Vesuviano	15	Reconnected	1.300	Working	Working	Suitable and functioning	Suitable PV plant support structure	No answer	No answer
Plesso Ceschelli	San Giuseppe Vesuviano	10	Never connected to network	850	Working	Working	Suitable, operation undetectable	Undetectable PV system support structure	No answer	No answer
Plesso De Amicis / Ammendola	San Giuseppe Vesuviano	10	Reconnected	2.350	Working	Working	Suitable and functioning	Suitable PV plant support structure	No answer	No answer
Plesso Nappi	San Giuseppe Vesuviano	15	Reconnected	2.400	Working part one	Working	Suitable and functioning	Suitable PV plant support structure	No answer	No answer
Plesso Rossilli	San Giuseppe Vesuviano	15	Connected to network	-	Working	Working	Suitable and functioning	Suitable PV plant support structure	No answer	No answer
Casa comunale Palma Campania	Palma Campania	27,7	Connected to network	8.250	Undetectable operation with a broken panel	Not working	Not working	Suitable PV plant support structure	No answer	No answer
Centro Polifunzionale	Palma Campania	No information in report	Inability to access the plant	150	Undetectable	Undetectable	Undetectable	Undetectable	No answer	No answer
Plesso Via Macello	Palma Campania	33	Never connected to network	9.350	Undetectable	Not connected	Suitable, operation undetectable	Undetectable PV system support structure	No answer	No answer
Plesso Via San Nicola	Palma Campania	10	Never connected to network	550	Undetectable	Undetectable but tension present	Suitable, undetectable but tension present	Undetectable PV system support structure	No answer	No answer
Plesso Via Trieste	Palma Campania	20	Never connected to network	2.300	Present but disassembled	Not connected	Suitable, operation undetectable	PV system support structure not present	No answer	No answer

Table 2 - Summary existing systems identified in Campania area in December 2024

The technical assessment of the current systems' situation and the first interventions for reconnection of the five systems were carried out in 2024 by the company A.G.A. Impianti Solari. Under the current knowledge, no other authorisation of use of the rooftop will be needed, since the systems are already installed there. The new authorisation of reconnection by DSO/GSE will be done with the administrative procedures.

The contract involves a limited amount of resources, and all refurbishment and technical recovery works on the photovoltaic systems have been carried out by A.G.A. Impianti Solari, which was directly appointed for these services. Additional external support was required for the completion of the grid connection procedures, which will also be performed by A.G.A. Impianti Solari. The total cost for managing the connection practices amounts to 3.599 euro (VAT included).

It is important to note that the originally planned "second phase" no longer concerns a single PV system. Based on the final technical report (October 2025), all four remaining systems have already undergone full refurbishment, and are now under connection procedure. Therefore, the last remaining step is the administrative and technical grid connection, expected to be finalized during December 2026, following completion of the DSO's procedures.

Ground-based photovoltaic system

For the ground system foreseen in Palma Campania, for the REC creation, the final feasibility studies for a new 411 kWp system was approved in the City Council on January 31, 2025. The favorable decision regarding the possibility of connection to the electricity grid in the current configuration was issued by the local DSO on May 28th, 2025.

On 12 November 2025, the Municipality of Palma Campania submitted, through the dedicated online portal of the Gestore dei Servizi Energetici – GSE S.p.A., its request for access to the contribution under Mission 2, Component 2 (M2C2), Investment 1.2 of the Italian Recovery and Resilience Plan (PNRR) for the photovoltaic installation in question, for an amount of €200,000.00.

The next step in the process has been the publication of the public tender for the selection of the operator (ESCO) in charge of financing, constructing and managing the new PV installation.

The tender was officially approved and published by the Municipality of Palma Campania on 20 November 2025.

Specific selection criteria were defined by UCSA with the support of AESS, including:

- the mandatory participation of the new installation in the REC Vesuvio Est, and
- the allocation of incentives to support vulnerable households experiencing energy poverty.

The final project design for the 441 kWp PV system foresees a total investment of €720,054.69, as established in the approved technical and economic documentation.
According to the tender requirements, the selected operator must complete the installation and commissioning of the plant within 12 months from the signing of the contract. Based on the administrative timeline, the selection and contracting phase is expected to take place during early 2026, with the installation expected to be completed by the end of 2026.

2.3

Governance aspects

Stakeholders involved in the implementation

The main stakeholders involved in the REC called Vesuvio Est, are the municipalities of San Giuseppe Vesuviano and Palma Campania, which acted as key promoters of the initiative. As founding members of the REC foundation, their role is not only formalized in the foundation act which was officially signed on 29 July 2025, but is also central to the operational and strategic development of the community. The two municipalities took on the financial and administrative responsibility for establishing the foundation, covering the initial costs related to its legal constitution. Furthermore, they financed the installation of the new photovoltaic plant, which was set up on land confiscated from organized crime. By taking on these responsibilities, the municipalities provided the necessary resources and institutional support to involve other stakeholders, such as citizens, associations, and local businesses.

Secondly, the households participating in the REC are key stakeholders, as they represent both beneficiaries and active members of the community. Over the years of the project, there has been a gradual increase in their attention and interest toward activities related to the creation of the REC. While their role is still emerging, they have the potential to shape the community through participation in its governance, expressing their energy needs, and contributing to the development of shared goals. Their involvement also helps strengthen the connection between institutions — such as the founding municipalities — and the broader local community, supporting a more inclusive and participatory energy transition.

Finally, there are stakeholders that are closely related to the REC but no formal members, such as the other two municipalities of the UCSA/Campania area (San Gennaro Vesuviano and Striano) and Caritas. They have all been active members of the local working group, the predecessor of the REC, in the earlier stages of the project.

Although San Gennaro Vesuviano and Striano were part of the initial local working group that laid the groundwork for the REC, they ultimately chose not to participate in the formal establishment of the Vesuvio Est Energy Community (REC) as founding members, due to internal political and administrative decisions. Currently, they are not directly involved in the REC's implementation. However, they have expressed their willingness to join later as members. Moreover, since both municipalities are part of UCSA, which is actively supporting the REC, the resources invested by UCSA can be considered to some extent as an indirect contribution from them as well. There is strong confidence that, once the REC is up and running, they will be more inclined to take an active role.

Reaching out to and involving participants

The ambition of the POWER UP pilot in Campania is to involve 100 vulnerable households in renewable energy production. Due to delays in the formal establishment of the REC, no households have yet been included as direct beneficiaries.

With the signing of the foundation act, the REC Vesuvio Est is now formally established and open to the public. AESS and UCSA will reach out to potential participants, with a particular focus on vulnerable households living in the pilot area. This outreach will include a new series of information sessions and workshops planned for the first months of 2026, aimed at explaining how the REC works, how households can join, and how they can benefit from energy sharing. These meetings will also continue to provide practical guidance on energy savings, and will offer space for questions and feedback.

Building on the contacts collected during the previous cycles of public meetings (co-creation workshops in 2023 and energy-saving sessions in 2024), UCSA and AESS will directly invite interested participants to express their intention to join the REC.
In parallel, broader communication activities will continue, including the REC institutional video, local radio messaging, and the use of the Energy Contact Point in Palma Campania, which remains a key touchpoint for citizens seeking information and assistance. Special attention will continue to be dedicated to residents living in public housing buildings identified in D5.1, as

they represent a priority target group. A major development since the previous reporting period is the launch of the official REC Vesuvio Est website: https://cervesuvioest.it.

The website provides clear information about the REC, its objectives and governance, and includes a dedicated section for prospective members. As the REC becomes fully operational, households will be able to submit their membership request directly through the website, or alternatively through the participating municipalities or the Energy Contact Point.

In addition to household engagement, UCSA will also implement a targeted outreach action aimed at expanding REC participation on the production side. Both member municipalities — Palma Campania and San Giuseppe Vesuviano — maintain an updated official register of all photovoltaic systems connected to the electricity grid in their territories. Based on this registry, UCSA will contact the owners of PV systems connected after the establishment of the REC, informing them of the opportunity and advantages of integrating their installations into the REC Vesuvio Est. This action will help increase the volume of renewable energy shared within the community and strengthen the long-term sustainability and impact of the REC.

Benefits for participating households

Existing photovoltaic systems on public roofs

The (re)connection of the existing PV systems on public roofs will lower the municipal energy bill. The municipalities will use the money saved to finance energy poverty mitigation measures. AESS and UCSA are working to identify and collect the energy bills of the respective buildings from the competent offices of the municipalities of Palma Campania and San Giuseppe Vesuviano. The objective is to verify that the PV systems are really in operation and to estimate the energy consumed directly, the economic advantages in terms of reducing the electricity bill and revenues from selling the surplus to the national grid, as well as the amount of CO_2 emissions avoided.

Ground-based photovoltaic system

In the case of the PV on-land, the pilot will make use of the incentives for energy sharing (cfr. D4.2). Once installed, 100% of the solar energy produced by the installations will be shared (no local self-consumption).

This yearly production will allow 400 households to be involved in energy sharing inside the REC, by providing an annual contribution estimated at 24,733.00 euro / year, with around 60 euro for each family engaged if divided equally among all families. Given the low amount per family in the case of equal division for all members, a proposal will be presented to the REC assembly, suggesting that the amount could be divided between the 100 most vulnerable families involved in the scheme, in order to guarantee a minimum contribution of 250 euro per year for each family. These benefits will be shared as direct payment of members' energy bills or bonus, in line with the Italian regulatory framework.

2.4

Key implementation challenge

The main barriers to a timely implementation of the UCSA pilot scheme are to be found in the following elements:

Political instability

Initially, all four municipalities of the UCSA region were to be part of the REC. However, after local elections, the political landscape had changed and two municipalities withdrew from the initial plan. This implied that the REC foundation act had to be slightly adapted, mentioning only the two involved municipalities. The adapted foundation act had to be signed again by the two participating councils, creating an extra delay of several months.

Change in locations for PV implementation

Initially, several options have been investigated for the installation of photovoltaic systems to produce renewable energy that then can be shared with the members of the Renewable Energy Community (REC), such as:

- Six social housing buildings in the municipalities of San Giuseppe Vesuviano and Palma Campania (three buildings in each), for a total of 279 kWp.
- Two school buildings in the municipality of Palma Campania: "Vincenzo Russo" (59 kWp) and "Antonio de Curtis" (100 kWp).
- One ground-based photovoltaic system in the A30, in which preliminary studies showed a potential of 600 kWp in total (in the executive project, performed in 2025, the total power was reduced to 441 kWp).

Due to the need to redo the roofing of buildings before installing the PV, the Municipality's resource limitations, and time constraints, it was decided to focus on the system that was easiest to install and most economically viable, reason why it was decided to proceed in this first phase only with the ground-based photovoltaic system in the A30 area. More information is available on the deliverables D.4.1.

