Interreg CENTRAL EUROPE
European Union European Regional Development Fund

BOOSTEE-CE

DELIVERABLE D.T2.3.1

D.T2.3.1 Developing Training Materials

Version 1
10/2019

D.T2.3.1: Developing Training Materials

A.T2.3 Trainings for municipality/city staff, urban and energy planners

Transnational report

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Table of contents

1. Introduction

The training material, which is included in this document, has been developed within the BOOSTEE-CE project, co-funded by the Interreg CENTRAL EUROPE programme, which encourages cooperation on shared challenges in Central Europe. The project supports implementation of the concept of integrated energy management in public buildings through implementation of selected technical and ICT tools in 8 pilot areas from different EU countries. The tools implemented will lead to reduction of energy consumption and change of behaviour of building users. The training material focuses on issues related to the overall topic of energy efficiency in public buildings, that could be used to increase knowledge, capacities and skills of building owners, managers and decisions makers, enabling them to successfully implement sustainable energy measures in their buildings.

The training material elaborated by the consortium discusses variety of topics, which fall under three main categories: ICT issues, financial aspects and energy management.
The training material has been divided into 3 training modules presented below:

1. Module I: Introducing Energy and Climate Planning.
2. Module II: The Online Energy Platform OnePlace.
3. Module III: Energy management for public administrations: from retrofit measure to financial scheme.

For each module there is a theoretical introduction accompanied by at least one exercise allowing the trainees to test new knowledge gained. What is very important about the BOOSTEE-CE training material, is that it not only provides knowledge but also shows practical aspects related with the implementation of ICT tools and energy efficiency measures in public buildings. Each training module is available in English version as well as was translated into 7 consortium languages (Polish, Italian, Slovenian, German, Croatian, Czech, Hungarian). The training materials are available on BOOSTEE-CE project website:
https://www.interreg-central.eu/Content.Node/BOOSTEE-CE.html

2. Training courses curricula

The BOOSTEE training is structured in three parts:

THEMATIC PANEL 1: Energy and climate planning for boosting public building EE

Partner in charge for the content	Regional Energy Agency North – PP 4
Summary	The first panel gives an overview about the tools and actions in EE as well as insights to the decision-making process regards EE actions, RES investments. A guided exercise during the first panel helped to put theory into practice!
Duration	2 h 45 min

The purpose of the thematic panel "Introducing Energy and Climate Planning" is to enable participants of BOOSTEE-CE International Training to apply gained EE knowledge to a real world problems within their area of action. Energy and climate planning is a framework of each country/county/municipality within each of them have to plan, in an integrated manner, their climate and energy objectives, targets, policies and measures that are, in many cases, basis for decision-making.

Training participants will acquire the following learning outcomes:

- basic knowledge on energy and climate planning, procedures and methodology, relevant directives and legislations and key stakeholders to be involved in implementations
- identify and use tools for actions identification and decision making facilitation
- develop measures and actions on energy efficiency and use of renewable energy sources in public sector
- develop measures and actions on adaptation to climate change
- define presentation strategy
- present measures developed as a part of energy planning in public buildings.

Training will be divided into three parts. The first one will provide brief theoretical introduction into energy and climate planning methodology and key issues planners facing with. The second and third parts are guided practical works that will give participants ability to prepare three different measures or actions as a part of energy and climate plans through three different roles: Managing Director, Energy Expert and Financial Expert.

Agenda:

- Introducing Energy and Climate Planning
- Tools for facilitating decision making
- Guided exercise on energy planning in public buildings
- Closing discussion

THEMATIC PANEL 2: Online Energy Platform - OnePlace

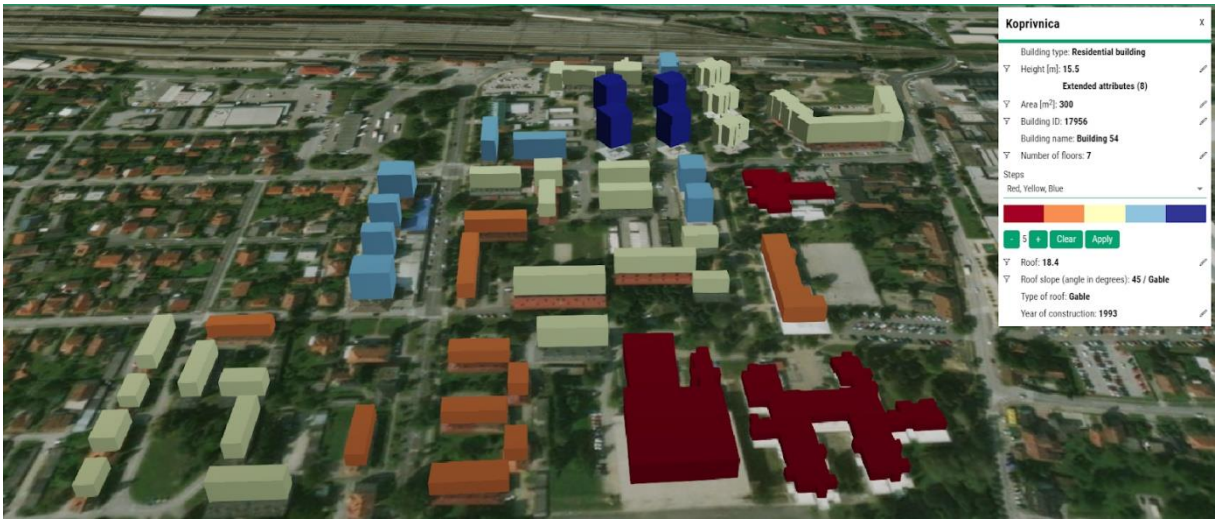
Partner in charge for the content	FBK – PP1, EUWT NOVUM – PP12
Summary	BOOSTEE-CE OnePlace platform was introduced as well as tutorial on how to use and how to navigate between the different sections which help the visualization and query of energy audits within a 3D city model to improve assessment, understanding and planning of energy uses and flows. At the same time, the platform offers also guidebooks, tools and best practices to improve energy efficiency of building(s).
Duration	1 h 45 min

The thematic panel will introduce, describe and showcase the BOOSTEE-CE web platform named OnePlace. OnePlace allows to use 3D city models for the visualization and query of energy related information to better assess, understand and plan energy uses and flows. At the same time, the platform offers also guidebooks, tools and best practices to improve energy efficiency of public buildings.

The training will introduce the online platform with its tools, examples and methodologies for public authorities and energy planners in order to assist them at proper energy management and energy savings in public buildings. The participants will learn

- how to visualize and query energy data (consumption, audits, PV potential) within 3D city models to enhance assessment, understanding and planning of energy uses and flows
- how to use the national & EU-level resources (practical steps) through introduced transnational strategy outcomes, financial road maps and examples of the best practices

- how to make an energy-wise decision when buying electronic or electric appliances and where to find qualified contractors for energy efficiency projects (architects, engineers, auditors, craftsmen, technicians and installers, energy agencies etc.)
- some good practices within energy efficiency sector, that demonstrate the range of approaches and measures various cities have used to undertake efficiency improvements and thus help to guide cities in designing effective urban energy efficiency policies and programs.



Agenda:

- Introduction to OnePlace Platform
- I module: Living Energy Marketplace
- II module: Energy Efficient Cities
- III module: Financing Energy Efficiency
- IV module: 3D Energy Management System (3DEMS)
- DEMO – practical use of 3DEMS

THEMATIC PANEL 3: Introduction to EU funding sources and financial models for applying energy efficiency in public buildings.

Partner in charge for the content	RER – PP 7
Summary	Participant became familiar with the European Structural and Investment Funds – what is their role in the European Union, who

	can be a beneficiary, their aims, how do they work and what are their expected results.
Duration	2 h

The purpose of the thematic panel "Energy management for PA" is to review available funding sources to implement energy efficiency action in public administrations. Regarding sustainable energy and energy efficiency, the main directly managed instruments (i.e. direct funds) are the following:

• the Horizon 2020 program;

• the Life 2014 - 2020 program;

• financial instruments (Elena, EEEF).

On the other hand, more than half of the EU funds are disbursed through 5 European Structural and Investment Funds (ESIF), jointly managed by the EC and EU countries. All these funds are used to make investments to create jobs and a healthy and sustainable economy and environment in Europe. ESIF focus on 5 sectors: research and innovation, digital technologies, supporting the low-carbon economy, sustainable management of natural resources, small businesses. ESIF include:

• the European Regional Development Fund (ERDF) - which promotes balanced development in the different regions of the EU.

• the European Social Fund (ESF) - which supports projects on employment throughout Europe and invests in Europe's human capital: in workers, young people and all those seeking a job.

• the Cohesion Fund (CF) - which finances transport and environmental projects in countries where the gross national income (GNI) per capita is less than 90% of the EU average. In the 2014-2020 period, these are Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.

• the European Agricultural Fund for Rural Development (EAFRD) - dedicated to rural areas of the EU.

• the European Fund for Maritime Affairs and Fisheries (EMFF) - which helps fishermen to use sustainable fishing methods and coastal communities to diversify their economies, improving the quality of life in European coastal regions.

All these funds are managed by the countries themselves, through partnership agreements. Each country prepares an agreement, in collaboration with the European Commission, which illustrates how the funds will be used during the funding period.

Participating in a community program is certainly not an easy task, even if the EC's programming tends to call planning that allows you to prepare a proposal well in advance. Starting from the announcement, in fact, one must deal with documents of considerable complexity that require the application of specific skills. The activity of study of the reference documentation is therefore absolutely preliminary to obtaining community subsidies. However, this activity should not be limited to the study of the call, because any proposal must necessarily comply with the general objectives of the European Commission and the specific

objectives of the individual program. The project proposal must therefore organically integrate a hierarchy of equally relevant objectives. Participating in a community program and obtaining grants for a project is an important growth opportunity for the local authority and its territory, but at the same time a challenging challenge because it represents a long-term commitment that requires the acquisition of skills specific and high motivation. As with any competition, to win you need to prepare yourself with determination, build a competitive team and participate with ambitious goals.

Agenda:

- European direct funds
- European structural and investment funds

Abstracts of the three topics provided in Annex 1 will be distributed to participants before the training. The presentations for each panel are attached as annex 2.

3. Transnational implementation of training courses

The training course curricula presented in the previous chapter is developed for the two planned transnational trainings. Joint transnational training seminar are organized for municipalities and agencies in the partnership which will act as ambassadors for the implementation of OnePlace platform in their administrations and premises.

Also other regions will be invited to participate at the international training - municipality staff, public building operators, urban and energy planners, citizens and researchers from the whole EU to take part and to increase their knowledge about energy efficiency in public buildings. Two-day events are planned in Warsaw, Poland and Bled, Slovenia.

The knowledge and experience transfer will facilitate the uptake, diffusion & possible improvement of OnePlace and the transnational work of the project.

4. National implementation of training courses

Trainings (D.T2.3.3) for municipality staff, urban & energy planners will be organized in each region in order to showcase/explain the project's platform useful for energy audit and EE tasks. Trainings will be organized in each participating region, also inviting other regions.

The national versions of the training material will be developed, modified and aggregated to suit the characteristics of the local context and the needs of local users of BOOSTEE-CE tools and knowledge.

The BOOSTEE-CE developed training materials can be tailored by each Partner during the realisation of national versions of the training material for different target groups. So, it is important to point out that the duration of the courses and training presentations as shown above are “indicative” and during the implementation of the national courses they can be modified.

The steps expected before implementing the national courses in the involved countries are the following:

- development of a common training materials in English language;
- preparation of the national version of the training material;
- translation of the training material into local language;
- development and implementation of the training courses in each country.

5. Training courses evaluation

After the training the participants will be invited to fill in the questionnaire to give feedback on training. The questionnaire covers:

- General information on participants
- Feedback on organisation of the training
- Feedback on training content and training material
- Feedback on usefulness of the training
- Additional comments and suggestions.

The questionnaire is attached as annex 3.

The data collected from the evaluation of the training will be used to improve the training material, to compare the national training courses implemented in the eight different regions (7 countries) and analyse strengths and weaknesses of the national training experiences.

Annex 1 - Abstracts of the three training modules

Introducing Energy and Climate Planning

- introduction and agenda -

The purpose of the thematic panel "Introducing Energy and Climate Planning" is to enable participants of BOOSTEE-CE International Training to apply gained EE knowledge to a real world problems within their area of action. Energy and climate planning is a framework of each country/county/municipality within each of them have to plan, in an integrated manner, their climate and energy objectives, targets, policies and measures that are, in many cases, basis for decision-making.

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Agenda:

- Introducing Energy and Climate Planning
- Tools for facilitating decision making
- Guided exercise on energy planning in public buildings
- Closing discussion

Tutors:

Petra Orehovacki, Jurica Perko – Regional Energy Agency North (REAN), Koprivnica, Croatia

The Online Energy Platform OnePlace

- introduction and agenda -

The thematic panel will introduce, describe and showcase the BOOSTEE-CE web platform named OnePlace. OnePlace allows to use 3D city models for the visualization and query of energy related information to better assess, understand and plan energy uses and flows. At the same time, the platform offers also guidebooks, tools and best practices to improve energy efficiency of public buildings.

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- how to make an energy-wise decision when buying electronic or electric appliances and where to find qualified contractors for energy efficiency projects (architects, engineers, auditors, craftsmen, technicians and installers, energy agencies etc.)
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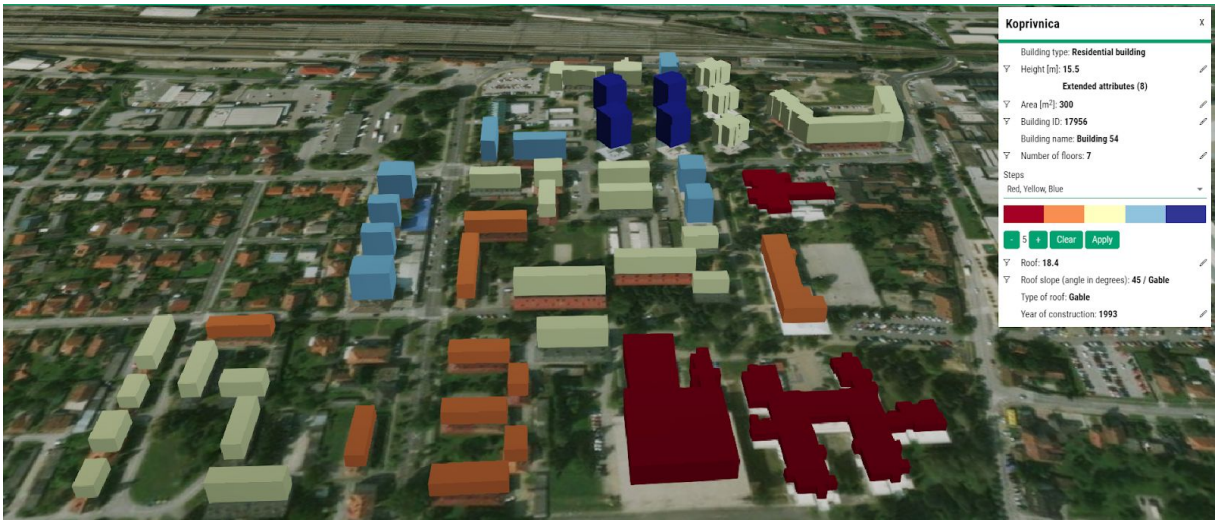

Agenda:

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- I module: Living Energy Marketplace
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- III module: Financing Energy Efficiency
- IV module: 3D Energy Management System (3DEMS)
- DEMO – practical use of 3DEMS

Tutors:

Fabio Remondino – FBK, Trento, Italy & Anna Nowacka – EUWT NOVUM, Jelenia Góra, Poland

Energy management for PA: from retrofit measure to financial scheme

- introduction and agenda -

The purpose of the thematic panel "Energy management for PA" is to review available funding sources to implement energy efficiency action in public administrations. Regarding sustainable energy and energy efficiency, the main directly managed instruments (i.e. **direct funds**) are the following:

• the Horizon 2020 program;
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On the other hand, more than half of the EU funds are disbursed through 5 **European Structural and Investment Funds** (ESIF), jointly managed by the EC and EU countries. All these funds are used to make investments to create jobs and a healthy and sustainable economy and environment in Europe. ESIF focus on 5 sectors: research and innovation, digital technologies, supporting the low-carbon economy, sustainable management of natural resources, small businesses. ESIF include:

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• the European Agricultural Fund for Rural Development (**EAFRD**) - dedicated to rural areas of the EU.
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Agenda:

- European direct funds
- European structural and investment funds

Tutor:

Silvia Rossi - Clust-ER BUILD Manager, Bologna, Italy

Annex 2 - Presentations

THEMATIC PANEL 1: Energy and climate planning for boosting public building EE

Transnational training

Introducing Energy and Climate Planning

Petra Orehovacki, REA North, Croatia

Regional Energy Agency North

September, 2019

Energy planning

→ Process of developing long-range policies to help guide the future of a local, national, regional or even the global energy system.

→ Energy planning is particularly appropriate for **communities** who want to develop their own energy security, while employing best available practice in their planning processes.

Energy planning

→ MITIGATION – actions or measures that helps to reduce energy consumption and human-generated greenhouse gas emissions

→ Cities must be leaders in reducing greenhouse gases!!!

Climate planning

→ There is no „**one-size fits all**” approach
→ **ADAPTATION** – process through which communities prepare to cope with an uncertain future climate
→ It does not mean that negative impacts of climate change will be completely avoided, only that they will be less severe than if no planning had occured

Energy and climate planning

Energy and climate planning is a cross sectoral task and involves a variety of different professional capabilities:

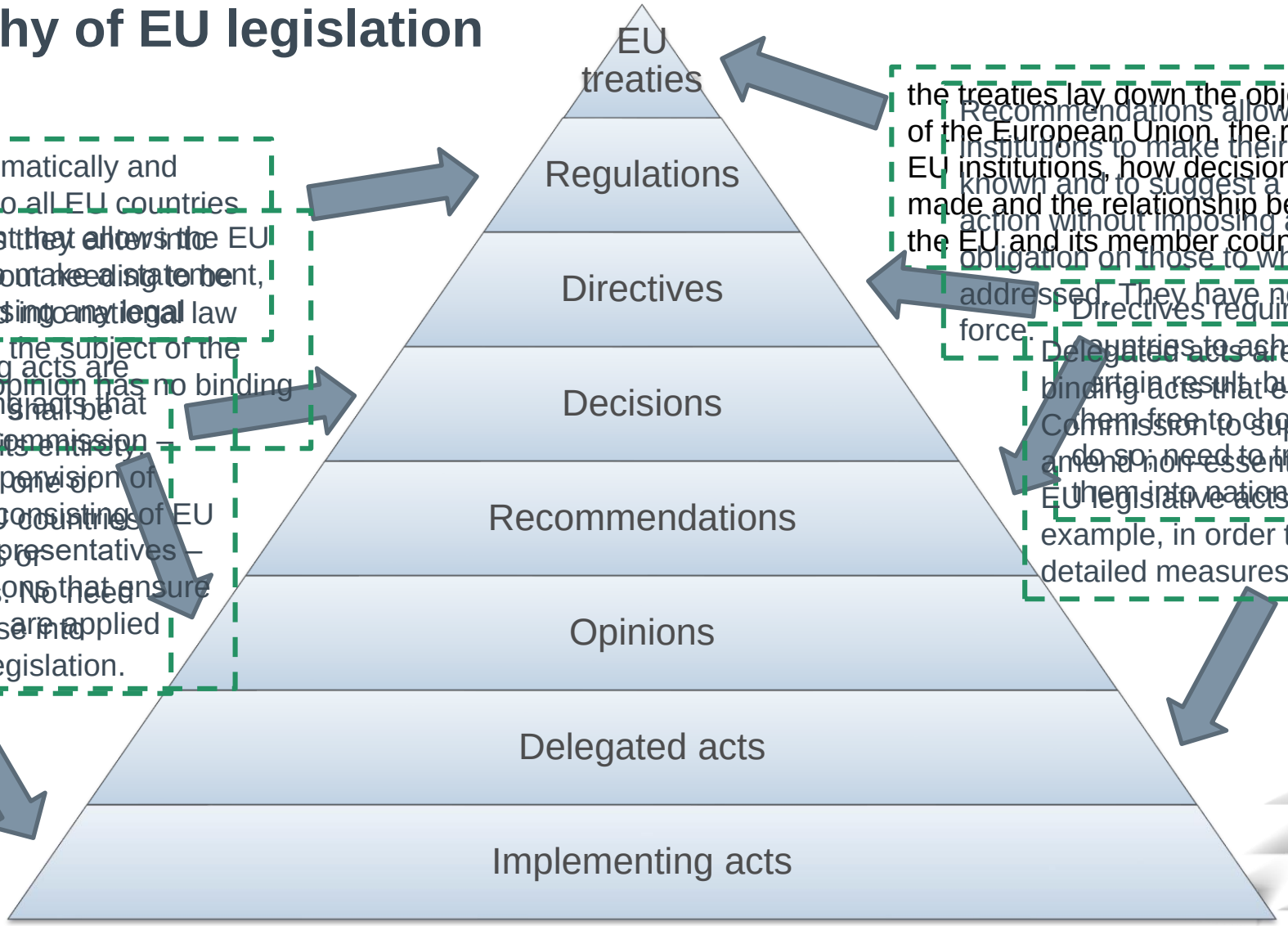
- **Energy sector**
- **Environmental issues**
- **City building and urban planners**
- **Architecture**
- **Logistics**

Energy and climate planning comprises many elements:

- **Planning**
- **Coordination**
- **Analyzing**
- **Process management**
- **Consulting**
- **Law issues**
- **Education**
- **Engineering**

Energy and climate planning

Hierarchy of EU legislation



the treaties lay down the objectives of the European Union, the rules for EU institutions, how decisions are made and the relationship between the EU and its member countries.

Recommendations allow the EU institutions to make their views known and to suggest a line of action without imposing any legal obligation on those to whom it is addressed. They have no binding force.

Directives require EU countries to achieve a certain result, but leave them free to choose how to do so; need to transpose them into national law

Delegated acts are legally binding acts that enable the Commission to supplement or amend non-essential parts of EU legislative acts, for example, in order to define detailed measures.

apply automatically and uniformly to all EU countries as soon as they enter into force, without needing to be transposed into national law

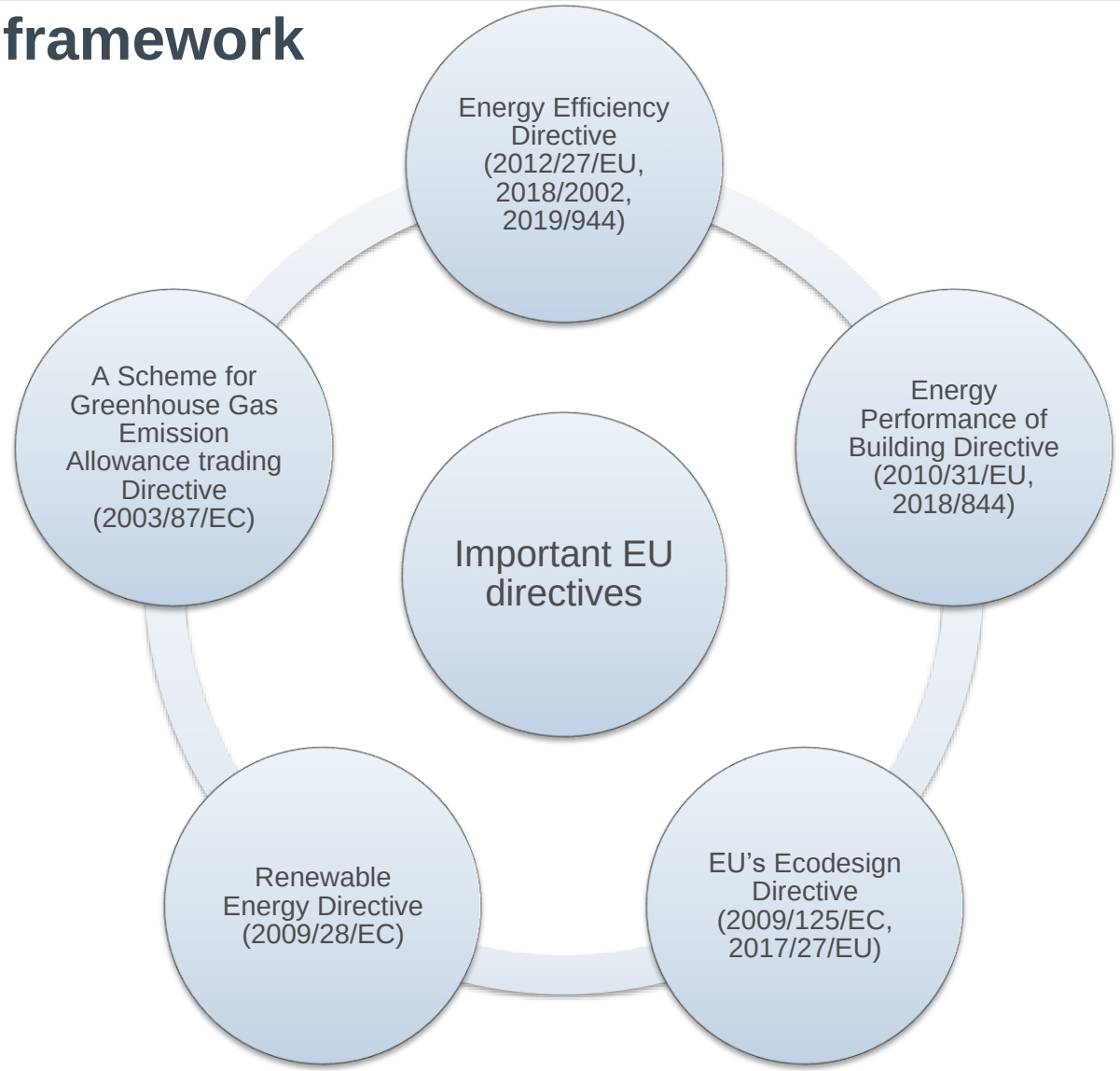
An instrument that allows the EU institutions to make a statement, without imposing any legal obligation on the subject of the opinion. An opinion has no binding force

Implementing acts are legally binding acts that enable the Commission – under the supervision of committees consisting of EU countries' representatives – to set conditions that ensure that EU laws are applied uniformly.

A decision shall be binding in its entirety. Applies on one or several EU countries companies or individuals. No need to transpose into national legislation.

