ProDeSA

Energy Efficiency Project Development for South Attica

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Project Presentation

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Covenant of Mayors Investment Forum –

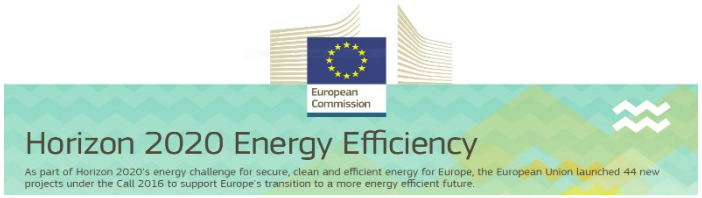
Energy Efficiency Finance Market Place

18th of October 2022

In a nutshell

PRODESA

Duration:	2017 -2022
Financed:	**'Project Development Assistance'** instrument of H2020
Partners:	13 partners
Scope:	**7 municipalities** located in the metropolitan area of Athens, joined forces to:



- **develop** showcase energy efficiency projects
- **bundle** energy efficiency interventions in larger projects
- utilize **innovative financial tools** and attract private investments by means of **Energy Performance Contracting (EPC)**

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Partners – Cooperation of Municipalities

Five municipalities developed projects and proceeded with **tendering and contract signing**:

- **ALIMOS (Project Leader)**
- **AGIOS DIMITRIOS**
- **GLYFADA**
- **VARIS - VOULA – VOULIAGMENI**
- **AGII ANARGIRI – KAMATERO**

Two municipalities participated as **replicators**

- **PALAIO FALIRO**
- **AMAROUSSION**

Results were **disseminated** to all municipalities in Greece via

- **CENTRAL UNION OF MUNICIPALITIES OF GREECE**

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Facilitating Partners

- **EUDITI**
  Energy and Environmental Design LTD
  Project management & coordination support
  Technical support

- **CRES**
  Centre for Renewable Energy Sources and Saving
  Support on regulatory issues
  Technical support

- **ENFINITY NV**
  Support on project financing issues

- **ECN**
  European Crowdfunding Network
  Support on crowdfunding issues

- **Kelemenis & Co. Law Firm**
  Legal support

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PRODESA was designed to resolve barriers such as:

- **Lack of financing for Project Development**
  - Due to the economic crisis, resources were allocated to more pressing needs, and investing in energy efficiency project development was ranked as a second priority;
  - **PRODESA** supported the project development which is the most difficult phase to be financed
- **Non-developed ESCO market**
  - only few EPC projects implemented in the private sector
  - in the public sector EPCs have not been deployed yet **for buildings' energy retrofits,** while few EPC street lighting projects with started appearing
  - **PRODESA** resulted in real large scale examples in the public sector with 'Data Evidence' on energy performance contracting so as to increase confidence
- **Municipality reluctance**
  - Municipalities are reluctant to adopt new financing mechanisms such as energy performance contracting
  - **PRODESA** developed blueprints of new approaches and tendering procedures that are necessary to support implementation and replication

