

## PV-ESTIA



### Enhancing Storage Integration in Buildings with Photovoltaics

Project co-funded by the European Union and National Funds of the participating countries

## Partners:



**Aristotle University of Thessaloniki - Department of Electrical & Computer Engineering, GREECE**



**University of Western Macedonia, GREECE**



**University of Cyprus - Foss Research Centre for Sustainable Energy, CYPRUS**



**Electricity Authority of Cyprus (DSO), CYPRUS**



**Energy Agency of Plovdiv, BULGARIA**



**Faculty of Electrical Engineering and Information Technologies of Ss. Cyril and Methodius University in Skopje, NORTH MACEDONIA**



**Ministry of Environment and Energy - Directorate for Renewables and Electricity, GREECE**



**EVN Electricity Distribution LLC Skopje, NORTH MACEDONIA**

## Pilot Activities:

- PV systems;
- LiFePO4 & LTO battery energy storage systems;
- Hybrid inverters;
- Electrical and thermal energy metering and control equipment;
- Data acquisition & display features;
- Smart meters in prosumers and consumers installations.



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## The Challenges

European Union's **energy targets for 2030** include the **transformation of the building stock to Nearly Zero Energy Buildings - nZEBs**. NZEBs are characterized by **reduced net-energy demand**, where most of their energy needs are **met by renewable energy sources**, especially **Photovoltaics (PVs)**. Consequently, in the following years, a considerable amount of intermittent solar generators will be connected to the electrical grid, thus **posing new challenges concerning the secure and reliable grid operation**. As the number of NZEBs increases, PV integration in the distribution grids of Balkan-Med region becomes a challenging task, hence **suitable policies and regulations should be adapted in order to promote grid-friendly buildings**. High PV penetration levels may result in unacceptable stress on the electrical grids during hours with high solar power generation. The most important technical challenges that may arise include overvoltages, overloading of network equipment, and fault protection issues. To effectively address these challenges, **the integration of Energy Storage Systems (ESSs) in NZEBs is considered as the most promising solution**.



*Enhancing storage integration in buildings with Photovoltaics (PV-ESTIA) is a project funded by the transnational Cooperation Programme Interreg V-B "Balkan-Mediterranean 2014-2020" and co-funded by the national funds.*

## PV-ESTIA primary goals:

- To enhance the integration of PVs & ESS in the building environment facilitating the transition towards nZEBs;
- To identify and tackle barriers in PV deployment;
- To provide a new energy management solution for buildings, taking into consideration potential interactions with the electrical grid;
- To transform buildings into a controllable energy source;
- To design and implement proper policies and regulations.



## PV-ESTIA main outputs:

- An innovative management scheme for hybrid PV+storage systems, making buildings grid-friendlier;
- A generalized model assessing alternative policies related to the implementation of such hybrids;
- An online tool providing profitability estimation of such systems;
- An advanced tool evaluating multiple policy scenarios;
- Set of joint policy & regulation recommendations in the form of roadmap for Balkan-Med region.

In the framework of the **PV-ESTIA project**, the performance of the proposed **PV+storage Innovative Management Scheme** will be evaluated under real-field conditions. **Pilot installations** will be selected with the aim to examine if and how the **size of the ESSs** and the different geographical conditions affect **the performance of the innovative management scheme**. **The pilot installations include the following cities:**

### THESSALONIKI, GREECE:

*The research committee building of **the Aristotle University of Thessaloniki** has been selected as pilot site for the installation of both **15 kWp PV system and 15 kWh ESS**.*

### KOZANI, GREECE:

*In this pilot site, **a 20 kWh ESS** is additionally installed to the existing **20 kWp PV** installation. at the dormitories building of the **Western Macedonia University of Applied Sciences**.*

### NICOSIA, CYPRUS:

***Five ESSs** with nominal capacity of **9.8 kWh** are installed in five different prosumers with existing PV installations. Additionally, **a 29.7 kWh ESS** is added to the existing PV installation in the Municipality building of Nicosia.*

### PLOVDIV, BULGARIA:

***Five prosumers** are selected for installing **ESSs** with a nominal capacity of **9,6 kWh**.*

### SKOPJE, NORTH MACEDONIA:

***7 kWh LTO ESS** has been installed in the building of **FEEIT, UKIM**.*