

POWERTY

Renewable energies for vulnerable groups

PILOT ACTION IN BULGARIA (EAP)

Hybrid of PV plus Battery Energy Storage System in social housing



**Interreg
Europe**



European Union | European Regional Development Fund



#POWERTY

Web

<https://www.interregeurope.eu/powerity/>

1. INSPIRATION BY POWERITY

The idea for this pilot action would not have been possible without the exchange of [good practices with POWERITY partners](#), highlighting the success stories of self-consumption models in Andalucía (Andalusian Energy Agency - AEA – Spain) and in Auvergne Rhone Alpes (Auvergne Rhone-Alpes – AURA-EE – France).

From AEA experience, local administrations are starting to develop initiatives to help solve the emergency climate change and energy poverty, in particular, through collective and shared renewable self-consumption. Data technologies are optimizing energy distribution between all users that are associated with the plant self-consumption of renewable energies, thus maximizing the amount of self-consumed energy. Also in Spain, the non-profit company ECOOO promotes collective and social self-consumption through different lines of action and strategies, in order to make it easier for citizens to benefit, directly or indirectly, from renewable energies.

From AURA-EE experience, collective systems of photovoltaic self-consumption in social housing is financed by the Sol Solidaire sponsorship campaign. The practice installs PVs for collective self-consumption systems (powers ranging from 10 to 250 kWp), in social housing (social and public landlords) to reduce their energy bills thanks to solar energy. A reduction annual electricity bill by around €200/household is achieved.

2. SUMMARY OF THE PILOT ACTION



The project tests an innovative **hybrid of PV plus Battery Energy Storage System (PV+BESS)** as a possible solution for **social households** to achieve a significant share of renewable self-consumption and thus decrease electricity bills and contribute to the **decarbonisation** of the energy system, while providing no further stress to the grid, as a results of the PVs installed.

3. NATURE OF THE PILOT ACTION

Rising energy prices are exacerbating energy poverty, especially in South-Eastern Europe. The seriousness and depth of the problem and the need to protect the vulnerable consumers requires the implementation of new renewable based technology solutions.

One of the most promising renewable solutions for alleviating energy poverty is PVs, as it provides competitive renewable power for self-consumption. However, PVs penetration is often burdened with additional challenges. For instance, connection issues, Distribution System Operator (DSO) and grid requirements, issues related to grid stress and how to deal with the excess energy, once many PVs are established. Low-income and low-energy-consuming households can achieve significant level of self-consumption and thus become energy independent, however innovative practices and reliable data are much needed in this sense.

The project implements **3 hybrids consisted of PV+BESS in social housing centers - 2 of them have capacity for 14 youngsters and the third one for 8 youngster, where all centers are all year long occupied (24h/day)**. All pilot buildings are owned by the **Municipality of Plovdiv** and are currently provided to **youths and children with disabilities**, as a possible solution to alleviate energy poverty of the participating households.



Consequently, a plan for measurement and verification of project results will be completed in the course of the pilot actions, evaluating the overall performance of all systems – renewable energy generated, consumed and stored, CO₂ emissions avoidance and economic results, such as the reduction of the energy bills.

The performance will be evaluated considering the methods to measure energy poverty, proposed by the University of Manchester, such as the expenditure approach (household energy costs) and the self-reported assessment about the level of domestic energy service and with direct measurements. All systems will be equipped with power metering device to monitor data in real time. A cloud-based system is available to monitor and record all data sets, including generation, storage and consumption from all pilot installations. Data sets will be stored in servers at EAP`s premises.

Given the expected abolition of Feed-in Tariffs and Net-Metering schemes in the EU by 2023, the described project provides data on the efficiency from the implementation of the innovative hybrid of PV+BESS, as a **possible solution for the vulnerable households to achieve a significant share of power neutrality.**

In this regards, EAP will **identify 3 social housing buildings** and will **design and install hybrid systems** with total capacity of **30 kWp PV and some 40 kWh of BESS.**

In order do so, **EAP will:**

- sign a cooperation **agreement with the Municipality of Plovdiv** and will also establish an agreement with the current tenants.
- investigate the **grid and DSO requirements**, as well as the additional technical requirements, such as shading burdens, availability of good roof conditions, availability of Wi-Fi connectivity, etc.
- make sure that all **legislative requirements** for the installation of such system are also covered and permission from the local DSO is received.
- subcontract the **executive design for each single installation** to electrical engineers authorised to develop technical projects.
- launch a **public tender** as the installation works are above the current national thresholds (30,000 €) in order to contract a third part company.
- supervise the system installation and will **monitor** data and performance and do the necessary evaluations.

Additional **partnerships will be also developed** within the project actions, such as with the Schneider Electric Bulgaria, whom EAP has established well working co-operations in the energy poverty field.