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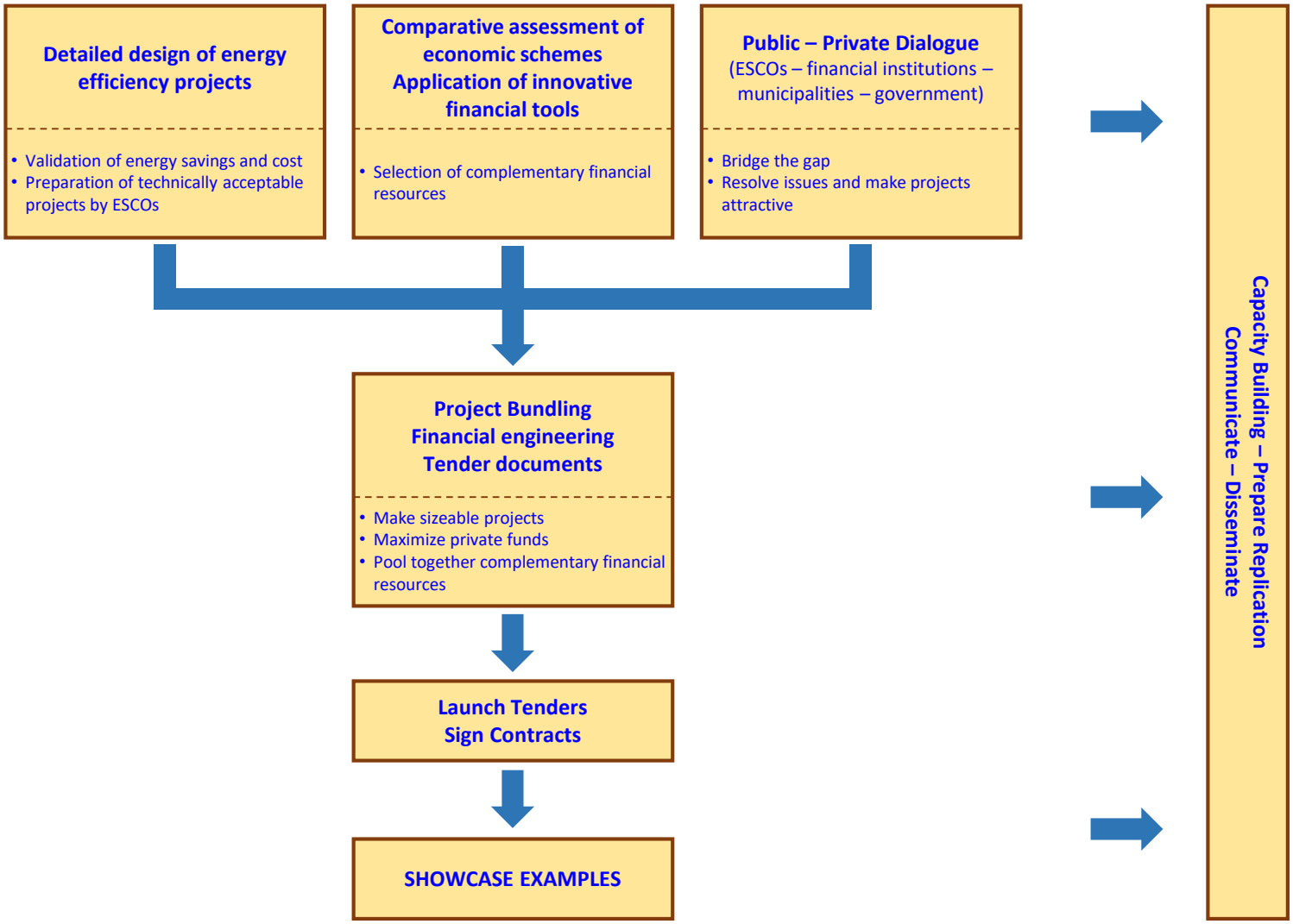
Project Structure



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Investments and financing schemes

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Building energy efficiency interventions

- Main building types
  - **schools** (mainly)
  - office buildings
  - open care centres for the elderly
  - cultural centres
- Most buildings are about **30 years** old
- Thermal protection needs improvement for the majority of the buildings
- Most of the heating systems **are based on oil**, are inefficient and need replacement
- Only a couple of buildings have photovoltaic system

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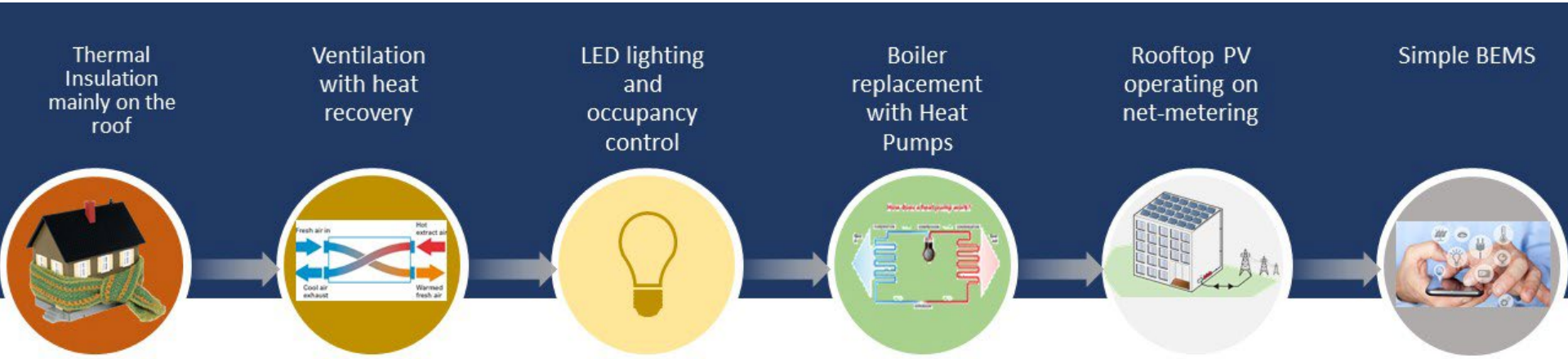
Building energy efficiency interventions