The investigation and analysis of these sites, although valuable in terms of capacity building and awareness raising among the involved stakeholders, caused a delay in the implementation of the other location.

National regulation on REC's

The transposition of European Directives on REC/CEC into Italian law has not been fully implemented by the start of the POWER UP project. The uncertainty around the details of the operationalisation of REC's (requirements, incentives, modalities of energy sharing,...) contributed to the delay of the pilot implementation. Specifically, the regulation that excludes existing PV installations from RECs impacted the UCSA pilot, as the 14 existing systems on public roofs could not, as planned, be added to the REC.

03

Valencia, Spain

The Valencia pilot consists of two models.

The first one implies the creation of renewable energy communities (REC) that invest in PV systems on public roofs and share the production by collective self-consumption. While households profit from self-consumption from the PV plants (according to their investment), selected households can benefit from this scheme by a limited amount of free shares dedicated to vulnerable households (which cost is collectively covered by REC members). The existing energy community Castellar-L-Oliveral, which has been realized outside the POWER UP project, serves as a reference for this model.

The second model is called the public service of collective self-consumption model (formerly known as fee model). It implies the installation of PV systems on public land by an investment of and in the hands of the municipality, with citizens being granted temporary access to a share of the production via an energy-sharing agreement by paying a fee. Selected vulnerable households will benefit from this scheme by being granted access to the energy-sharing agreement without having to pay the fee. The initial phase of implementation of this model, under the scope of POWER UP, will only consider vulnerable households as beneficiaries, as the implementation of access fees requires the promotion of local regulations (public prices) in a mid-term perspective.

3.1

Technical aspects

Renewable Energy Communities

No PV-installations have yet been realized in the REC model, at least in municipal roofs. The municipal tender is close to its publication and the initiative has been shared in a press release (see more detailed information in the following section).

RECs in the city have been advised and supported to apply for regional subsidies covering part of the installation costs of potential installations. For that, several installations were pre-designed in different spots. A previous screening of suitable municipal (and some private) roofs was performed in each neighbourhood where a REC has been founded.

The table below shows a list of potential installations that could be deployed during 2025 and 2026 once accessibility to the roofs is legal and administratively secured. The different spots and potential installations are related to the REC/neighbourhood that would lead the project.

Table 3 – Potential installations for renewable energy communities in Valencia pilot

REC	Potential locations	Potential kWp installed/location	Potential kWp of REC (sum)
CEL Castellar-L'Oliveral (potential locations involve additional plants to the already existing one)	Public School CE Rosa Llàcer	88	268
	Private School Nuestra Señora del Rosario		

	AVIFAUNA Center Nazaret	60	
	Bilateral agreement with Industrial REC "CE Horno de Alcedo" to access industrial buildings: 120kWp	120 in the short term	
CEL Ayora y Algirós	Public School Jaume I	55	55
CEL Malilla	Public School Pablo Neruda: 120 kWp	120	160,71
	Private multi-apartment building at C/ Juan Ramón Jiménez 61	40,71	
CEL Ruzafa	Public School Alejandra Soler		
CEL Ciutat Vella	Public School Santa Teresa	49	49
CER Zaidia	Public School Vivers		48
	Hogar San Eugenio	49,47	49,47
CEL Benimaclet	Naves Daniel Balaciart	80	80

CoEnSoMa - Comunitat Energètica Solidària Malva-Rosa[1]	Public School Ballester Fandos	28	28
CES - Comunitat Energètica Solidària	Public School Professor Sanchís Guarner	50	50

After the recent flooding in the Valencia region, the current deadline for executing the investments for those who obtain the regional subsidy was extended from April 25th 2025 to September 30th 2025. Additional extensions were demanded by RECs, with new potential deadlines no longer than early January 2026. Pilot partners have assessed each REC situation and assisted with extension requirements according to project implementation feasibility. Moreover, a new call is foreseen from the same programme by the end of 2025 (probably by December), giving new opportunities for ensuring the continuity of the projects.

By the moment of writing, only Castellar, Malilla and Zaidia will be able to take advantage of the 2024 awarded grants thanks to their projects in private roofs. A very gratifying spin-off of the pilot activities is the fact that, for its new installation, CEL Castellar will allocate free energy for up to 12 vulnerable households. Valencia Clima i Energia and CEL Castellar have signed a formal collaboration agreement to provide a legal frame and facilitate the identification, inclusion and support to these households, in line with the models and protocols already developed within POWER UP. The contribution from POWER UP models, the close and continuous collaboration and knowledge exchange among parts have been decisive to foster this inclusive approach from the REC, which have no legal obligation to reserve a percentage of participations for vulnerable collectives.

Another positive side-effect of the pilot activities is the fact that CER Zaidia expressed the intention to dedicate a percentage of the produced electricity in their new project at private roof "Hogar San Eugenio" to NGO's residing in the neighbourhood.

[1] This installation will be funded by an Interreg project, but the model has been developed in and the investment has been triggered by POWER UP.

Public Service model

The "Cemeteries Project" also known as the "Requiem in Power / RIP" project is the basis on which the public service model is being developed. The RIP project foresees the installation of five PV plants in five cemeteries of the city, accounting for approximately 2.8 MWp overall installed power, in what can be considered one of the biggest known urban municipal PV projects.

Table 4 shows the five planned installations, spatial reach for collective self-consumption according to current regulations (ampliation to 5km is under discussion at the national level), installed power, the foreseen share of energy from each installation that would be dedicated to fight energy poverty, current state and when it is planned/feasible to start implementing the scheme with vulnerable households.

Table 4 – Planned installations and their details

Name	Location and 2 km reach	Peak power (kWp) installed	% to VH	State (dec/24)	Expected implementation of the scheme
Grao	Link	62,78	99%	Installed, pending activation	Ongoing
Benimamet	Link	111,37	98%	Installed, pending activation	Short term
Campanar	Link	161,25	98%	Installed, pending activation	Short term
Cabanyal	Link	618,24	20%	Installation works ongoing	Mid term

General	Link	1.877,72	13%	Installation works ongoing (90% finalized)	Mid term
Total		**2.831,36**	**25%**		

Three PV plants have already been installed, pending legalization and operational activation with the DSO and the Industry department of the regional government.

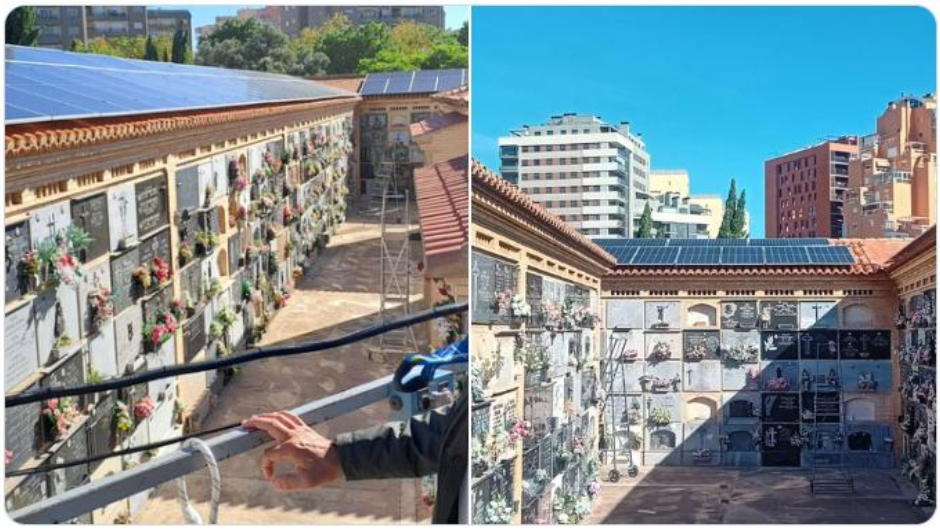


Figure 3 - PV plant in the cemetery of Campanar (161,25 kWp)

Figure 4 - Simulated aerial view of the future PV plant in the cemetery General (1.877,72 kWp):

Summary of technical implementation

Table 5 – Summary of the current implementation status at Valencia pilot

Scheme/system	Investment triggered	Total kWp installed
Energy communities	184k euro foreseen	210,18
Public service model	3,277 M euro partly pending	2.213,1

Planned investment triggered:

- Public Service: 3.277 M euro. Even if not completely executed by the end of the project, the investment is secured by public procurement.
- Energy Communities: 228.000 euro (considering 1,2 euro/Wp)

Planned kWp installed triggered:

- Public Service: 2.831,36 kWp. Even if not legalized by the end of the project, the plants are being 90% executed.
- Energy Communities: 120 kWp CEL Castellar + 49,47 kWp CER Zaidia + 40,71 kWp CEL Malilla = 210,18 kWp. This is the most likely scenario by December 2025

3.2

Legal aspects

Creation of legal entity

Renewable Energy Communities

The RECs supported by VCE have been legally established as non-profit associations, following a model of founding statutes that describe their goals, directive board configuration, internal rules, and other relevant details. These statutes have been tailored by the founding members (natural persons) of each REC and registered in the regional government official database. You can consult the different models in VCE's website, in the dedicated section "*Vuestras Comunidades*" for each REC here. The example of founding statues of the CEL Castellar-L'Oliveral can be found here. The terms for the legal relationship between the municipality and the RECs are established in the public procurement description. The result of the tender acts as a contract, with a whole section about rights and obligations as well as how to act in case of non-compliance of the agreed terms.

Non-vulnerable citizens participate by becoming a REC member and acquiring shares of the installations. The terms for participation are well described in a "participation contract" between the REC and the member; there's an example contract put into practice by CEL Castellar-L'Oliveral here. Normally a waiting list is prepared, to have a list of potential members once the possibility to invest is opened.

Vulnerable households are not able to formally take part in the REC as full right members, at least with the current scheme design. They participate by signing an informed consent form, authorizing the REC (with the assistance of VCE) to include them in the energy sharing agreements so they can receive the benefits of the energy generation. The participation is free and voluntary, but the selection of households as well as the duration of their participation is always in the hands of municipal Social Services.

Public Service model

In contrast to the REC model, the public service model does not necessitate the establishment of a legal entity. The model uses the possibility in Spanish law to virtually share and consume electricity within a certain geographical range around the production plant (collective self-consumption).

The Public Service model is focused on the participation of vulnerable households. As the collective self-consumption scheme is fully owned and managed by the municipality, it maintains control over who participates.