4. PLAYERS INVOLVED IN THE PILOT ACTION

The players involved in this pilot action are:

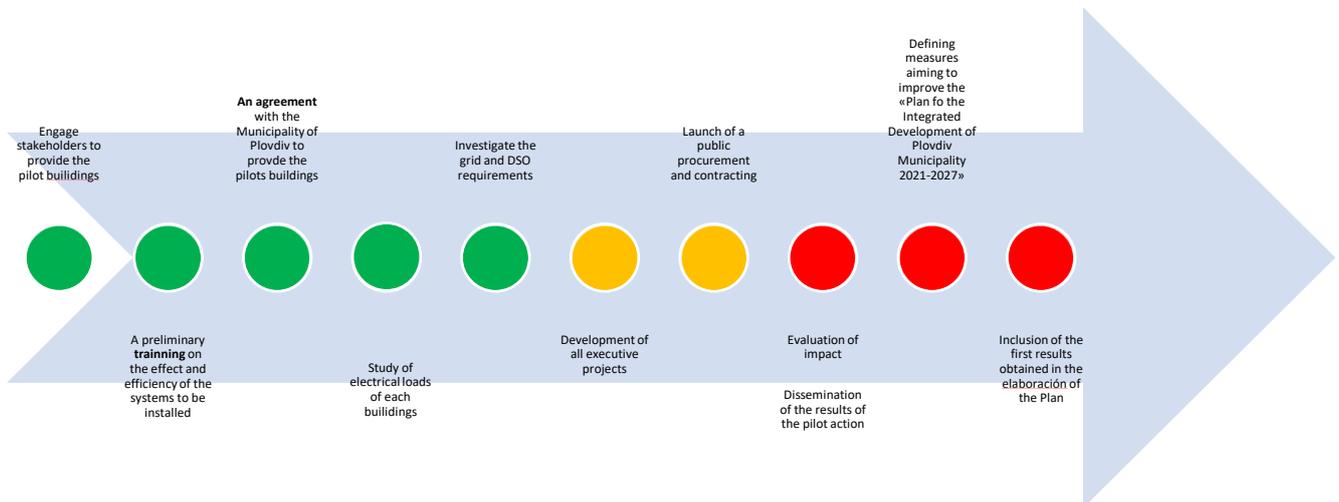
- **Energy Agency of Plovdiv (EAP)** is a private for non-profit entity and partner of the POWERTY project. EAP is the main facilitator of the POWERTY pilot action at local level and thus will be fully responsible for its proper implementation. EAP has been supporting numerous actions aiming to alleviate energy poverty for almost a decade.
- **Municipality of Plovdiv** through the Children centers will be the final users of the pilot installations, as owners of the building. The municipality will be responsible to transfer those innovation into their Strategical Plans in the energy field for the period 2021-2027.

5. BENEFICIARIES OF THE PILOT ACTION

The final users are **youths and children with disabilities** who are currently occupying publicly owned social housing. All pilot installations are planned to be co-supported by the **Municipality of Plovdiv**, which is going to facilitate the participation of the low-income households and **Schneider Electric Bulgaria**, who are running a specific fund helping alleviation of energy poverty at local level.

6. TIMEFRAME AND ACTIONS

The approval by Interreg Europe and initiation of the pilot action was at **24/06/2021**. The pilot action is expected to end before **30/04/2022**.



Activities done at 31/07/2021:

- An **agreement** has been reached with the Municipality of Plovdiv to **provide the pilots buildings**. (Document available in the Annex section)
- Pilot **buildings are identified** and energy consumption patterns are studied.
- A preliminary **training** on the effect and efficiency of the systems to be installed has taken place with the Children Complex organization who are running and maintaining the social centers.
- An **agreement** has been reached with the Municipality of Plovdiv to **co-finance the 10%** of the pilot installations. This has been officially voted by the local parliament on 03/08/2021.
- **Preliminary offers are collected**, so as to serve a basis for the public procurement and give us an insight on the renewable power and storage capacity that could be installed with the given budget (we plan to double the renewable power installed and slightly decrease storage capacity compared to the initial plan).
- **Ownership and data acquisition** issues has been also discussed with the Municipality
- **Grid specificities** are identified.