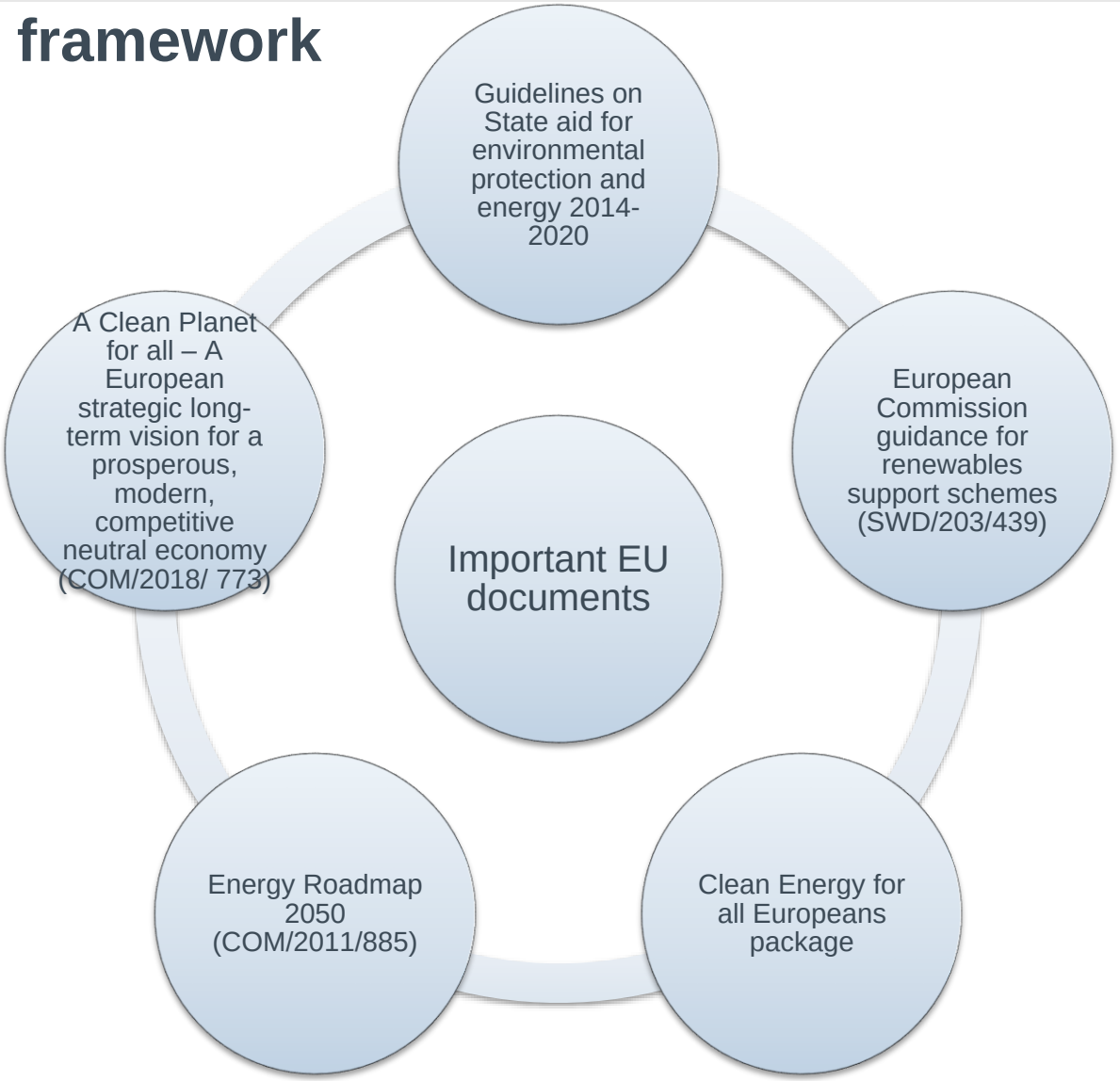
Energy and climate planning

EU legislative framework



Energy and climate planning

EU legislative framework

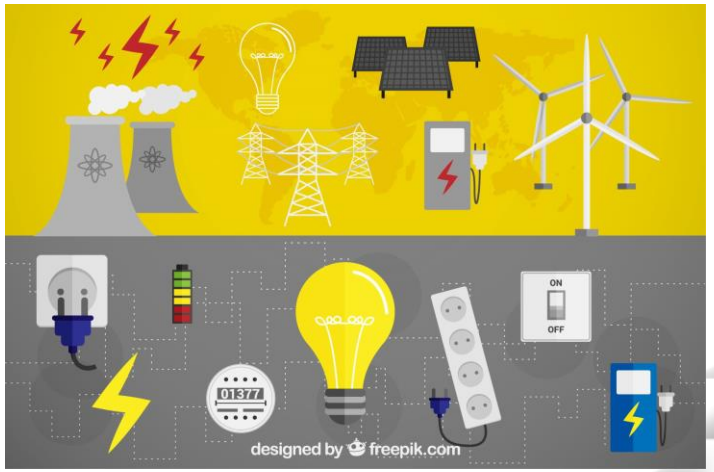


Energy Efficiency Directive (2012/274/EU)

PRACTICE SO FAR

→ EU countries obligated to draw up **National energy efficiency action plans** (NEEAPs)

→ NEEAPs – estimated energy consumption, planned energy efficiency measures, long-term renovation strategies and the improvements that individual EU countries expect to achieve to reach EU 2020 target of 20%



Energy Efficiency Directive (2012/274/EU)

→ those plans draw up every **three years** with report of the **progress** achieved towards their national energy efficiency targets on an **annual basis**

Member States shall encourage public bodies, including at regional and local level (…) to:

a) adopt an energy efficiency plan, freestanding or as part of a broader climate or environmental plan, containing specific energy saving and efficiency objectives and actions
b) put in place an energy management system, including energy audits, as part of the implementation of their plan
c) use, where appropriate, energy service companies, and energy performance contracting to finance renovations and implement plans to maintain or improve energy efficiency in the long term

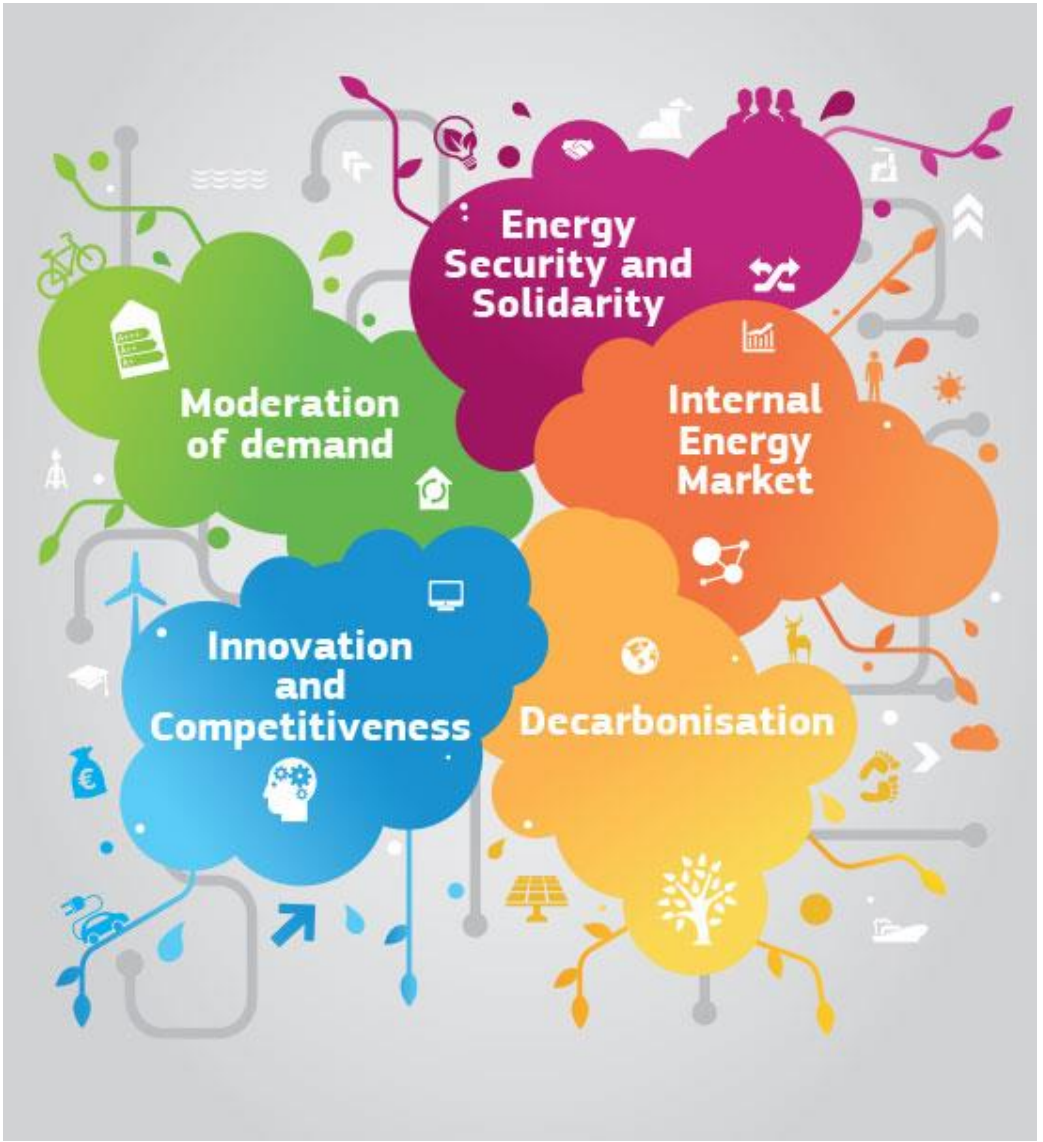
Energy Efficiency Directive (*ammendment* 2018/2002)

EU countries are required to:

→ develop integrated **National Energy and Climate Plans** (NECPs) for the period **2021 to 2030**

- → submit a draft NECP by 31 December 2018 and be ready to submit the final plans by 31 December 2019 to the European Commission
- → report on the progress they make in implementing their NECPs, mostly on a biennial basis

Five dimensions of the energy union



Proposition of the new law/regulation/strategy/decision etc.

central state administration body
prepare a draft/proposal

expert working group
discusses the draft/proposal

coordination of the Government
aligns the draft

Chief Government cabinet
contemplates aligned drafts for the agenda

Govenment members at the session
discuss and vote on the draft/proposal

MPs in the Croatian Parliament
discuss and vote on the proposal of the act

National planning process actors

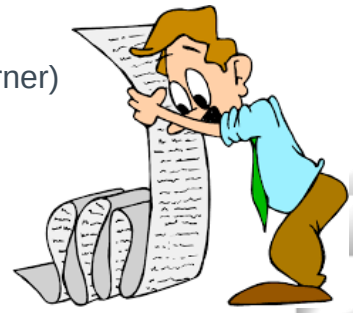
The main institutions responsible for energy policy in Croatia:
- Ministry of Physical Planning and Construction
- Ministry of Environmental Protection and Energy
- Ministry of the Sea, Transport and Infrastructure
- Center for Monitoring Business Activities in the Energy Sector and Investments
- Environmental Protection and Energy Efficiency Fund
- Agency for Transactions and Mediation in Immovable Properties
- Energy Institute Hrvoje Požar
- Croatian Energy Regulatory Agency

Institutions and organizations within various energy efficiency areas:
- HEP JSC
- HEP Heat Distribution
- HEP Distribution System Operator (HEP ODS)
- Croatian Transmission System Operator Ltd.
- INA JSC
- Croatian pipeline (JANAF)
- Faculty of Mechanical Engineering and Naval Architecture
- Society for Sustainable Development Design (DOOR)
- Croatia Green Building Council
- HEP ESCO Ltd.
- State Office for the Central Public Procurement
- Energy and Environmental Protection Institute (EKONERG)
- Faculty of Electrical Engineering and Computing (FER)
- UNDP
- The International Centre for Sustainable Development of Energy, Water and Environment Systems (SDEWES)
- Croatian Business Council for Sustainable Development
- Croatian Professional Association for Solar Energy
- Croatian Association of Energy Certificators

Regional energy agencies:
- Istrian Regional Energy Agency Ltd. (IRENA)
- North-west Croatia Regional Energy Agency (REGEA)
- Medjimurje Energy Agency Ltd. (MENEA)
- Regional Energy Agency North (REA North)
- Regional Energy Agency Kvarner (REA Kvarner)

Energy cooperatives:
- BAN – UNION
- Green energy cooperative (ZE
- Energy cooperative Otok Krk
- Energy cooperative Kaštela
- Energy cooperative Lug
- Energy cooperative Sunčani H
- Veteran cooperative Ka-Solar
- Energy cooperative SPES

ESCO companies:
- HEP ESCO Ltd.
- Rudan Ltd.
- REFLEX Ltd.
- Cras Ltd.
- Jedinstvo Krapina Ltd.
- Kamenmont Ltd.
- DUBOŠ GRADNJA Ltd.
- Sense ESCO
- WORK-ING Ltd. Varaždin
- SPACE Company
- …



Problems occured in energy and climate planning

→ impossibility to collect energy consumption dana (no historical data, „big data” etc.)

→ lack of fundings (small local/regional budgets)

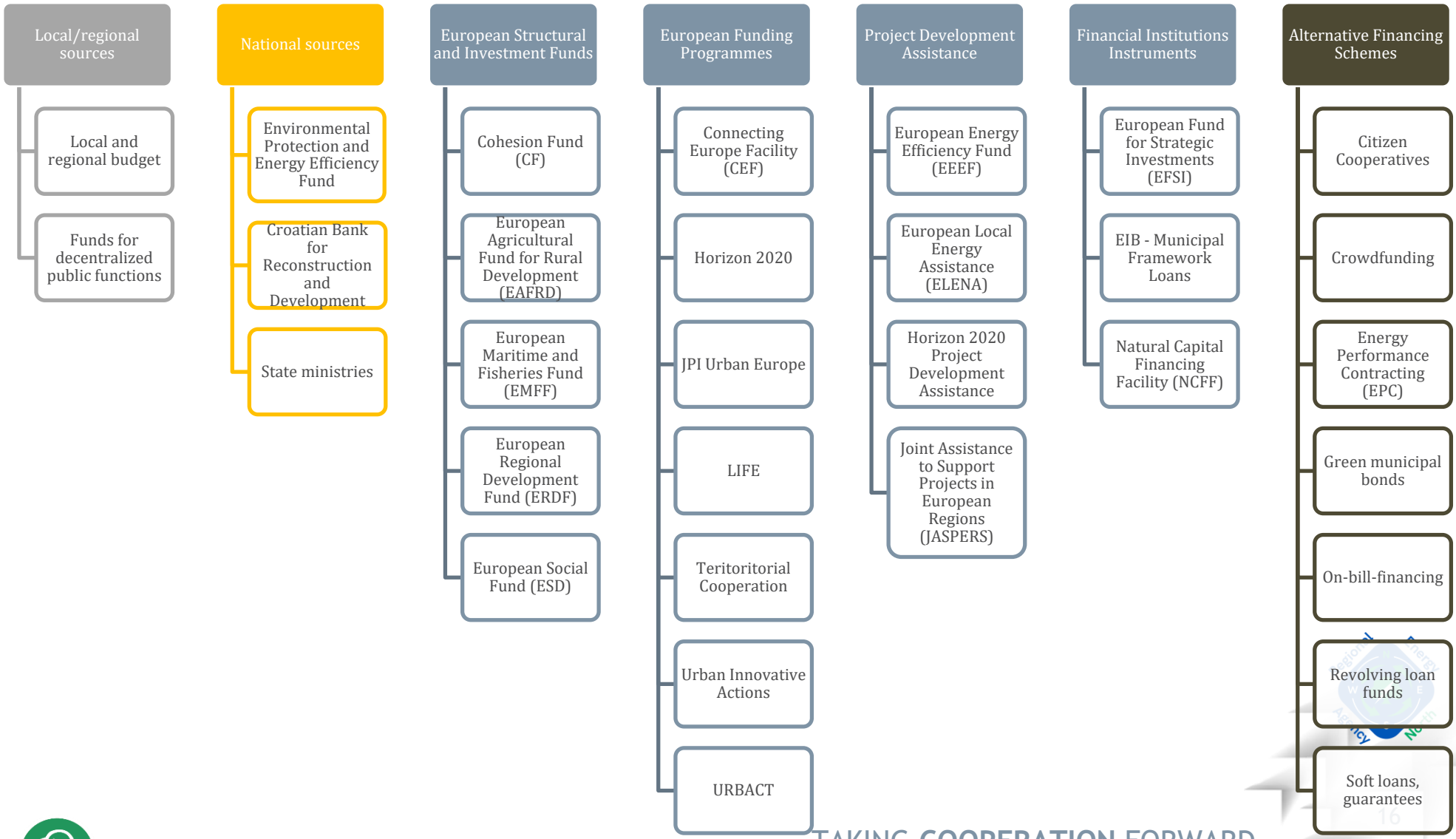
→ lack of knowledge

→ lack of interest

→ lack of multi-level governance (communication between national, regional and local level)

→ GDPR

Finantial opportunities in Croatia



Discussion points

→ Which are the main barriers in setting more ambitious targets in site of 2050 at the national level and adapting to climate change? (financial, regulatory, political, technical, social, lack of infrastructure and interconnections, other).

→ Buildings, transport and production from RES are key towards decarbonisation. Which have proven the most efficient incentives to further promote actions in these sectors?

→ Which structures could the local/ regional administration adopt to facilitate climate and energy policy planning (regional technical groups, steering committees, assignment of energy and climate policy officers etc.)?

→ What is the role of regional energy agencies and how can they more efficiently support the adaptation to climate change?

Discussion points

→ How satisfactory is the national framework for managing and monitoring energy and climate policy planning? How are data gathered at the local /regional level utilized at the national one?

→ How can the national governments work more efficiently on all aspects of climate change adaptation? Ideas and exchange of best practices.

→ Regulatory obligation for regional/local authorities to prepare a plan on energy and climate. Lessons learnt and issues to consider.

→ Which are the potential obstacles and barriers on assigning specific GHG reduction targets at the regional level? Exchange of best practices.

→ Innovative ways for national/regional actors to engage local authorities and pursue collaboration with them.

THANK YOU!

Petra Orehovacki

Energy advisor

Regional Energy Agency North

Email: petra.orehovacki@rea-sjever.hr

The BOOSTEE-CE project is EU-funded project implemented through the INTERREG CENTRAL EUROPE Programme and co-financed by the European Regional Development Fund (ERDF)

Transnational training

Tools for facilitating decision making

Jurica Perko, REA North, Croatia

Regional Energy Agency North

September, 2019

Tools for facilitating decision making

Good practice examples

HEP DSO metering - http://mjerenje.hep.hr/

SCADA Smartway - http://smartwayscada.com/

Other PV systems - https://www.sunnyportal.com/

ISGE - https://www.isge.hr/

SMIV - https://smiv.mzoe.hr/GIZ_MVP/Pages/Login/Login.aspx

THANK YOU!

Jurica Perko

Business Development Manager

Regional Energy Agency North

Email: jurica.perko@rea-sjever.hr

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Transnational training

Guided exercise on energy planning in public buildings

Petra Orehovacki and Jurica Perko
REA North, Croatia

Regional Energy Agency North

September, 2019

Main Task

1. **Build an action or measure for Energy and Climate Plan**

a) **development of fundamental financial analysis**
b) **funding plan**
c) **preliminary pitch which will be delivered to the city mayor**
d) **present built action/measure**

- Energy Expert (focused on energy savings, CO2 savings, technology implementation)
- Financial Expert (more focused on costs, financial savings, payback period)

Problem description

Form 3 groups of 7-9 people

1. Shavnik, Montenegro – 10 public company's official vehicles to be replaced with electric ones

2. Zhytomyr, Ukraine –8 public buildings upgradeable with PV systems

3. Gdynia, Poland – 14,600 public lighting lamps based on high pressure sodium technology without regulation modernisation with manageable LED lighting

Action development

1. Identify the key drivers for your mayor.
2. Prepare SWOT analysis of your action (address all pros and cons as a part of the SWOT analysis)

a) Identify the quantitative and qualitative benefits from the perspective of your mayor.

b) Identify all negative impacts of implementation of this action.

c) Identify the main reasons and external threats why your mayor may not support the initiative.

d) Identify opportunities that beneficiary may exploit within implementation of the action. What positive effects can cause?

3. Build a business case to present it to the stakeholder. You will have 3 minutes for your “pitch”.

THANK YOU!

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The BOOSTEE-CE project is EU-funded project implemented through the INTERREG CENTRAL EUROPE Programme and co-financed by the European Regional Development Fund (ERDF)

Guided exercise on energy planning in public buildings

Main Task:

Build an action or measure for Energy and Climate Plan including the development of fundamental financial analysis, funding plan and prepare a preliminary pitch which will be delivered to the city mayor. Present built action/measure as one of the following:

- Managing Director (generally focused on benefits of Energy and Climate Plan, needed for project application to EU funds, environmental protection – CO2 footprint)
- Energy Expert (focused on energy savings, CO2 savings, technology implementation)
- Financial Expert (more focused on costs, financial savings, payback period)

Problem Description

As part of Energy and Climate Plans the potential for direct action on public buildings, public lighting and transport have been prioritised.

There are two types of actions relevant in the following cities:

- Klagenfurt, Austria
    - 20 public buildings where initial feasibility indicates energy renovation and PV upgrades are viable
- Gdynia, Poland
    - 14,600 public lighting lamps based on high pressure sodium technology without regulation modernisation with manageable LED lighting are viable

You are part of energy and climate planning project team developing key actions to be included in Energy and Climate Plan. You are required to develop an action targeted at city mayor:

- Identify the key drivers for your mayor.
- Prepare SWOT analysis of your action (address all pros and cons as a part of the SWOT analysis)
    - Identify the quantitative and qualitative benefits from the perspective of your mayor.
    - Identify all negative impacts of implementation of this action.
    - Identify the main reasons and external threats why your mayor may not support the initiative.
    - Identify opportunities that beneficiary may exploit within implementation of the action. What positive effects can cause?
- Build a business case to present it to the stakeholder. You will have 3 minutes for your “pitch”. You may use up to 2 flip chart sheets to aid your presentation.

For the **building group** your team is working on consider the following relevant characteristics:

Action Type	**Public Buildings Renovation**[1]
Description	Initial assessments of the large public buildings your region have been completed by a junior engineer in your Agency. As a result, 20 large public buildings have been identified where the assessments have indicated that PV installations and integrated renovation upgrades are viable. The 20 public buildings are all occupied by different Departments and City organisations. In addition, no buildings currently have PV system and all buildings have traditional construction elements and traditional heating system (gas boiler) which were installed from 1964 to 1969 consisting of bricks and concrete. The buildings are near end of life and they often overheat in the summer and can't be warmed in the winter. An assessment has been completed on new, efficient gas boiler configuration. Overall integral renovation results with gas consumption reduction.
Number of Buildings	20
Electricity Cost (€/kWh)	0.19 incl. VAT
Gas Cost (€/kWh)	0.05 incl. VAT
PV Installation Scale	10kW per building with no export, 1,200 kWh annual production per kW
PV Installation Cost	€1,300/kW
Specific Energy Renovation Cost	€500 per m2 of usable surface area
Average usable surface area	1,200 m2 per building
Emission factor for electricity	0.234 kgCO2/kWh
Emission factor for gas	0.202kgCO2/kWh

[1] Use „Calculation on Public Building Renovation" excel file for savings calculation

For the **lighting group** your team is working on consider the following relevant characteristics:

Action Type	**Public Lighting Modernization**
Description	There are 14,600 public lighting lamps based on high pressure sodium (HPS) technology without regulation in the City area. There are 1,460 HPS lamps of 250 W, 4,380 of 150 W, 5,840 of 100 W, 2,190 of 70 W and 730 of 50 W. Referent working hours of public lighting system is 4,100 hours per year. A lighting assessment has been completed and a sensible modernization from the following old HPS lamps to LED technology is clearly viable: • 250 W HPS = 94 W LED • 150 W HPS = 90 W LED • 100 W HPS = 70 W LED • 70 W HPS = 40 W LED • 50 W HPS = 35 W LED New lighting system will be manageable and will have 3,250 working hours per year in total.
Electricity Cost (€/kWh)	0.19 incl. VAT
Average Cost of Single Lamp	€380 including installation costs
Total loss on old HPS lamps[2]	25 %
Total loss on new LED lamps[3]	4 %
Emission factor for electricity	0.234 kgCO2/kWh

[2] Multiply total power of old system by 25 % due to the network loss for HPS technology

[3] Multiply total power of new system by 4 % due to the network loss for LED technology

Guided exercise on energy planning in public buildings

Main Task:

Build an action or measure for Energy and Climate Plan including the development of fundamental financial analysis, funding plan and prepare a preliminary pitch which will be delivered to the city mayor. Present built action/measure as one of the following:

- Energy Expert (focused on energy savings, CO2 savings, technology implementation)
- Financial Expert (more focused on costs, financial savings, payback period)

Problem Description

As part of Energy and Climate Plans the potential for direct action on public buildings and public company's official vehicles have been prioritised.

There are two types of actions relevant in the following cities/municipalities:

- Wind-park Krnovo, Municipality of Shavnik, Montenegro
    - 10 public company's official vehicles to be replaced with electric ones
- Zhytomyr, Ukraine
    - 8 public buildings upgradeable with PV systems

You are part of energy and climate planning project team developing key actions to be included in Energy and Climate Plan. You are required to develop an action targeted at city mayor:

- Identify the key drivers for your mayor.
- Prepare SWOT analysis of your action (address all pros and cons as a part of the SWOT analysis)
    - Identify the quantitative and qualitative benefits from the perspective of your mayor.
    - Identify all negative impacts of implementation of this action.
    - Identify the main reasons and external threats why your mayor may not support the initiative.
    - Identify opportunities that beneficiary may exploit within implementation of the action. What positive effects can cause?
- Build a business case to present it to the stakeholder. You will have 3 minutes for your "pitch". You may use up to 2 flip chart sheets to aid your presentation.

For the **transport group** your team is working on consider the following relevant characteristics:

Action Type	**Cost-effectiveness of switching from conventional to electric vehicles**
Description	Public company Wind-park Krnovo from Municipality of Shavnik, Montenegro has a plan to replace all of their conventional official vehicles with electric ones. They have 10 vehicles in total with average yearly mileage of 15,000 km and with average fuel consumption of 1,200 litres per year. The calculation of financial viability is based on the analysis and comparison of the total cost of ownership of an existing conventional (TCOb) and new electric vehicles (TCOe). The total cost of ownership depends on the five basic parameters: technical examination costs (T), car insurance cost (I), fuel cost (F), vehicle maintenance cost (M) and the cost of buying a new vehicle (Cn). The cost-effectiveness period, as well as any of the parameters mentioned, depends on the type and manner of use of vehicle or the needs of an owner. **TCOb = N*(Tb+Ib+Fb+Mb)** **TCOe = N*(Te+Ie+Fe+Me)** **S = TCOb – TCOe** **JPP = N*(Cn – Co)/S**
Number of vehicles	10
Technical examination cost per vehicle (conventional vehicle) (Tb)	160 €/a
Car insurance cost per vehicle (conventional vehicle) (Ib)	192 €//a
Fuel cost (gasoline) per vehicle (Fb)	1,680 €/a
Maintenance cost per vehicle (Mb) (conventional vehicle)	350 €/a
Technical examination cost per vehicle (electric vehicle) (Te)	113 €/a
Car insurance cost per vehicle (electric vehicle) (Ie)	175 €/a
Fuel cost (electricity) per vehicle (Fe)	147 €/a
Maintenance cost per vehicle (electric vehicle) (Me)	80 €/a
Emission factor for gasoline	2.16 kgCO2/l
Emission factor for electricity	0.234 kgCO2/kWh
Fuel consumption per vehicle (conventional vehicle)	1,200 l/a
Fuel consumption per vehicle (electric vehicle)	2,100 kWh/a
Retail price of old conventional vehicle (Co)	6,200 €
Price of new electric vehicle (subsidy included) (Cn)	24,000 €

For the **PV group** your team is working on consider the following relevant characteristics:

Action Type	**Public Buildings Renovation**
Description	Initial assessments of the public buildings in the City of Zhytomyr have been completed by a junior engineer in your Agency. As a result, complex of 8 large public buildings have been identified where the assessments have indicated that PV installations are viable. Complex of 8 public buildings are all occupied by Zhytomyr Ivan Franko State University. Due to the conservator rules and impossibility of installation on the roof of the University building, PV installation must be implemented on the ground. Point the PV panels south-west and arrange them in rows with a distance of 4 meters between the rows. Ground panels with construction occupy 2 meters in width. The bird's eye view of the University environment is shown below.
Number of Buildings	5
Output power of one PV panel	230 W
Width of the panel	1.00 m
Electricity Cost (€/kWh)	0.23 incl. VAT
Annual production per kW	1,200 kWh
PV Installation Cost	€1,300/kW
Emission factor for electricity	0.234 kgCO2/kWh

THEMATIC PANEL 2: Online Energy Platform - OnePlace

Warsaw 01.10.2019 r.