Delivery of permits, authorisations and procurement processes

Renewable energy communities

In 2023 and 2024, a comprehensive legal study together with a model of public procurement process has been designed, with expert assistance from the administrative and environmental law department of the University of Valencia, to help the municipality understand, organize and satisfy the great and urgent demand of municipal roofs from RECs in the city.

Based on regional regulation (Climate Change Law, article 52), public administrations in the Valencia region **can** tender the use of their roofs to Energy Communities and Cooperatives through a competitive tender. The first step is then to have political willingness to do so, which has been proved and validated by the Climate Improvement Council as well as the Mayor's office.

In addition, an official statement and commitment has been approved at the Local Government Board regarding both models, which can be found here (page 676), as well as a press release about the first three roofs to be tendered

Besides political decisions, more technical departments such as the Architecture and Central Technical Services Department and the Heritage Department need to validate and adopt an important role. Up to date, these have been the principal advancements:

- VCE/Climate Improvement Service: preparation, together with legal experts, of an argument and legal basis for the need to launch a public procurement. It has been validated by the Secretary of the municipality. Also preparation of a model of tender specifications and selection criteria. It has been agreed that the tender call will be launched from this department once official positive feedback is received from all relevant departments.

- Heritage Department: The model of tender specifications and criteria facilitated by VCE was reviewed and validated from their side, receiving a very positive feedback on its sound basis and overall quality.

- Architecture Service: they should approve and help with the screening of potential building roofs to be procured, indicating any technical barrier or special specification with regards to the installation works. As they manage the energy bills and almost every electricity supply point of the municipality, they must facilitate information and indications on the existing electricity systems, potential connection points for the PV plants etc. The procurement proposal has been discussed with the Architecture Service in bilateral meetings (alongside with the cemeteries project and other initiatives), receiving a pretty skeptical and even negative feedback, expressing their opposition to the idea of losing control over the PV potential of public roofs for the coming 25 years. A technical report was received from this service in July 2025 in answer to the initial proposal of roofs, about availability and technical readiness. The answer was limited to three roofs and didn't give sufficient information about the structural conditions of the buildings nor their electrical systems, thus not representing the expected administrative validation.

This means that most of the key administrative steps have been taken, and all relevant documents have been ready to take quick action as soon as pilot partners would receive positive feedback from the Architecture Service. Given the limited response from the Architecture Service, VCE launched an urgent contract in September for the preparation of exhaustive PV installation projects in the three unlocked roofs (Benimaclet, Ciutat Vella and Castellar), covered with own funds (8 712 €). The resulting documents are being included in the administrative process, providing with a clear guidance for tender applicators and with

enough security for the municipality in terms of technical requirements. The tender is expected to be launched by the end of 2025.

Pilot partners plan to organise informative sessions and tailored training and assistance to RECs willing to apply for the tender call, once published.

On the other hand, for solidarity-based initiatives such as CES or CoEnSoMa, in which no private investment and profit is generated, no tendering is needed. This accelerates and facilitates the procurement process with a direct assignment once an official proposal is sent by the energy communities. This procurement is more likely to happen before the tendering is finished, but it also depends on receiving positive feedback from multiple municipal departments. Up to date, the roof has been validated and will be procured to VCE, which will co-finance the installation in agreement with CoEnSoMa in the frame of the Interreg EnerCmed project. The contract for preparation and execution of the project is still to be launched, expecting to have the installation ready by the first semester of 2026.

For non 100% solidary RECs, once the accessibility to the roof is unlocked, the roadmap will be as follows:

1. REC asks for commercial offers for PV installation works, compares and chooses the best proposal.
2. Communication of the project to engage new members and financers.
3. Collective financing to cover installation costs, gathering individual contributions. This collective effort would cover the cost of a certain percentage of shares dedicated to vulnerable households.
4. Identification and selection of vulnerable beneficiaries by Social Services and VCE.
5. Permits, installation and legalization of the PV plant.
6. Preparation and submission of an "energy sharing agreement" to regional government, DSO and energy suppliers.
7. Kick-start the energy sharing.

You can find below some of the main features of the tender specification that has been prepared and validated by the most important decision makers in the municipality. It will apply

for the tendering of six to eight municipal roofs (two of them could be directly assigned to solidarity-based RECs, avoiding the tender).

- Eligibility: Only existing RECs within two kilometers of the building may participate, and they must comply with European and national regulations for energy communities.
- Ownership and Use: The REC is fully responsible for ownership, financing, and management of the photovoltaic installation which must primarily be used for collective self-consumption.
- Social Contribution: A share of energy to vulnerable households will be required as an obligation, avoiding paying an annual grant fee to the municipality. Offering an additional share of their energy to vulnerable households will give more points in the tender.
- Technical Requirements: Installations must comply with relevant regulations and municipal technical services guidelines. A small portion of the energy must be allocated for free to the municipal building.
- Commitments of Selected RECs:
    - Submit a working plan including installation of a photovoltaic system, financing, energy distribution, monitoring, and communication.
    - Implement training programs and collaborate with other energy communities.
    - Actions to promote energy efficiency and social inclusion.
    - Participate in meetings and present annual reports.
    - Ensure transparency and organize at least one annual public event in the neighborhood.
- Duration: The right of use lasts at least 25 years, with the possibility of a five-year extension upon mutual agreement.
- Selection Criteria: Points are awarded for:
    - Allocating up to 10% of the energy to vulnerable households.
    - Allocating up to 15% of the energy to municipal buildings.
    - At least 50% female representation in the governing or management board.
    - Experience in the REC field, participation in workshops/training.
    - Supporting letters from neighbourhood organizations
    - Evaluation of submitted workplan: quality, coherence and originality

Public Service model

As the municipality owns and manages the land and buildings in which the project takes place, the authorisations concern internal agreements between all responsible parties: the Cemeteries department provides the land, the Climate Improvement and Energy Efficiency department puts the financing and contracting of installation works. Nevertheless, as the chosen locations are situated in the public cemeteries of the city, a meeting between the municipal government and the local church authority took place to avoid any possible conflicts.

In mid-August 2022, the municipality of Valencia launched a public tender for the "Supply and installation of photovoltaic installations in five Municipal Cemeteries in the city of Valencia". The tender has a base budget of nearly 3.3 M euro, previously tendering the preparation of technical studies and installation projects to expert companies, too.

Open tender publication here.
Organized in five lots (one per installation). Purpose of the Contract: Supply and installation of photovoltaic installations in five Municipal Cemeteries in the city of Valencia
Date of publication; 07/09/2022
Date of formalization: 15/04/2023

Automatically quantifiable award criteria:
1- Economic offer, lowest price offered (60 points)
2- Reduction of the execution period (20 points)
3-Extension of the warranty on photovoltaic solar installations (20 points)

Lot 1 Grau

- Base tender budget Amount 94,645.43 euro.
- Amount (excluding taxes) 78,219.36 euro.

Number of bidders: 14
Successful Bidder: Sociedad Ibérica de construcciones eléctricas, S.A. Tax ID No. A28002335
Award Amounts:

- Total bid amount (excluding taxes) 49,200 euro.
- Total bid amount (including taxes) 59,532 euro.

Lot 2 Benimamet

- Base tender budget: Amount: 195,653.13 euro.
- Amount (excluding taxes): 161,696.8 euro.

Number of bidders: 14

Successful Bidder: Sociedad Ibérica de construcciones eléctricas, S.A. Tax ID No. A28002335

Award Amounts:

- Total bid amount (excluding taxes) 98,100 euro.
- Total bid amount (including taxes) 118,701 euro.

Lot 3 Campanar

- Base tender budget: Amount: 373.235,68 euro.
- Amount (excluding taxes): 308.459,24 euro.

Number of bidders: 14

Successful Bidder: Sociedad Ibérica de construcciones eléctricas, S.A. Tax ID No. A28002335

Award Amounts:

- Total bid amount (excluding taxes) 213.213 euro.
- Total bid amount (including taxes) 257.987,73 euro.

Lot 4 Cabañal

- Base tender budget: Amount: 894.578,37 euro.
- Amount (excluding taxes): 739.320,97 euro.

Number of bidders: 18

Successful Bidder: UTE Urbia-Serveo-Cuerva Tax ID No. A07077969

Award Amounts:

- Total bid amount (excluding taxes) 599.613,42 euro.
- Total bid amount (including taxes) 725.532,23 euro.

Lot 5 General

- Base tender budget: Amount: 2.509.863,23 euro.
- Amount (excluding taxes): 2.074.267,13 euro.

Number of bidders: 18

Successful Bidder: UTE Urbia-Serveo-Cuerva Tax ID No. A07077969

Award Amounts:

- Total bid amount (excluding taxes) 1.748.346,19 euro.

- Total bid amount (including taxes) 2.115.498,89 euro.

The selected companies for the installation of the PV plants are experienced and perfectly capable of carrying out all the works. The contracts include the legalization and activation of the installations. Below the current status of the implementations that already took place are presented:

Grao

Date beginning of construction: 1/08/2024
Date end of construction: 30/08/2024
Date final certificate: pending legalization

Benimamet

Date beginning of construction: 29/05/2024
Date end of construction: 9/07/2024
Date final certificate: pending legalization

Campanar

Date beginning of construction: 26/06/2024
Date end of construction: 30/08/2024
Date final certificate: pending legalization

Cabanyal

Date beginning of construction: 17/11/2025
Date end of construction: -
Date final certificate: -

General

Date beginning of construction: 19/04/2025
Date end of construction: last certificate with 90% executed on 13/11/2025
Date final certificate: pending transformation center construction and legalization

To make sure the involvement of vulnerable households is organized efficiently and successfully, a contract with an external technical assistant has been closed (read more about this assistance in 3.3.2).

As for the social and administrative implementation and follow-up, the Climate Improvement and Energy Efficiency department, through VCE, deals with the management of the energy sharing for energy vulnerable households, in close coordination with Social Services and the Architecture and Central Technical Services department.

The Architecture and Central Technical Services department adopts the role of 'producer' and formal single manager of the installations. They select the municipal buildings to be included in the collective self-consumption linked to each installation, and take responsibility for the maintenance of the installations. They also submit the modifications of energy sharing agreements to the DSO.

3.3

Governance aspects

Stakeholders involved in the implementation

Energy communities

Among the stakeholders involved in this model are citizens, vulnerable households, the POWER UP project partners Valencia Climate and Energy Foundation (VCE) and Las Naves (LNV), the municipal facility services and the municipal social services.

The projects in this scheme are led and managed by citizens organizing themselves in REC's. Every household in the respective area can participate in the REC by financially participating in the PV plant on the public roof offered by the municipality. The members of the REC decide on the number of shares financed by all participants together and allocated to vulnerable households. To stimulate inclusive actions, the submission of an Inclusivity Plan is required yet not contractually binding for REC's applying for the tender. These actions could involve including the voice of vulnerable households in the collective assemblies, inviting them to participate in activities organised by the REC, or designing mechanisms that allow acquiring shares in the mid-long term without having to bear with the initial investment barrier (revolving funds, partial payments, discounts…). The relations between the municipality and the REC's are formalized contractually.

