# Efficient Buildings First

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**EUDITI – Energy & Environmental Design**

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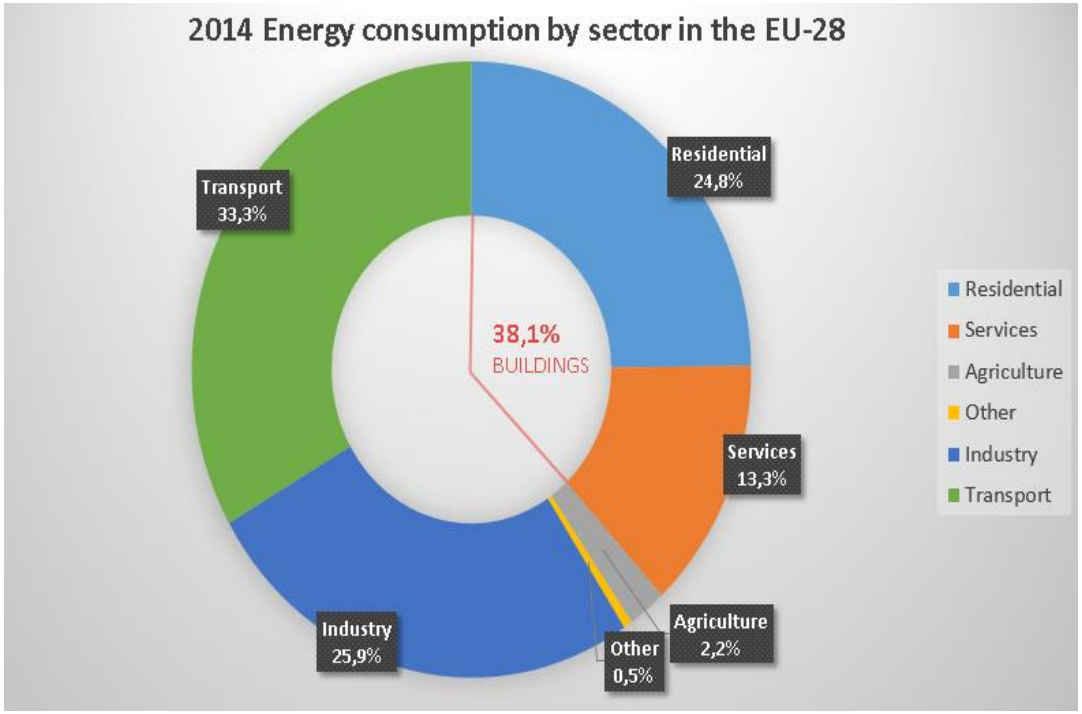
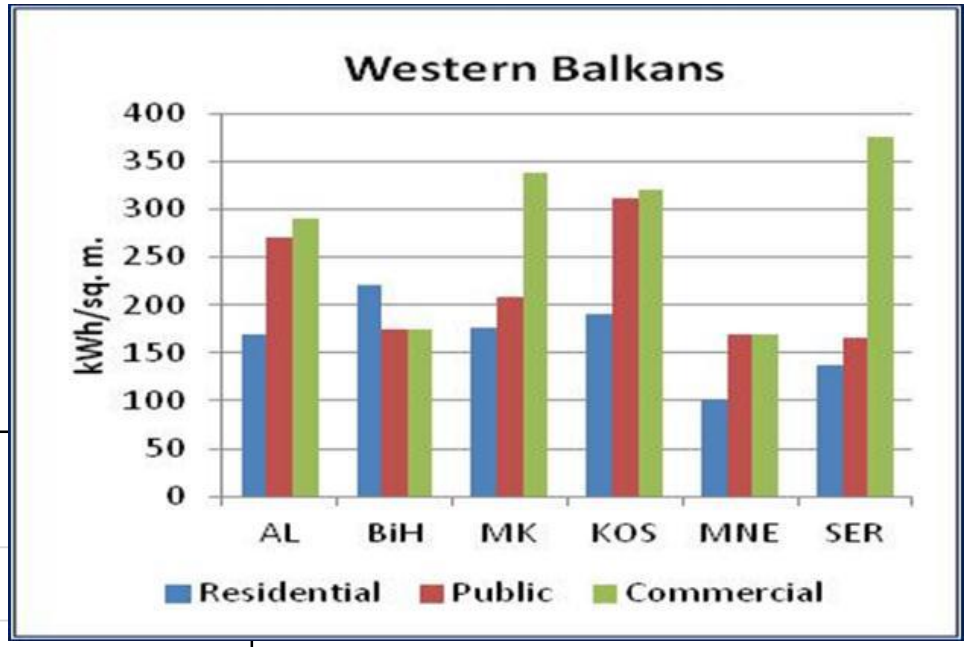
- Current consumption and Energy Efficiency Potential
- Where are we today and where are we going for 2030 and 2050 (large consumers now but nearly zero energy buildings and positive energy buildings)
- What are the requirements to get there (need high capital)
- Need to bring in private investments
- Best ways to do so (ESCOS)
- Example of an EU – Horizon 2020 - PDA supported project