BOOSTEE-CE - Train the Trainers

Fabio Remondino - FBK, Trento, Italy
Anna Nowacka - EUWT NOVUM, Jelenia Góra, Poland
Tomáš Perutka - EAZK, Zlin, Czech Republic

THEMATIC PANEL

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The Online Energy Platform - OnePlace

Schedule of the module (9:00 - 10:45)

1. Introduction to OnePlace Platform
2. I module: Living Energy Marketplace
3. II module: Energy Efficient Cities
4. III module: Financing Energy Efficiency
5. IV module: 3D Energy Management System (3DEMS)
6. DEMO – practical use of 3DEMS

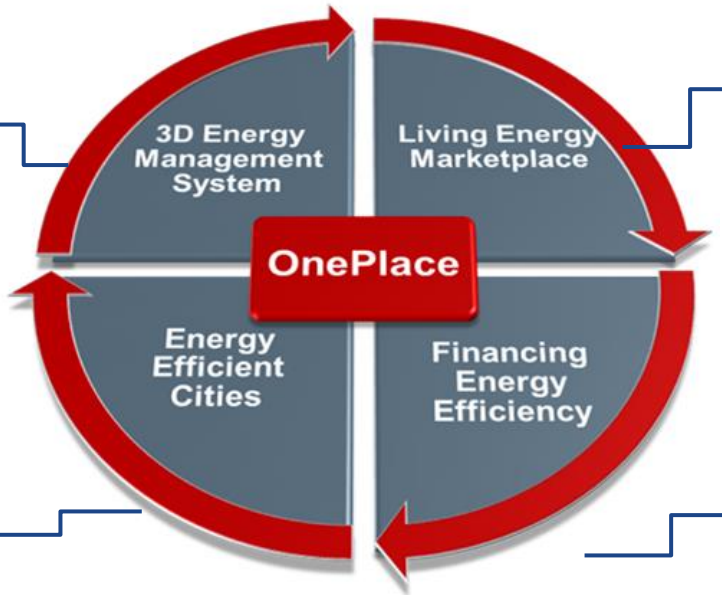
The Online Energy Platform - OnePlace

The Online Energy Platform - OnePlace

Web platform includes 4 interlinked modules enriched with energy related contents (best practices, database of devices, energy certificates, PV maps, etc.) **freely accessible** to policy makers, energy planners and citizens in order to improve the governance and understanding of energy efficiency.

A **webGIS viewer** for the visualization of energy- related information (consumptions, audits, PV potential, etc.) within **3D city models**

A collection of country-based **experiences, best practices and guidelines** in the energy efficiency sector for public authorities and citizens.

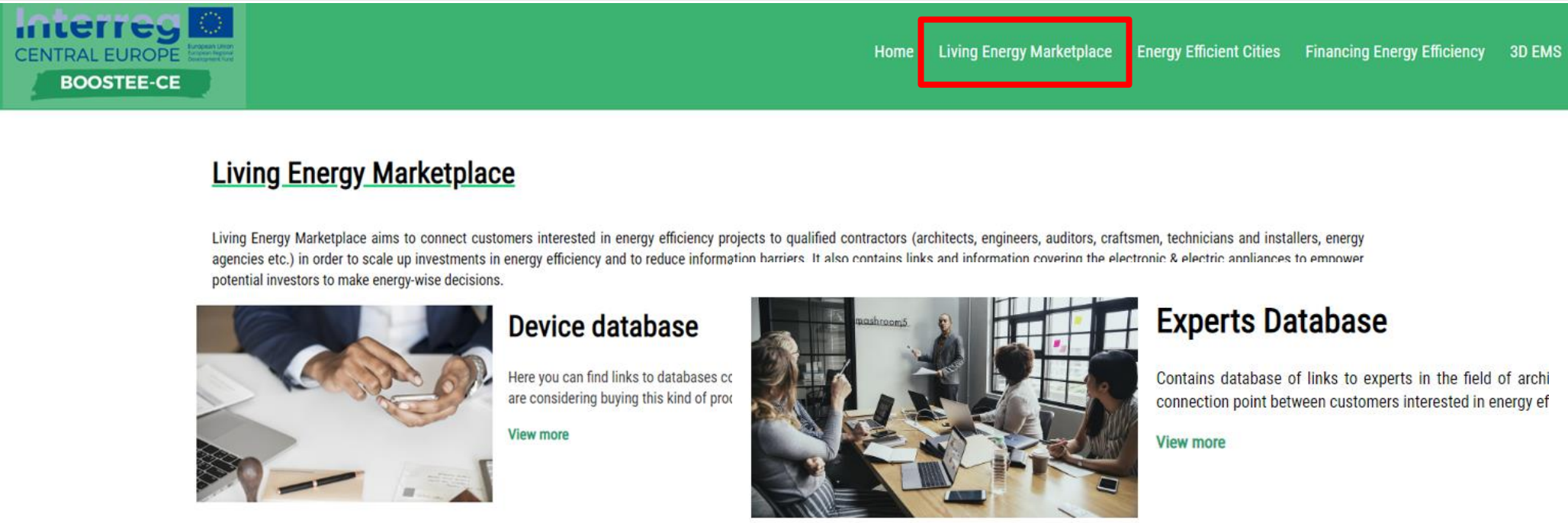


Database reporting information about electronic & electric appliances as well as a country-based list of qualified contractors (*engineers, auditors, technicians*) for EE projects.

Transnational strategy outcomes (*financial road map*), examples of best practice and practical steps to use the national & EU-level resources

The Online Energy Platform - OnePlace

OnePlace - Living Energy Marketplace



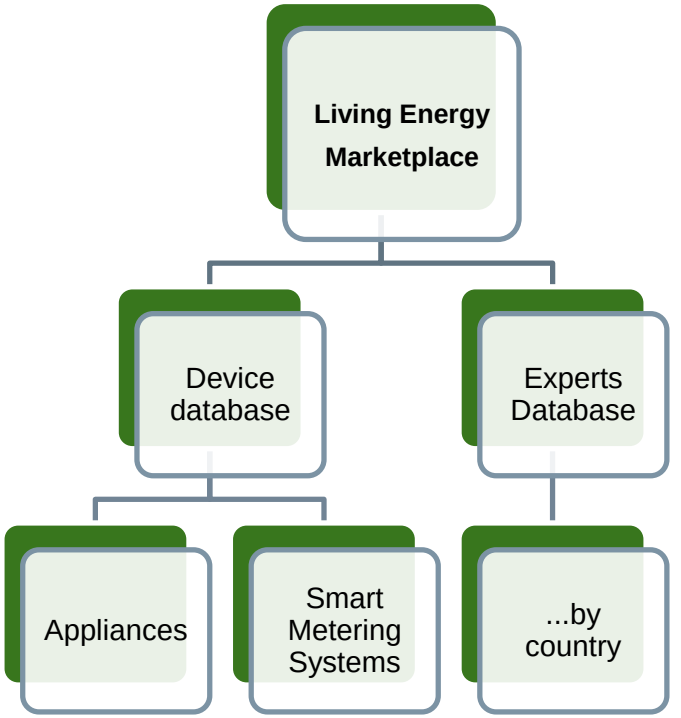
Living Energy Marketplace aims to **connect customers** interested in energy efficiency projects **to qualified contractors** (architects, engineers, auditors, craftsmen, technicians and installers, energy agencies etc.) in order **to scale up investments in energy efficiency** and to reduce information barriers.

OnePlace - Living Energy Marketplace

It contains:

- links and information covering the **electronic & electric appliances** to empower potential investors to make energy-wise decisions.

- and **database of links to experts** in the field of architecture, engineering, energy efficiency, renewable energy sources etc. This database is meant to serve as **a connection point between customers** interested in energy efficiency projects and qualified contractors.



It is basically a **database of devices and experts** to empower potential investors to make energy wise decisions.

OnePlace - Living Energy Marketplace

Austria

Energieberatungsstellen

Sie planen eine Biomasseheizung, eine Wärmepumpe, eine Solaranlage und interessieren sich für eine Förderung Ihres Vorhabens? Zur Beratung und Einreichung Ihres Förderungsantrages stehen Ihnen zahlreiche „Ich tu´s"-Beratungsstellen in der Steiermark zur Verfügung.

→ Visit the page

Fördereinreichstellen

EINREICHSTELLEN – UND BERATUNGSSTELLEN in der Steiermark für folgende Ökoförderungen:

- Heizungsoptimierung - Biomasse
- Biomasse-Heizungen
- Heizungsoptimierung - Wärmepumpe
- Solarthermische Anlagen

→ Visit the page

Energieberater

Heizkostenvergleich

Der Heizkostenvergleich der Österreichischen Energieagentur ist ein Vollkostenvergleich, der Konsumentinnen und Konsumenten als Orientierung dienen soll. Die Auswahl der zu vergleichenden Heizsysteme erfolgt mit dem Fokus, den Stand der Technik der derzeit am häufigsten neu installierten Heizsysteme in Einfamilienhäusern in Österreich abzubilden. Der Heizkostenvergleich der Österreichischen Energieagentur vergleicht folgende Heizsysteme:

- Fernwärme
- Erdgas-Brennwert
- Öl-Brennwert
- Scheitholz
- Pellets
- Luft/Wasser-Wärmepumpe
- Sole/Wasser-Wärmepumpe mit Erdsonde

→ Visit the page

Effiziente Heizwerke

OeMAG - Abwicklungsstelle für Ökostrom

Die OeMAG Abwicklungsstelle für Ökostrom AG (auch Ökostromabwicklungsstelle) wurde 2006 eingerichtet., um die von anerkannten Ökostromanlagen in das öffentliche Netz eingespeisten Ökostrommengen gem. Ökostromgesetz 2012 (ÖSG 2012) und den geltenden Marktregeln abzunehmen und zu vergüten. Die gelieferten Strommengen werden an die auf österreichischem Bundesgebiet tätigen Stromhändler weitergeliefert. Die Weiterlieferung und Verrechnung erfolgt nach Maßgabe der an Endkunden abgegebenen Mengen an elektrischer Energie (Quotenregelung).

→ Visit the page

Monitoringstelle für Energieeffizienz

Die Monitoringstelle Energieeffizienz ist eine Einrichtung in der Österreichischen Energieagentur im Auftrag des Bundesministeriums für Nachhaltigkeit und Tourismus (BMNT) und Anlauf- und Informationsstelle für die laut Energieeffizienzgesetz verpflichteten Unternehmen, öffentlichen Stellen und

OnePlace - Living Energy Marketplace

Croatia

Arhitekti

Hrvatska komora arhitekata

Hrvatska komora arhitekata ustanovljuje se kao baštinik tradicije i nasljeđa udruga i organizacija arhitekata, te nastavlja slijed organiziranih strukovnih udruga arhitekata u Hrvatskoj. Komora promiče arhitekturu kao izraz identiteta naroda i kulturu građenja, unapređuje arhitektonsku djelatnost u cilju zaštite javnog interesa i zaštite interesa trećih osoba. Ovdje možete pronaći imenik ovlaštenih arhitekata.

→ Visit the page

Građevinski inženjeri

Voditelji projekata (elektrotehničke struke)

Voditelj projekta je osoba koja je odgovorna za ostvarivanje definiranih ciljeva projekta. Ključne odgovornosti voditelja projekta podrazumijevaju kreiranje jasnih i ostvarivih ciljeva projekta, definiranje zahtjeva projekta te upravljanje trima važnim elementima projekta, troškovima, opsegom te kvalitetom. Ovdje možete pronaći imenik ovlaštenih voditelja projekata.

→ Visit the page

Energetski certifikatori

IEC

eEnergetskiCertifikat

Energetsko certificiranje je skup radnji i postupaka koji se provode u svrhu izdavanja energetskog certifikata a uključuje energetski pregled zgrade, potrebne proračune za referentne klimatske podatke za iskazivanje specifične godišnje potrebne toplinske energije za grijanje, specifične godišnje potrebne toplinske energije za hlađenje, specifične godišnje isporučene energije, specifične

Izvođači

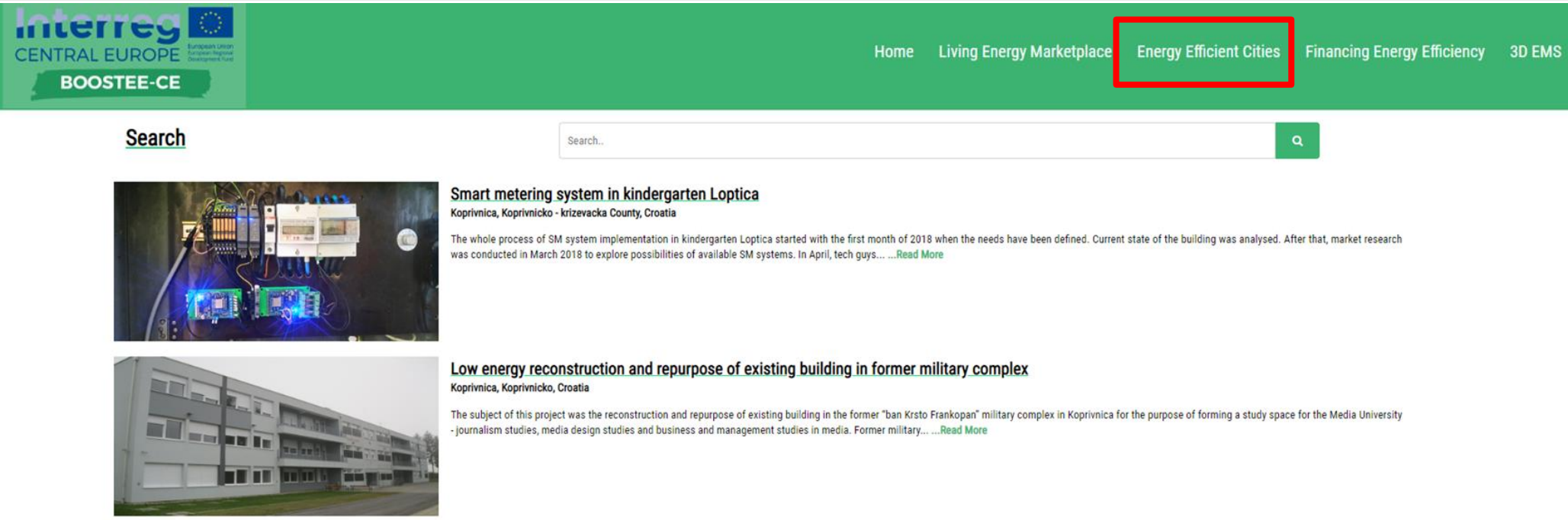
Izvođač je osoba koja gradi ili izvodi pojedine radove na građevini. Ako u građenju sudjeluju dva ili više izvođača, investitor ugovorom o građenju određuje glavnog izvođača koji je odgovoran za međusobno usklađivanje radova i koji imenuje glavnog inženjera gradilišta. Ovdje možete pronaći popis nekih izvođača u RH.

→ Visit the page

Esco tvrtke

OnePlace - Energy Efficient Cities

OnePlace - Energy Efficient Cities



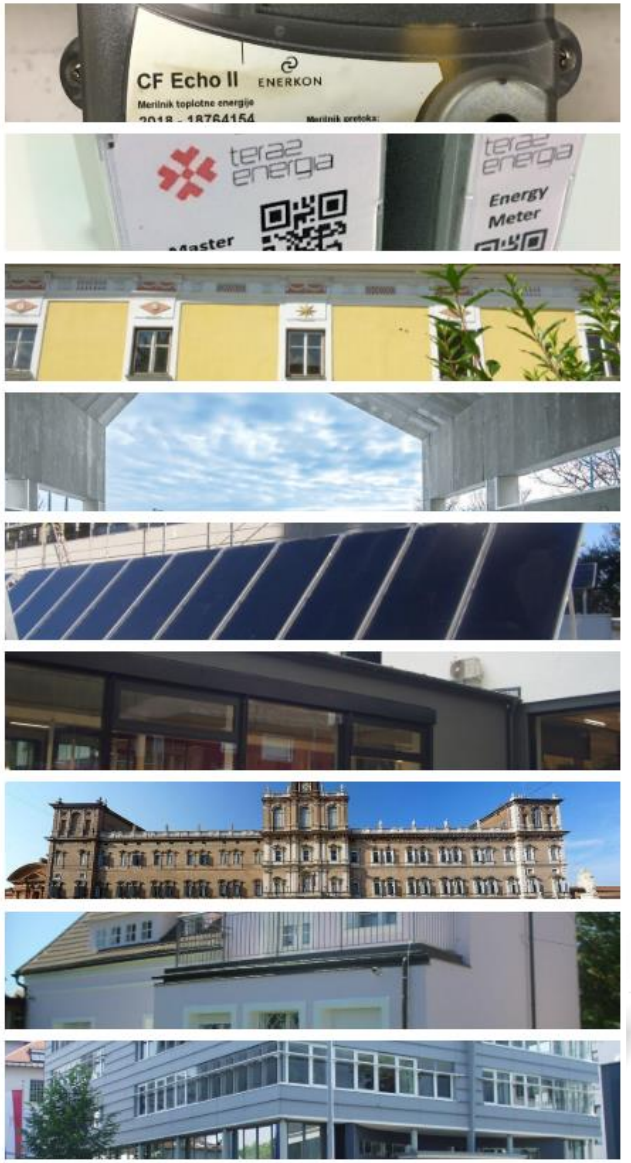
The **Energy Efficient Cities** module is an **exchange platform of experiences** and identification of **good practices** within energy efficiency sector for public authorities and other public users.

It demonstrates the range of **approaches and measures** various cities have used **to undertake efficiency improvements** and thus helps to guide cities in designing effective urban energy efficiency policies and programs.

OnePlace - Energy Efficient Cities

It contains:

- **24 Best Practices from 7 CE countries** (constantly updated) covering energy efficiency of buildings and smart metering.
- Each best practice **contains basic information**, system characteristics, financial sources and financing details and project implementation benefits.



OnePlace - Energy Efficient Cities

Energy renovation of 7 buildings of Kindergarten Ptuj with the co-financing share of 85% from the European cohesion fund

Ptuj, Podravska, Slovenia

Total heating surface of 4,408 m2. High consumption of energy for heating and a bad condition of the buildings envelope (windows, ceilings, and facades) were the reasons for the renovation. Implementation of measures on the buildings envelope:

- Windows (935 m2)
- Façade (2323 m2)
- Attic (4408 m2)

Benefits

It's a remarkable case of a good practice (on a municipal level) in terms of improving and ensuring environmentally friendly and energy-efficient spatial conditions for children in the context of educational process and improving working conditions for employees. These renovations can be easy transferred into other regions.

Documents:

D.T2.1.2 Energy renovation of 7 kindregartens SLOVENIA (160 KB) Download

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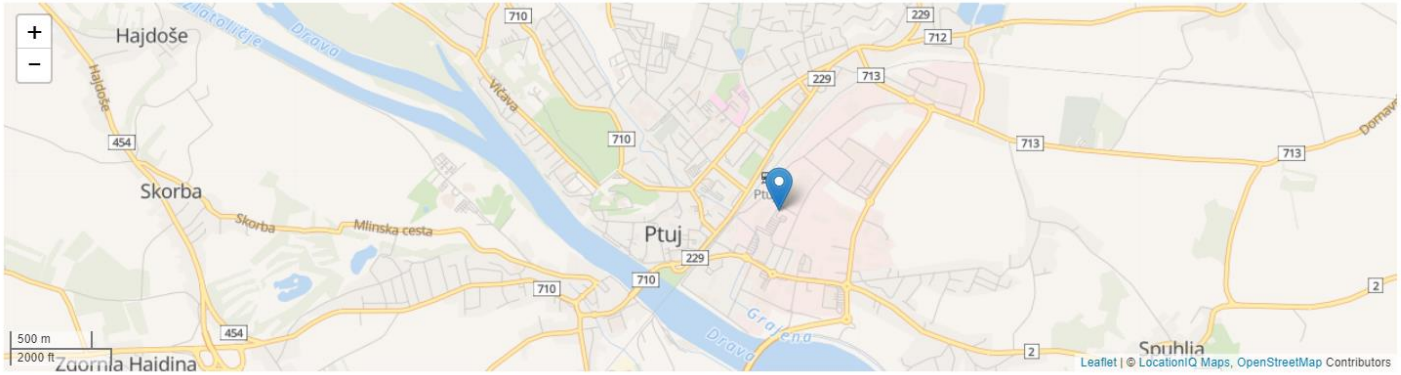
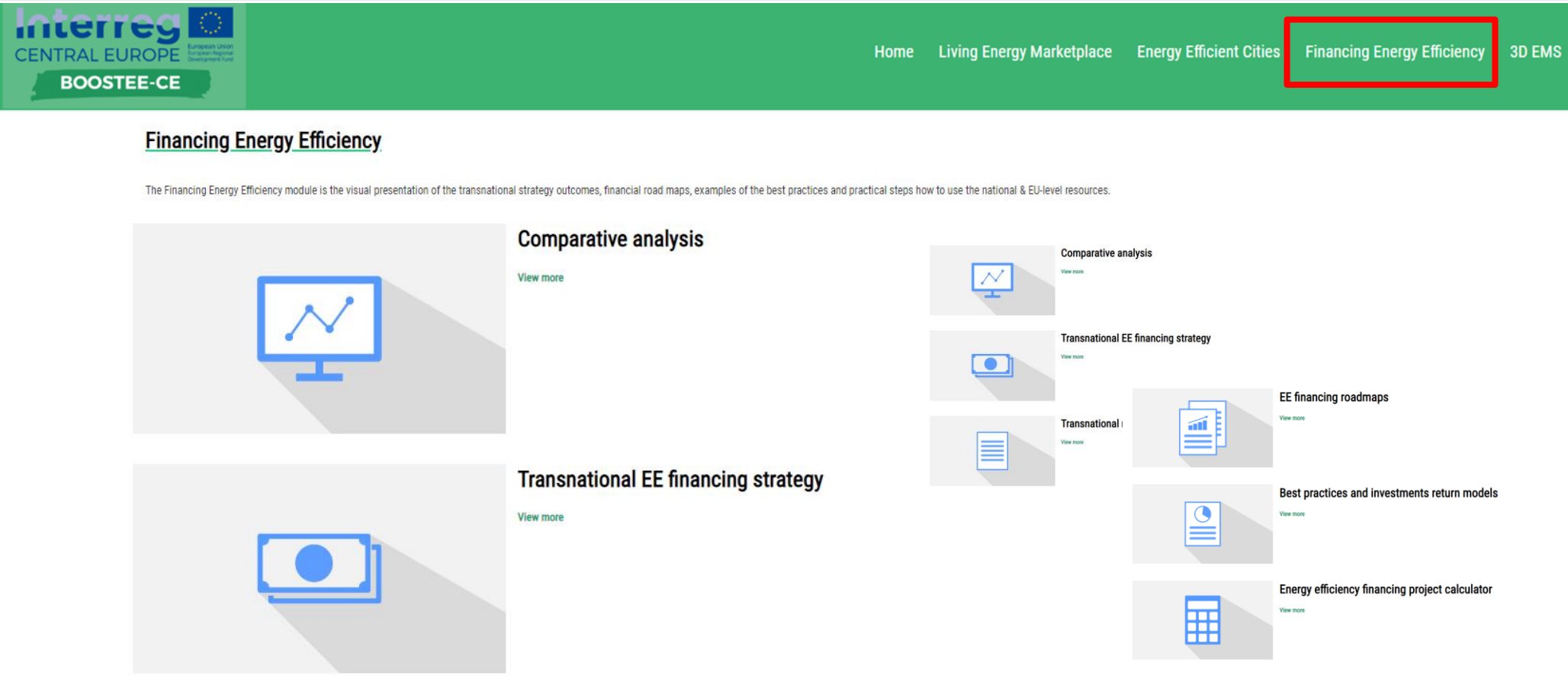


OnePlace - Financing Energy Efficiency

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund
BOOSTEE-CE

OnePlace - Financing Energy Efficiency



The **Financing Energy Efficiency** module is the visual presentation of the transnational **strategy** outcomes, **financial road maps**, examples of the **best practices** and practical steps how to use the national & EU-level resources.

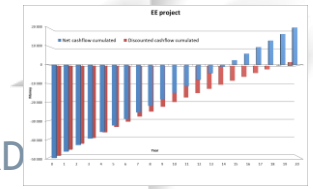
OnePlace - Financing Energy Efficiency

It contains:

- ❑ Comparative analysis of financial schema in CE countries
- ❑ Transnational Energy Efficiency Financing Strategy
- ❑ Transnational methodological framework for a EE roadmap development
- ❑ Energy efficiency financing roadmaps for public infrastructures in CE municipalities
- ❑ Best practices and investments return models in energy efficiency financing
- ❑ Energy Efficiency Financing Project Calculator





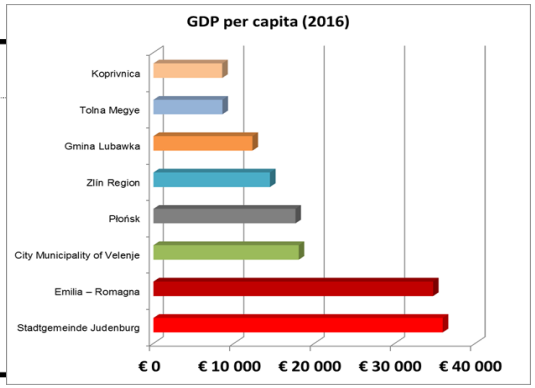



OnePlace - Financing Energy Efficiency

Comparative analysis of financial schema in CE countries

Analysis & elaboration of **differences among financial schema** in partner countries, considering EU grants/funds, possible normative obstacles, investment return, models, etc.

Name of the region / area
Judenburg
Emilia – Romagna
Velenje
Płońsk
Zlínský kraj
Lubawka
Tolna Megye
Koprivnica

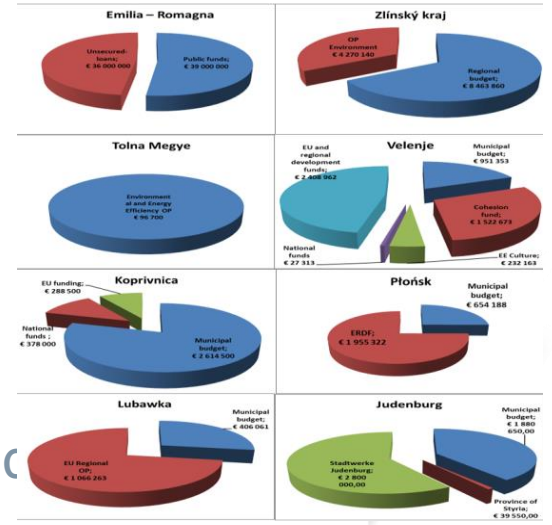


- **Basic comparison of analysed areas**
  against - population
  - area size
  - GDP
  - GDP per capita

- **Current EE financing situation in partners´ areas**

  EE services - core activities which must be continuously provided to fulfil partner´s EE strategic objectives

  EE projects - short-term, self-contained activities that augment the EE services, boost the energy efficiency by reducing the amount of energy required to provide services and products



Transnational Energy Efficiency Financing Strategy

A review of the existing energy financing solutions and models that are or will be in the future the important enablers for EE and energy savings in public infrastructures. The strategy evaluates the potential of different financial models and give recommendations.

- **Key stakeholders, their needs and investment barriers**

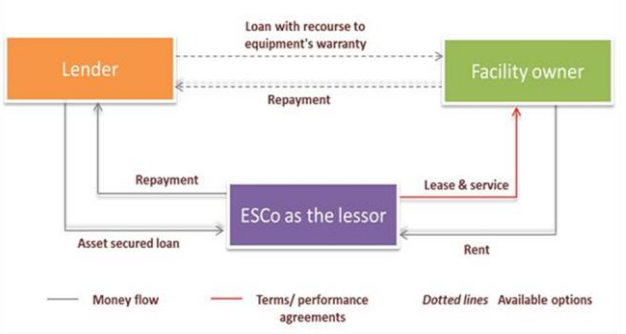
  Identification the key public and private actors responsible for Energy Efficiency Financing Strategy. Examination of barriers to investment of these actors, ways to deal with barriers and assessment of their knowledge and experience regarding financing models for energy efficiency upgrades

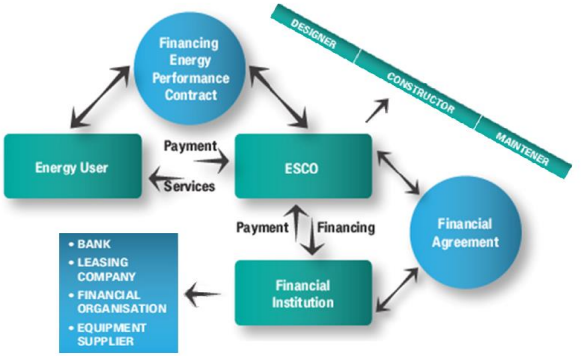
- **Existing funds and assistance in CE countries** (Italy, Austria, Slovenia, Croatia, Hungary, the Czech Republic and Poland):
  Funding leveraged by ESIF
  National Funding

Transnational Energy Efficiency Financing Strategy

❑ Assessment of the existing models of financing

- Proven financing instruments in partner countries - assessment with description of main factors that contributed to success of each financial instrument, along with recommendations for further improvement.
- Transferring of established financing instruments (FI) in partner countries - measures that could enable transferring of experiences critical for deployment of established FIs to partner countries that were not able to deploy pertinent FI.
- Deployment of new financing instruments – selection of instrument that could be developed in partner countries with measures required for deployment of each financial instrument.