Besides the existing REC's listed in 3.1, also new energy communities are being promoted in the neighbourhoods of Poblats Maritims, Benicalap, Olivereta, El Saler, Poblats del Nord, Nazaret and Jesus, with different levels of maturity but still not ready to promote renewable energy installations in the short term.

Vulnerable households are able to realize savings on their energy bill without initial investment by accessing the self-consumption scheme for free. However, they don't take part, in principle, as full right members of the Energy Community as they don't own the shares.

VCE / LNV take the role of enabler and facilitator, helping the municipality to offer access to public roofs and spaces to citizen initiatives by organizing public tenders open to all citizens organized in energy communities. They supported the development of energy communities in the city with community workshops in which they explained the scheme and used the pioneering energy community CEL Castellar-L'Oliveral (realized outside the POWER UP project) as a best practice and inspiration. More support for new and upcoming energy communities has been possible by extending the current team with additional staff, financed by a national grant. VCE team has doubled the number of constituted RECs in the city and is focused in the identification, intermediation and facilitation of negotiations with private roof owners and condominiums.

The municipal architecture and central technical services guard that the city's self-consumption needs of solar energy produced on public roofs are being met.

The municipal Social Services plays a role in helping REC's identify and include vulnerable households. VCE involved the three municipal Social Services delegations affected by the implementation of the installation in cemetery "El Grao" in thematic working sessions about the project. The goal was to go into detail on the requirements for the potential beneficiaries, agree on an information exchange protocol and plan next actions. A first round of recruitment activities has been launched with the social services centres of Nazaret and Cabanyal (for the Grao installation) and Campanar (for Benimamet and Campanar installations)

Public Service model

The initiative of this model lies with the municipality. The Climate Improvement and Energy Efficiency department identified suitable grounds and decided to invest in solar installations on public land. VCE facilitates the whole model and takes charge of the energy poverty side of the project. Municipal Social Services are selecting vulnerable households who will profit from free access to collective self-consumption. The Architecture and Central Technical Services Department of the municipality is called to play a crucial role as they have the competences

on energy management of municipal buildings and will take charge of the ownership and operation of the plants as producer subject.

Selected vulnerable households (based on vulnerability criteria and living within a two km radius from the related installation) obtain free access to the collective self-consumption scheme and realize an even bigger advantage on their electricity bill. Their fee is taken over by savings from municipal buildings included in the self-consumption scheme as well as savings in the expenditure in municipal aids and subsidies to families struggling to pay their energy fees.

In the future, non-vulnerable households and SME's will be able to participate in the model by paying an annual fee, leading to savings on their energy bill by participating in the collective self-consumption scheme. They are not able to join the scheme in this first phase, as it requires advanced and rather complex internal regulations that go beyond the POWER UP project timeline. Nevertheless, POWER UP has made key contributions in the first definition of the long-term model, with essential legal feasibility studies as well as a first techno-economic analysis of different public prices (or "fees") scenarios.

Reaching out to and involving participants

Energy community

It has been agreed within the municipality, on a proposal from pilot partners, that 25% of the energy generated by the five PV plants (overall) will be dedicated to reducing energy bills of vulnerable households. The scheme could potentially reach more than 800 vulnerable households in the city, which can be gradually included in the scheme as they are identified and supported by Social Services and VCE.

REC's are in different phases when it comes to reaching out to potential participants. Most of them organize informative sessions or open days to share the initiative and start collecting potential members. As long as most of the REC's are still waiting to access a roof, they are not taking too much outreaching action yet. CEL Castellar-l'Oliveral, already having one operational installation, grew big public interest and has a waiting list that even surpasses their current number of members.

Once the roof is available, the REC requests installation offers from expert companies. Once the best offer is selected, there's a clear view of the overall installation costs that need to be collectively financed. The expected cost is then split into shares, which are then offered to potential members. Each REC decides on the minimum/maximum number of shares that can be acquired by each member. Normally shares are equivalent to 0,5 kWp installed power, around 600 euro upfront investment.

Public Service model

Just like in the REC model, the Social Services are in charge of the identification of beneficiaries and follow-up of their participation. They prepare a list of potential participants, based on the families having asked for financial support related to energy bills or other profiles they find interesting to include. This list is pre-contacted by the social workers, and then referred to VCE who facilitates the energy analysis (electricity needed, rational use of energy received at home…) and registers the proactivity of each household in terms of attendance to group meetings, training etc. This information is shared with Social Services who cross this input with their standard vulnerability criteria (income and others), make an assessment and decide over the participation and continuation of each household on a regular basis (changes in the energy sharing configuration are accepted every four months).

To coordinate the involvement of different types of consumers (municipal buildings and vulnerable households), which is a rather innovative scheme, pilot partners are relying on external technical assistance.

Previously, there has been technical assistance granted and financed in the context of the Horizon 2020 Sun4All project. A very good implementation plan has been developed, covering topics like eligibility criteria, recruitment phase and engagement strategy. However, at the moment, this plan is too ambitious for the pilot.

To facilitate the outreach to potential participants, external support through a dedicated technical assistance is being organized and financed by POWER UP and contracted by VCE (term of contract: September 2024 to September 2025). It focuses on the implementation of

the first three cemeteries, which can potentially reach more than 225 households. The contract includes the following actions:

- Organisation of information and work meetings in the Municipal Social Services Centres (CMSS) involved according to the radius of action of the self-consumption facilities, aimed at the managers and professionals of each centre.
- Support in the establishment and implementation of a system of information exchange and referral of potential participants in the project with Social Services, agreed with the reference CMSS through the necessary work meetings.
- Contact with the referred households and organisation of group and/or individual appointments to explain the project to them. For those people with mobility or conciliation problems, a home visit should be offered.
- Explanation of the project, the conditions of participation, benefits, advice and basic indications for making responsible and efficient use of the energy received. Explanation of the informed consent that must be signed, as well as the other documents necessary for their inclusion in collective self-consumption.
- Proposal and active search for networks and local agents that help to amplify the scope of the project, especially for the identification and referral of potential participants to Social Services (whose validation is essential).
- Organizing training workshops.

Up to date, several barriers have been faced for having a satisfactory deployment of the project service. Even if multiple meetings and working sessions have been organized in 4 municipal social services buildings, receiving generally positive feedback and willingness for cooperation, the slow times when activating the installations and offering tangible benefits have limited the prioritization and time dedication from social workers for the identification of households. Data protection issues and the use of safe repositories have also been addressed, finding an adequate solution and providing a clear protocol and data flow definition for the referral of potential participants among municipal departments and external partners.

Moreover, social services departments are struggling with staff availability, and the situation has been worsened after the floods in the south of the city. All these factors led to limited activity from the external partner (whit a contract only partially executed), which could only

recruit households for one of the three installations (Grao) and 2 municipal services centers (Nazaret and Cabanyal). Summarizing the main figures: more than 100 households referred by social services have been contacted, out of which 31 finally decided to join the project and sign all the documentation. In addition, all those who showed interest received a first energy bill analysis and, when needed, were attended by the Energy Office OSS for a tailored bill optimization. The external partner also cooperated in the content design for the informative leaflets.

Both models: single manager of collective self-consumption

In addition, as there is a huge need for technical and administrative management tasks for the implementation of both models, VCE has contracted an external expert to take the role of "single manager of collective self-consumption". This recently created actor, however not yet fully developed in regulations, is a key element to facilitate efficient and fully operational collective self-consumption initiatives in Spain, no matter their form (REC, or public service model). The tasks covered by this technical assistance are as follows:

- Centralize administrative procedures and communications, being able to receive and keep the documentation related to collective self-consumption.
- Activate collective self-consumption on behalf of the associated consumer
- Preparation of energy distribution agreements.
- Carry out communications with public institutions and energy companies, on behalf of the user, directly or through the self-consumption manager.
- Remote access to the electricity consumption readings of the user's home, for compilation and study.
- Within this action, continuous monitoring of the energy consumption of homes must be carried out, making available some type of web platform or "dashboard"
- Provide quarterly reports, which include: Information on the evolution of the number of active users in self-consumption, information on the supply company and tariff of each of the associated consumers, economic profitability analysis and energy indicators analysis,

These tasks only apply for the participation of vulnerable households. The tasks of intermediation, monitoring and analysis of indicators corresponding to the participation of municipal buildings and/or non-vulnerable households are out of the scope of this contract.
In this case, as none of the installations have been connected to the grid, the external partner has not been able to activate and monitor energy sharing for the recruited households (leading to a contract also only partially executed). However, their role has been key as professional advisors, intermediating between actors and facilitating the legalization of the three first installations. The single manager has prepared all contractual models and energy sharing agreements as well as tailored documents with different formats to communicate with the DSO, regional industry authority, municipal administration and all relevant stakeholders.

Benefits for participating households

Energy community

Through an initial investment, non-vulnerable households obtain a constant share of free renewable energy over the years. Thanks to the collective self-consumption scheme, shared renewable energy directly reduces the household's electricity bills.

A specific number of free shares is reserved for vulnerable households. They are not required to pay participation fees and benefit from the free energy directly, even increasing the benefit on their bill. For an overview of the detailed business case, we refer to D4.2.

As can be understood by the public tender design, giving a central importance to the social aspects, this model has the goal to activate truly transformative Energy Communities which can lead the ecological transformation of Valencia neighbourhoods. The benefits go far beyond the savings in the bills, as the communities can be a close, easy to reach reference in anything related to energy: from delivering basic information on tariffs, to activating more innovative activities on mobility, efficiency, retrofitting, local food, collective purchases, etc.

Public Service model

A total of 25% of the renewable energy generated across the five sites is dedicated to selected vulnerable households. When selected for participation by the municipal services, they obtain free access to the collective self-consumption scheme, impacting their electricity bill. 99% of

the electricity produced on the first three sites (already installed by the moment of writing) are dedicated to vulnerable households, allowing the scheme to start off quickly.

Vulnerable households rely on the project manager (the municipality) for any administrative procedure with regards to their participation in the scheme. By doing so, the households don't need to suffer the burden of formalizing all the contractual steps with the DSO and their energy suppliers, and the municipality is free to decide on their behalf how much energy they receive (by setting a coefficient factor[2]), as well as modify or update the energy sharing over time without additional authorizations from the beneficiaries.
Besides the clear individual benefit of participation in the scheme, a more collective approach will be tested too. Periodic gatherings of participants will be organized, to build a sense of community around their participation, train themselves about energy related topics and broadening the outreach and impact of a single PV installation.