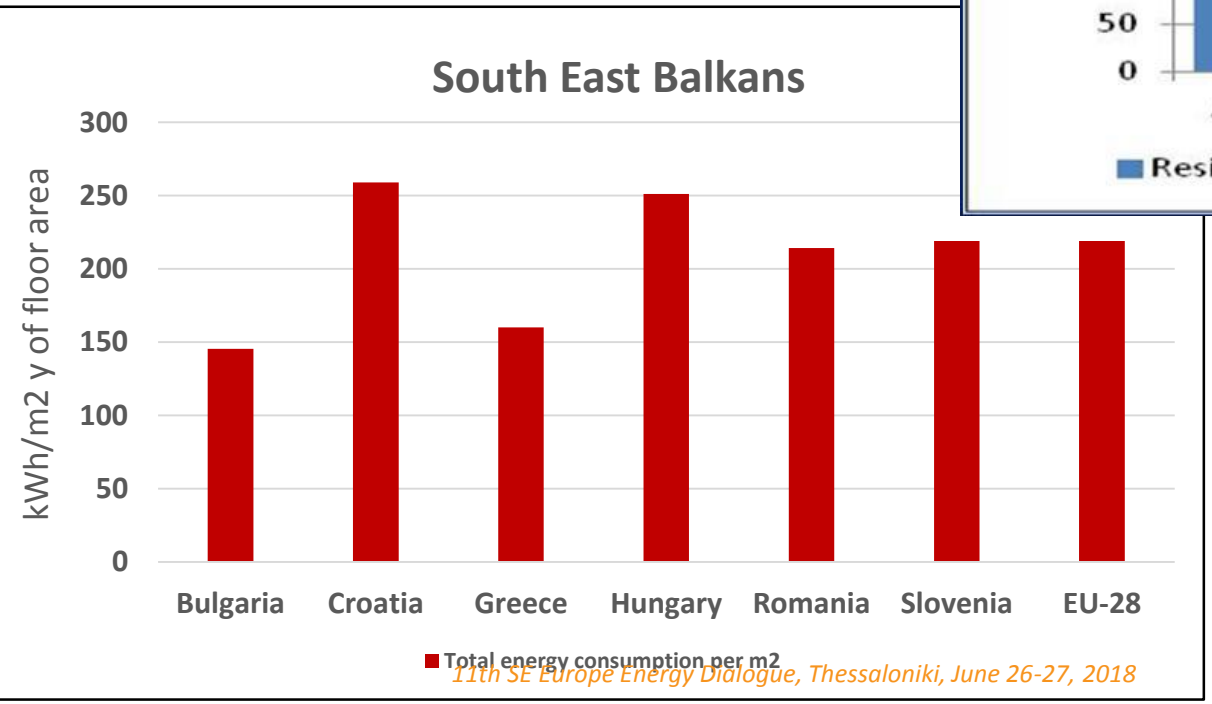
# Buildings as energy consumers




**In the Western Balkan Countries**
Buildings represent about 50% of the total energy consumed in the region

# SEE Countries – Specific energy consumption in buildings



# What is the potential for energy efficiency

Energy Intensity



the EU figure for 2013 was 128 kgoe/€1,000

Source: WBIF, Financing energy efficiency investments in the Western Balkans

# What is the potential for energy efficiency

- The vast majority of the energy used in buildings is for **heating and cooling systems** (85%). This means that not only can simple measures such as improved insulation increase comfort in homes; they can also greatly reduce final energy consumption, saving on costs
- Improvements in technology and proper building design can ensure very low energy consumption levels
- Today it is technically easy to reach as low consumption levels as 10 – 30 kWh/m$^2$ per year depending on the building use and further reduce these levels by combining energy efficiency with renewable energy supply systems