- Replace existing oil or gas-burning heating systems with heat pumps
- Install rooftop PVs for supplying RES electricity to cover a large part of building energy needs
- Reach nearly **Zero Energy Building (nZEB)** or A, or B+ energy performance class

- 40% improvement due to energy efficiency interventions
- PV electricity covers almost 50% of the remaining load
- post-renovation average annual energy consumption of 31 kWh/m^2 y

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Streetlighting energy efficiency interventions

- Define lighting levels based on categorization of streets according to standards (EN13201-1:2015)
- Replace existing luminaires with LED technology
- Install monitoring system that can also support smart cities applications

2 Municipalities

- **2.7 MW** or 12,000 luminaires replaced with LED and monitoring system
- Current primary energy consumption **34 GWh/y**
- Estimated primary energy savings of app. **75%**

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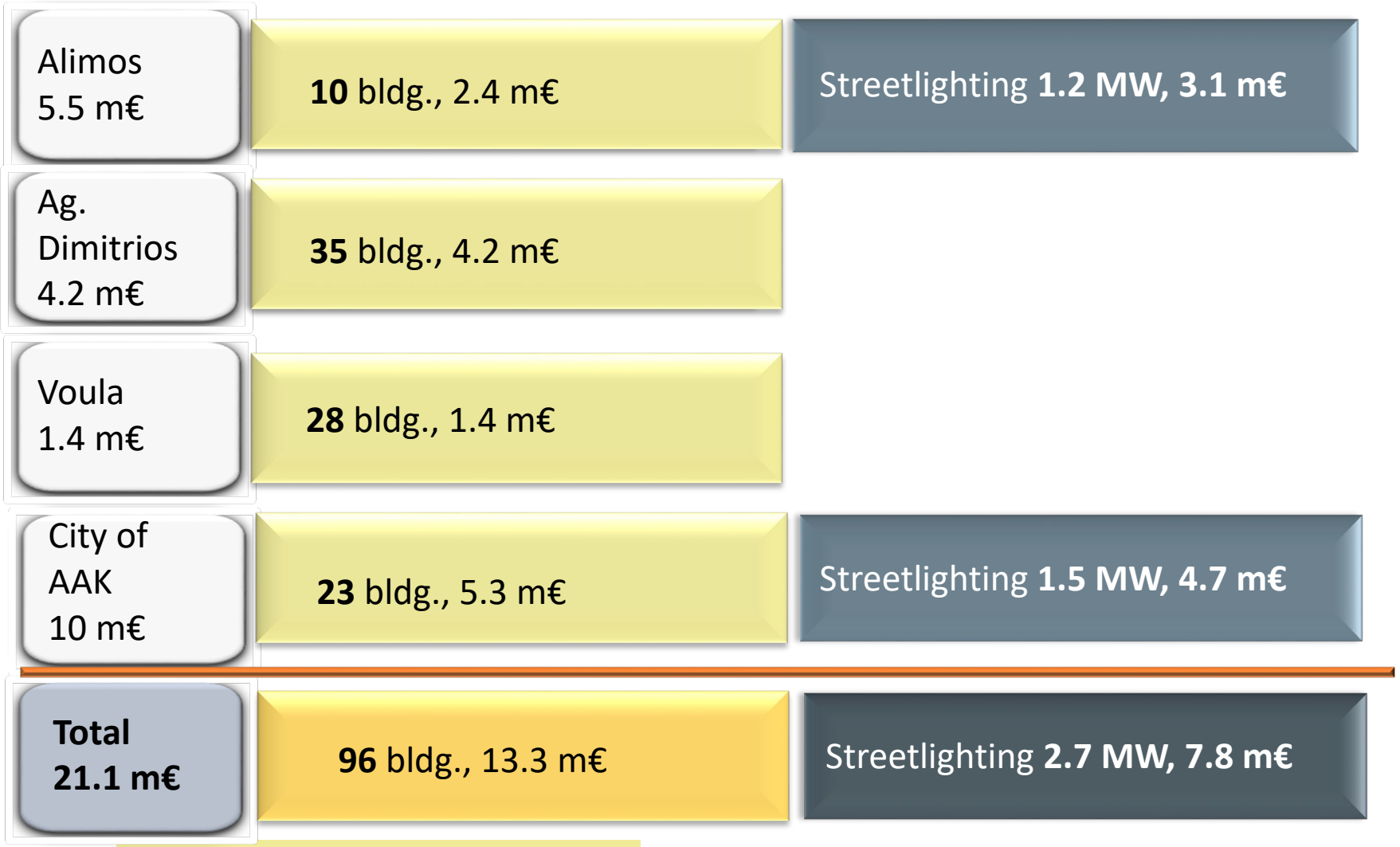
Total investment: 21.1 m€