[2] The initial proposition is to set a coefficient that implies an approximate coverage of 25% of the electricity needs of each household, trying to minimize the individual surpluses (energy which is not used as it is produced) and thus ensuring efficiency. It must also be taken into account that the variability of solar energy resources (over the day and over seasons) have an impact on the savings of the families. All these factors are well explained and are part of the training on responsible, good use of energy at home.

3.4

Key implementation challenges

The main barriers to a timely implementation of the Valencia pilot scheme are to be found in the following elements.

Access to roofs

Despite significant advancements in the promotion of renewable energy communities in the city with already eight REC's legally established and more to come, access to municipal (or private) roofs proved to be the main bottleneck of the Energy Community model.

Internal complexity

Valencia, being the third city of Spain, has a massive public service apparatus with administrative complexities and procedures. Initiating an innovative project in one part of the organisation requires the collaboration of departments in other domains of the government, departments that might have other or even contradictory tasks and ways of working.

Specifically, the municipal architecture and central technical services departments raised an initial concern when preparing the implementation of the Energy Community model, arguing that these public roofs would be necessary to cover the city's needs for renewable energy production sites for its own electricity demand. VCE and LNV demonstrated that this fear is not grounded by carrying out a feasibility study (financed by POWER UP) for the whole portfolio of municipal buildings, mapping the actual demand and current production capacity. It turned out that only 14 MWp of the about 70 MWp available municipal production sites will be needed by the city to cover almost 40% of their electricity needs. Even if not all of these sites will be suitable in the end, the surplus is clearly big enough for the city to offer public roofs to energy

communities. However, pilot partners have been long waiting for a technical report from the Architecture Service, hoping for validation of the initial proposal of roofs to be procured that was sent in July 2024. The recent floods in the region of Valencia had impacted part of the southern districts of the city, making it even more difficult to prioritise this action from their side.

As explained in previous sections, the screening and validation of the three first municipal roofs to be tendered faced non-expected additional barrier from the architectural service, which could only accept detailed PV execution projects to advance with the administrative process. To overcome this, VCE contracted an external expert engineering company to prepare the projects urgently and unlock the situation.
Secondly, Social Services lack sufficient human resources and the necessary technical skills to undertake all the required steps for including a household in a collective self-consumption scheme. Even if we understand that, in the long term, this project (and model) should be understood as an additional tool for social workers to deliver their services, the gap is still too big and needs intermediation from other parts of the municipality. VCE has played a crucial role over the last five years by implementing a successful collaboration between its OSS "Energy Offices" and Social Services, filling the more technical gap about bill optimization, energy efficiency at home and now adding a renewable energy layer to assist vulnerable households and include them in the energy Transition of the city. However, not even the OSS (financed with municipal funds) is currently sized to lead such an innovative and demanding process. That's the reason why an external expertise service is needed to kick-start the project. A decision should be made, based on the learnings and monitoring of the project implementation, about how the project should be implemented and followed-up during the coming year, contracting external services or (most likely) integrating the tasks into the OSS services.

Finally, local elections caused a complete shift in the local government team in the middle of the pilot process, implying that the pilot had to be explained again to new mandatories, and administration had to be restructured.

Engagement of vulnerable households

An important barrier has been identified in relation to sharing a common repository with personal data from potential participants, so as to facilitate a dynamic and agile referral of cases and follow-up with each social services delegation. Even if VCE and Social Services have a signed agreement in relation to GDPR since 2022, having a common digital space is a long-time discussion with a complex solution. However, it has been agreed that the municipal IT Department would enable specific folders in a controlled environment so VCE and Social Services can speed up the identification and recruitment of households. It must be said that the first 25 households that were recruited during the summer of 2025 were approached in an informal way that cannot be replicated, as we need to fulfil specially demanding data protection standards. The protocols have been well established and now there's a common and safe repository of personal data shared between VCE and the different municipal social services.

Legalization and activation of innovative PV cemeteries installations

The process of contracting, executing and following up of the different project phases for the five PV installations has proved to be especially difficult in terms of administrative complexity, lack of stakeholder coordination, unclear role definition and non-optimal installation services provision. The absolute lack of previous experience has unveiled several deficiencies in the internal capacities for deploying such a complex and innovative project. Project partners have dedicated great efforts and lean on external expertise support to unlock multiple technical and, mostly, administrative hurdles which have come up throughout the project implementation.

However, this project challenge has provided valuable learnings and increased capacities from project partners and relevant municipal departments, which will be key for present and future activities.

04

Eeklo, Belgium

The Eeklo pilot consists of a cooperative wind turbine financed and owned by the members of citizen energy cooperatives Ecopower and Volterra (respectively 74% and 25%), and the city of Eeklo (1%). The city of Eeklo uses its part in the wind turbine to pre-finance social shares of Ecopower for vulnerable inhabitants who, this way, will be able to become a member of Ecopower and share wind energy at cost via its cooperative supplier activities. Secondly, to participants with a suitable home, Ecopower provides an offer to install free cooperative plug & play social solar panels, further reducing the electricity bill by direct consumption of solar energy from their roof.

4.1

Technical aspects

Social shares

As the Huysmanhoeve cooperative wind turbine already existed when the POWER UP project started, there has been no technical implementation or procurement of the plant in the context of the project. The city of Eeklo decided to participate for 1% in the cooperative wind turbine and use their participation to create 100 pre-financed social shares of Ecopower and allocate these to vulnerable households. Read more about the development of the wind plant in D4.1.

Social plug & play solar panels

When the market situation changed in 2024, the cooperative tariff was not always the cheapest on the market, urging the pilot partners to adapt and complement the social share model with a more stable benefit for vulnerable households: plug & play solar panels (please read more about the changes of the pilot context in 4.4). A plug & play solar panel is a solar panel with a long cable that can be directly plugged into a grounded outlet. It starts working immediately as soon as it is plugged in. These panels can be placed on a roof, wall, balcony, in the garden, etc, without registering with the grid operator. The panel continues to support part of the consumption as long as there is enough sunlight. It can support part of the base load of household appliances such as refrigerator and freezer, and standby energy from electrical appliances and chargers. Any surplus is injected into the grid with an appropriate remuneration from the cooperative.

As concerns the choice of panels, the Belgian Commission for Electricity and Gas Regulation (CREG) publishes a list of approved panels. Plug & play panels are limited to 800W per home,

have to be CE-labeled and approved by Synergrid. They have a built-in converter, making them a space-saving option even for small housing situations.

Installation is easy and can be done within a day. When installing, it has to be made sure that panels are mechanically fixed in a safe way, and electrically that the connection is weatherproof and cables are laid correctly. Connection should always be to the household grid, not directly to an appliance. Also, attention has to be paid to the load on the home's electrical circuit not to blow the fuse.

Summary of technical implementation

No target have been defined for the Eeklo pilot in terms of investment triggered or kWp installed as the installations had already took place before the pilot start. However, the pilot will trigger investments due to the installation of social plug & play solar panels.

Table 6 – Summary of the current implementation status at Eeklo pilot

Scheme/system	Investment triggered	Total kWp installed
Social shares	-	-
Social plug & play solar panels	-	-

Figure 5 - Example of plug & play solar panels on a balcony (Image: Timm Reckman, CC-BY-2.0)

Figure 6 - Huysmanhoeve wind turbine.

4.2

Legal aspects

Creation of legal entity

The legal entity used to realize the Eeklo pilot is the existing energy community Ecopower. Ecopower is a member of the REScoop federation, specialized in the development of cooperative solar, wind and sustainable heating projects. As an energy community with a supplier license, Ecopower shares the energy produced by its plants as a service to the members. By buying a share of 250 euro, everyone can become a member, co-owner of the plants, have a vote in the General Assembly and can share the produced energy by signing an electricity contract with their energy community Ecopower.

Delivery of permits, authorisations and procurement processes

Social shares and energy sharing

The Huysman wind turbine is built on public land. The ownership of the plant is shared between the members of citizen energy cooperative Ecopower (74%), the members of citizen energy cooperative Volterra (25%), and the municipality of Eeklo (1%). This means that the installation and the production are in the hands of citizens.

A contract with the public landowner foresees the permission to use the location for 20 years to build and operate a wind plant, in exchange for a yearly building and operating fee.

An agreement between the municipality, Volterra and Ecopower formalizes the cooperation between the participating parties such as responsibilities and the division of costs and benefits according to the degree of participation. Ecopower takes care of the exploitation of the wind park and the trading of the energy.

In the Eeklo pilot, vulnerable households sign an agreement with the city of Eeklo as participant of POWER UP that details the pre-financing of the share of 250 euro and the requirements and regulations that go along with it. Thanks to the pre-financing of a 'social share' by the municipality, vulnerable households become full members of the energy community Ecopower from day one, and can benefit from all the services of Ecopower including energy sharing at cost. Becoming a participant in the POWER UP Eeklo pilot also gives access to social plug & play solar panels if their home allows the installations.

Social plug & play solar panels

For the additional PV-scheme on individual homes, no additional contract between the participant and Ecopower is needed. The energy community is financing the plug & play solar panels out of the energy community social fund with profit from the wind plant. POWER UP participants interested in making use of the social PV-offer contact the single Ecopower contact person by mail, phone or every Monday during the fixed POWER UP office hours in the Eeklo social department office. Ecopower explains the model and does a first screening of the building and potential locations to install the panels (balcony, roof, wall,...).

The maximum power for plug & play solar panels allowed in Belgium is 800 W per household. Users with a digital meter do not need to report the installation to DSO Fluvius. With an analogue meter, however, notification is mandatory. In flats, permission from the association of owners might be needed. Sometimes this is prohibited for the appearance of the facade. But a ban is only possible if it is explicitly stated in the regulations. In some cities or 'historical protected zones', specific municipal rules apply. At the moment of writing the city of Eeklo environmental department is still working on specific regulations, which means that pilot partners still need to wait for this information before being able to proceed with the local offer.

If the building is suitable for plug & play solar panels and the participant agrees to it, Ecopower orders the panels and pays the invoice. Ecopower provides practical help with the installation and advice in using the panels (how to use the panels safely, how to increase self-consumption, - if needed - how to inform and communicate with the homeowner or association of owners).

The POWER UP participant immediately becomes the owner of the panels. This is explicitly stated in the acknowledgement of receipt that the participants sign at the moment of installation. As an owner, the participant is responsible for the safe use of the installation. Potential damage caused by the use of the panels is covered by the participant's individual insurance. Most insurance companies do not adjust their policies, so participants do not have to pay an extra premium after installing plug & play solar panels. Participants moving to another home can easily take the installation with them and continue benefiting from the self-consumption of the solar energy at the new place.