# Benefits from improvement of energy efficiency in buildings

- Energy savings, leading to lower running costs, a healthier living and working environment for citizens
- Alleviating energy poverty, by improving in-efficient buildings usually housing low income citizens
- Gradual decentralisation of Europe's energy system through the use of sustainable energy in buildings
- Boost the construction industry which is one of the main pillars of the European economy
- Contribute to the circular economy
- Retrofitting is often the more environmentally friendly option, because it preserves material and reduces transport needs

# Benefits from improvement of energy efficiency in buildings

- Reduction in GHG emissions as about 36% of the EU's total GHG emissions can be attributed to energy consumption in buildings
- According to the Stern Review, if emissions are not reduced, losses from climate impacts could amount to 5-20% of GDP
- The EU is unlikely to be able to achieve its own climate objectives, such as the reduction by 80-95% of GHG emissions by the year 2050 compared to 1990 levels, without more energy efficient buildings

# Energy and climate targets

- 2030 Targets
  - The new regulatory framework includes an energy efficiency target for the EU of 32.5% with an upwards revision clause by 2023. Together with the recently agreed 32% renewable energy target for the EU for 2030, Europe will be equipped to complete the clean energy transition and meet the goals set by the Paris Agreement
- 2050 Targets
  - A low carbon economy with 80% - 90% reduction in GHG

# Energy and climate targets

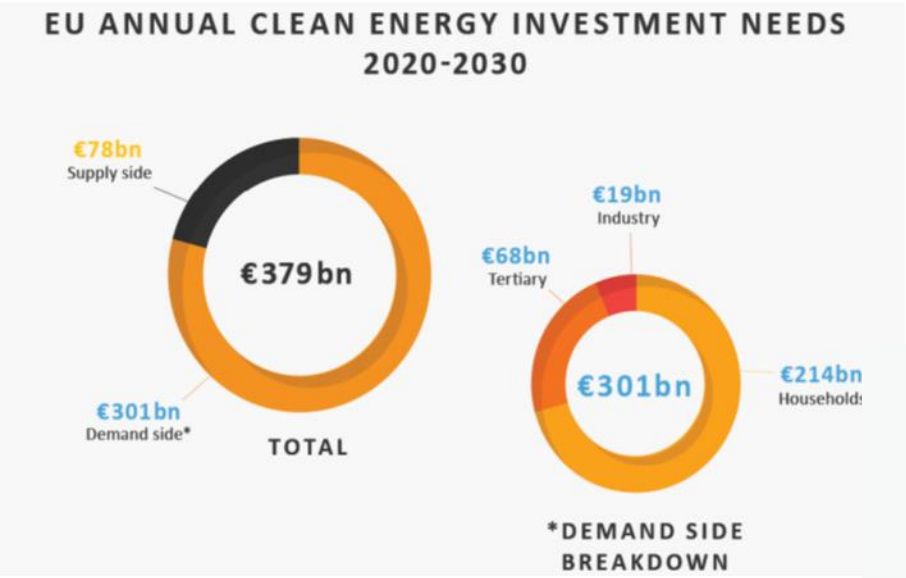
- Around 75% of the building stock is energy inefficient
- More than 75% of the current building stock will still stand in 2050 whilst the new construction rate is overall low.
- At the current 1% annual renovation rate it would take around a century to decarbonise the building stock to modern, low carbon levels
- A faster a deeper rate of renovation in terms of energy savings is crucial for Europe to achieve its commitment to the Paris agreement (*BPIE*).
- A decarbonised building stock by 2050 requires the big majority of buildings in the EU to be highly energy efficient, complying, at least, with an Energy Performance Certificate (EPC) label A