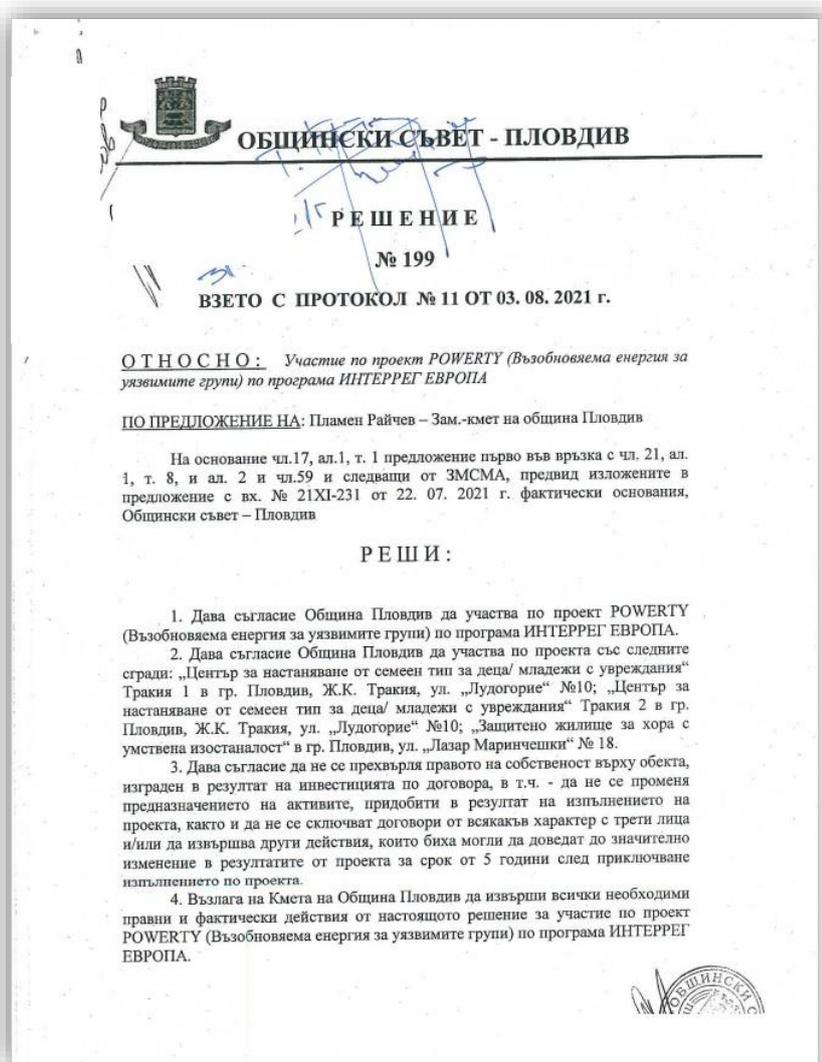
Next activities to be done:

- **Development of all executive projects** required by the Law.
- Launch of a **public procurement** and contracting.
- **System implementation and supervision** by third party. Supervision for the smooth implementation of the activities.
- **Data and performance monitoring** including energy generation and storage, grid consumption, to validate results and benefits – data sets based on 5 minutes intervals from consumption, generation and storage will be stored in a local server on the premises of EAP.
- **Evaluation of impact** – this deals with **technical data analyses** including renewable energy generation, consumption and stored energy, **environmental analyses**, such as **CO₂ emissions avoidance**, **economic results**, such as the reduction of the energy bills and social acceptance and vulnerability changes status, such the **decreased energy costs** (the expenditure approach) and the improved self-reported assessment about the level of domestic energy service of each building.
- **Defining measures aiming to improve the 'Plan for the Integrated Development of Plovdiv Municipality' 2021-2027** – the final goal is to shape specific line addressing energy poverty and vulnerable groups and including the PV+BESS solution, as a technical solution helping to alleviate to high extend the energy poverty status of the households.

7. ANNEX

Documents:

1. **An agreement has been reached with the Municipality of Plovdiv to provide the pilots buildings:** See Below you can see the official decision of the Municipality of Plovdiv to join POWERTY project and provide pilot buildings:



Press releases:

- 29/09/2021– Energy Magazine of the Bulgarian Transmission System Operator - Article on “Good practices and regulatory policy aimed at energy vulnerable consumers” highlighting the good practice (the POWERTY pilot action) do be developed in Plovdiv ([Link to the article in Bulgarian](#)).



- 29/09/2021 – Focus News - Announcement of the new issue of the magazine "Energy - Electricity perspectives" - Successful solutions to achieve the EU's green goals ([Link to the article in Bulgarian](#)).

- 29/09/2021 – Publics.bg - Announcement of the new issue of the magazine "Energy - Electricity perspectives" - Successful solutions to achieve the EU's green goals ([Link to the article in Bulgarian](#)).

- 29/09/2021 – Energy, Ecology, Economy - Announcement of the new issue of the magazine "Energy - Electricity perspectives" - Successful solutions to achieve the EU's green goals ([Link to the article in Bulgarian](#)).
- 02/10/2021 – Energy, Ecology, Economy What is the role of innovative renewable energy technologies and projects to overcome energy poverty? ([Link to the article in Bulgarian](#)).