4.3

Governance aspects

Stakeholders involved in the implementation

Among the stakeholders involved in the Eeklo pilot are vulnerable households and the POWER UP project partners municipality of Eeklo citizen energy cooperative Ecopower.
Vulnerable households eligible for the model are living in Eeklo, have a family income of less than 27,550 euro, plus 5,100 euro per additional family member, or entitled to an increased allowance, and do not (yet) get a social energy tariff. This is a group that regularly experiences difficulties in paying their energy bills, while their income is still too high to have the right to the social tariff granted by the federal government.

The municipality of Eeklo uses its participation in the Huysmanhoeve cooperative wind turbine to prefinance an Ecopower share of 250 euro and create 'social shares' to up to 100 vulnerable households that comply with the definition of vulnerable household. The municipal social services identify potential participants, inform and advise them. If interested, the social assistants explain the POWER UP agreement between the city and the participant for the pre-financed social share. Ecopower supports calculating the impact of switching to Ecopower as a supplier on their energy bill based on their final settlement invoice using the public V-test simulator from the VREG. Subject to the participant's agreement, Ecopower helps with online registration as a member and customer. Social services remain the first, accessible contact point for participants for any questions related to the POWER UP scheme.

Generally, Ecopower treats the POWER UP participants as normal members and customers. Additional actions are taken in specific situations:

- a new participant enters the scheme: besides the general information on contract and billing, Ecopower sends an additional email repeating the rules and requirements detailed in the agreement between the municipality and the participant.

- a participant chooses to make use of the offer for free plug & play solar panels, Ecopower investigates the possibilities of the installation together with the participant and proceeds with the contracting and installation of the plant.
- there are payment arrears: Ecopower clients service does a monthly check on the payment statues. If payment arrears are detected among POWER UP participants, a smooth procedure is being started, with a reminder letter accompanied by an intervention by the social assistant of the municipality to find a solution before advancing in the general procedure applied in case of non-payment. This way, non-payments are detected early which can avoid the start of a snowball effect of debt.

Reaching out to and involving participants

The ambition of the Eeklo pilot is to involve 50 vulnerable households in the scheme by the end of 2025. Due to the different challenges in the pilot, by the time of writing 17 households from the target group are participating in the social shares scheme, and no social solar panels have been installed yet.

The municipality reaches out to vulnerable households by integrating information on the model in individual consultations at the social office, by working together with organizations like the neighborhood center De Kring, and by using its general municipal communication channels. Recently, DSO Fluvius provided the municipality with a list of 124 Eeklo clients dropped by commercial suppliers who are debt free and ready to change back to the commercial market. The city is contacting these potential candidates (GDPR proof) and invites them to make an appointment with the social department to review their eligibility for the pilot scheme. Ecopower informs Eeklo residents about the POWER UP model in its local newsletter that is being sent to members and interested non-members regularly (read more about communication activities in D5.1).

Interested residents make an appointment with a specialized assistant from the municipal social services for more information about the scheme. When potential candidates are interested to join the scheme, Ecopower supports calculating the impact of switching to Ecopower as a

supplier on their energy bill, based on the final settlement invoice of their supplier using the public V-test simulator from the VREG.

When convinced, candidates sign the pre-financed share agreement with the municipality of Eeklo detailing the nature of the project, the rights and duties of the different parties. The six-year term starts from the signing of this agreement. The agreement is set up in accessible language and is being explained in detail by the social assistant, making sure that the candidate understands it.

Aspects covered in the agreement are:

- Full membership of the energy community Ecopower via the pre-financed share, including entitlement to Ecopower's cooperative electricity price, the annual dividend when Ecopower makes profit (maximum of 6% of 250 euro per year)
- Saving scheme of 3.5 euro per month during a 6-years term via the advanced bill to accumulate the value of the pre-financed share.
- Cancellation is possible at any time. The participant has two choices: either buy over the share at the residual value of the saving plan (250 euro minus the amount already saved) to remain a member of Ecopower and still be able to share electricity from Ecopower, or transfer the share back to the municipality, regaining the amount already saved.
- Procedure in case of payment difficulties (installment plan, support from social services)
- End of agreement in the following case: participant no longer lives in Eeklo, participant switches to another electricity supplier, death, or non-compliance with the installment plan). In these cases, the agreement will be terminated and the amount already saved will be refunded.

Once the agreement is signed, Ecopower helps the participants with online registration as a member and customer by concluding an electricity contract on the Ecopower website. The Ecopower client service double checks with the municipality that the candidate is eligible and sets up a saving plan.

If participants also wish to make use of the offer for a free plug & play solar installation, Ecopower carries out a first quick scan of the house, discusses the options with the participant and orders and installs the plug and play panel.

Benefits for participating households

Through the pre-financing of an Ecopower 'social share', vulnerable households obtain direct access to the Ecopower energy community, with as most direct benefit the possibility to receive the local, renewable energy at cost price at home. The advantage that can be made depends on the difference between the price / kWh and conditions of the current supplier compared to the Ecopower price. To determine this difference, the official V-test is used, which allows for an objective comparison of all electricity prices and contracts on the Flemish market. As the original target group is supplied by the DSO (Fluvius as supplier of last resort) at one of the highest tariffs in the market (to stimulate them to go back to the commercial market as soon as possible), the difference between the cooperative tariff as one of the cheapest in the market is obvious. During the pilot this advantage varied between 300 euro and 100 euro depending on market volatility.

Households that participate in the project can increase this advantage by making use of the plug & play solar panel offered by Ecopower. By directly consuming the free energy produced by the panels, the households can lower their energy consumption from the grid by another 15%.

Further, by becoming an Ecopower member, vulnerable households will gain free access to the cooperative energy monitoring platform EnergyID that helps them keep track of their consumption. In a new feature developed in the context of POWER UP energy poverty mitigation measures (D5.3), participating households and other households in Eeklo are able to set a consumption limit (in euro or kWh) which, once exceeded, triggers an automatic message in the EnergyID app, warning participants that their consumption exceeds the amount they expected to have. This feature has been tested in Eeklo in the fall 2024 and, after further refinements, has been launched in May 2025 and scaled to the whole of Flanders. At the moment of writing, almost 600 households are actively using the budget control feature.

Additional benefits for participating households provided by the municipality comprise the Energy Guide developed by the city of Eeklo, energy scans and information offered by the municipal housing services. From the side of Ecopower as a cooperative supplier, participants receive information on the electricity market, are invited to social and informative events of the

energy community and as co-owners, are able vote in the General Assembly and to share in the profit by retrieving a dividend.

4.4

Key implementation challenges

The main barriers encountered by the Eeklo pilot scheme are situated in the following domains.

Reaching out and involving vulnerable households

Identifying, contacting, building trust and involving vulnerable households turned out to be much more complex than expected. A dedicated staff member of the municipality intensively worked with the target group in the early phase of the project, organising co-creation workshops, joining forces with the neighbourhood centre De Kring for visibility and accessibility, and integrating the expertise of a local poverty organisation in workshops and conversation. This very time-consuming approach yielded good results, but could not be maintained during the whole timespan of the project. Clearly, falling back to more classical channels like written communication or appointments at the social service department proved to be less efficient. Providing sufficient social manpower and reaching out physically to places where the target group can be found seems to be the main learning of the pilot.

Change of original target group

Originally, the target group of the POWER UP Eeklo pilot consisted of households dropped by commercial suppliers and currently provided by the DSO on a very high 'standard tariff' and with a budget meter. It is this group that has the biggest advantage to change to the cooperative tariff that reflects the cost of production. However, candidates cannot switch if they are not debt-free. The average debt of the target group is 450 euro. Although the DSO was in favor, the pilot did not succeed to get an exception on the Flemish regulation that clients with debt could make the switch to a social program as POWER UP. In addition, the DSO decided in 2024 to immediately provide customers who were dropped by commercial suppliers with a

digital meter with prepaid function. As a result, no more debt could be built up by customers at the DSO, but prepaid meters are not accessible to suppliers by law. As a result, the original target group became inaccessible for Ecopower and the POWER UP scheme.

This is why the pilot had to adapt the target group, now focussing on vulnerable households active on the commercial market, living in Eeklo without the right to social tariff and with a right to increased compensation. Focusing on households that were able to benefit from the government's expanded target group for social tariffs during the energy crisis of 2022. For them, the advantage they can make is less compared to the original target group supplied by the DSO at high 'standard tariff'. In 2024 the average advantage based on their final settlement invoice in the V-test compared with their based on the final settlement invoice of their current supplier was ca 100 euro, but the cooperative tariff was not always the cheapest contract on the V-test. That's where the idea of adding plug & play solar panels to the scheme was born. This ensures that the benefit on the energy bill is always positive.

Dependency from market circumstances and consequent additions to scheme

The initial pilot scheme consisted of social shares only: the municipal revolving fund allowing vulnerable households to get instant access to the Ecopower energy community including green energy at cost price.

When the market situation changed in 2024, the cooperative tariff was not always the cheapest on the market. Price breakers sometimes can offer cheap electricity without investing in renewable energy production themselves. In order to make the scheme less dependent from market evolutions, the idea of social solar panels for participants has been investigated: solar panels financed by the energy community (third-party financing), providing free solar energy to vulnerable households when the sun is shining (self-consumption) and paid off by Ecopower with injection fees of excess solar energy. The advantages of this scheme were clear: third-party financed solar panels tangibly and sustainably lower the energy consumption from the grid and the energy bill of the POWER UP participant (30% on average), without requiring any form of investment. However, the context of solar energy in Flanders has changed, with an

enormous growth in solar production, creating negative prices on the electricity market and killing the business case of pre-financed solar panels.

This is why, when in April 2025 the use of plug & play solar panels was authorized in Belgium, this meant good news for the pilot. With a much lower investment cost (300 - 500 euro), lower production covering the baseload of a household without causing (a lot of) injection, and particularly with much less complexity in situations of rental homes and multi-family homes. This is a real game changer for the Eeklo pilot, sustainably lowering the energy consumption from the grid and the energy bill of the POWER UP participant (15% on average). The 'social plug & play panels' are financed by the energy community from the social fund of Ecopower with profit from the cooperative wind farm. However, as it came late in the project timeline and capacity on the technology and local regulation had~~s~~ to be built up first, this new addition to the pilot has at the moment of writing not yet resulted in kWp installed.

05

Rožnov, Czechia

The Rožnov pilot project consists of the installation of the city's first solar plant on an apartment building owned by the city. The objectives of this installation are to enable self-consumption of the generated electricity, use it for heating water and powering the building's common areas, and to sell any surplus energy back to the grid.