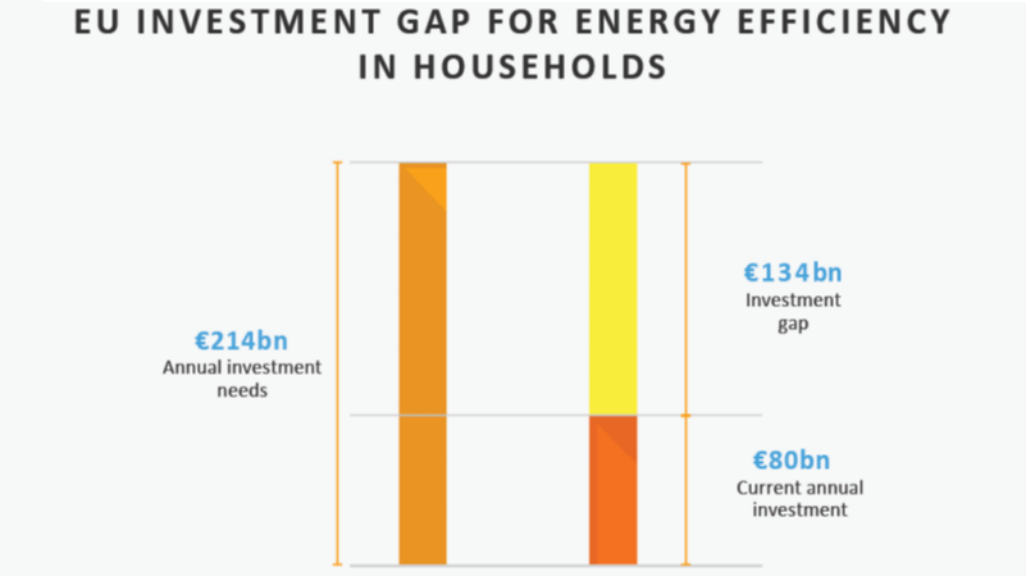
# Target for 2050

- **Buildings**
- Emissions from houses and office buildings can be almost completely cut – by **around 90%** in 2050.
- Energy performance will improve drastically through:
  - **Very efficient new buildings – nearly zero energy buildings**
  - **refurbishing** old buildings to substantially improve energy efficiency
  - substituting **electricity and renewables** for fossil fuels in heating, cooling & cooking
  - Investments can be recovered over time through reduced energy bills.

# Investment needed

## To meet the targets substantial investments are needed




Source: 'Efficiency first scorecard', Briefing paper 2017, E3G

# Innovative financing needed

As the public money does not suffice, it should be complemented by private investments

Public money should be used more effectively addressing identified market failures and maximising leverage of private investments

Energy Performance Contracting, EPC, is key financing mechanism and its role should increase in public buildings as it offers a holistic approach to renovations, including financing, carrying out the works and energy management

# EPC is Key Financing mechanism

- Energy Performance Contracting guarantees savings for the whole contract period as the reimbursement of the EP contractor is linked to the savings achieved
- Depending on the percentage of private investment, EPC allows investing in energy efficiency without increasing public debt; *(Eurostat, EIB 2018, A Guide to the Statistical Treatment of Energy Performance Contracts)*
  - **This is very important for local and regional authorities facing budgetary constraints**

# ProDeSA

Ανάπτυξη Έργων Ενεργειακής Αποδοτικότητας στη Νότια Αττική


Seven municipalities located in the Athens Metropolitan area will reduce their energy bills via energy efficiency retrofits and by locally available renewable energy sources