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Energy Savings and CO_2 reduction

Buildings				
Municipality	**No. Buildings**	**Primary Energy Savings (MWh/year)**	**Electricity generated by PV (MWh/year)**	**CO_2 reduction (tn/year)**
Alimos	10	1,300	90	380
Agios Dimitrios	35	-	3,400	1,400
Vari-Voula-Vouliagmeni	28	200	300	310
City of AAK	23	1,100	700	460
Total	**96**	**2,600**	**4,500**	**2,600**

Street Lighting				
Municipality	**Installed capacity before (kW)**	**Luminaires**	**Primary Energy Savings (MWh/year)**	**CO_2 reduction (tn/year)**
Alimos	1,200	5,200	11,100	3,800
City of AAK	1,500	7,000	13,200	4,900
Total	**2,700**	**12,200**	**24,300**	**11,200**

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Financing schemes

- Mapping of available sources
- Mix of public and private financing resources
- Crowdfunding was also investigated as a financing option (donation type with rewards)

	Examples of financing schemes
Alimos	89% Regional Grant, 21% Own equity
Agios Dimitrios	100% EPC
Vari-Voula-Vouliagmeni	100% EPC
City of AAK	13% Public grant, 15% Own equity 72% EPC

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Energy Performance Contracting and Tendering procedures

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Suitable tendering procedures for EPC

Parameters taken into account:

- available **tendering procedures according to national procurement legislation (Law 4412/2016)**
- **requirements** imposed by each financing entity that would be used in the financial mixture
- point of view of the **market actors** obtained through the **ESCO Dialogue**
- point of view of the **participating municipalities**
- **EUROSTAT's** guide to the statistical treatment of EPC in order to try to keep the contract off-balance sheet

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The approach followed in PRODESA

Type of procedure: Open procedure

Municipalities were not willing in following a two-step procedure (e.g. competitive dialogue) since they were:

- unfamiliar with such procedures,
- it was perceived as difficult to be handled by the Municipal services and
- very time consuming

Preparatory work before the EPC tender

- Energy Audit identifying baseline consumption, the technical solution, the actual energy savings and the corresponding energy upgrade of the building class level (e.g. from class D to B+)
- Detailed design study of the Energy Efficiency and RES measures
- Basic elements of the Measurement and Verification Plan (M&V)
- Issuance of the Energy Performance Certificates of the buildings

In cases where the Authority doesn't have the means to perform **such a preliminary work**, the specification and design should be lead by the ESCO by utilizing a two-step procedure, e.g. a competitive dialogue.

Type of contract: Mixed contract of work, supply and services

- energy upgrade of buildings, traditionally has been treated in the public sector in Greece as a work or supply contract
- 2nd ESCO Dialogue ➔ EPC more compatible with the idea of an energy service contract rather than a work or supply contract
- financing sources brought together in PRODESA implicate grants from the National Strategic Reference Program (NSRF), it would not be compatible to procure an EPC for EE measures in the building sector as a service contract.