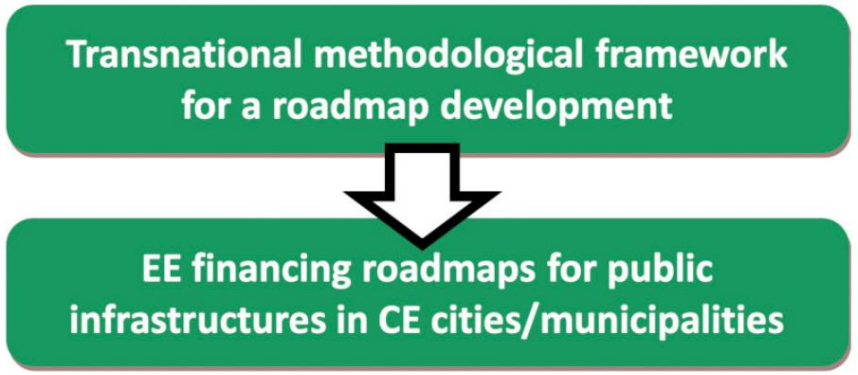
❑ Principles for creating own EE financing strategy

- Balanced level of core financing and programme funding, exploration financing options for activities within key services, organisational background, sustainability etc...

Transnational methodological framework for a EE roadmap

The aim of the financial roadmap is to help public authorities to deal with many different financing grants in the EE domain. The methodological framework builds **upon the practical knowledge of public institutions** and provides an overview of financing models used to finance EE upgrades in the public sector with the specific focus on:

- ❑ **financial models** to minimize the load on public budgets;
- ❑ **recommendations** for decision-makers on identifying & implementing a suitable financing model;
- ❑ **risks and measures** in case of financial investm
- ❑ **case studies.**



Funding sources for energy efficiency

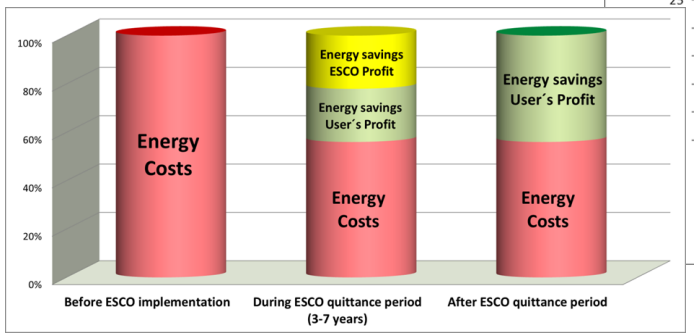
- ❑ European level, national level, self-financing and alternative schemes, intermediaries.

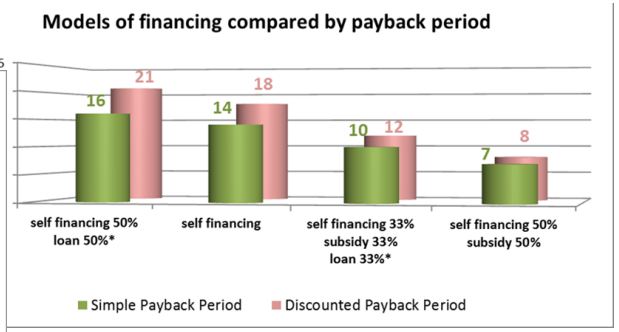
OnePlace - Financing Energy Efficiency

Transnational methodological framework for a EE roadmap

Financing models for energy efficiency

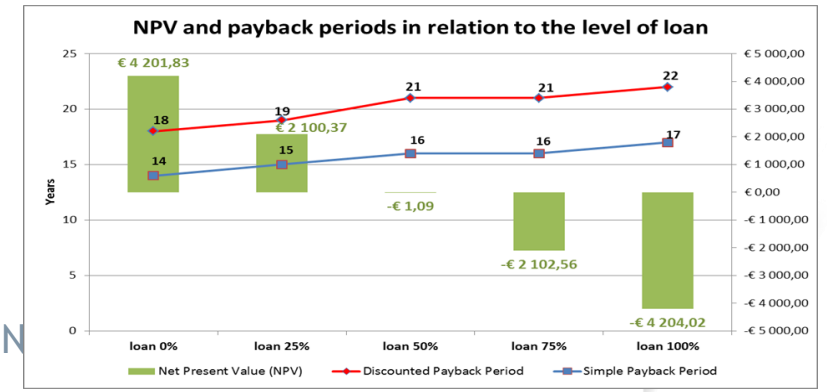
- Conventional models of EE project financing (Self-financing through energy savings, Debt financing, EU funds and operational programmes
- Energy Performance Contracting
- Citizen Cooperatives
- Crowdfunding
- Green municipal bonds
- On-bill financing
- Revolving loan funds





Indicative structure for EE financing roadmap

- Introduction & Internal and External Conditions
- Strategic Targets & Priority Areas
- Action plan & Financing
- Monitoring & Evaluation



Energy efficiency financing roadmaps for public infrastructures in CE municipalities

Financing roadmaps designed to achieve a desired goal of energy efficiency in public infrastructures in specific towns/municipalities in CE cities.

Energy Efficiency Financing Roadmaps for:

- Zlín Region, Czech Republic
- Regione Emilia – Romagna, Italy
- Mestna občina Velenje, Slovenia
- Tolna Megye, Hungary
- Grad Koprivnica, Croatia
- Stadtgemeinde Judenburg, Austria
- Lubawka, Poland
- Płońsk, Poland

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Best practices and investments return models in energy efficiency financing

Collection of the best practice examples from CE countries on various financial investments return models through which market-enabling actions for large investments are highlighted. The best practices are presented and analysed on **attractive factsheets**

BP #1 - Zlín Region, Czech Republic

BP #2 - Emilia-Romagna, Italy

BP #3 Tolna County, Hungary

BP #4 – Loški Potok, Slovenia

BP #5 - Koprivnica, Croatia

BP #6 - Płock , Poland

BP #7 - Płońsk, Poland

BP #8 - Jelenia Góra, Poland

BP #9 - Judenburg, Austria

BP #10 - Judenburg, Austria

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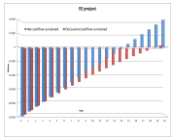
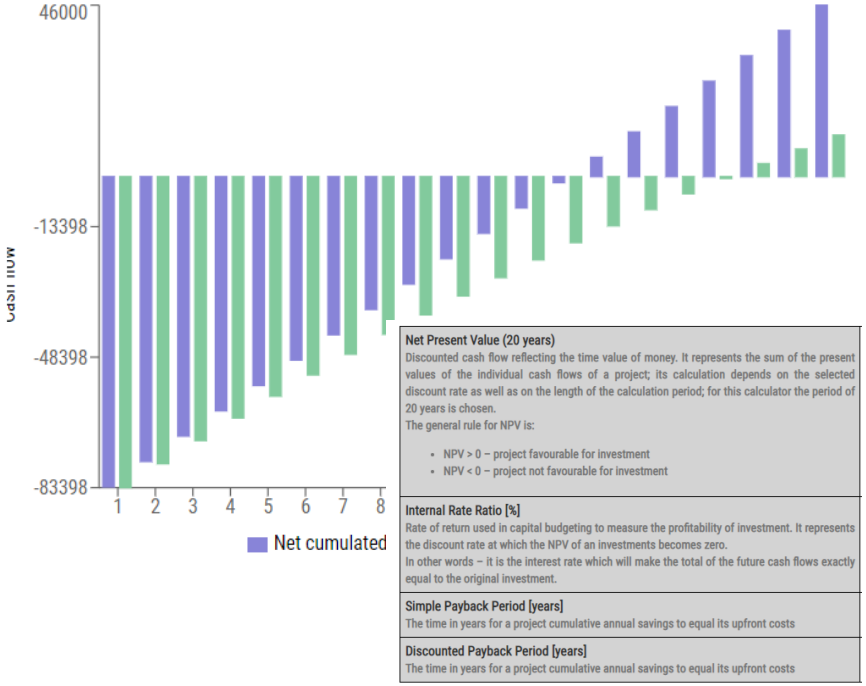


Energy Efficiency Financing Project Calculator

- The simple EE project calculator which gives to the user a basic indicative idea of the profitability and advisability of the investment into an energy efficiency or RES project.
- It counts **just with own sources**, **not considering subsidies or loans** which both can change foreseen values significantly (*If subsidies are involved, the NPV and IRR are increasing and payback periods are shortening, while loans affect the investment in the opposite way)*



- Terms and definition of **basic financial indicators** included (NPV, IRR, Discount rate, payback period)
- Involves **graphical illustration of cash flow** and discounted cash flow.

Important note *– the calculator is just an indicative tool, for concrete investment calculations it is highly advisable to carry out a proper financial analysis by a financial expert!*

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- **Cities occupy** some **2% of the earth's surface** but their inhabitants consume approximately **75% of the world's energy resources.**
- Various European Directives, including the Energy Efficiency (EE) Directive 2012/27/EU (2012), is **aiming for a 27% cut in Europe's annual primary energy consumption** by 2030**.**

- Measures to reduce the energy consumption **focus** particularly **on the building sector** as buildings alone consume some 40% of the total energy.
- For existing constructions (buildings, streets, etc.), large attention is being paid to **improve energy efficiency** as they are accountable for large electric power consumption as well as night light pollution.

A more extensive and powerful use of **GEOSPATIAL DATA** and ICT tools **FOR ENERGY EFFICIENCY** can support the creation of **SMART** and **LOW-CARBON CITIES**

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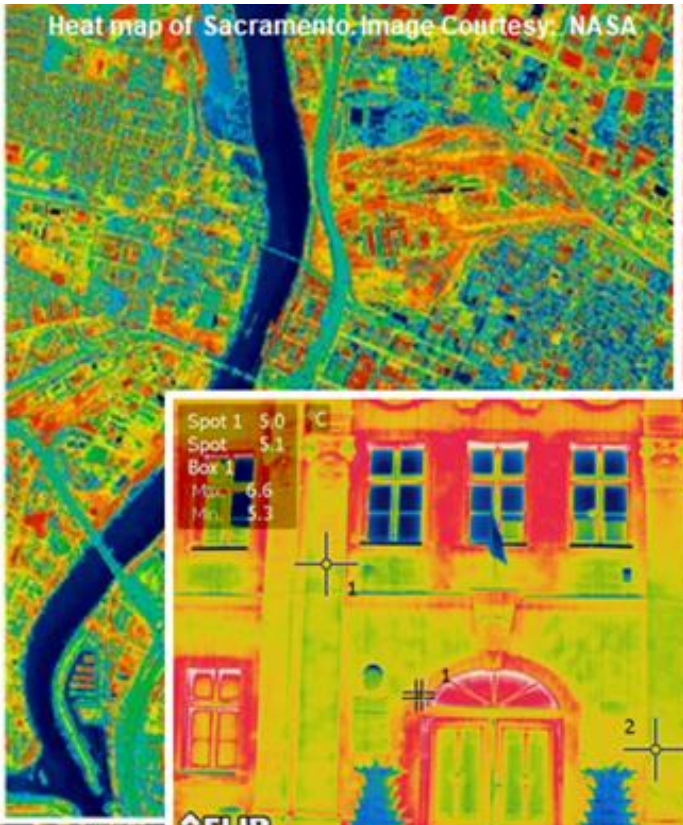

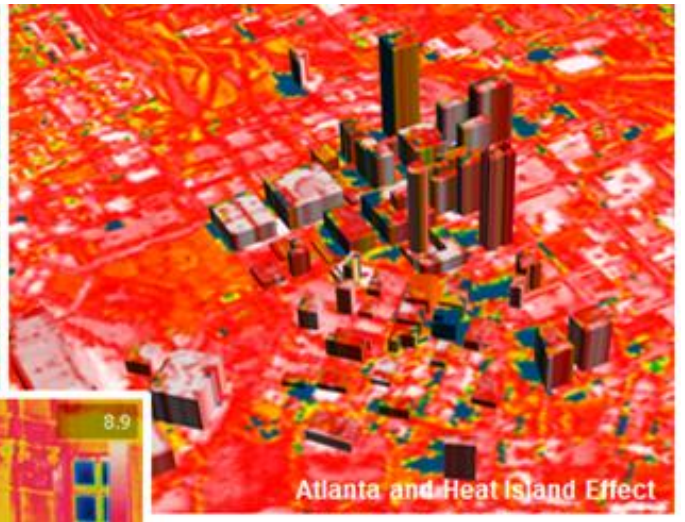

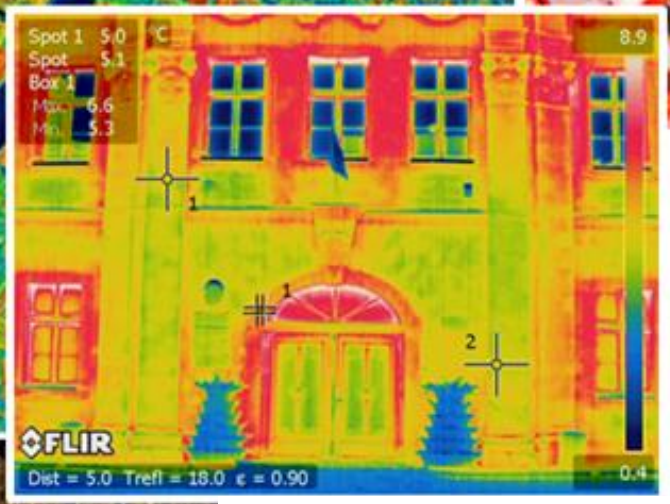

Examples of

VALUE ADDED GEOSPATIAL DATA…

…as useful tools to estimate, analyze and visualize heating flows, urban heat islands, night light pollution, etc.

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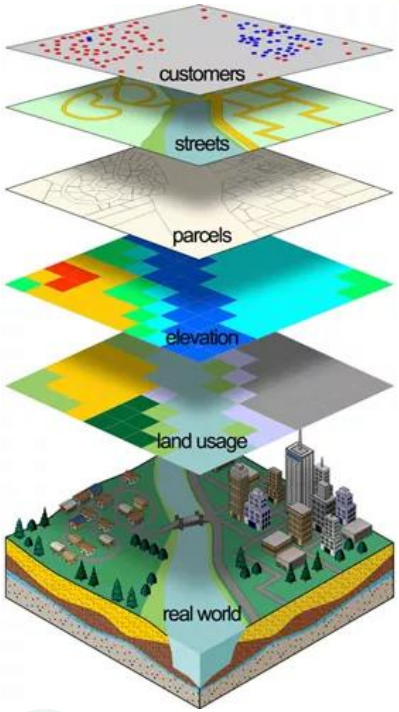
DATA + GIS + 3D CITY MODELS

While (2D) **GIS** are almost common in public administrations, the use of **3D city models** is still **confined** and mainly applied **to visualization purposes.**



Spatial and non-spatial energy-related data integrated with **3D city models into GIS environments** have been already adopted in some cities, but we are very **far away from** their **widespread** utilization and daily use.

Although **on-going initiatives** have demonstrated the potential of geospatial data, 3D city models and webGIS for better planning and management of energy efficient buildings, there is still a **gap between a "nice to have" attitude and a "need to have" one.**

www.williamsnd.com/Department/GIS

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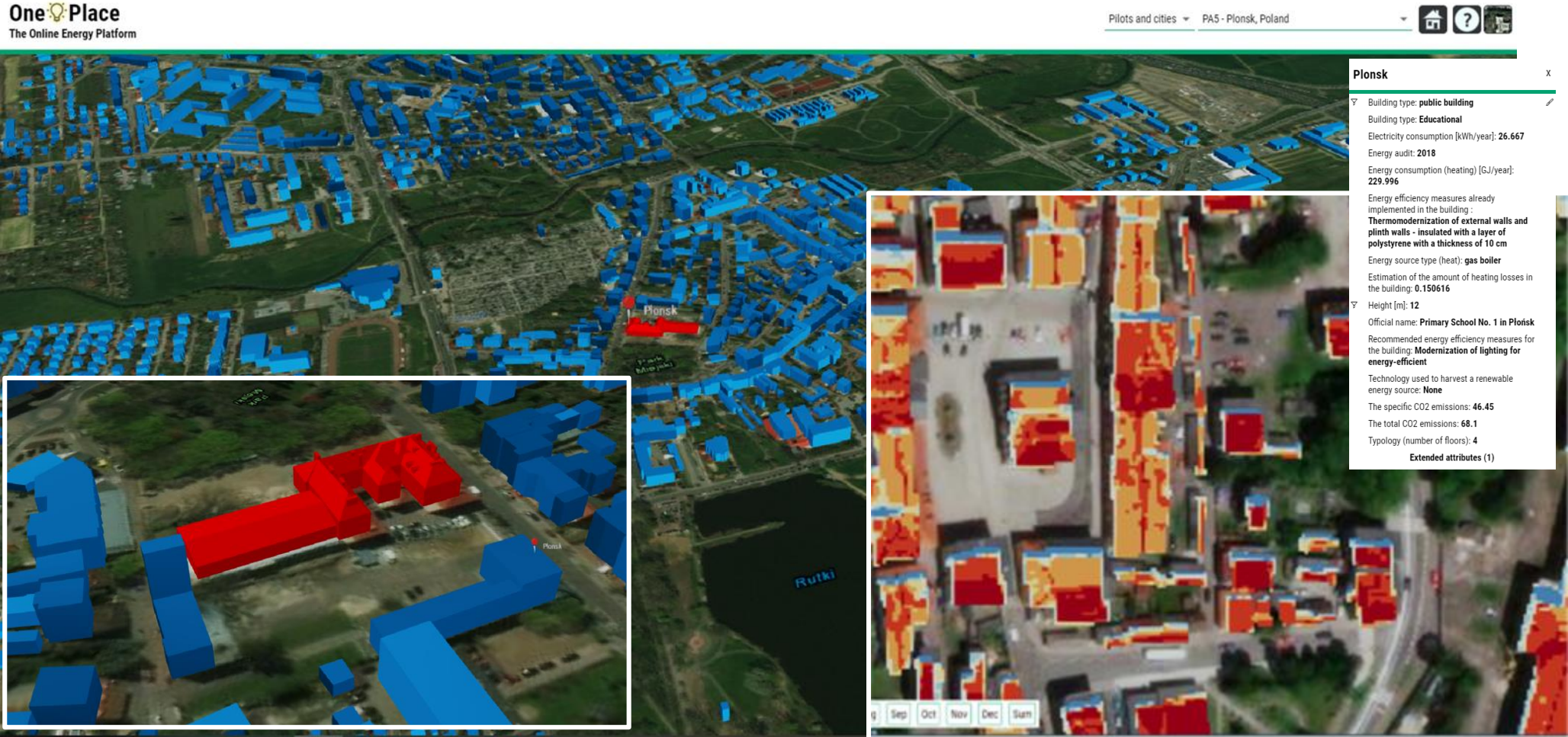
3D Energy Management System is a module (**WebGIS tool**) to visualize, query and manage energy information / uses / loses / PV potential / audit certificates of (public) buildings using 3D building models.



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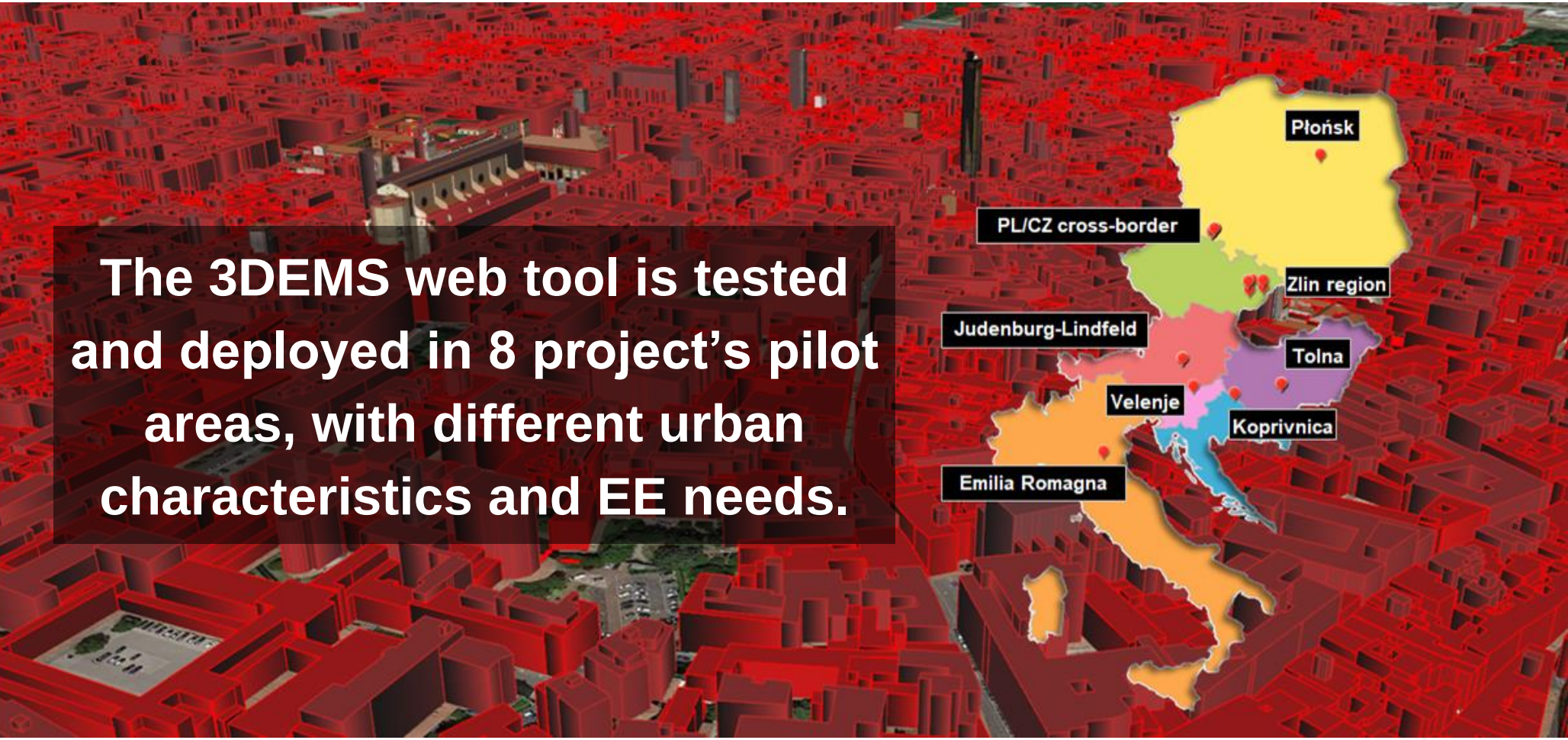
In the **pilot areas**, for selected public buildings, **geospatial databases** with urban and energy data are created in order to **combine** them **with 3D building** geometries within the **3DEMS** tool.



The 3DEMS web tool is tested and deployed in 8 project's pilot areas, with different urban characteristics and EE needs.

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To create the **3DEMS tool**, heterogeneous data were collected, harmonized and stored in the **2 categories** (**spatial** and **non-spatial data**):

a) spatial data

(i) land **cadastre maps** (2D vector or raster) / **building footprints** with attribute info



(ii) **2.5D and 3D point clouds** (derived from LiDAR or photogrammetric flights)


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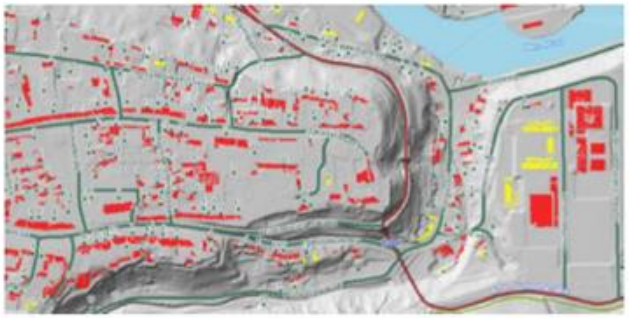
To create the **3DEMS tool**, heterogeneous data were collected, harmonized and stored in the **2 categories** (**spatial** and **non-spatial data**):

a) spatial data

(iii) **solar energy potential maps** (available or produced from DEM data with GIS)



(iv) **3D building model LOD1 / LOD2** (produced from footprints + DEM data)

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To create the **3DEMS tool**, heterogeneous data were collected, harmonized and stored in the **2 categories** (**spatial** and **non-spatial data**):

a) non-spatial data

(i) Energy Performance Certificates incl.

- energy consumptions
- carbon dioxide emissions
- energy efficiency indexes
- etc.

(ii) Data from the register of buildings

- official name
- typology
- building type
- etc.

(iii) Statistical and survey data

- construction plans
- energy bills
- etc.

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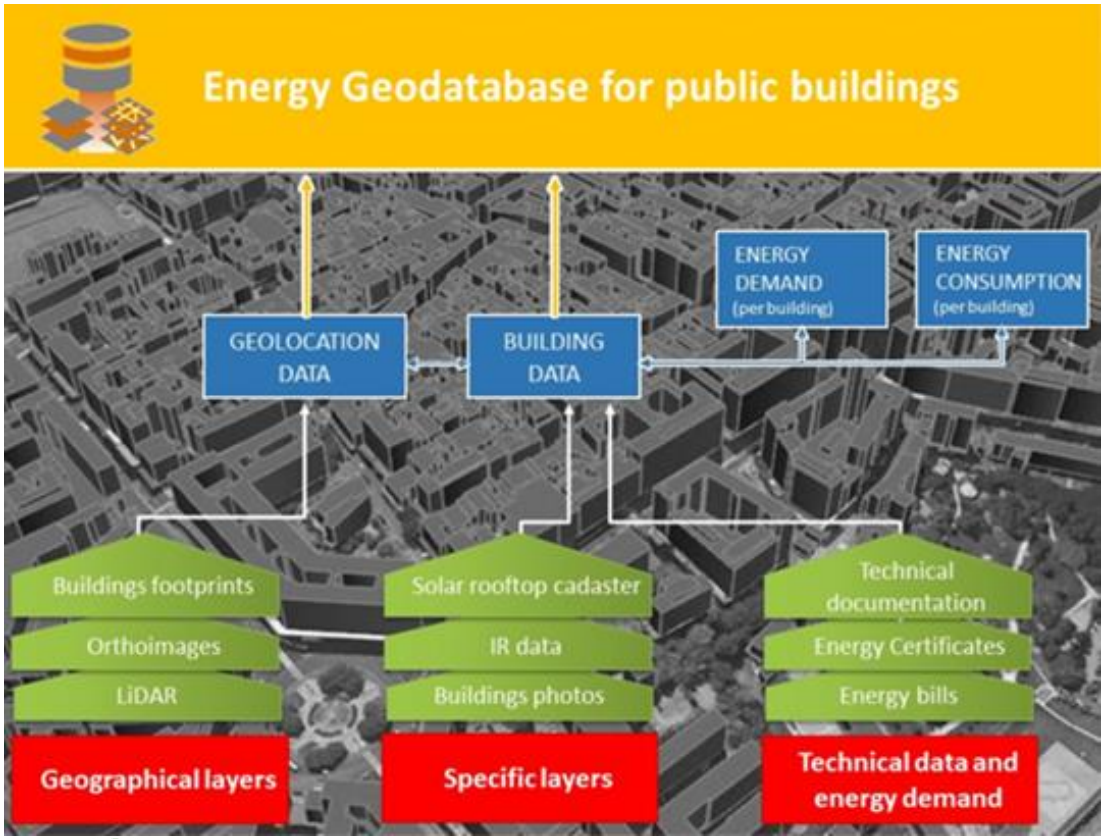
Starting from these (collected, generated and harmonized) data, the **3DEMS webGIS** tool **allows the user to:**



(i) **navigate** through the urban environment at different altitudes and camera angles (based on Cesium);

(ii) **visualize and interact** with LOD1 building models at urban scale, LOD2 building models at single building scale (selected pilots);

(iii) **select** a building of interest and **retrieve** energy and other cadastral/building info, incl non spatial data;

(iv) **analyze** the solar maps and energy maps (heating loss), visualized as additional building texture.