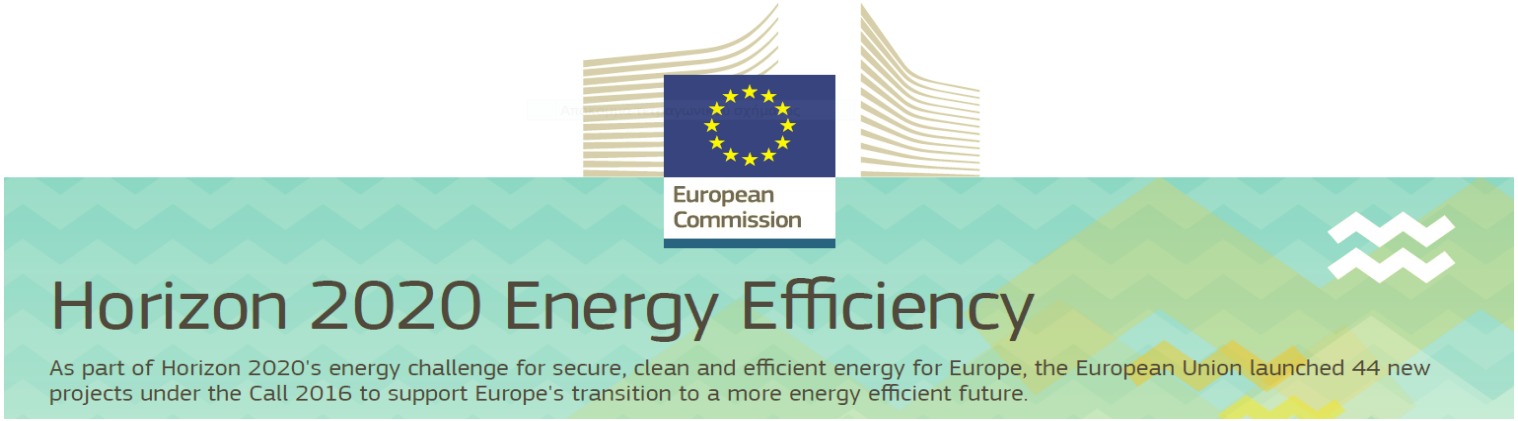
# Energy Efficiency Objectives

In 116 municipal buildings

- expected primary energy savings 8 GWh/year
- PV electricity generation 4,8 GWh/year