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EPC model

Guaranteed savings model

Guaranteed level of energy savings

- The ESCO guarantees to achieve a minimum level of energy consumption and of cost savings over the duration of the contract

- Energy consumption savings are expressed in kWh but also in monetary terms using an agreed energy price

The EPC makes it clear that the ESCO is responsible for ensuring that the design, construction, installation and performance of the EPC measures (including those specified and designed by the Authority) meet the standards set out in the EPC

Fixed operational payments towards the ESCO, given that the guaranteed levels are met (energy savings, RES production)

If there is a shortfall in actual achieved savings, then the ESCO pays the difference between the guaranteed and achieved savings to the Authority

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Prerequisites for contracting authority

Set already in public subsidy programs:

- Clear legal ownership of the buildings
- Permission documentation depicting the current status of the building (e.g. additions, refurbishment)
- Primary Seismic Control Bulletin, showing adequate seismic capacity (macroscopic inspection of the building) (http://www.oasp.gr/node/74)
- Energy Performance Certificate (energy class of the building)

Additional:

- Energy Audit (Baseline consumption)
- Identification of the technical solution and the energy upgrade that will improve the building class level (e.g. from class D to B+)
- Identification of the actual energy savings based on real consumption data

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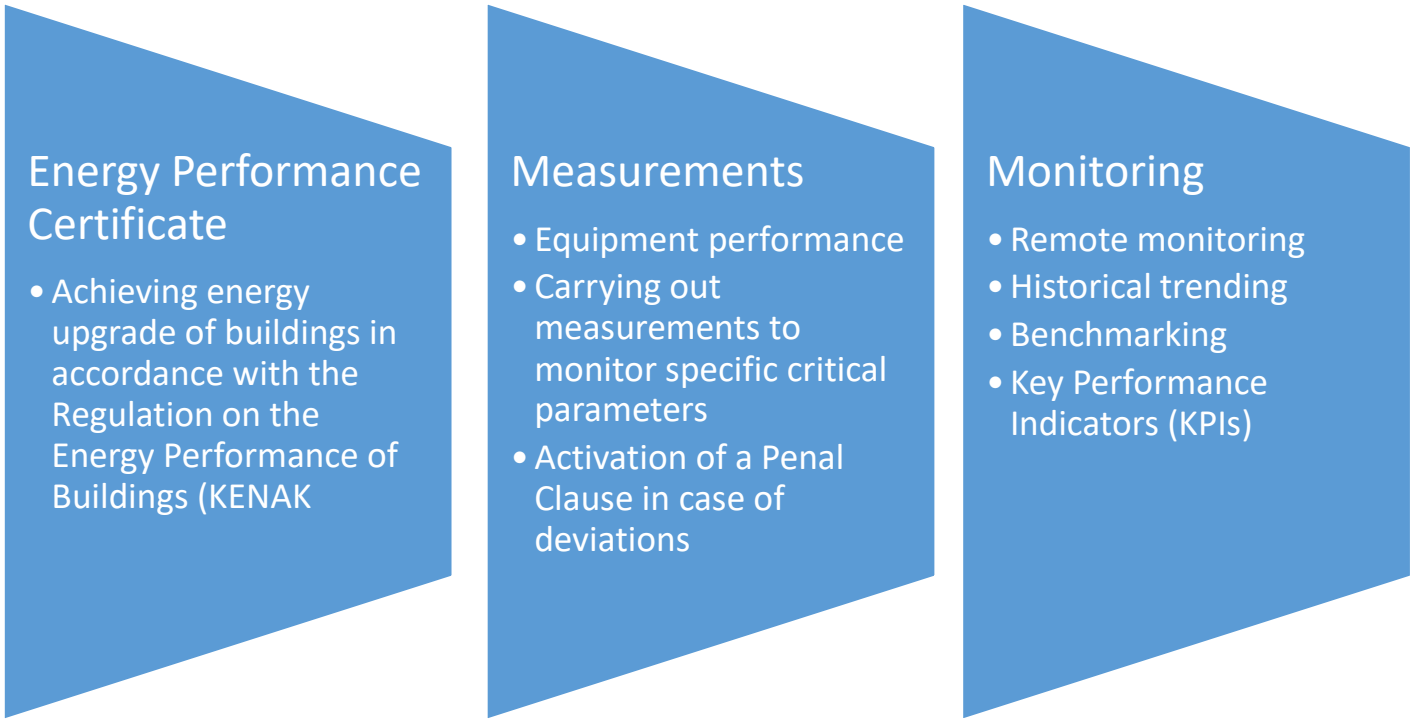
Measurement and Verification (M&V)