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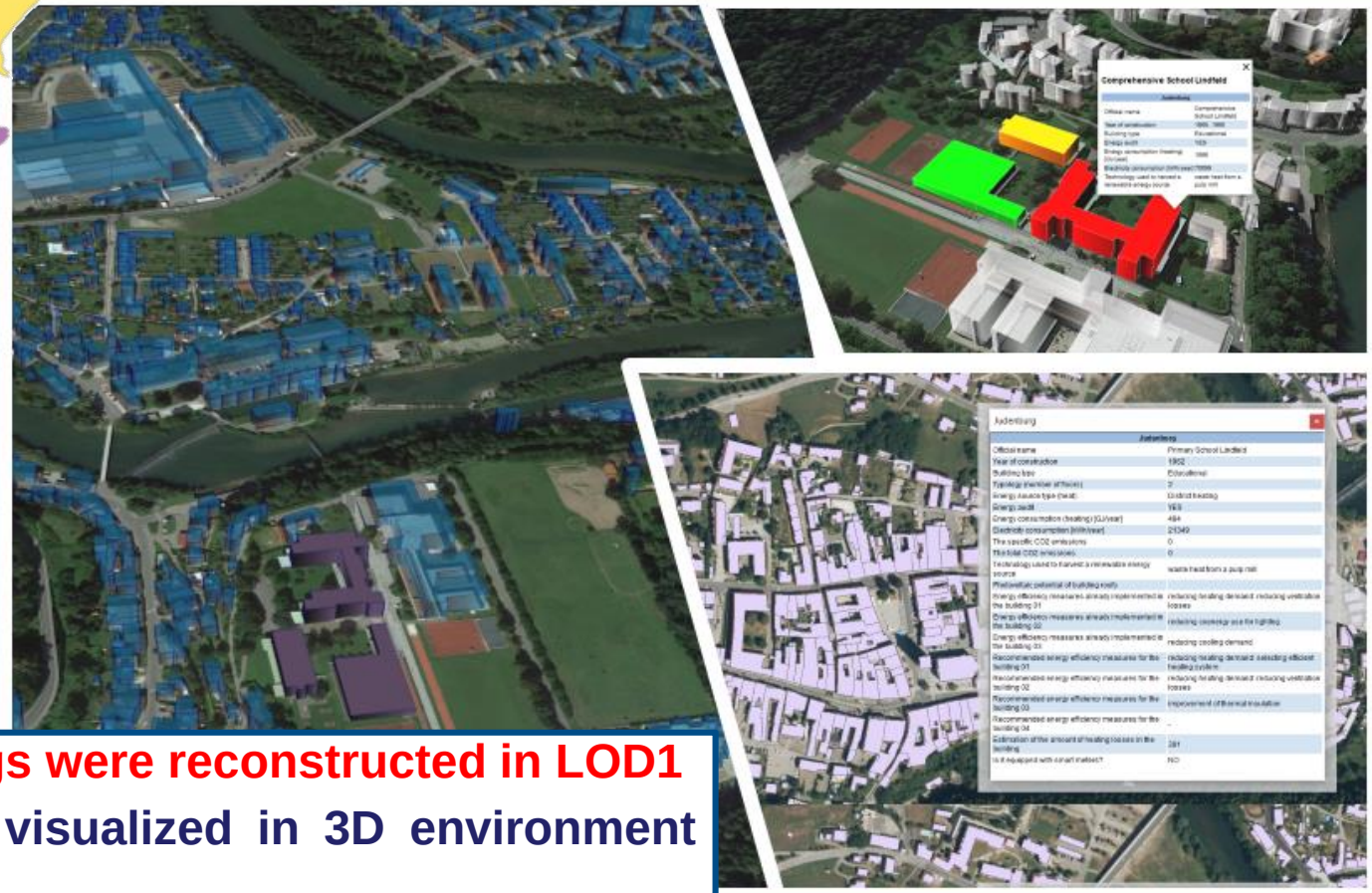
Example of web based visualization of **building geometry** (LOD1 and LOD2) with associated **energy database**



More than 10,000 buildings were reconstructed in LOD1 (some 25 in LOD2) and visualized in 3D environment

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Example of **visualization LOD1 building models** at urban scale &
LOD2 building models at single building scale

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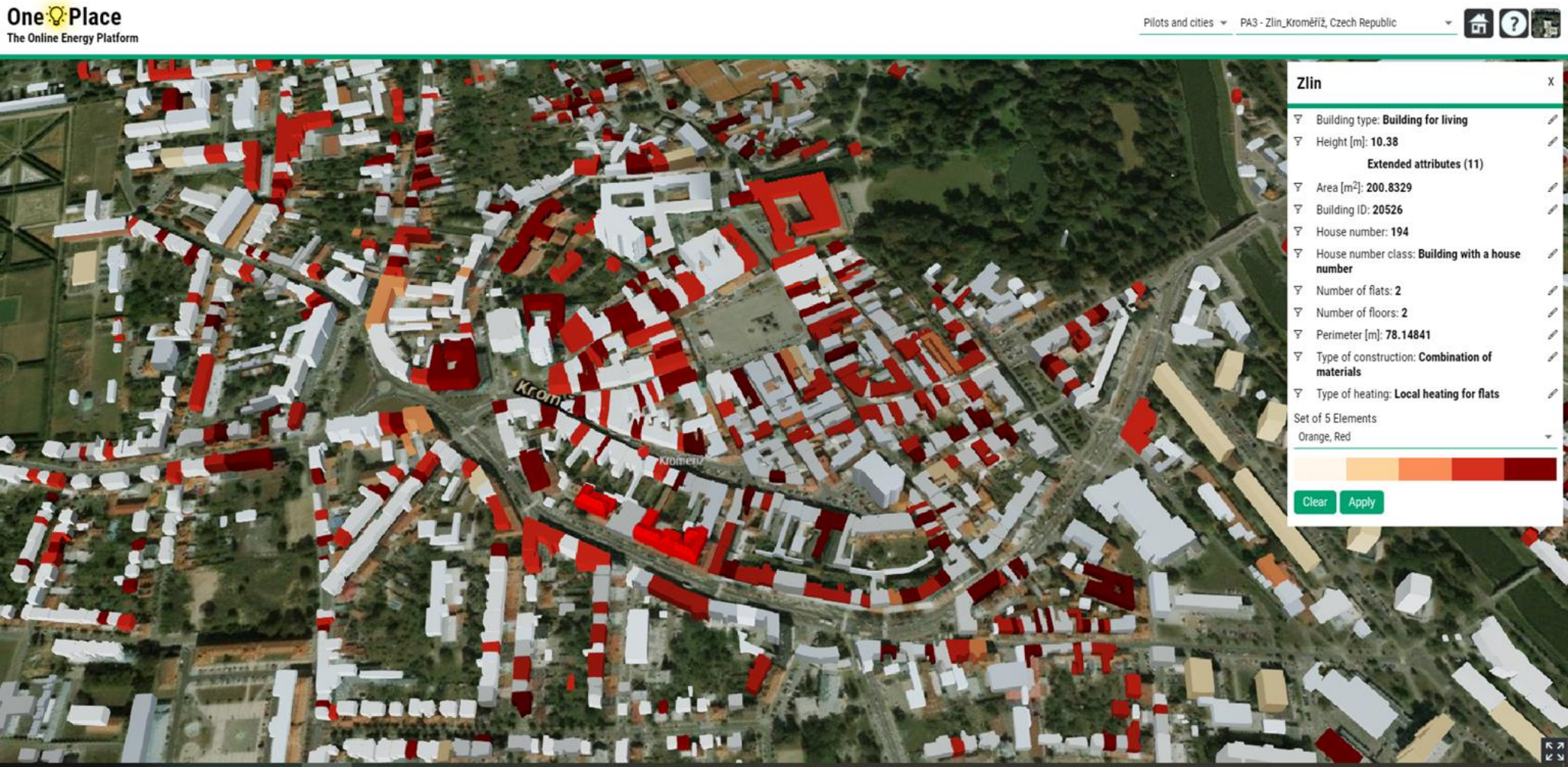
Example of **aggregation** functions within 3DEMS:

energy sources used for buildings' heating



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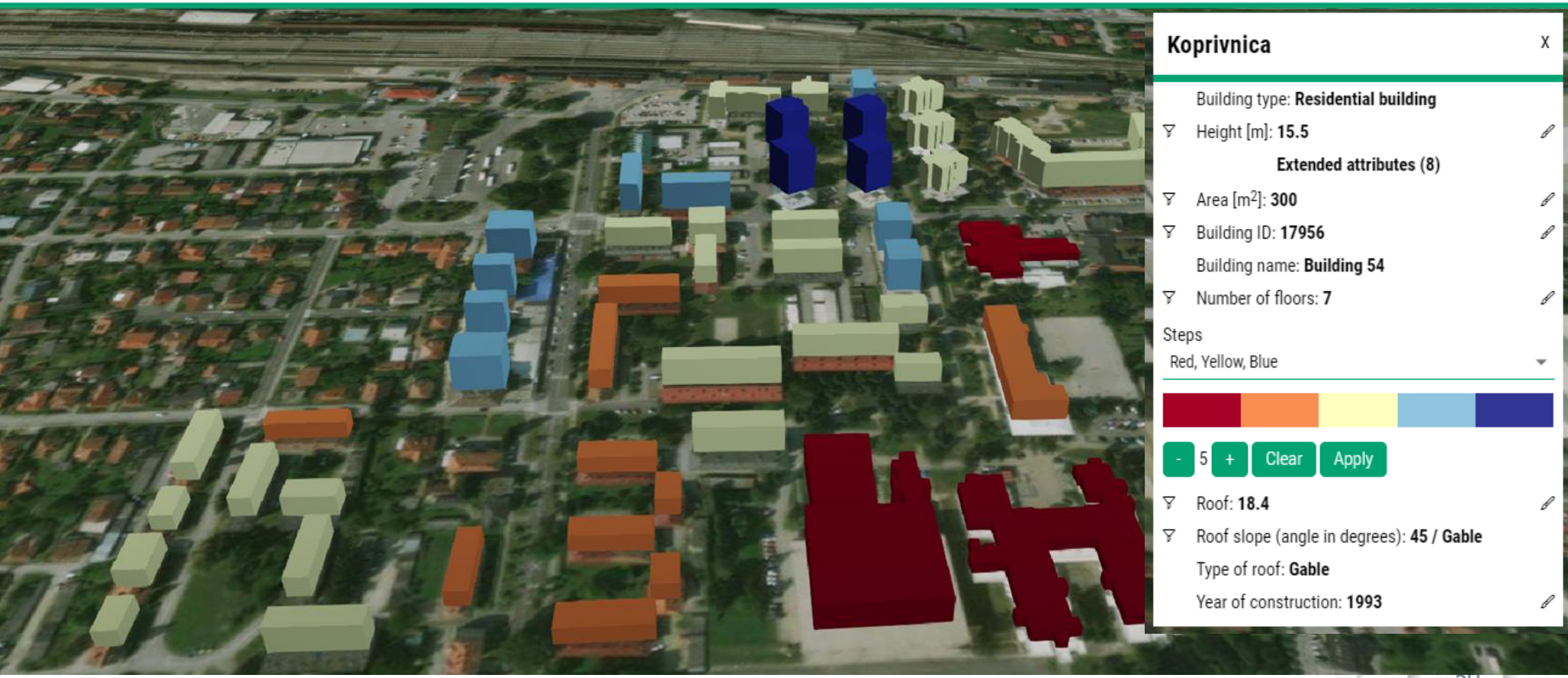
Example of **aggregation** functions within 3DEMS:

number of floors



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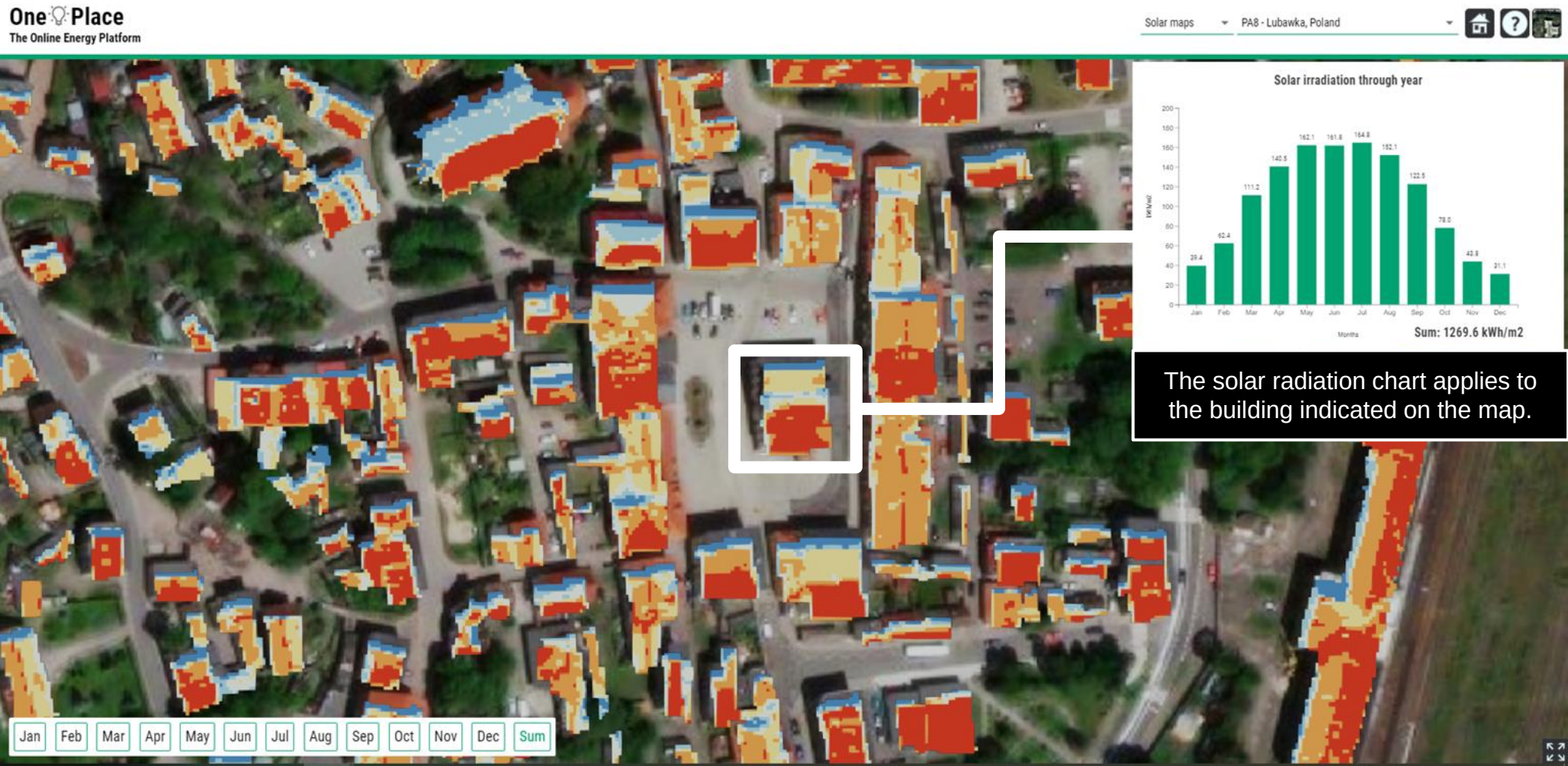
Example of web based visualization of **photovoltaic PV maps**:

hourly global incoming solar radiation, aggregated on a monthly and yearly basis



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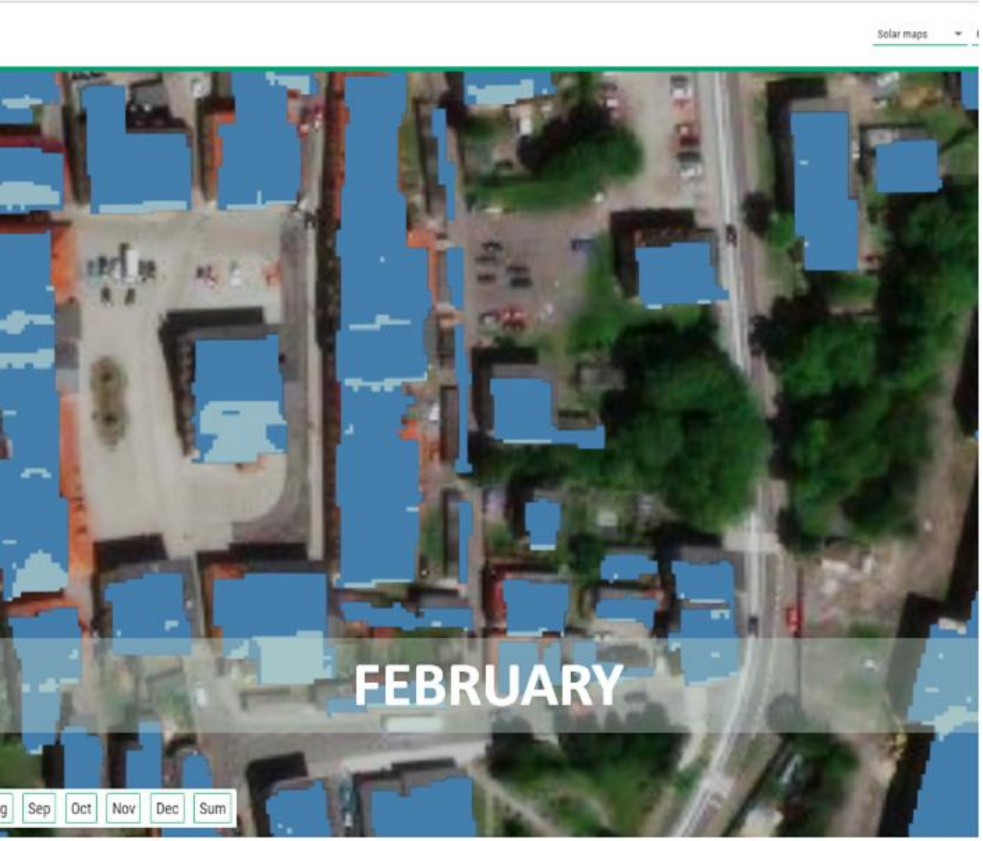
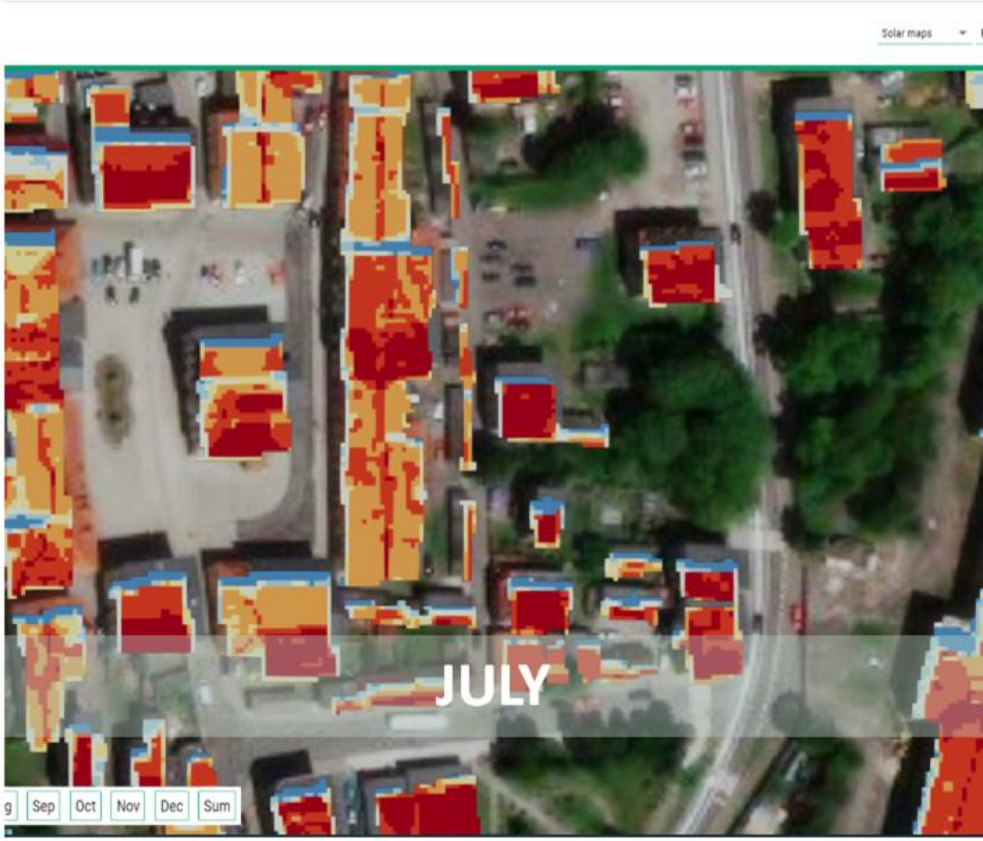
Example of web based visualization of **photovoltaic PV maps in February (**on the left**) and July (**on the right**)**





OnePlace - 3D Energy Management System

Why create your own 3D EMS? Different reasons:

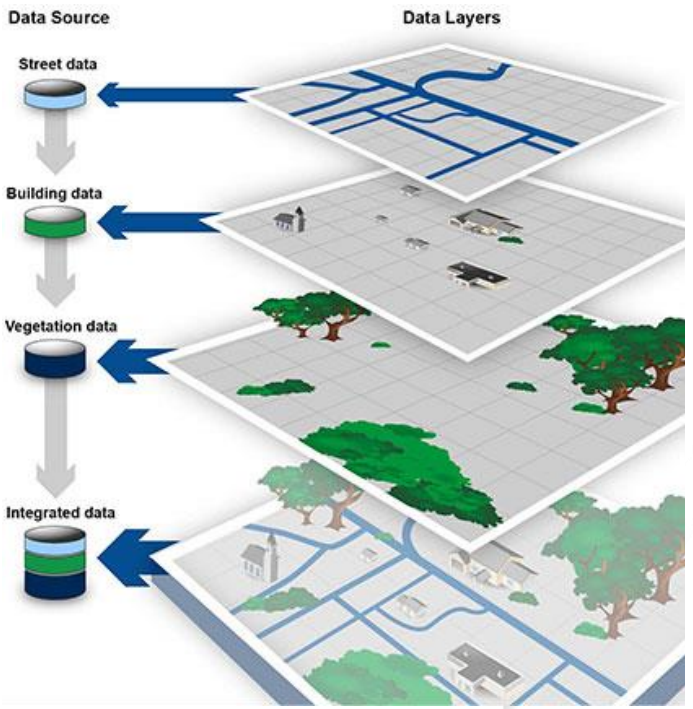
1. Data you need is on a paper map (documents) and needs to be converted to a digital format.

2. To organize geospatial data and 3D building models for energy-related needs

3. To plan retrofits to save energy and improve energy efficiency.

4. Data need to be accessed /used by multiple people at the same time.

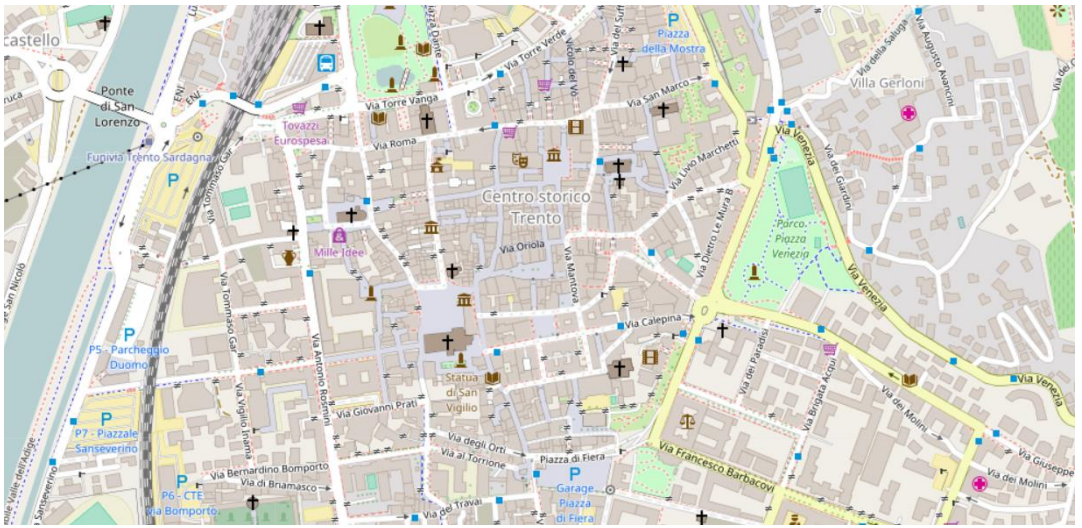
...and many other reasons.



HOW TO START?

1. **(spatial) data collection:**
- **geospatial data to create 3D building models**
  (*building footprints, maps, LiDAR point clouds, terrain models, orthoimages, etc.*)

Building footprints



Building footprint but much more (semantics)

HOW TO START?

1. **(spatial) data collection:**
- **geospatial data to create 3D building models**
  (*building footprints, maps, LiDAR point clouds, terrain models, orthoimages, etc.*)

Aerial 3D survey of the territory which deliver point clouds (LAS format), DTM and DSM (ASCII grid format)

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HOW TO START?

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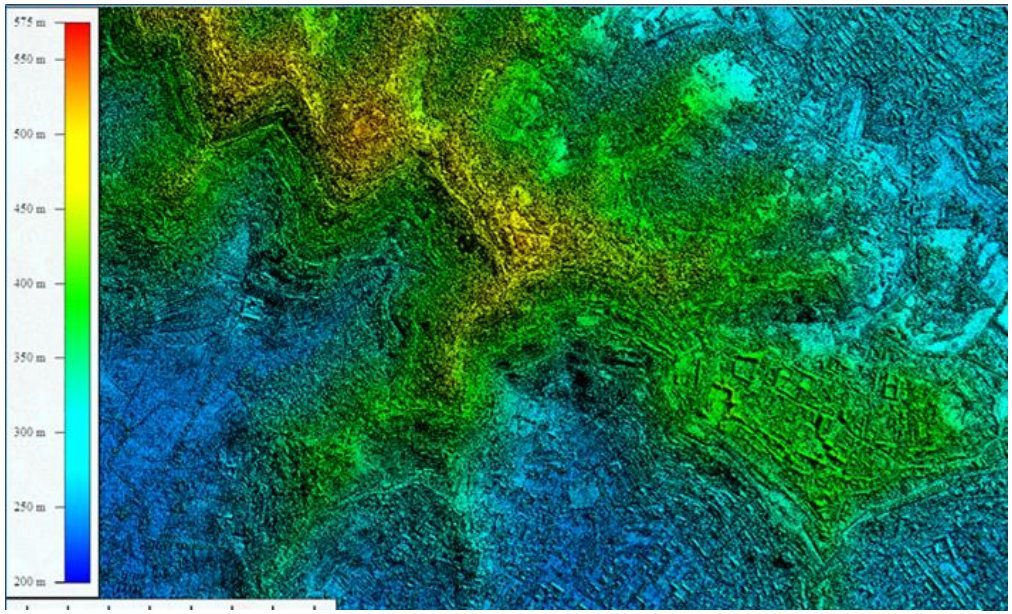
- **geospatial data to create 3D building models**
  (*building footprints, maps, LiDAR point clouds, terrain models, orthoimages, etc.*)



DSM (Digital Surface Model) - raster format

DSM (Digital Surface Model) - point cloud format

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HOW TO START?