5.1

Technical aspects

The apartment building, located at Moravská 1443 in Rožnov pod Radhoštěm, was constructed in 1970 and comprises a total of 85 flats distributed across six floors. With a total floor area of 3,510 square meters, the average flat size is approximately 41 square meters. The entire building is owned by the municipality, and the prevailing lease agreements are short-term, typically lasting around two years.

In terms of energy performance, the building underwent significant improvement in 2022 with the installation of 140 mm of thermal insulation (with a thermal conductivity of $\lambda = 0.033$ W/mK). The building's average annual energy consumption for common areas over the three-year period from 2019 to 2021 is 6.218 MWh. This includes electricity used for shared systems and spaces, such as lighting in hallways, operation of elevators (if any), and other communal infrastructure.

In November 2022, an assessment was carried out by an external expert to assess the capacity potential of suitable roofs for the installation of photovoltaic (PV) systems. This included identifying which roofs are technically appropriate for solar energy use and estimating the feasible size and output capacity of PV installations. The study serves as a preliminary planning document to support decision-making on the deployment of solar energy solutions on municipal or residential buildings.

In June 2023, a structural assessment was completed after an in-person inspection of the rooftop. The assessment concluded that the existing roof structure can withstand the increased load from the installation of PV panels, demonstrating its sufficiency. In spring 2025, the municipal council decided not to insulate the roof. This allowed the advancement of the pilot implementation in a shorter period as no second public tender had to be launched and no insulation works had to be carried out.

The City received a subsidy from the State Environment Fund's New Green Savings programme to support the installation of the rooftop photovoltaic system, including battery storage and the integration of apartment units into the collective self-consumption scheme. The subsidy amounts to CZK 15,000 per kWp of installed capacity, CZK 10,000 per kWh of battery storage, and CZK 10,000 per participating apartment unit. The State Environment Fund will pay the subsidy amount only after the implementation is completed and according to the actual number of participating household units. Based on the acceptance of the application and currently available programme funds, financial resources have been reserved for the City up to a maximum of CZK 1,604,860, at the latest until October 10, 2026. Eligible applicants for this subsidy are owners and builders of apartment buildings. The funding is aimed at improving energy efficiency, promoting renewable energy use, and reducing carbon emissions in residential buildings.

The public tender titled "FVE BD Moravská 1443, Rožnov pod Radhoštěm" included the installation of a PV power plant on the roof of the residential building. Furthermore, the contractor must prepare complete project documentation at all required levels of detail and quality to enable the proper implementation of the PV system. This also involves carrying out engineering activities, securing approvals and opinions from all relevant authorities and stakeholders (where applicable), and delivering any additional documentation or clarification requested by the competent building authority during the permitting process.

The second phase of the project consists of the complete, functional, and defect-free execution of all construction and installation works. This includes the supply and installation of all necessary materials, equipment, and technologies, as well as the provision of related services. The contractor must ensure that all conditions for commissioning the PV system are fully met, enabling its safe and lawful operation.

The tender was announced on 25 March 2025, with the deadline for bid submissions set for 10 April 2025. The contract was subsequently awarded to ENVO s.r.o. on 12 May 2025, with a total contract value of 1,208,354 CZK including VAT.

As regards investments, the following costs have been made in the preparatory phase of the implementation:

- Study of Construction and Technological Solutions. Study on the Use of Roofs for Photovoltaic Systems (November 2022, 15,500 CZK, Ing. Petr Belica)
- Structural assessment of the roof (June 2023, 10,000 CZK, Ing. Aleš Palička-ČKAIT 1103150)
- Energy Assessment of Roof Insulation for the Residential Building Moravská 1443 and Preparation of Project Documentation for Roof Insulation in the Scope Required for the New Green Savings Subsidy Programme (November 2023, 55,000 CZK, Endum CZ s.r.o.)

The following investment was carried out:

- procurement and installation of the solar plant (May-August 2025, 1,208,354 CZK including VAT, ENVO s.r.o.

The PV installation has a total capacity of 39.5 kWp, divided into three sections oriented to the east, south, and west. It is complemented by a 20 kWh battery storage system, a Wattrouter for controlling domestic hot water preheating, and a 1,000-litre hot-water preheating tank equipped with a 9 kW heating element. As part of the project, the PV system is connected to the metering point of the building's common areas, including the merger of seven individual metering points.

The implementation process included the consolidation of metering points, preparation and approval of the project documentation including fire-safety measures, and installation of the rooftop panels. Cabling was routed through the building's common areas, followed by the installation of the associated technologies such as the inverter, switchboards, and battery system. The project also involved installing the accumulation tank and completing all fire-safety requirements.

The power plant was commissioned on 24 September 2025, after which adjustments to the electricity meter switchboards throughout the building took place in November 2025. In the same period, a smart-control system comprising of routers and 30 smart sockets was installed and distributed across all floors of the building.

The investment costs are fully covered by the municipality. The table below provides a summary of the technical implementation of the pilot scheme.

Table 7 – Summary of the current implementation status at Rožnov pilot

Scheme/system	Investment triggered	Total kWp installed
PV on apartment building	Expected: 48.000 euro (1,208,354 CZK)	39.5 kWp

Figure 7 - BD Moravská 1443 in Rožnov pod Radhoštěm

5.2

Legal aspects

Creation of legal entity

Under Czech law there is no need to create a legal entity for this pilot as the energy sharing happens within an apartment building. The pilot makes use of the legal possibility of collective self-consumption in apartment buildings, as introduced in the Act No. 458/2000 Coll., the Energy Act, specifically under §28a, which enables shared consumption of electricity among multiple offtake points. While this model is already being implemented in some privately owned multi-apartment buildings in Czechia, this pilot marks the first case where a municipality is both the initiator and electricity producer. Therefore, it serves as a test case for how municipalities can facilitate the direct use of locally produced renewable energy by tenants in municipal buildings, particularly in the context of social housing.

In this model, the municipality owns the building and the rooftop photovoltaic installation, and also organises and administers the electricity sharing among interested tenants. Importantly, the group of participating tenants is not a legal entity: the municipality remains the sole legal subject in relation to the energy system and assumes all associated responsibilities. The group of consumers is thus a technical and organisational construct rather than a formalised legal body.

The implementation of collective self-consumption is further supported by Decree No. 408/2015 Coll., which sets out the rules for electricity market operation, including technical parameters for measurement, data handling, and the allocation of shared electricity. The process of registering and managing shared consumption is facilitated through the Electricity Data Centre (EDC), operated in accordance with the market rules issued by the Energy Regulatory Office (ERÚ).

Due to the novelty and complexity of this legal framework combined with the limited municipal experience, the pilot partners engaged an external legal firm to draft a tailored contract between the municipality and participating households. The final version of the contract was approved by the City Council in July 2025.

The contract enables tenants to participate in the shared consumption of solar electricity generated on the building's roof. Crucially, tenants are not required to pay any upfront fees to join the scheme. The modification of the meter cabinet is handled and financed by the municipality, and the installation of smart consumption meters is provided free of charge by the electricity distributor.

Under the agreement, tenants purchase shared solar electricity from the municipality at a rate that is less than half the average market price, offering a substantial financial benefit compared to conventional electricity tariffs. The sharing process is administered via EDC. To enable this, tenants authorise the municipality to carry out the necessary registration and data exchange processes.

Tenants do not pay any additional fees to their electricity supplier as a result of participating in the sharing model. The electricity sharing agreement is aligned with the existing lease agreements, ensuring consistency in payment schedules, advance billing, and termination clauses.

The contract is concluded for an indefinite period and can be terminated by either party at any time without providing a reason, offering flexibility and ease of participation.

Delivery of permits, authorisations and procurement processes

The apartment building is owned by the municipality. It is the municipality who authorised the use of the rooftop for the production of solar energy in the context of the POWER UP project.

The Connection Agreement, a formal contract between the electricity producer (the City of Rožnov, as the owner of the photovoltaic (PV) installation) and the distribution system operator

ČEZ Distribuce, a.s., had to be signed following the completion of the Study of Construction and Technological Solutions for the PV system, in order to secure the installation's capacity for grid connection.

Once all permits and authorisations have been concluded, the public procurement tender for the installation of the solar plant was published on March 25, 2025, with April 10 being the closing date for interested parties to react.

The project is commissioned by the City of Rožnov pod Radhoštěm and is structured as a small-scale public contract. The scope of work encompasses the design and build of the PV system, including the supply and installation of photovoltaic modules and associated electrical components. The contract follows a design & build approach, wherein the contractor is responsible for both the design and execution phases.

The public tender for the project "FVE BD Moravská 1443, Rožnov pod Radhoštěm" is structured in two main phases, covering both the preparatory and implementation stages of a photovoltaic (PV) system installation on a residential building. In the first phase, the contractor is responsible for preparing all technical and administrative requirements necessary for the connection of the PV system to the electricity distribution network. This includes the merging of electricity metering points for the building's common areas, in accordance with the connection agreement between the City of Rožnov pod Radhoštěm and ČEZ Distribuce a.s. The contractor is also expected to prepare a compliance inspection report and a single-line diagram of the PV system, which will serve as the basis for submitting the connection request (to be formally submitted by the contracting authority).

Response and selection process

- Number of bids received: 5 (of which 2 bidders withdrew before the deadline)
- Valid bids evaluated: 3
- Winning bidder: ENVO s.r.o.
- Final contract value: 1,000,000 CZK excluding VAT (1,208,354 CZK incl. VAT)
- Evaluation criterion: Lowest price

Warranty and guarantees

As part of the contractual agreement, the following warranties were secured:

- Photovoltaic panels: 25-year product warranty and 30-year performance warranty
- Inverter and battery storage: 10-year warranty

The contract with the tender-winning party was signed on 12 May 2025. Given the deadline of 70 days after signature to complete the works, the installation should have been completed by mid-July.

The project experienced several delays due to a combination of administrative, technical, and installation-related issues. An error in the application for connection and the merging of metering points caused the first major delay. Although a wrong type of accumulation tank was initially delivered, it was replaced without impacting the schedule. Further delays occurred during the summer installation, when high temperatures caused the asphalt roof covering to soften, making it temporarily unsuitable for working on. Additional time was also needed to install supplementary sub-metering due to incorrect initial specifications. Finally, it was necessary to resolve specific conditions and technical parameters for domestic hot water preheating to meet the requirements of the heat supplier, which further extended the timeline.

5.3

Governance aspects

Stakeholders involved in the implementation

The main stakeholders involved in the pilot are the city of Rožnov and the residents of the apartment building.