6,3 MW streetlighting

# Supported with 100% by the European Program:

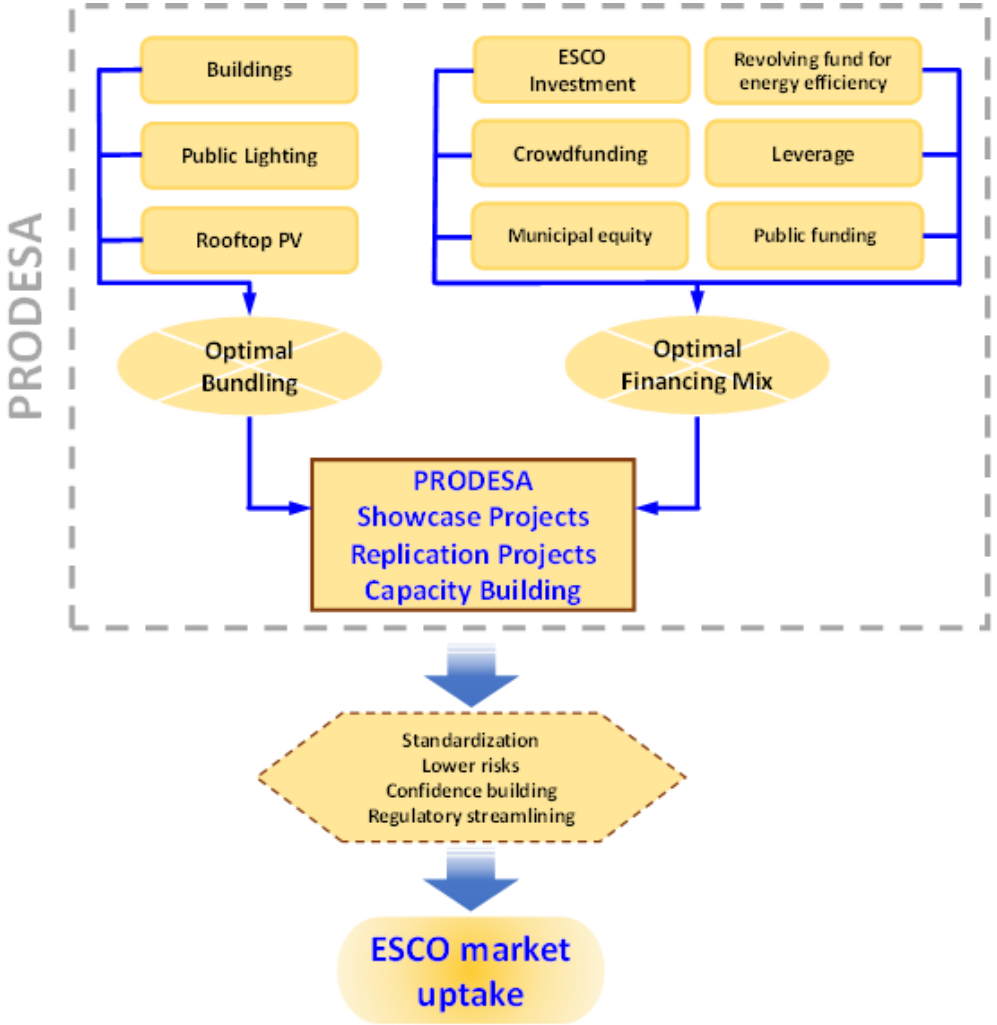



Innovative financing /
EE22/2016 Project development assistance

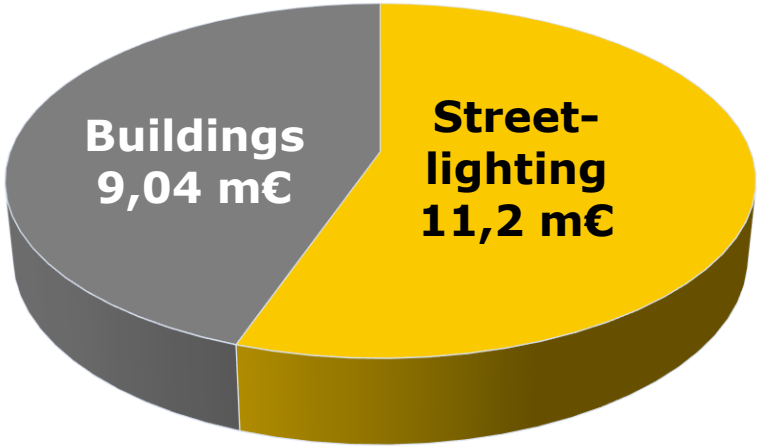
# Objectives

- Technical and economic evaluation of energy interventions and categorization based on criteria of energy and cost efficiency
- Bundling of energy efficiency interventions to make sizable projects facilitating their implementation via Energy Performance Contracts
- Development of a financing scheme which will provide guaranties for all parties and reduce the operational risks
- Contribution to standardization of energy efficiency projects in municipalities (design studies, specifications, guaranties, contracts, verification)
- Demonstrate financing and organisational innovation for the municipalities in Greece and produce “Data Evidence” on performance of EPCs and investments

# The Concept


PRODESA
Buildings
Public Lighting
Rooftop PV
ESCO Investment
Revolving fund for energy efficiency
Crowdfunding
Leverage
Municipal equity
Public funding
Optimal Bundling
Optimal Financing Mix
PRODESA
Showcase Projects
Replication Projects
Capacity Building
Standardization
Lower risks
Confidence building
Regulatory streamlining
ESCO market uptake

# The Investment




**Total Investment: 20,4 m€**

| | Current Primary Energy Consumption (GWh/year) | Primary Energy Savings (GWh/year) | Savings in % | Electricity generation by PV (GWh/year |
|---|---|---|---|---|
| **Buildings** | 18,96 | 8,02 | 42 | 4,8 |
| **Street-lighting** | 60,11 | 37,63 | 61,7 | - |
| **Total** | **79,07** | **45,65** | | **4,8** |