1. **(spatial) data collection:**
- **geospatial data to create 3D building models**
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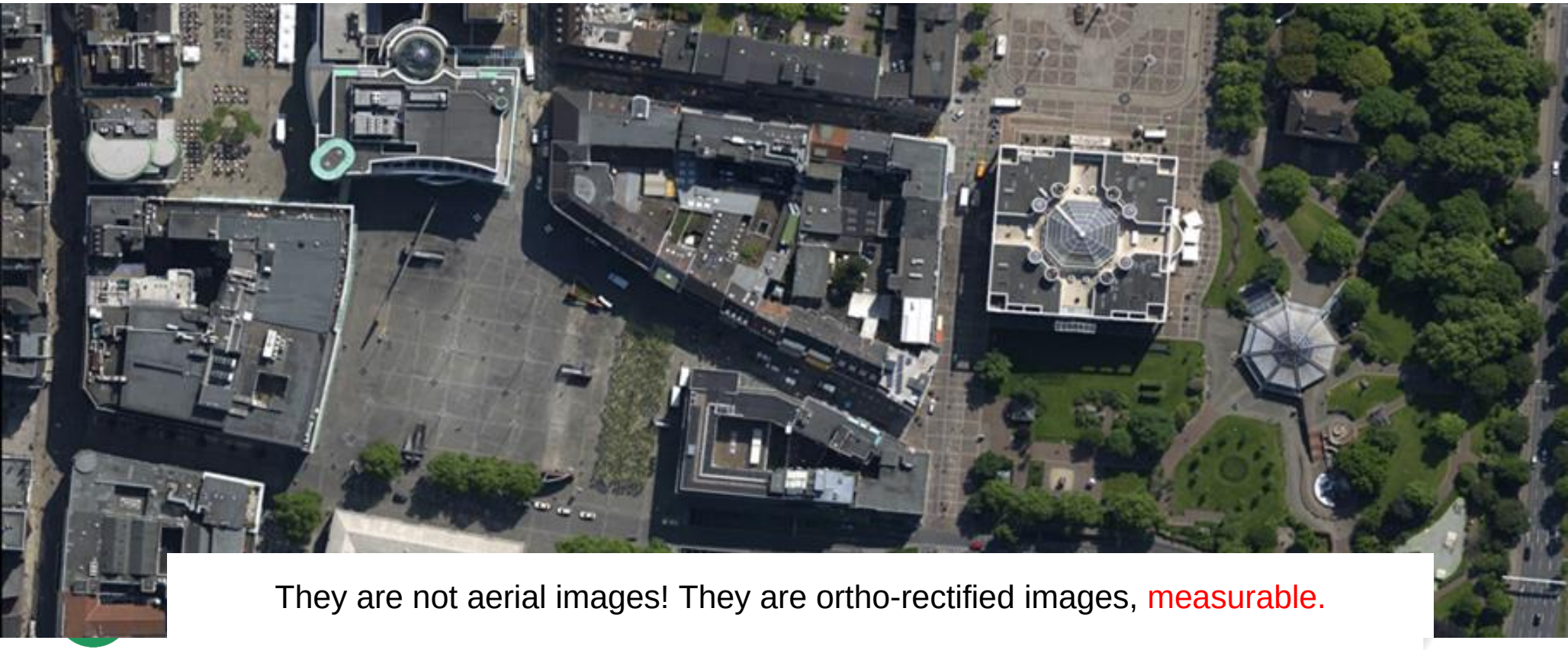

They are not aerial images! They are ortho-rectified images, measurable.

HOW TO START?

1. (non-spatial) data collection:

- energy-related data

(e.g. energy consumption, CO2 emissions, heating consumption, etc.)

Field	Units	Description
Official name	-	-
Year of construction	-	-
Building type	-	**Type of building:** residential, agricultural, civil, medical, educational, government, industrial, military, religious, transport.
Typology (number of floors)	-	-
Energy source type (heat)	-	**Type of the heat source:** geothermal energy, district heating, cogeneration unit, heat pump, biofuel boilers, solid fuel, electricity, natural gas, oil.
Energy audit	-	-
Energy consumption (heating)	GJ/year	-
Electricity consumption	kWh/year	-
The specific CO2 emissions	tons/year	-
The total CO2 emissions	tons/year	-
Technology used to harvest a renewable energy source	-	**Type of the technology:** photovoltaics (PV), solar collectors, biofuel boilers, heat pumps
Estimated photovoltaic potential of roof	kW	Calculated from the solar potential maps
EE measures already implemented in the building	-	**Type of the measures:** (i) reducing heating demand: improving the insulation, limiting the exposed surface area, reducing ventilation losses, selecting efficient heating system, new roof; (ii) reducing cooling demand, (iii) reducing energy use for lighting, (iv) reducing energy used for heating water, etc.
Recommended EE measures for the building	-	
Estimation of the amount of heating losses	MWh/year	-

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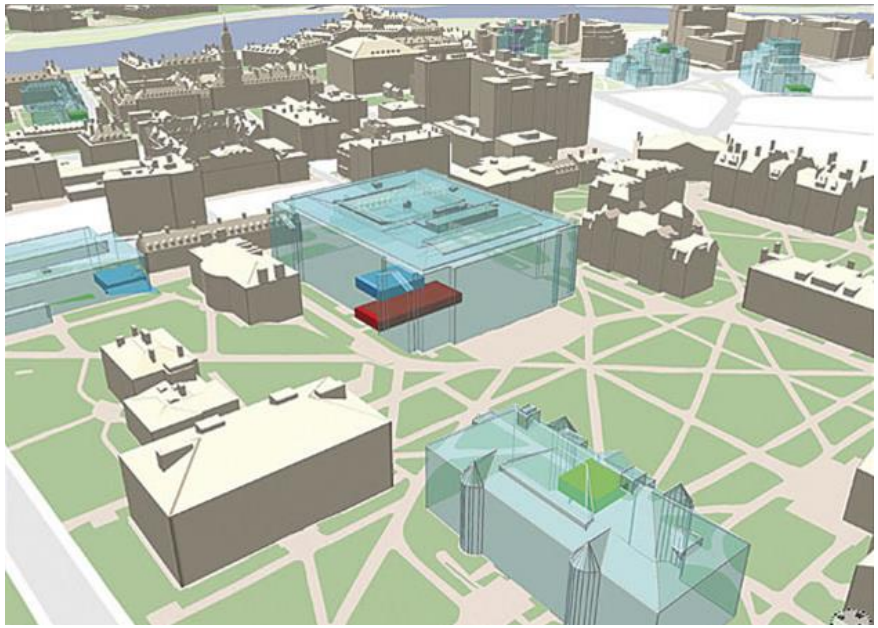
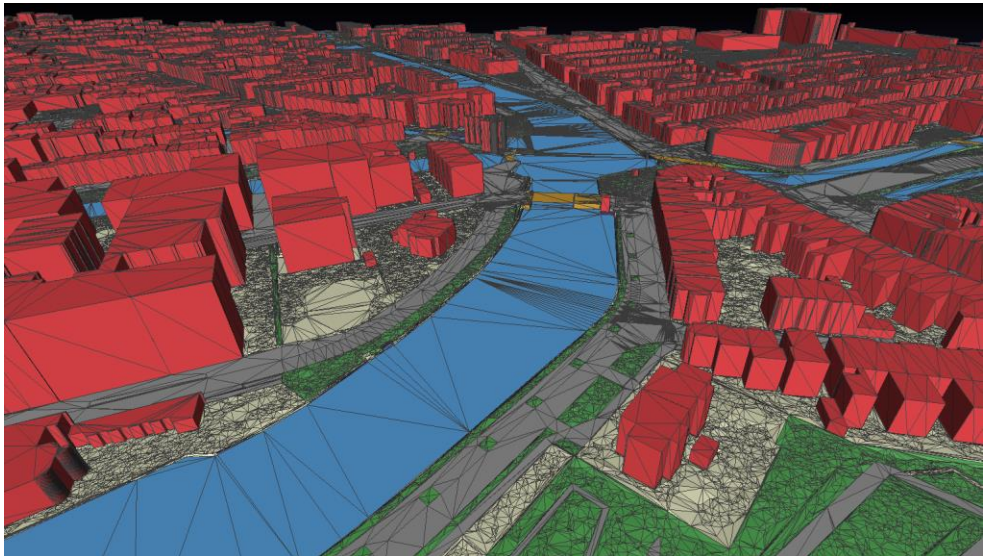
HOW TO START?

2. 3D model generation:

depending on the available geodata, different procedures can be applied to produce 3D geometries, *i.e. 3D envelops, at different geometric resolution and with different levels of detail*

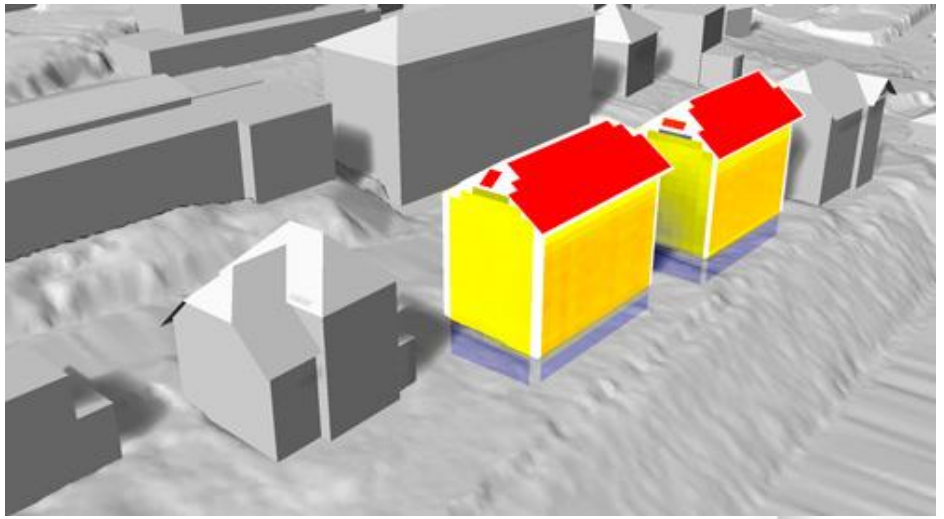




HOW TO START?

3. Further data generation and collection:

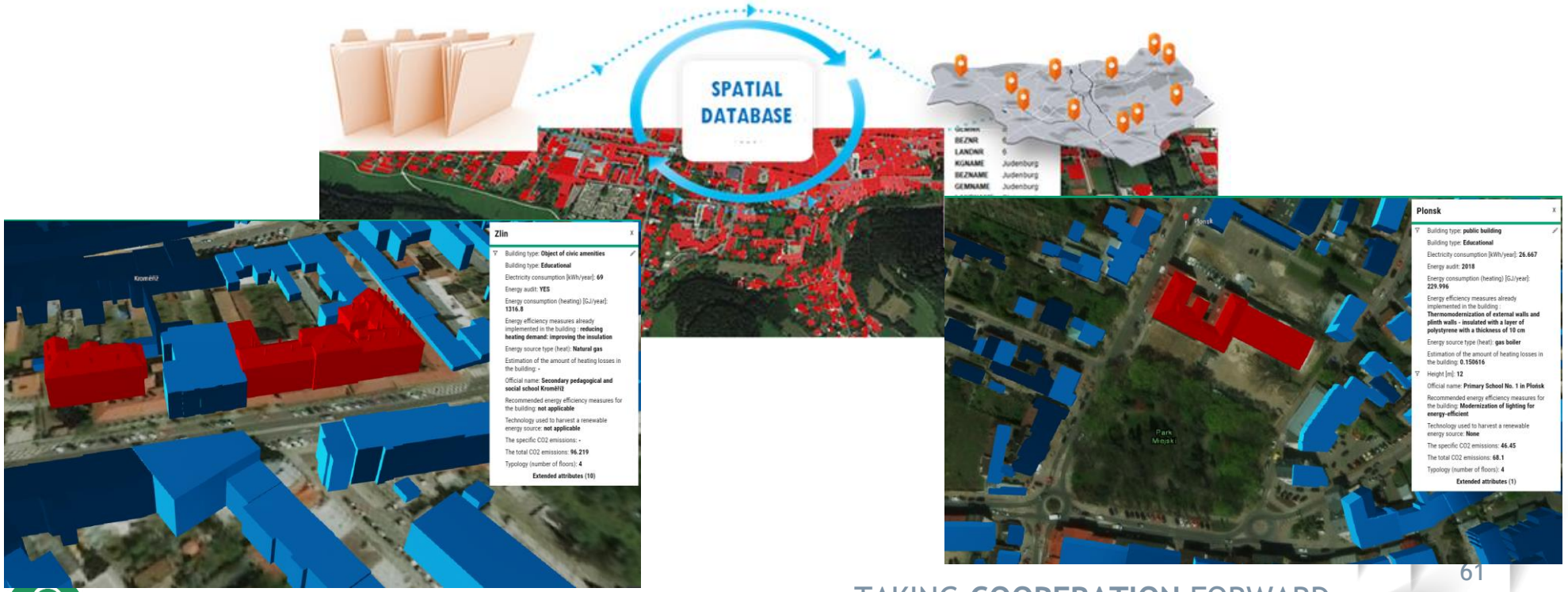
3D building geometries, coupled with terrain information, occlusions and geolocations, can be used to estimate the photovoltaic (PV) potential of building roofs and produce 3D solar maps



HOW TO START?

4. Data and geometry linking:

the created **geospatial databases** allow to connect heterogeneous information (*also non-spatial attributes available in the geoDB*) **with geometric/3D information**, retrieving such info on demand and with specific tools



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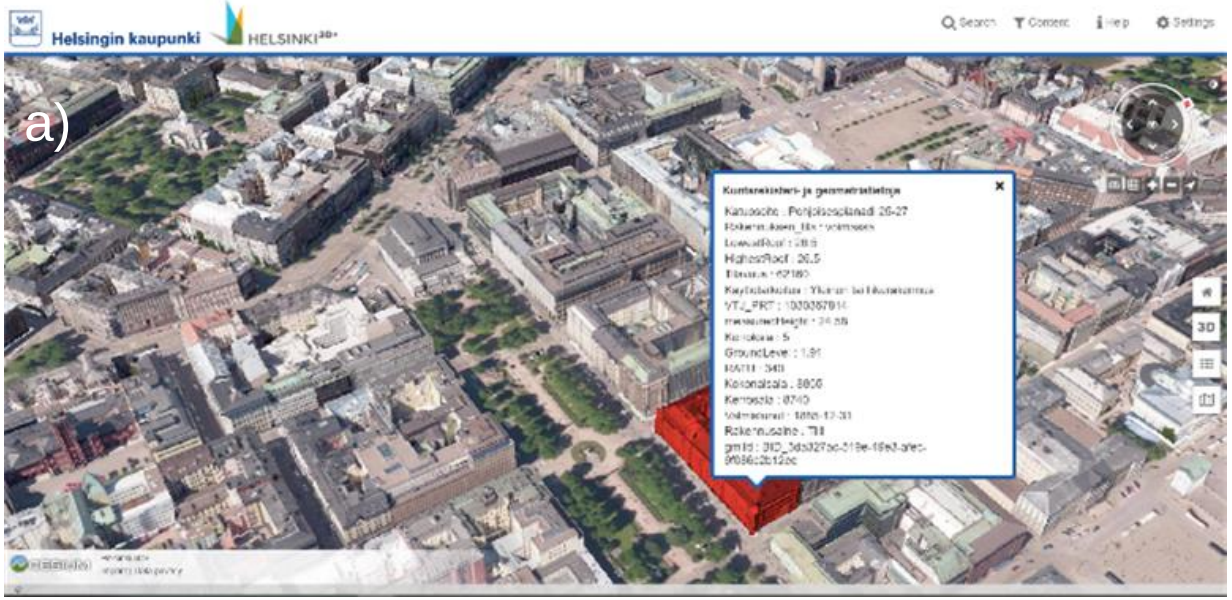
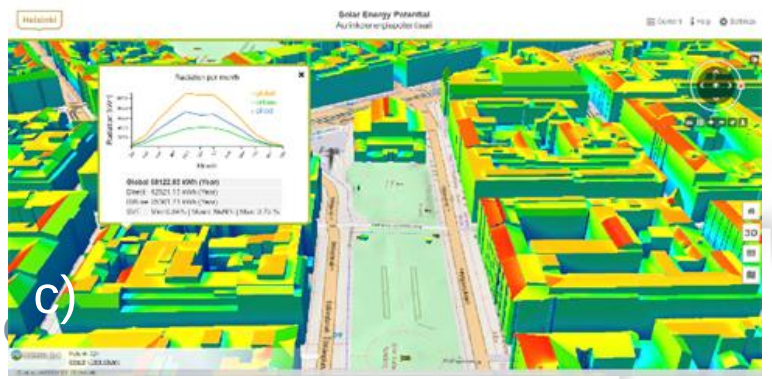
HOW TO START?

5. Data visualization on the web:

using OGC web platforms (e.g. Cesium) all collected / generated information can be visualized online. Queries can be performed producing new visualization scenarios in order to better understand energy flows, requests, etc.





a) - Helsinki 3D+: https://kartta.hel.fi/3d/); buildings categorized by energy source
b) - The Climate and Energy Atlas: https://kartta.hel.fi/3d/atlas); solar irradiation analyses on the LOD2 building models
c) - Helsinki Solar Energy Potential: https://kartta.hel.fi/3d/solar/

OnePlace - DEMO
- practical use of 3DEMS -

OnePlace - DEMO
- Living Energy Marketplace: 5 min -

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Home | Living Energy Marketplace | Energy Efficient Cities | Financing Energy Efficiency | 3D EMS

Living Energy Marketplace

Living Energy Marketplace aims to connect customers interested in energy efficiency projects to qualified contractors (architects, engineers, auditors, craftsmen, technicians and installers, energy agencies etc.) in order to scale up investments in energy efficiency and to reduce information barriers. It also contains links and information covering the electronic & electric appliances to empower potential investors to make energy-wise decisions.

Device database

Here you can find links to databases covering the electronic & electric appliances. This databases can help you to make energy-wise decisions if you are considering buying this kind of products.

View more

Experts Database

Contains database of links to experts in the field of architecture, engineering, energy efficiency, renewable energy sources etc. This database is meant to serve as a connection point between customers interested in energy efficiency projects and qualified contractors.

View more

OnePlace - DEMO
- Energy Efficiency Cities: 5 min -

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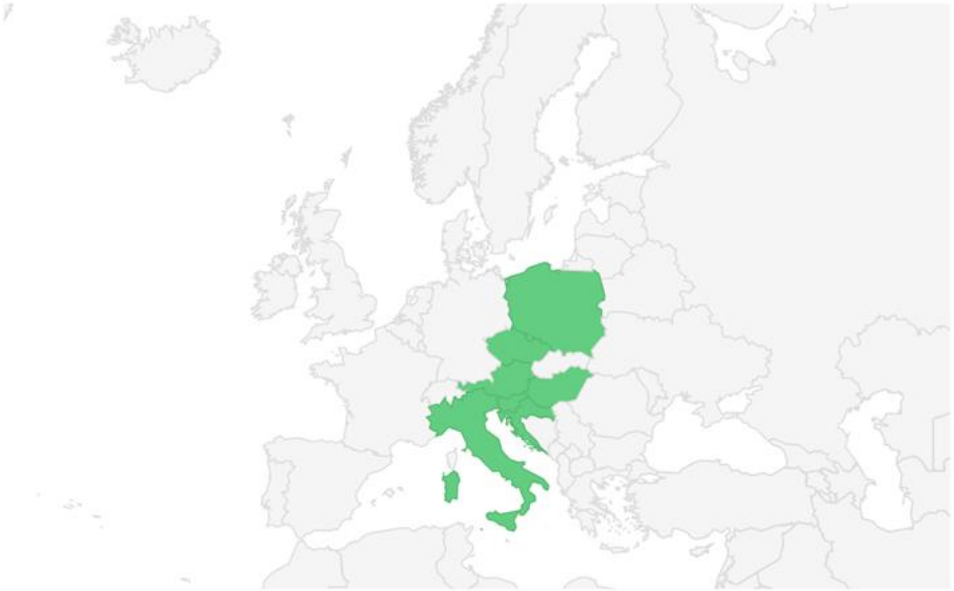
Home | Living Energy Marketplace | Energy Efficient Cities | Financing Energy Efficiency | 3D EMS

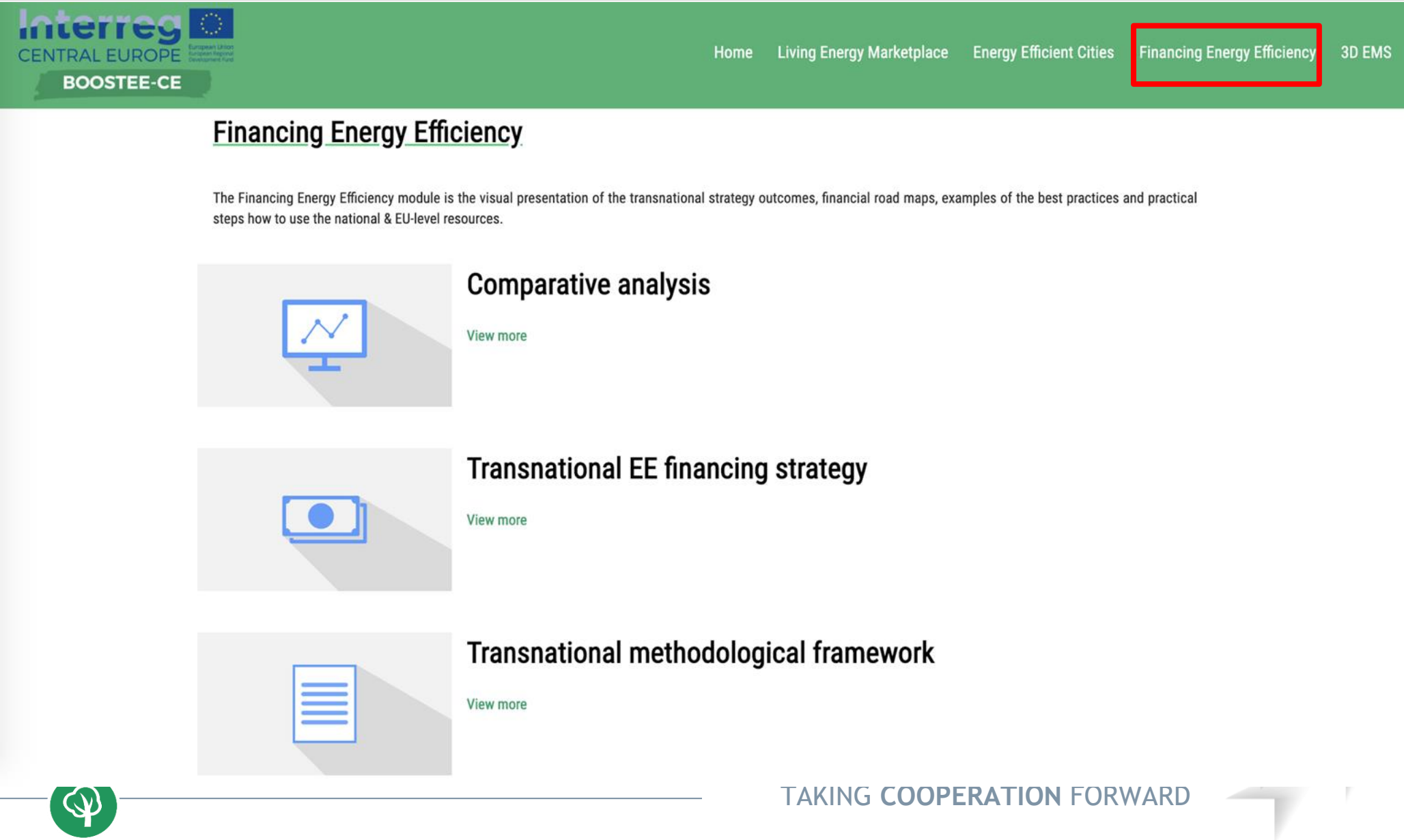
Energy Efficient Cities

The Energy Efficient Cities module is an exchange platform of experiences and identification of good practices within energy efficiency sector for public authorities and other public users. It demonstrates the range of approaches and measures various cities have used to undertake efficiency improvements and thus helps to guide cities in designing effective urban energy efficiency policies and programs.

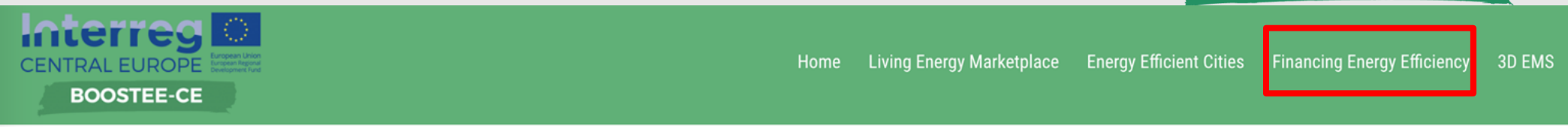


Search Database

OnePlace - DEMO
- Financing Energy Efficiency: 10 min -



OnePlace - DEMO
- Financing Energy Efficiency: 10 min -



Energy efficiency financing project calculator

This is the simple web based energy efficiency project calculator which gives to the user a basic indicative idea of profitability and advisability of the investment into an energy efficiency or RES project. It counts just with own sources, not considering for instance grants and subsidies on one side or loans on the other side which both can significantly change foreseen values.

If grants and subsidies are involved, the NPV and IRR are increasing and payback periods are shortening, on the other hand, loans affect the investment the opposite way, i.e. when you are co-financing the investment project with a loan, the NPV and IRR are decreasing and payback periods are extending.

You can check also graphical illustration of cash flow and discounted cash flow on a separate sheet.

For concrete investment calculations it is highly advisable to carry out a proper financial analysis by a financial specialist!

You can find instruction on how to use the calculator here.

Capital costs

Capital costs

Capital costs are fixed, one-time expenses incurred on the purchase of land, buildings, construction, and equipment. The sum of the different type of costs related to the considered investment, for example the capital costs of building refurbishment, new EE and RES installations, infrastructure reconstruction etc.

Annual Energy Savings

Annual Energy Savings

Annual sum of money savings generated by the investment, for instance costs saved for heating, hot water preparation, electricity etc.

Annual Revenues

Annual Revenues

Annual sum of money generated by the investment, for instance electricity sales received on a basis of feed in tarrifs, overall heat and electricity sales to customers etc.