1. City of Rožnov

The city plays the central role in the implementation of the pilot project. As the owner of the apartment building and the initiator of the PV installation, the municipality is responsible for:

- Financing and overseeing the installation of the rooftop PV system;
- Acting as the electricity producer and administrator of the energy sharing model;
- Managing the legal, technical, and administrative aspects of collective self-consumption;
- Signing and maintaining individual energy-sharing contracts with interested tenants;
- Coordinating communication with the Electricity Data Centre (EDC) and the electricity distributor.

The municipality of Rožnov pod Radhoštěm stands to benefit from the pilot project both financially and strategically. By installing the rooftop photovoltaic system, the city will reduce its operational costs for electricity in the building's common areas, such as lighting, elevators, and hot water production. This leads to direct budgetary savings, as the municipality currently covers these costs. Additionally, the city will generate revenue from surplus electricity sold back to the grid, and will collect an annual administrative fee from participating households to help offset maintenance and metering costs. Over time, the investment is expected to pay for itself within approximately six years.

2. Residents of the Pilot Building (Moravská 1443)

The apartment building comprises 85 residential units. Based on criteria of acceptance to social housing, the resident population is predominantly composed of vulnerable or socially disadvantaged households. Most tenants fall into one of the following categories:

- Social regime: Individuals receiving social benefits or public assistance;
- Care regime: Elderly residents or persons with reduced self-sufficiency due to health conditions;
- Starter scheme: Young individuals under 30 years of age entering the housing market.

While no official data on energy poverty is collected at the building level, the combination of these categories suggests a high probability that many residents are at risk of energy poverty. This vulnerability was one of the key motivations for selecting this building as a pilot site.

3. ENVO s.r.o. (Contractor)

The company ENVO s.r.o. was selected through a public tender to implement the project. The contractor is responsible for:

- Designing and installing the PV system;
- Delivering all technical documentation and permits;
- Managing engineering tasks, inspections, and approvals;
- Commissioning the PV plant and ensuring full functionality.

ENVO s.r.o. has also provided warranties on major components:

- 25 years for PV panels (30 years on performance);
- 10 years for the inverter and battery storage.

4. Legal and Technical Advisors

The municipality engaged the services of Frank Bold to draft a legally sound energy-sharing contract between the city and the tenants. Legal advice was essential to:

- Ensure compliance with national energy legislation (§28a of the Energy Act);
- Align the sharing model with lease agreements;
- Define opt-in/opt-out procedures, data authorisations, and billing rules.

Additionally, technical assessments were conducted by:

- Ing. Petr Belica – Feasibility study on rooftop PV deployment;
- Ing. Aleš Palička – Structural assessment of the roof;
- Endum CZ s.r.o. - Energy assessment of roof insulation and project documentation.

5. Distribution System Operator (ČEZ Distribuce, a.s.)

The regional distribution system operator (DSO) is responsible for:

- Installing smart meters in participating households;
- Handling grid connection and metering point aggregation;
- Managing data exchange with the Electricity Data Centre (EDC).

The cooperation of the DSO is essential for ensuring that shared electricity is properly measured and allocated.

6. State Environmental Fund

The State Environmental Fund of the Czech Republic provided a subsidy for the PV installation under the New Green Savings programme, contributing to the financial feasibility of the pilot.

Reaching out to and involving participants

In the preparatory phase of the project, residents of the pilot building could attend the co-creation workshops (cfr. D3.2) and general information sessions on energy (D5.3), providing a first contact with the project.

In November 2024, the municipality contacted all residents of the apartment building to inform them about the upcoming installation of a solar power system on the roof and the possibility of joining a new electricity sharing scheme. Each household received a letter explaining how the system would work, how it could help lower their electricity bills, and inviting them to express interest in joining.

After this first contact, 25 residents said they would like to participate, five declined, and another five called the city office to ask for more details. The city remained optimistic about achieving its goal for the number of participating households.

Once the solar system was fully installed and operational, the municipality held two information meetings for residents. The meetings were intended for both those who had already expressed interest and those who were still undecided. During these sessions, the city's energy manager explained how the electricity-sharing scheme worked, what benefits it offered, what the contract included, and how residents could join.

The first meeting, organised on 1 October 2025 at a municipal venue, saw disappointingly low attendance, with only three residents participating. In response, the city scheduled a second meeting two weeks later (16 October 2025), held directly in the pilot building and re-announced to all households living there. This approach proved slightly more effective, attracting between 15 and 20 participants.

To join the scheme, residents simply need to let the city know they are interested and then sign a contract. By signing, they also agree to let the city register them in the Electricity Data Centre (EDC), which manages the energy sharing system. Smart meters are installed or adjusted by the electricity distributor, and participants start receiving the shared electricity. The cost for this electricity appears as a separate item on their monthly rent invoice.

Joining the scheme is voluntary, free of charge, and very flexible. Residents can leave the scheme at any time by giving 30 days' notice. No technical knowledge or special equipment is required. This simple process helps ensure that all residents, especially those in vulnerable situations, can take advantage of the benefits of clean, locally produced solar energy.

Benefits for participating households

The POWER UP pilot in Rožnov pod Radhoštěm offers multiple benefits for households who choose to participate in the electricity sharing scheme. Thanks to recent changes in Czech energy legislation, specifically the introduction of collective self-consumption for apartment buildings, residents now have the opportunity to use clean, locally produced electricity directly in their homes.

The most direct benefit for participating households is a reduction in electricity costs. Households that join the scheme will purchase solar electricity from the municipality at a rate that is less than half the average market price, helping them lower their monthly energy bills. This price advantage is especially important for residents at risk of energy poverty, many of whom live in this municipal building.

Beyond savings on individual consumption, all households, regardless of whether they join the scheme, will benefit from reduced operating costs in the building's common areas, such as lighting, elevators, and hallway ventilation. These shared spaces will now be partly powered by the rooftop solar panels, and the resulting energy savings will be reflected in tenants' rent payments, since the city covers those shared electricity costs.

Additionally, the solar electricity will partly be used to produce hot water for the building, which will reduce heating costs. The price of this solar-heated water will be passed on to residents using the same formula as for heat pricing, adjusted for the efficiency of the system.

Residents also benefit from a no-cost, low-barrier participation model: there is no upfront investment required, no technical responsibilities for the tenants, and the city handles all administrative and registration tasks. Moreover, the pilot encourages greater energy awareness through outreach and engagement activities designed to help households better understand their energy use and potential for savings.

5.4

Key implementation challenges

One of the primary institutional challenges was the need for formal approval from the city council for the use of the rooftop for the photovoltaic (PV) installation. While the pilot partner SEMMO is responsible for implementing the POWER UP pilot in Rožnov, the municipality is not a formal project partner. As such, SEMMO progress depended on the collaboration and decision-making of the city council, including their approval of the pilot scope, investment amount, financing model, and whether to combine the project with additional construction work.

This dependency resulted in a delay in the implementation timeline, as the internal decision-making process took longer than expected and also municipal staff capacities were limited. Regarding the exact setup of the pilot and its financial implications, negotiations and consultations within the city extended over several months and postponed the launch of key procurement and installation steps.

In addition to governance-related delays, several other implementation challenges emerged:

- Legal and regulatory uncertainty: Due to the recent introduction of collective self-consumption into Czech legislation (effective as of January 1, 2024), the original concept had to be reconsidered, and a new implementation approach had to be defined.
- Administrative complexity: Managing the registration of tenants in the Electricity Data Centre (EDC), coordinating with the distribution system operator (ČEZ), and handling legal and financial processes requires strong administrative capacity.
- Engaging vulnerable households: Many tenants in the building belong to groups at risk of energy poverty. Communicating the benefits of the scheme in a clear and accessible way, while also managing legal consent, contract signatures, and technical information, poses a significant challenge.

- Technical integration: While the building was found to be structurally sound, integrating a PV system into older infrastructure and ensuring compatibility with smart metering and modern grid requirements required careful planning.
- Procurement risks: The city received five bids in the public tender, but two companies withdrew. Managing costs while ensuring reliability and experience of the selected contractor was essential.
- Long-term sustainability: The project is fully funded by the municipality, but ongoing operation, maintenance, and user support will require continued attention, especially given the likely turnover in tenants and variable participation rates over time.

06

Conclusions

This report covered the seven schemes explored in the four POWER UP pilot sites, focusing on the implementation of each scheme. Due to differences in national regulations, local context, stakeholders involved and pilot partners, there is a great variety between schemes and pilot sites. This means that comparison is not sensible, while the richness of the insights and experiences may be very helpful for future initiatives on energy poverty and renewables.

We see that all pilots struggled to deliver the scheme within the given project timeline, indicating that pioneering work like this often encounters unforeseen barriers, is subject to changes in context, and requires an experimental space where approaches can be developed, tested, and refined after evaluation.

However, each pilot succeeded in defining at least one promising scheme, adapted to the local context, in which vulnerable households will directly benefit from the production of renewable energy in the municipality. For all seven schemes, the necessary first steps towards implementation have been taken during the project: the creation of a legal entity (where necessary), and requiring an installation permit for the renewable energy source. For the majority of the schemes, the installation permits have been granted and the plant(s) have been procured. The installation of the plant has been realized in four out of the seven schemes. In three out of the seven schemes the plants are connected to the grid and electricity is being produced. All schemes are being continued after the official end of the POWER UP project, aiming at an implementation of all schemes by the end of 2026.

The following table presents the situation of the pilots on November 30, 2025, after 25 months of implementation.

Table 8 - Summary of the situation of the four pilots on November 30, 2025

Pilot	Scheme	Legal entity created	Installation permit	Procurement of plant	Plant installed	Connection to grid	Electricity produced
UCSA	PV on public roof	Not necessary	✔	✔	✔	5 out of 9	1 out of 9
	Energy Community	✔	✔	Public call published	Planned for end of 2026		
Valencia	Energy Community	✔	Ongoing	Planned for spring 2026	Planned for mid-2026	Planned for mid-2026	Planned for end of 2026
	Public Service model	Not necessary	✔	✔	✔	Ongoing	
Eeklo	Social shares	✔	✔	✔	✔	✔	✔
	Social PV	✔	✔	✔	Planned for 2026	Planned for 2026	Planned for 2026
Rožnov	PV on apartment building	Not necessary	✔	✔	✔	✔	✔

Looking at governance, we see that all pilots succeeded in involving the stakeholders relevant to pilot implementation, although it took more time than expected to get them on board and in action. However, reaching out to and actively involving vulnerable households in the schemes has been a challenge for all pilots: identifying, selecting and contacting potential participants in the schemes, building trust and convincing them to participate, as well as

keeping them engaged and supporting them in optimizing their energy consumption are elements that all pilot partners encountered in the process.

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