# Initial Bundling of Interventions

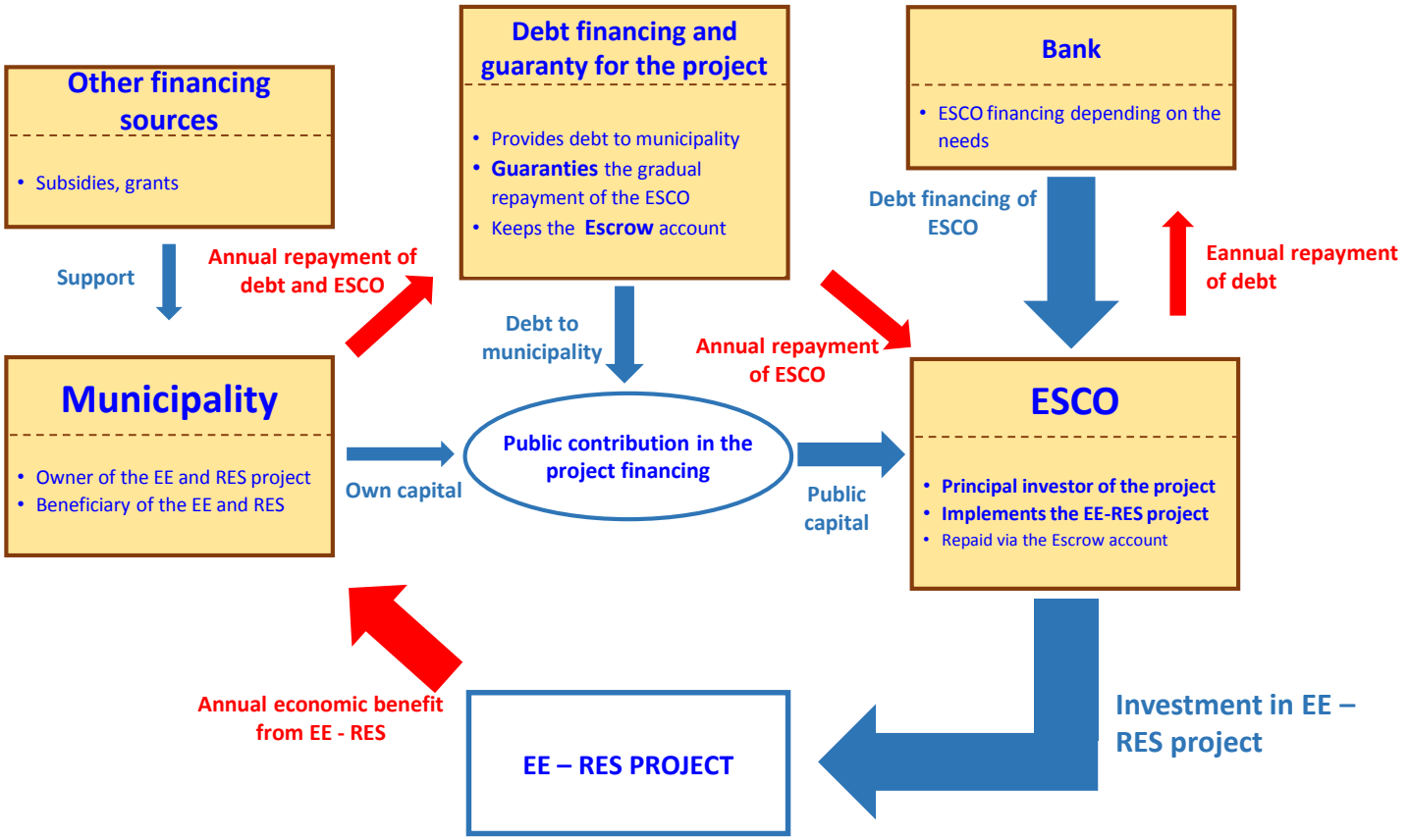
| | Buildings (m €) | Streetlighting (m €) | Total Investment (m €) |
|---|---|---|---|
| Alimos | 1.24 | 4.0 | 5.24 |
| Ag. Dimitrios | 2.44 | -- | 2.44 |
| Glyfada | 1.11 | 5.7 | 6.81 |
| Voula | 2.47 | --- | 2.47 |
| Ag. Anargiri Kamatero | 1.78 | 1.5 | 3.28 |
| Total | 9.04 | 11.2 | 20.24 |

# Expected Results from Bundling

Bundling of energy efficiency interventions will lead to:

- ✓Reduction of operational cost
- ✓Easier access to financing
- ✓Attraction of investors' interest
- ✓Achieve better payback periods
- ✓Risk reduction (technical, operational, financial)
- ✓Reduction of project runtime and faster revenue inflow

# Preliminary Financing Scheme



# Partners – Cooperation of Municipalities

PRODESA benefits from the **cooperation** and **exchange of experience** of seven municipalities in Athens. Most of them located in the southern part of Athens

Five municipalities will develop projects and proceed with tendering and contract signing:

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

Two municipalities will participate as replicators

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

Results to be disseminated to all municipalities in Greece via

- **CENTRAL UNION OF MUNICIPALITIES OF GREECE**

also participating in PRODESA

# Facilitating Partners

- **EUDITI**
  Energy and Environmental Design LTD
  Project management & coordination support
  Technical support
- **CRES**
  Centre for Renewable Energy Sources
  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

# www.prodesa.eu

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