Operational Costs

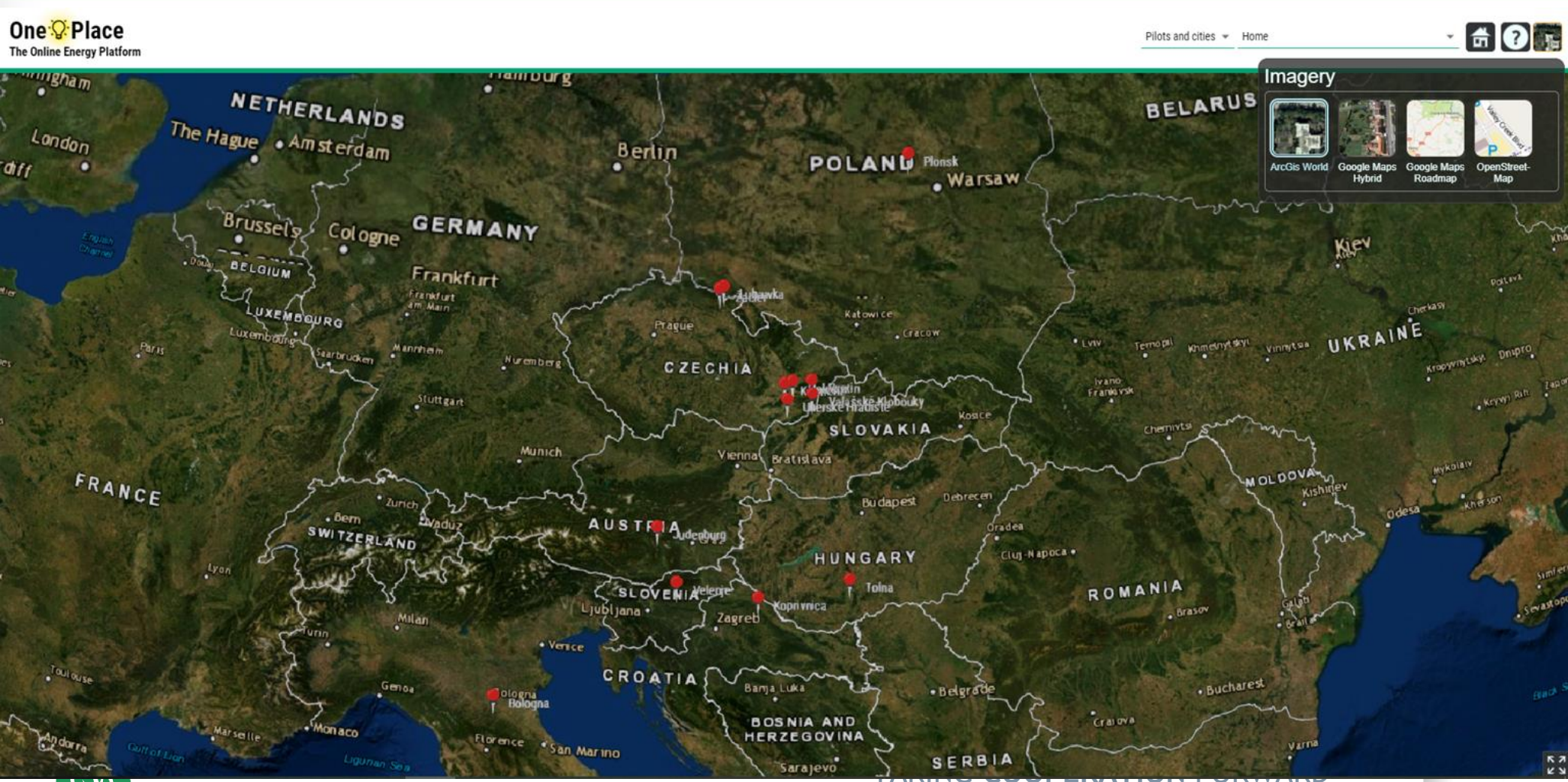
Operational Costs

OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund
BOOSTEE-CE

Interreg CENTRAL EUROPE
BOOSTEE-CE

Home | Living Energy Marketplace | Energy Efficient Cities | Financing Energy Efficiency | 3D EMS



OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
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One Place
The Online Energy Platform

Pilots and cities | PA3 - Zlin_Kroměříž, Czech Republic

OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
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One Place
The Online Energy Platform

Pilots and cities | PA7 - Velenje, Slovenia

OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
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One Place
The Online Energy Platform

Pilots and cities | PA6 - Koprivnica, Croatia

OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
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Interreg CENTRAL EUROPE
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One Place
The Online Energy Platform

Pilots | PA5 - Plonsk, Poland

Plonsk X

- Building type: **public building**
- Building type: **Educational**
- Electricity consumption [kWh/year]: **26.667**
- Energy audit: **2018**
- Energy consumption (heating) [GJ/year]: **229.996**
- Energy efficiency measures already implemented in the building : **Thermomodernization of external walls and plinth walls - insulated with a layer of polystyrene with a thickness of 10 cm**
- Energy source type (heat): **gas boiler**
- Estimation of the amount of heating losses in the building: **0.150616**
- Height [m]: **12**
- Official name: **Primary School No. 1 in Płońsk**
- Recommended energy efficiency measures for the building: **Modernization of lighting for energy-efficient**
- Technology used to harvest a renewable energy source: **None**
- The specific CO2 emissions: **46.45**
- The total CO2 emissions: **68.1**
- Typology (number of floors): **4**

Extended attributes (1)

OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
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OnePlace
The Online Energy Platform

Pilots | PA8 - Lubawka, Poland

Lubawka X

Building type: **Government**

Electricity consumption [kWh/year]: **58200**

Energy audit: **YES**

Energy consumption (heating) [GJ/year]: **1650**

Energy efficiency measures already implemented in the building : **not applicable**

Energy source type (heat): **Natural gas**

Estimation of the amount of heating losses in the building: **no data**

Height [m]: **16.100006**

Official name: **Town hall in Lubawka**

Recommended energy efficiency measures for the building: **no data**

Technology used to harvest a renewable energy source: **not applicable**

The specific CO2 emissions: **no data**

The total CO2 emissions: **no data**

Typology (number of floors): **3**

Extended attributes (1)

OnePlace - DEMO
- 3D Energy Management System: 15 min -

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
BOOSTEE-CE

Interreg CENTRAL EUROPE
BOOSTEE-CE

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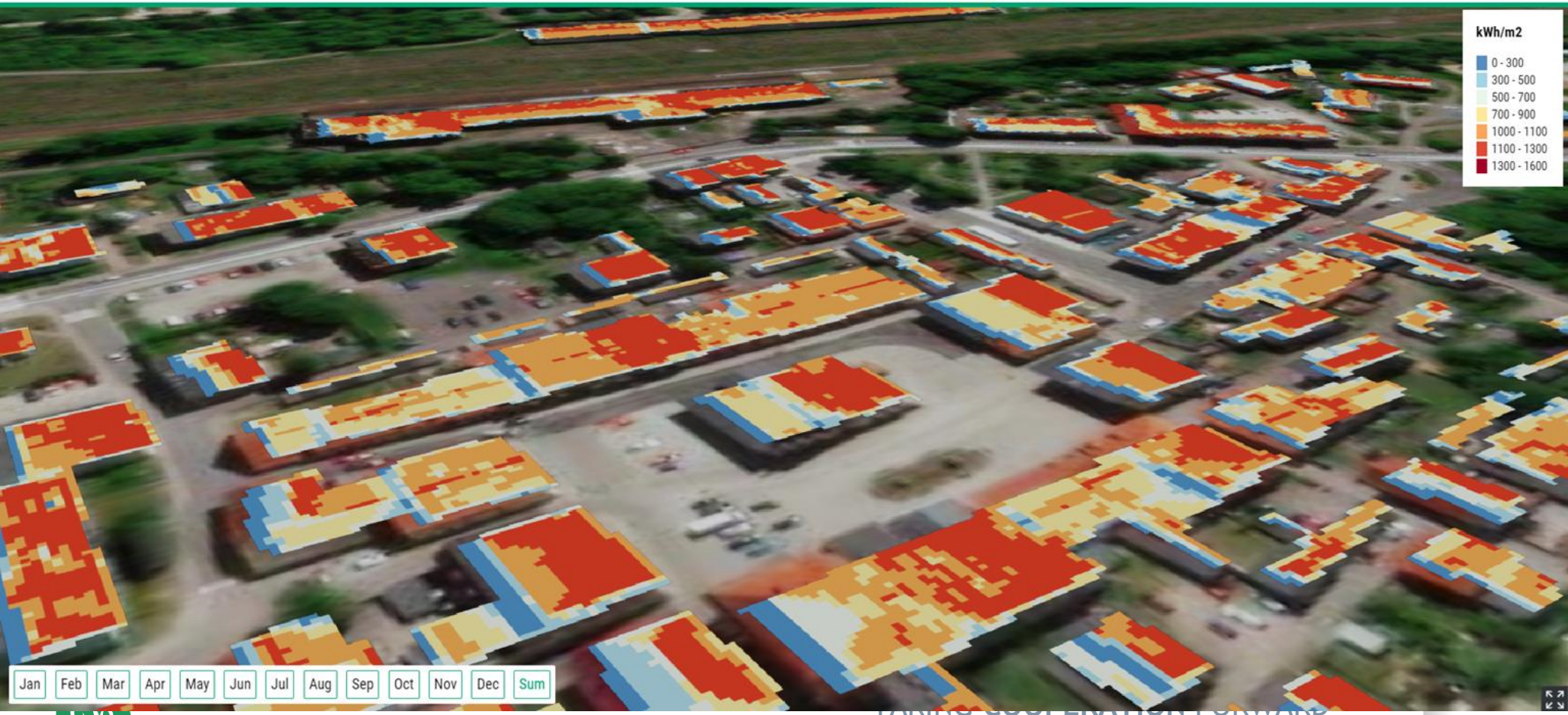
One Place
The Online Energy Platform

Solar maps | PA8 - Lubawka, Poland



THANK YOU!

BOOSTEE-CE Train the Trainers

Warsaw, 1.10.2019

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Bruno Kessler Foundation (FBK)
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The BOOSTEE-CE project is EU-funded project implemented through the INTERREG CENTRAL EUROPE programme and co-financed by the European Regional Development Fund (ERDF)

THEMATIC PANEL 3: Introduction to EU funding sources and financial models for applying energy efficiency in public buildings.

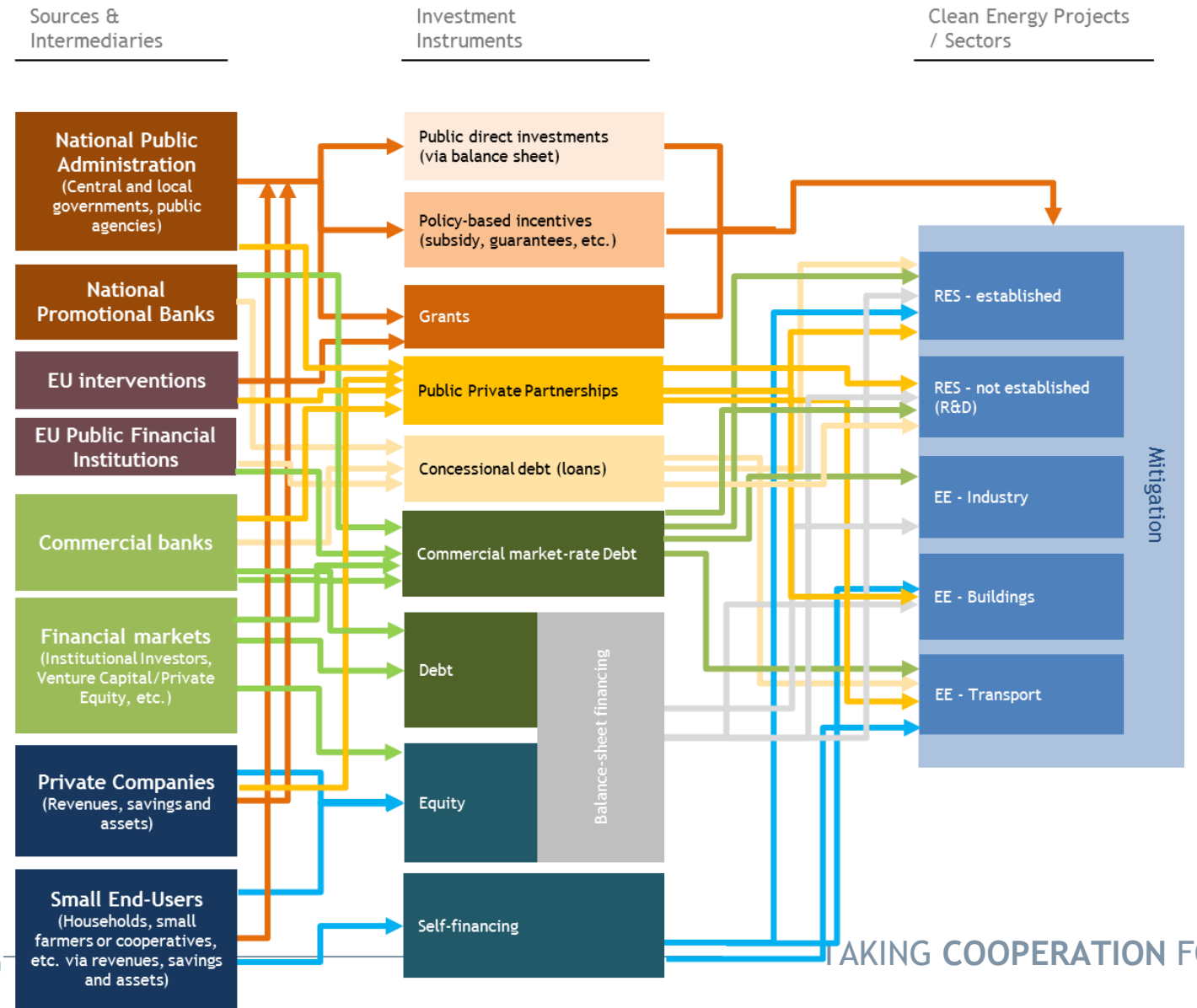
ENERGY MANAGEMENT FOR PA: FROM RETROFIT MEASURE TO FINANCIAL SCHEME

Energy management for PA: from retrofit measure to financial scheme

Silvia Rossi - Clust-ER BUILD – Energy Management Expert

17/18-10-2010 - **Hotel Park, Cesta Svobode 15, Bled (Slovenia)**

Financial Landscape for clean energy in EU



OVERVIEW EU GRANT SOURCES AND FINANCIAL OPPORTUNITIES

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
BOOSTEE-CE

Structural Funds	Direct Funds	Financial opportunities
Regional management	Assigned to projects chosen directly by the eu	ESCO and EPC comtract

STRUCTURAL FUNDS

•The **European Regional Development Fund** (ERDF) - which promotes balanced development in the different regions of the EU.

• The **European Social Fund** (ESF) - which supports projects on employment throughout Europe and invests in Europe's human capital: in workers, young people and all those seeking a job.

• The **Cohesion Fund** (CF) - which finances transport and environmental projects in countries where the gross national income (GNI) per capita is less than 90% of the EU average. In the 2014-2020 period, these are Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.

• The **European Agricultural Fund for Rural Development** (EAFRD) - which focuses on solving specific challenges facing rural areas of the EU.

• **The European Fund for Maritime Affairs and Fisheries** (EMFF) - which helps fishermen to use sustainable fishing methods and coastal communities to diversify their economies, improving the quality of life in European coastal regions.

DIRECT FUNDS

Horizon 2020 is the recent Framework Program for Innovation and Research launched by the EU for the period 2014 - 2020. It groups European funding for research and innovation into a single framework, allowing for greater simplification than the previous programming. The general objective of the new Program is to contribute to building a society and an economy based on knowledge and innovation, thus promoting the implementation of the Europe 2020 strategy, the European Research Area (ERA) and the other European policies.

The **Life Program 2014 - 2020** is aimed at supporting the protection of the environment, the best use of resources and the evolution of European legislation on the subject. The available budget is around 3.4 billion euros for the entire period.
The Life program particularly encourages the development of innovative technologies and good practices capable of producing a positive environmental impact in certain priority areas: water and the marine environment, waste, efficient use of resources, soil, environment and health, air and urban environment, forests.

DIRECT FUNDS

The financing of energy efficiency projects, as well as non-repayable grants, can be done using financial instruments, among which it is useful to remember the **ELENA** - **European Local Energy Assistance program**.

It is an initiative promoted jointly by the European Commission and the European Investment Bank (EIB) in December 2009 to grant funding to local and regional authorities to carry out large-scale investments in the energy efficiency, renewable energy sources and of sustainable urban transport. A key condition for the eligibility of projects is that they contribute to the CO2 reduction targets set in the "Covenant of Mayors".

JESSICA – *Joint European Support for Sustainable Investment in City Areas* – is an initiative of the European Commission, implemented in partnership with EIB that promotes sustainable urban development through innovative financial engineering tools.

EBRD – European bank for reconstruction and development

WORLD BANK

DIRECT FUNDS: focus on HORIZON2020

EXCELLENT SCIENCE	INDUSTRIAL LEADERSHIP	SOCIETAL CHALLENGES
▪ **European Research Council (ERC)** ▪ **Future and Emerging Technologies (FET)** ▪ **Marie Sklodowska-Curie actions** ▪ Research infrastructures (including e-infrastructures)	▪ Leadership in enabling and industrial technologies: • **ICT** • **Nanotechnologies** • **Advanced materials** • Biotechnology • **Advanced manufacturing and processing** • Space ▪ Access to risk finance ▪ Innovation in SMEs	▪ Health, demographics change and wellbeing ▪ Food security, sustainable agriculture, marine and maritime research and the bio-economy ▪ **Secure, clean and efficient energy** ▪ Smart, green and integrated transport ▪ Climate action, resource efficiency and raw materials ▪ Inclusive, innovative and reflective societies ▪ Secure societies
	SME Instrument	
	Fast Track to Innovation Pilot	
Spreading Excellence and Widening Participation		
Science with and for society		
European Institute of Innovation and Technology (EIT)		
Joint Research Center (JRC) + Euratom		

DIRECT FUNDS: focus on HORIZON2020

EXCELLENT SCIENCE

- **European Research Council (ERC)**
- **Future and Emerging Technologies (FET)**
- **Marie Sklodowska-Curie actions**
- Research infrastructures (including e-infrastructures)

SPECIFIC OBJECTIVES:

- Strengthening of frontier research, through the activities of the EUROPEAN RESEARCH COUNCIL
- Strengthening of research in the field of FUTURE AND EMERGING TECHNOLOGIES (FET)
- Strengthening skills, training and career development, through the Marie Skłodowska-Curie initiatives (" MARIE CURIE ACTIONS ")
- Strengthening of European RESEARCH INFRASTRUCTURES, including e-infrastructures

DIRECT FUNDS: focus on HORIZON2020

INDUSTRIAL LEADERSHIP

- Leadership in enabling and industrial technologies:
  - **ICT**
  - **Nanotechnologies**
  - **Advanced materials**
  - Biotechnology
  - **Advanced manufacturing and processing**
  - Space
- Access to risk finance
- Innovation in SMEs

SPECIFIC OBJECTIVES

- Reinforcement of Europe's industrial leadership through research, technological development, demonstration and INNOVATION IN THE FIELD OF ENABLING AND INDUSTRIAL TECHNOLOGIES (LEIT)
- Improve access to RISK CAPITAL to invest in research and innovation
- strengthen innovation in SMALL BUSINESSES

DIRECT FUNDS: focus on HORIZON2020

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
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SOCIETAL CHALLENGES

- Health, demographics change and wellbeing
- Food security, sustainable agriculture, marine and maritime research and the bio-economy
- **Secure, clean and efficient energy**
- Smart, green and integrated transport
- Climate action, resource efficiency and raw materials
- Inclusive, innovative and reflective societies
- Secure societies

SPECIFIC OBJECTIVE

priority reflecting the strategic priorities of the Europe 2020 strategy and addresses major concerns shared by European citizens and others

SFIDE

1.Health, demographics change and wellbeing
2.Food security, sustainable agriculture, marine and maritime research and the bio-economy
3.Secure, clean and efficient energy
4.Smart, green and integrated transport
5.Climate action, resource efficiency and raw materials
6.Inclusive, innovative and reflective societies
7.Secure societies

DIRECT FUNDS: focus on HORIZON2020

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
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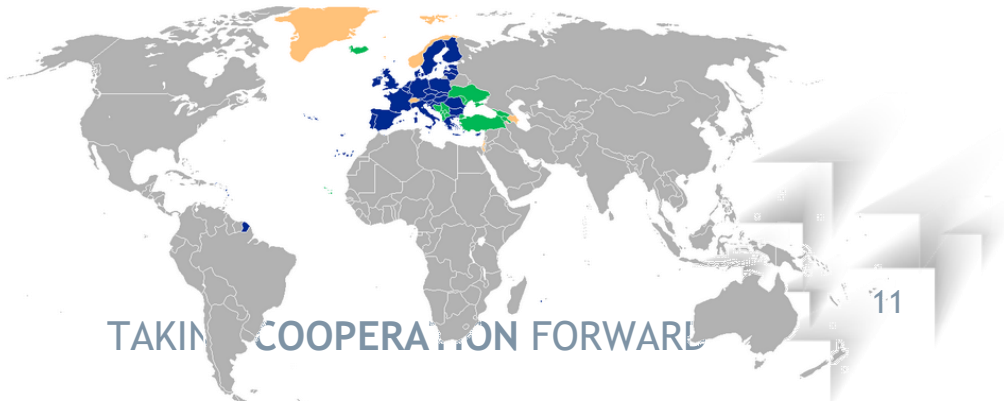
WHO CAN PARTICIPATE?

- any legal entity established in a member or associated state
- subjects lacking legal personality (as long as with contractual and financial responsibility to the legal representatives) established in a member or associated state *
- Joint Research Center
- international organizations of EU interest (CERN, ESA, etc.)
- international organizations and entities established in Third Countries (in addition to the minimum conditions)
- non-profit legal entities

WHO CAN RECEIVE FINANCING?

- any legal entity established in a member or associated state
- Joint Research Center
- ICPC countries
- international organizations of EU interest
- international organizations and entities established in third countries not ICPC only if provided for in the Work Programs and bilateral agreements or if essential for the action



DIRECT FUNDS: focus on HORIZON2020

MINIMUM CONDITIONS in general:

- at least 3 legal entities
- each of them must be established in a different Member State or associated country
- all three legal entities must be independent of each other

EXCEPTIONS:

- border research actions of the European Research Council (ERC)
- tool for SMEs (with obvious European added value)
- co-financing of research programs
- Support and Coordination Actions
- Marie Skłodowska-Curie
- where indicated by work schedules or work plans

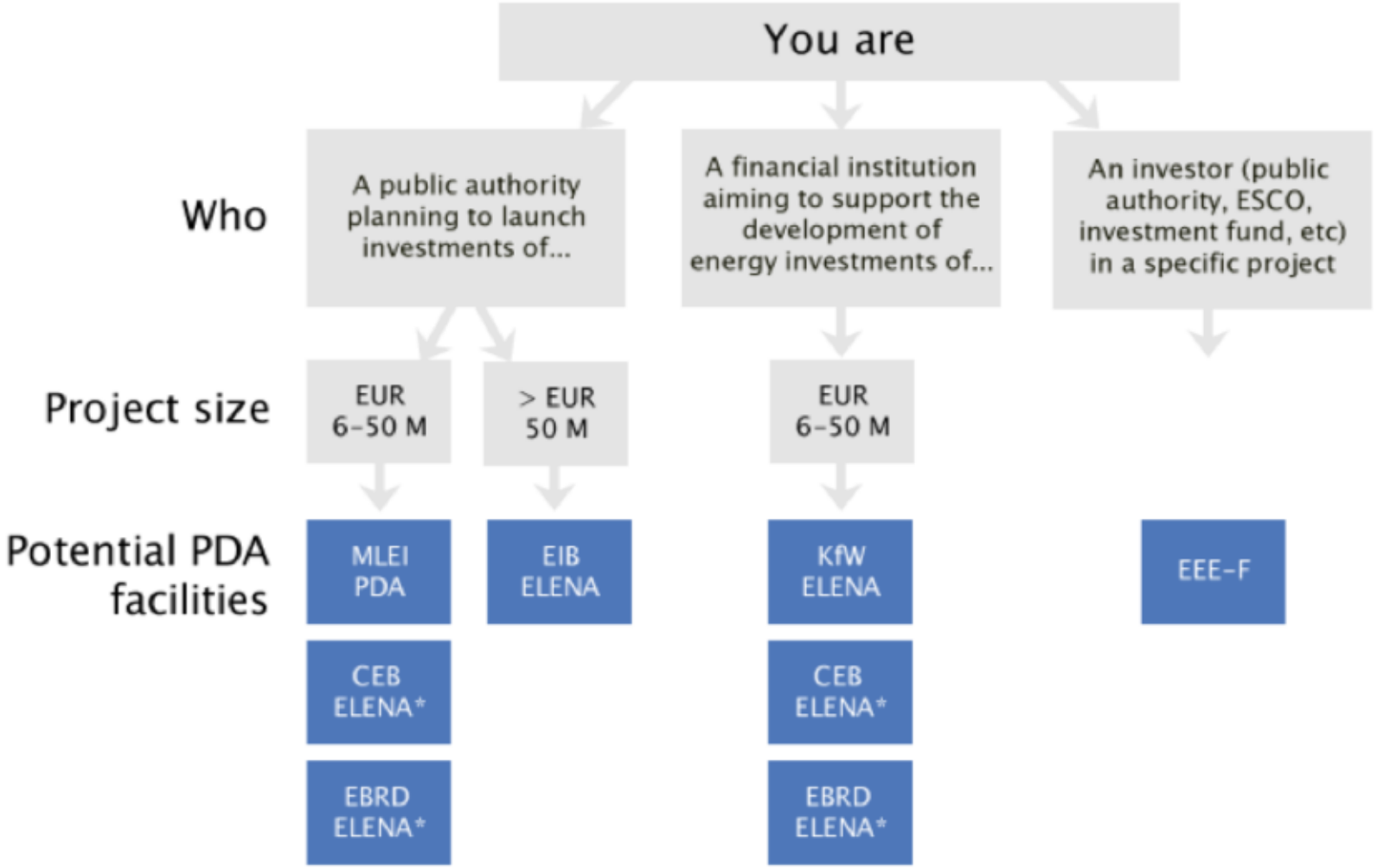
DIRECT FUNDS: focus on HORIZON2020

The European Commission has set up a series of facilities funding **Project Development Assistance** (PDA) to support ambitious public authorities - regions, cities, municipalities or groupings of those - and public bodies in developing bankable sustainable energy projects.

The PDA facilities aim to bridge **the gap between sustainable energy plans and real investment** through supporting all activities necessary to **prepare** and mobilise investment into sustainable energy projects. **These activities can include feasibility studies, stakeholder and community mobilisation, financial engineering, business plans, technical specifications and procurement procedures.**

Project development assistance facilities under the IEE Programme

DIRECT FUNDS: focus on HORIZON2020



*Country restrictions apply for CEB-ELENA and EBRD-ELENA

DIRECT FUNDS: focus on LIFE

Private Finance for Energy Efficiency PF4EE

Private Finance for Energy Efficiency (PF4EE) instrument is a joint agreement between the EIB and the European Commission which aims to **address the limited access to adequate and affordable commercial financing for energy efficiency investments**.

The instrument targets projects which support the implementation of National Energy Efficiency Action Plans or other energy efficiency programmes of EU Member States.

Objectives

to make energy efficiency lending a more sustainable activity within European financial institutions, considering the energy efficiency sector as a distinct market segment.

to increase the availability of debt financing to eligible energy efficiency

DIRECT FUNDS:
focus on HORIZON2020

The proposed action should:

deepen the demand side-related parameters in existing models

include new aspects and data sources

allow to make better projections inside energy policy development

inform policy making at all levels

DIRECT FUNDS: focus on LIFE

Private Finance for Energy Efficiency PF4EE

Objectives

- to make energy efficiency lending a more sustainable activity within European financial institutions, considering the energy efficiency sector as a distinct market segment.

- to increase the availability of debt financing to eligible energy efficiency investments.

DIRECT FUNDS: focus on LIFE

Private Finance for Energy Efficiency PF4EE

ACCESSIBILITY

Programs	Partnership	Projects		Covering	beneficiary	€/Mil
Horizon 2020	yes (EU countries)	research and innovation, coordination and support actions	capital account	100%	Private and Public	1-20
Horizon PDA	yes (local)	technical assistance for feasibility research	capital account	100%	Private and Public, Esco and utilities	0,5 - 2
Life 2014 - 2020	yes (local)	pilot, demonstrative and innovative projects	capital account	60%	Private and Public	1-3
Elena	Yes (local)	technical assistance for feasibility In ELENA the funds necessary to carry out the projects must be made available by the private, but the technical assistance activities financed allow the launching of programs of vast impact on the territory.	capital account	90%	Private and Public, Utilities	1-3
Jessica		technical assistance for feasibility JESSICA aims to make use of the structural funds for urban development in a rotative perspective based on project finance, ensuring the achievement of high performance and the possibility of obtaining new resources in subsequent years.	capital account	90%	Private and Public, Utilities	1EE-3
EEEF	No	Energy Efficiency Investment	capital account	100%	Private and Public, Utilities	5-25
CTE	Yes (EU countries)	Pilot, demonstrative and innovative projects	capital account	100%	Public	2-3
URBACT III	Yes (EU countries)	exchange of knowledge and best practices, pilot projects	capital account	80		
Urban Innovative Actions	Yes (local)	innovative actions in urban areas (only for cities more than 50.000 inhabitants)	capital account		Public	1-5

URBAN INNOVATION ACTION

- **What it is:** the Urban Innovative Actions initiative promotes urban development in the Member States through the financing of innovative solutions in favor of European cities

- **Objective**: to identify and test new solutions to problems related to sustainable urban development and relevant at European level

Themes:

- Air quality
- Circular economy
- Demographic change
- Culture and cultural heritage

Publication: 16 September 2019

Deadline: 12 December 2019

Link: https://www.uia-initiative.eu/en/call-proposals/5th-call-proposals-launched

URBAN INNOVATION ACTION

- **RESILIO – Resilience nEtwork of Smart Innovative cLImate-adaptive rOoftops**
- Amsterdam

Amsterdam is experiencing the effects of climate change: flash floods due to heavy rainfall, higher temperatures and increased droughts.

The RESILIO project aims to address critical urban climate challenges related to flooding, heat, water supply, energy consumption and urban livability by repurposing the rooftops of climate-vulnerable neighbourhoods of Amsterdam.