Measurement and Verification (M&V) constitutes a reference point for the Contracting Parties and is the cornerstone of an EPC

- 2nd ESCO Dialogue➔ importance of choosing the appropriate Measurement & Verification Plan for each project, that will not pose on the ESCOs responsibilities above their control.
- Lack of energy records kept in Municipalities



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Investments- Buildings

Municipality	Investment (m€)	Financing scheme/ Contract type
City of AAK	5.3	Split into two investments - **4.4 m€** procured as mixed work, supply and service contract, dealing with the upgrade of 19 building, fi**nanced by the ESCO (73%)**, while the remaining part is financed by a grant and municipality's own equity. A **Guaranteed Savings model contrac**t is utilized with a **10-year duration.** M&V Program, with penal clauses for not reaching the guaranteed savings - **0.9 m€** procured as a work contract dealing with the upgrade of 4 buildings and is financed by a grant (72%) and municipality's own (28%)
Vari Voula Vouliagmeni	1.4	Split into two investments - 1.2 m€ procured as a mixed supply and service contract, **financed 100% by the ESCO** and utilizing a **Guaranteed Savings model** contract with a 5-year duration, M&V Program, with penal clauses for not reaching the guaranteed savings - 0.2 m€ financed by equity procured as a work contract dealing with insulation
Ag. Dimitrios	4.2	procured as a service contract**, financed 100% by the ESCO, Guaranteed Performance** model contract, minimum performance level of the installed PVs for a 10-year period
Alimos	2.4	procured as a work contract, **with financing coming from a grant (81%) and municipality's own equity (19%), Guaranteed Savings model** that requests from the Contractor to achieve certain level of energy class upgrade of the buildings involved, according to the national building code (KENAK), 5-year guarantee

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Investments– Street lighting

Municipality	Investment (m€)	Financing scheme
Agii Anargiri Kamatero (City of AAK)	4.7	**10-year Guaranteed Savings EPC, 70%** paid upon completion and 30% through annual installments conditional to energy efficiency target
Alimos	3.1	**10-year Guaranteed Savings EPC**, 100% paid upon completion against **50% guarantee** to be annually released conditional to energy efficiency target

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Contributions of PRODESA

- Cooperation with the 'Consignments and Loans Fund' to **provide guarantee of payments** to the ESCO during the whole energy performance contract duration
  - **The Fund is empowered to do so (Law 4643/2019, art. 28)**
- Proposal to the Ministry of Environment and Energy for the amendment of the net-metering regulation **for allowing the use of PV generated electricity to offset electrical consumption by other municipal uses, e.g. street lighting,** through virtual net-metering
  - **(Law 4951/2022, art. 100)**
- **Replication guidelines** for implementing energy efficiency projects through EPC and a network of replicators with **39** municipalities
- **Tools** and **useful material** for all steps available at the project website such as:
  - specifications for the **design**
  - set of easy – to – use **EXCEL tools** for the **economic assessment**
  - **templates for procurement procedures** and **tender documents**
  - model contract, including **M&V Plan**
  - **real case examples**

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Lessons learned

- **Implicate all relevant actors** from the municipality's side from the very beginning in order to make sure that all actors understand the **basic features of the EPC concept** and how to incorporate them **in their business as usual processes**
- **Openness to new mechanisms** such as EPC, and c**ommitment from higher hierarchy level** (i.e. Mayor) to proceed with EPC is very crucial for having a positive outcome
- **Public grants** are essential for making building energy efficiency projects **sustainable**, especially when including envelope insulation.
- Bundling photovoltaics with energy efficiency interventions improves the **economic sustainability** of the investment
- Grants coming from the previous programming period 2013-2020 of the National Strategic Reference Framework (NSRF) **are very difficult to be combined** with private financing through EPC
- PRODESA was in close communication with the relevant ministries (Ministry of Environment and Energy, and Ministry of Development) in order to **pass though all the experience gained** from the project and make sure to foresee in the next programming period (2021-2027) the **compatibility of EPC financing and grants**

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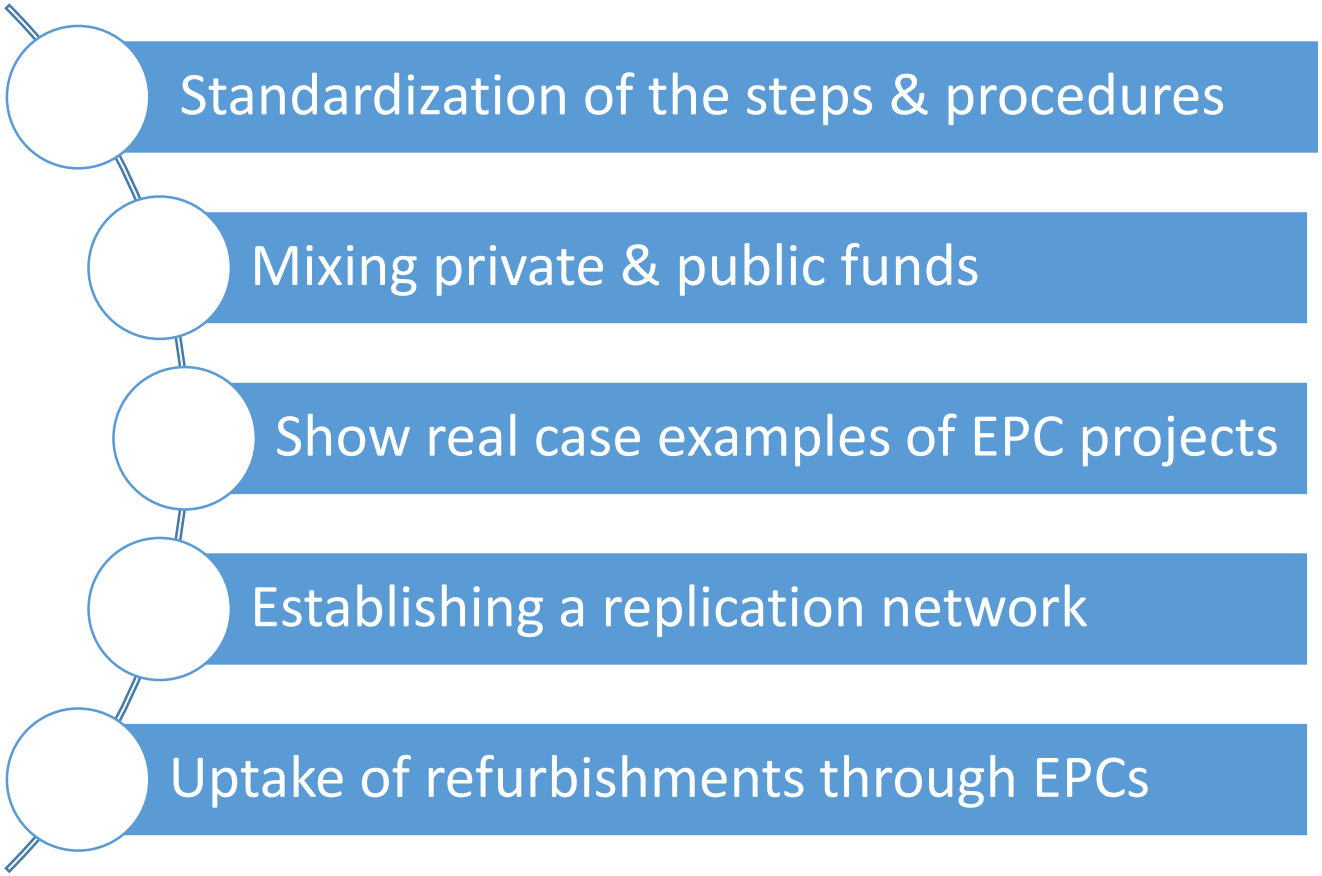
Major outcomes



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Thank you

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