The 10,000m2 area of smart blue green roofs is expected to help the city adapt to climate change by reducing impacts of heavy rain, urban heat island effect and drought while improving building insulation, biodiversity and quality of life

The project in numbers

10,000m2
of smart blue green roofs will be built to increase Amsterdam's rainwater resilience and reduce urban heat effect and energy consumption at building level

96
urban areas of Amsterdam are highly vulnerable to flood damage from extreme rain fall

1500
residents of all socioeconomic levels will be engaged in the development of their residential areas

EUR 4,814,248.00
Total ERDF budget granted

URBAN INNOVATION ACTION

- **GBG_AS2C – Blue, Green & Grey_Adapting School to climate change**
- **Barcelona**

The GBG_AS2C project solution relies on a package of measures to adapt schools to climate change. By nature, schools are relevant spaces where actions can be implemented to adapt the city to climate change for the benefit of all. Moreover, not only their spatial distribution in the city ensures great capillarity and penetration in the communities, but they also offer the possibility for continuous use throughout the year.

Therefore, schools playgrounds will be transformed into climate shelters and be open to the wider public in non-school period. Playground transformation will be operated through a threefold intervention - Green, Blue, and Grey - essentially articulated around the introduction of an aquatic (blue) component at the heart of the cities, as accessible municipal recreational point of refreshment. This will be combined with greening and applying traditional solutions (grey) to school facilities in order to combat heat.

URBAN INNOVATION ACTION

UIA URBAN INNOVATIVE ACTIONS

Partnership

- Barcelona City Council
- Public Health Agency of Barcelona - sectoral agency
- Barcelona Consortium of Education
- Barcelona Cycle of Water - Public Service Provider
- Barcelona Institute for Global Health - Higher Educati
- Institute for Environmental Science and Technology (
  Institute
- Vila Olimpica School

Partnership

- City of Amsterdam
- Hogeschool van Amsterdam - higher education and research institute
- Vrije Universiteit - higher education and research institute
- Waternet - public water management company
- MetroPolder Company - SME
- Consolidated - SME
- Stadgenoot - social housing company
- De Key - social housing company
- De Alliantie - social housing company
- Rooftop Revolution - foundation

SOME EXAMPLES FOR DIRECT FUNDS

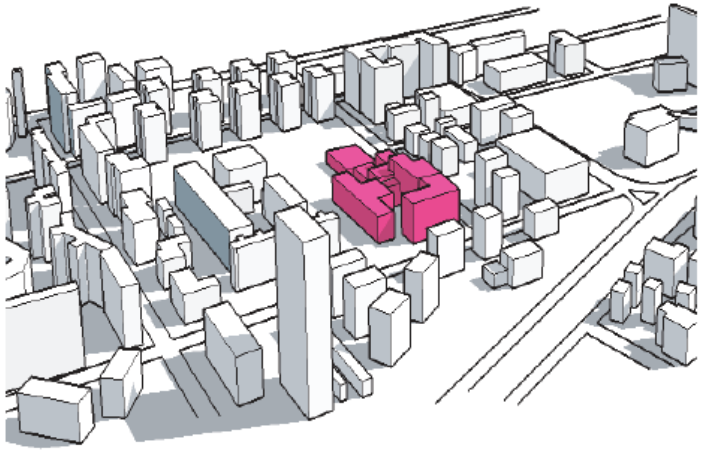
Interreg Mediterranean
EUROPEAN UNION
IMPULSE

https://impulse.interreg-med.eu
E-mail: impulse@cres.gr

Project co-financed by the European Regional Development Fund

Integrated Management Support For Energy efficiency in Mediterranean Public buiLdings

IMPULSE introduces an integrated management support system for planning energy efficiency interventions in public buildings. The transnational approach foresees extensive testing in **pilot** MED Cities in 6 countries, for the conclusion of MED public building typologies, accompanied with **cost-optimal interventions** and **financial plans**. The results are organized into a transnational purpose **GIS-based information system**, being a user-friendly decision making tool for affordable buildings' **energy efficiency action plans.**



ΚΑΠΕ CRES
ΔΗΜΟΣ ΗΡΑΚΛΕΙΟΥ
IVE INSTITUTO VALENCIANO de la EDIFICACIÓN
EIHP
envirobatbdm
area Provence-Alpes-Côte d'Azur
Ajuntament d'Elx
Agencia Provincia de la Energía de Alicz
GENERALITAT VALENCIANA
REGIONALNA RAZVOJNA AGENCIJA SLAVONIJE I BARANJE
CANNES CÔTE d'AZUR
DOOR

SOME EXAMPLES FOR DIRECT FUNDS

Interreg Mediterranean IMPULSE
https://impulse.interreg-med.eu
E-mail: impulse@cres.gr

Project co-financed by the European Regional Development Fund

Buildings Library

Classification criteria:

- Type of use.
- Year of construction.
- Number of floors.
- Gross usable area (m2),
- Construction system
- Heating system.
- Cooling system.

....

	Region	Construction Year Class	Additional Classification	SFH Single-Family House	TH Terraced House	MFH Multi-Family House	AB Apartment Block
1	Mediterranean climate (Clima Mediterráneo)	... 1900	generic	0.ME.SFH.01.Gen	0.ME.TH.01.Gen	0.ME.MFH.01.Gen	0.ME.AB.01.Gen
2	Mediterranean climate (Clima Mediterráneo)	1901 ... 1936	generic	0.ME.SFH.02.Gen	0.ME.TH.02.Gen	0.ME.MFH.02.Gen	0.ME.AB.02.Gen
3	Mediterranean climate (Clima Mediterráneo)	1937 ... 1959	generic	0.ME.SFH.03.Gen	0.ME.TH.03.Gen	0.ME.MFH.03.Gen	0.ME.AB.03.Gen
4	Mediterranean climate (Clima Mediterráneo)	1960 ... 1979	generic	0.ME.SFH.04.Gen	0.ME.TH.04.Gen	0.ME.MFH.04.Gen	0.ME.AB.04.Gen
5	Mediterranean climate (Clima Mediterráneo)	1980 ... 2006	generic	0.ME.SFH.05.Gen	0.ME.TH.05.Gen	0.ME.MFH.05.Gen	0.ME.AB.05.Gen
6	Mediterranean climate (Clima Mediterráneo)	2007 ...	generic	0.ME.SFH.06.Gen	0.ME.TH.06.Gen	0.ME.MFH.06.Gen	0.ME.AB.06.Gen

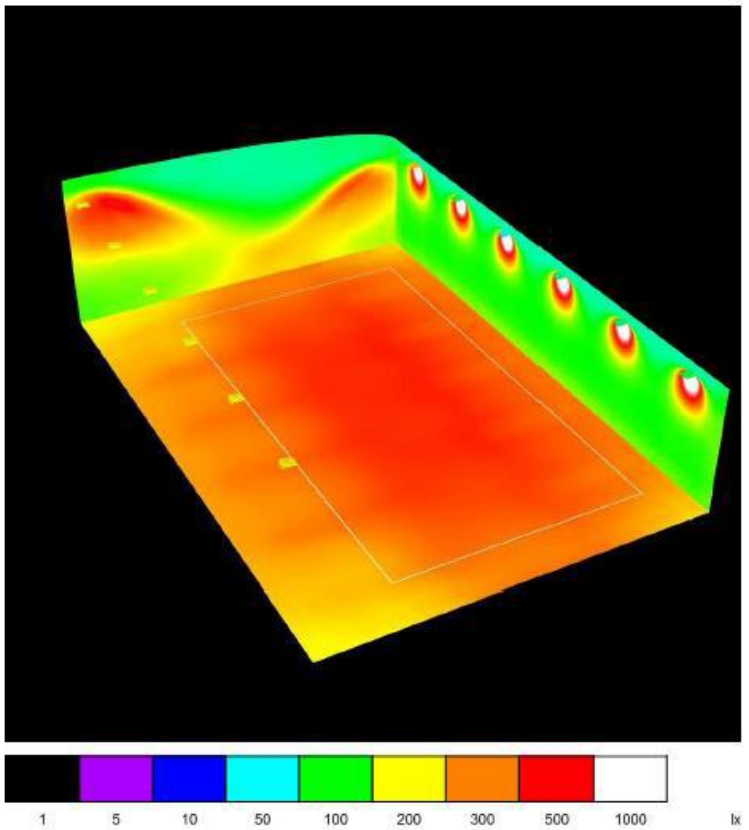
SOME EXAMPLES FOR DIRECT FUNDS

Interreg Mediterranean IMPULSE

https://impulse.interreg-med.eu
E-mail: impulse@cres.gr

Project co-financed by the European Regional Development Fund

Energy Diagnosis and Small scale pilot project



SOME EXAMPLES FOR DIRECT FUNDS

Interreg Mediterranean IMPULSE
https://impulse.interreg-med.eu
E-mail: impulse@cres.gr
Project co-financed by the European Regional Development Fund

Energy retrofit 20 years plan

Relative retrofit area annualy		3%	%					
Total floor area		105.768	m²					
Retrofit area annualy		3.173	m²					
Combination		Year		1	2	3	4	
Minor	15%	Floor area retrofited	m²	3.725,77	3.836,63	3.234,88	3.815,17	
Medium	30%	Anualy investment	NC	317.270	666.853	106.646	230.532	
Major	90%	Savings - currency	NC/a	60.680	129.009	18.331	31.887	
Deep	100%	Savings - CO2	tCo2/a	152	294	51	90	
		Savings - kWh	kWh/a	655.994	666.608	148.804	312.386	
			1	PBT6 - Bacino Canottaggio Standiana - Minor Retrofit	PBT9 - Uffici Circoscrizione Prima - Minor Retrofit	PBT4 - Scuola Secondaria di primo grado Don G. Minzon	PBT4 - Scuola Secondaria di primo grado S. P. Campiano	PBT4 - Scu
			2	PBT6 - Polisportivo Darsena - Minor Retrofit	PBT9 - Palazzo Rasponi "Del Cavaliere" (Palazzo Raspon	PBT4 - Accademia Di Belle Arti - Minor Retrofit	PBT4 - Scuola Secondaria di primo grado C. Viali - Minor	PBT4 - Acc
			3	PBT6 - Palestra Scuola Secondaria S. Pietro in Vincoli R.	PBT9 - Uffici VV.UU. - Medium Retrofit	PBT4 - Scuola Secondaria di primo grado S. Pietro in Vin	PBT4 - Scuola Primaria V. Randi - Minor Retrofit	PBT4 - Scu
			4	PBT6 - Palestra Scuola Secondaria di primo grado Guido	PBT9 - Residenza Municipale - Medium Retrofit	PBT4 - Scuola Secondaria di primo grado Guido Novello	PBT4 - Scuola Secondaria di primo grado Ricci-Murator	PBT4 - Scu
			5	PBT8 - Circoscrizione di Mezzano - Minor Retrofit	PBT9 - Uffici Circoscrizione Prima - Medium Retrofit	PBT4 - Scuola Primaria A. Torre - Minor Retrofit	PBT8 - Circoscrizione di Mezzano - Medium Retrofit	PBT4 - Scu
			6	PBT8 - Azienda Ausl S. Pietro in Vincoli - Minor Retrofit	PBT10 - Museo Didattico - Minor Retrofit	PBT4 - Scuola Primaria Goffredo Mameli - Minor Retrof	PBT8 - Azienda Ausl S. Pietro in Vincoli - Medium Retrof	PBT4 - Scu
			7	PBT8 - Uffici Circoscrizione Piangipane - Minor Retrofit	PBT10 - Casa Vignuzzi - Minor Retrofit	PBT4 - Scuola Primaria Iqbal Masih - Minor Retrofit	PBT8 - Uffici Circoscrizione Piangipane - Medium Retrof	PBT4 - Scu
			8	PBT5 - Palestra Scuola Secondaria di primo grado M. Mo	PBT10 - Biblioteca Guerrini - Minor Retrofit		PBT4 - Scuola Secondaria di primo grado M. Montanari	
			9	PBT5 - Palestra Scuola Secondaria di primo grado Don G	PBT10 - Biblioteca Oriani - Minor Retrofit			
			10	PBT5 - Palestra Scuola Primaria A. Torre - Minor Retrofit	PBT10 - Centro Lettura Albero dei Bimbi (Ex Lucertola) -			
			11	PBT5 - Palestra Piangipane - Minor Retrofit	PBT10 - Palazzone Museo Natura - Minor Retrofit			
			12	PBT5 - Palestra Scuola Media Statale C. Viali - Minor Ret	PBT10 - Biblioteca S. Stefano - Minor Retrofit			
			13	PBT5 - Palestra Scuola Elementare Riccardo Ricci - Mino	PBT4 - Scuola Secondaria di primo grado M. Montanari			
			14	PBT5 - Palestra Scuola Primaria V. Randi - Minor Retrofit				
			15	PBT5 - Palestra Scuola Secondaria di primo grado Ricci-				
			16	PBT5 - Palestra Scuola Dell'Infanzia Garibaldi - Minor Re				
			17	PBT5 - Palestra Scuola Scuola Primaria G. Garibaldi - Mi				
			18	PBT9 - Palazzo Rasponi "Del Cavaliere" (Palazzo Rasponi				
			19	PBT9 - Uffici VV.UU. - Minor Retrofit				
			20	PBT9 - Residenza Municipale - Minor Retrofit				
			21					
			22					

SOME EXAMPLES FOR DIRECT FUNDS

Interreg Mediterranean IMPULSE

https://impulse.interreg-med.eu
E-mail: impulse@cres.gr

Project co-financed by the European Regional Development Fund

Energy retrofit 20 years plan

Energy

Environmental

Economy

The values of the indicators are adapted to each type of indicator selected.
The values listed are homogenized for all 6 partner cities (without following the regulations by country).

SOME EXAMPLES FOR DIRECT FUNDS

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

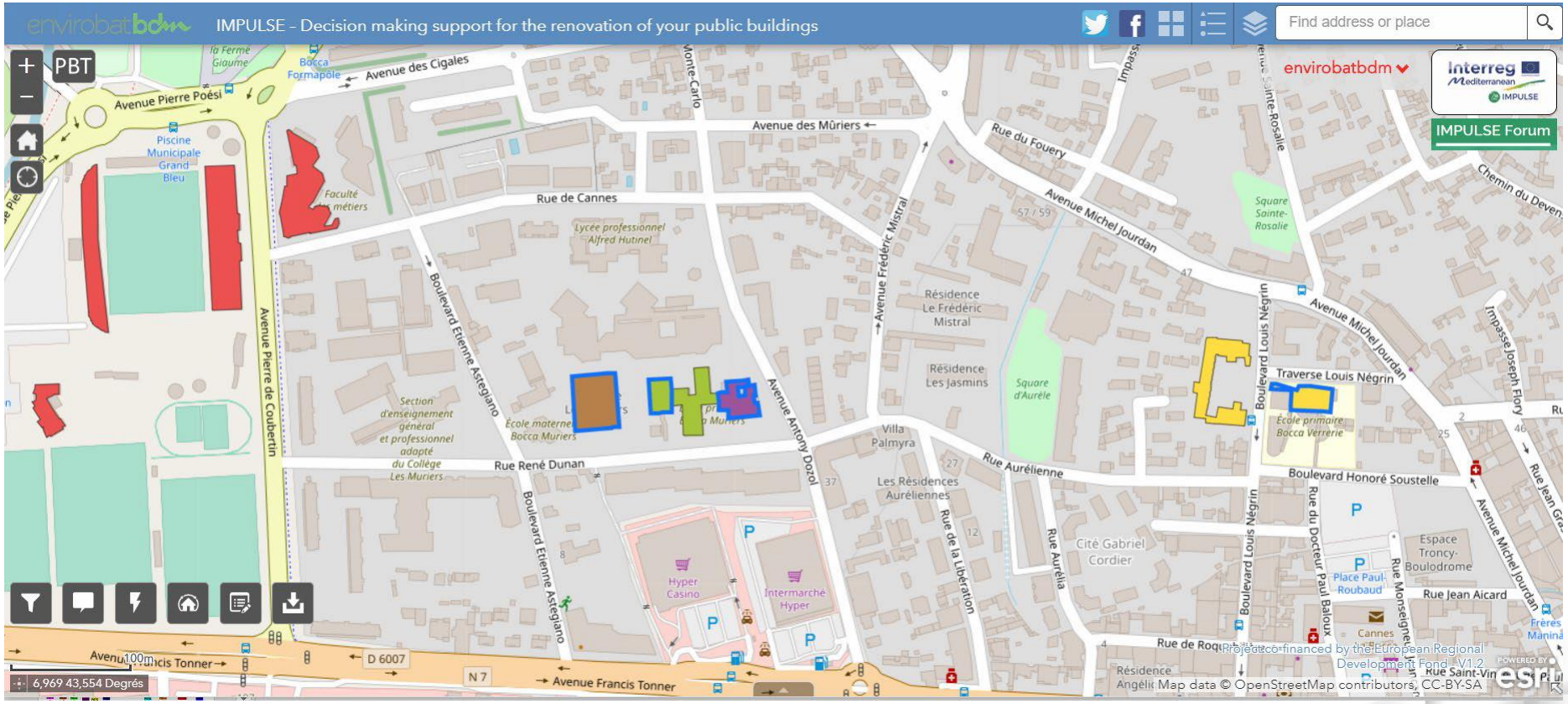
BOOSTEE-CE

Interreg Mediterranean
IMPULSE

https://impulse.interreg-med.eu
E-mail: impulse@cres.gr

Project co-financed by the European Regional Development Fund

GIS Platform – impulseonline.eu



SOME EXAMPLES FOR DIRECT FUNDS

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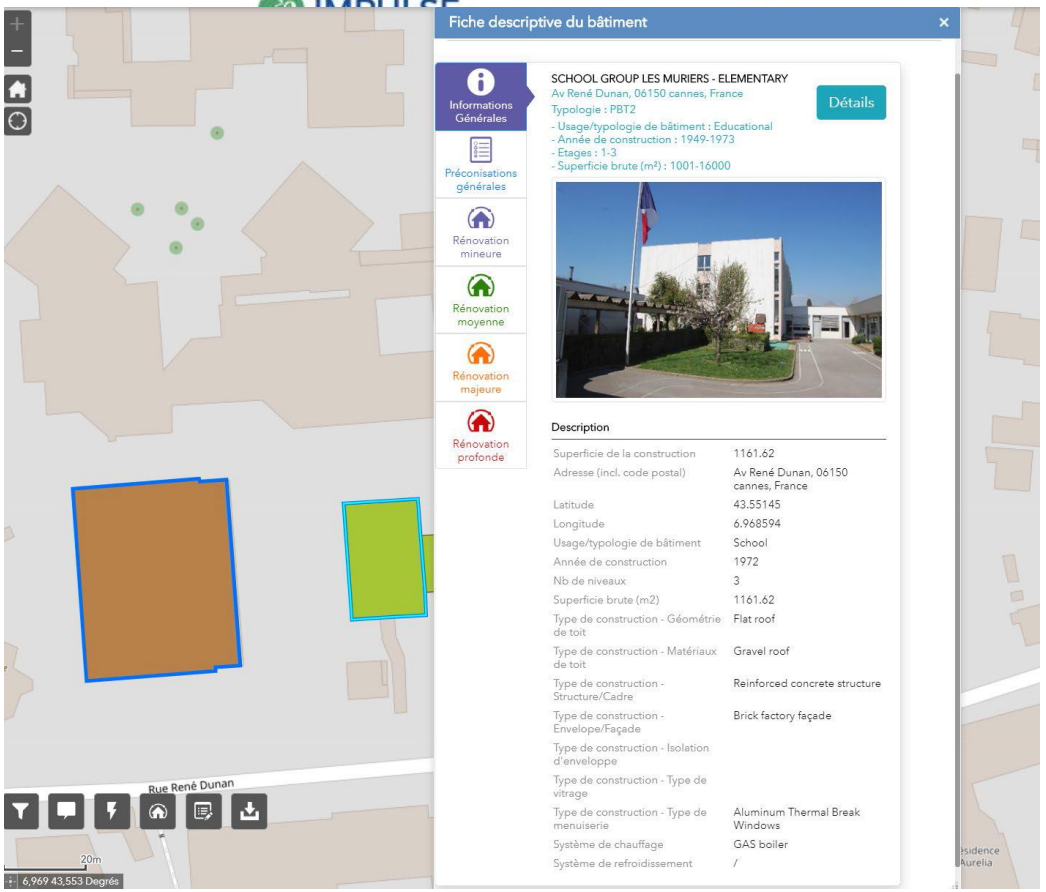

SOME EXAMPLES FOR DIRECT FUNDS

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
BOOSTEE-CE

Interreg Mediterranean
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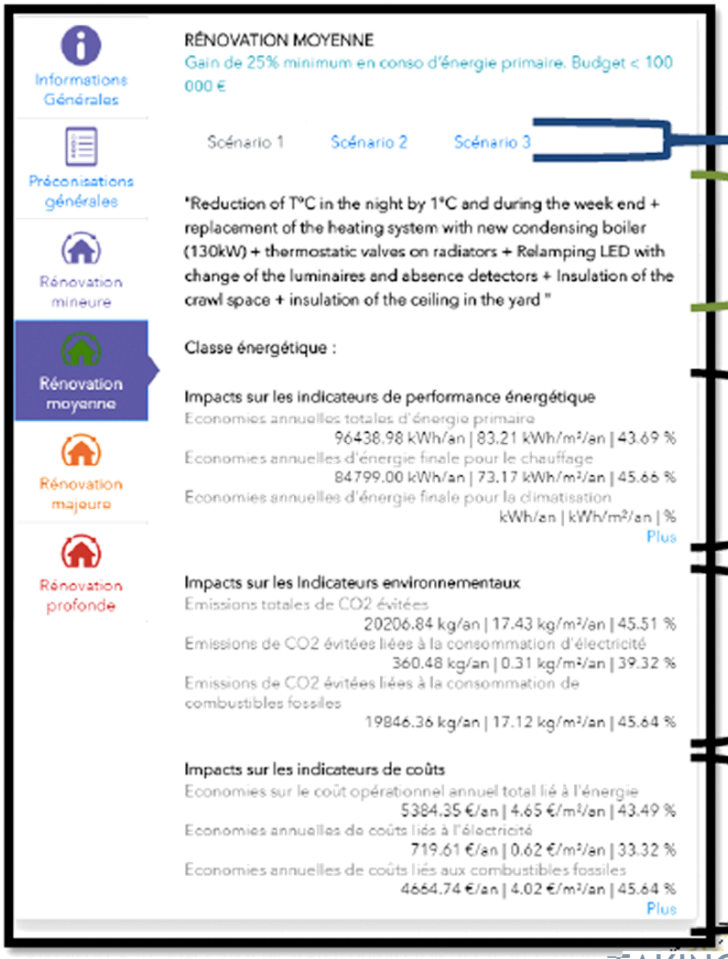


Scenario choices (if available).

Detailed description of the retrofit scenario selected.

Energy performance impacts

Environmental performance impacts

Economic performance impacts

SOME EXAMPLES FOR DIRECT FUNDS

Interreg Mediterranean IMPULSE

https://impulse.interreg-med.eu
E-mail: impulse@cres.gr

Project co-financed by the European Regional Development Fund

In this case, the direct funds have financed the study, the technical toolkits and the definition of policy recommendation.

SOME EXAMPLES FOR DIRECT FUNDS

ABRACADABRA – **Policy Recommendation on Financial Toolkit**
Assistant Buildings' addition to Retrofit, Adopt,
Cure And Develop
the Actual Buildings up to zeRo energy,
Activating a market for deep renovation

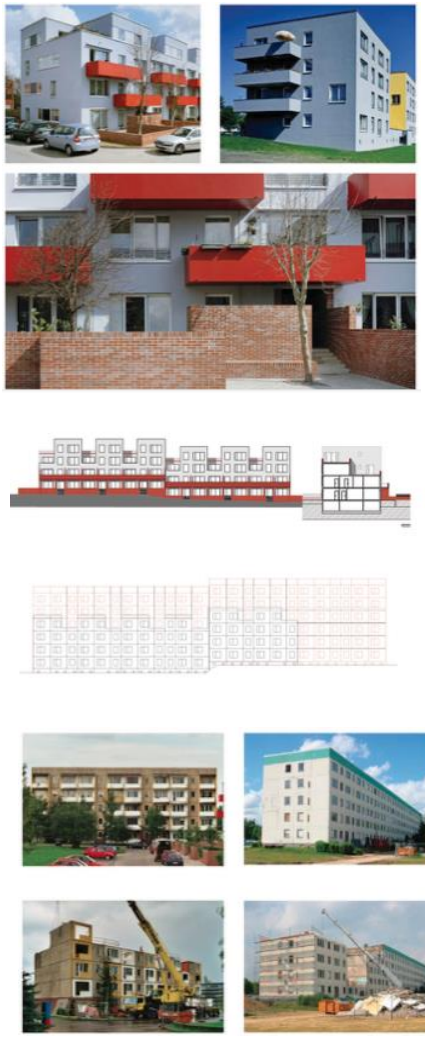
SOME EXAMPLES FOR DIRECT FUNDS

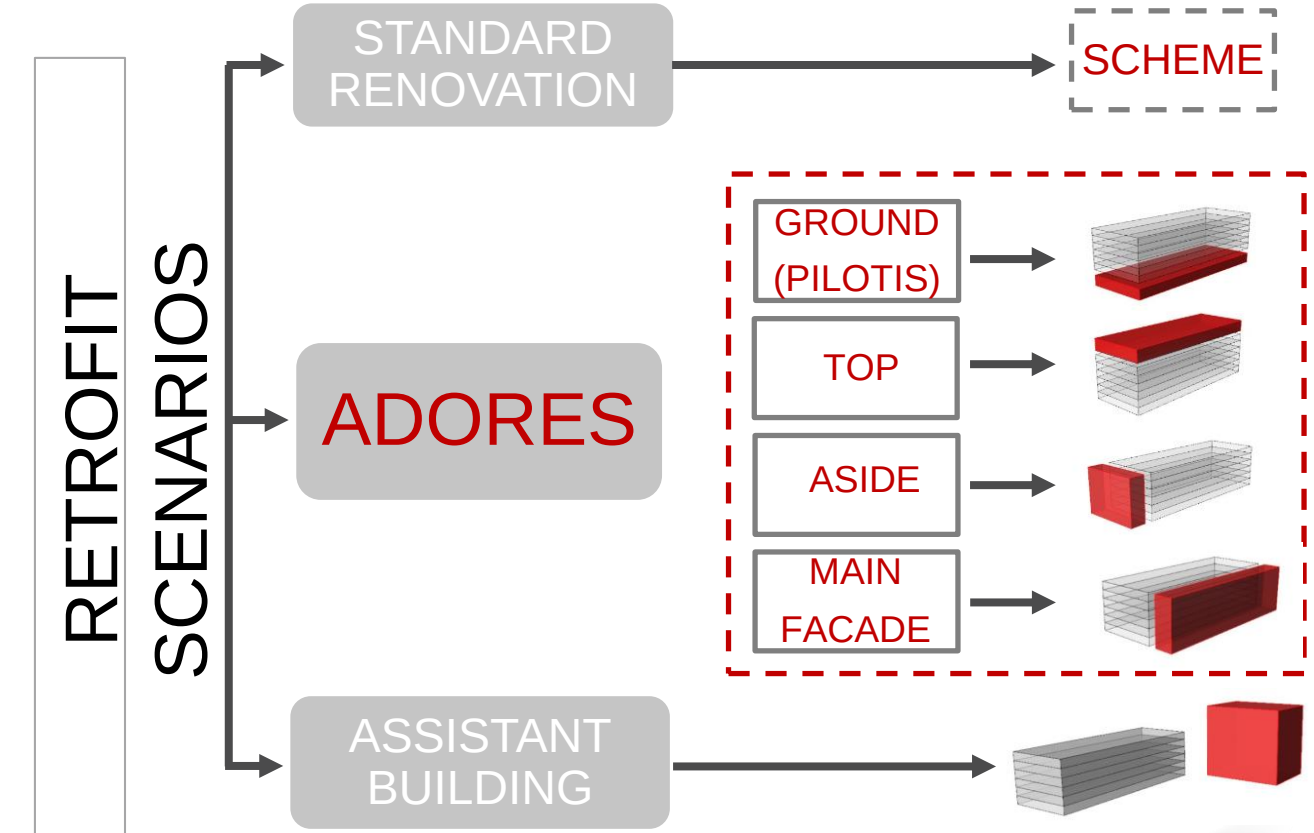
Abracadabra wants to find the sustainable solution to **transform existing buildings into NZEB buildings**. The economic savings generated by the increase in energy efficiency of buildings is not economically sufficient to justify the intervention: the PBP can be over 33 years old. Then I can calculate how much new volume I should create to balance the whole investment.

The Public Administrations can "manage" the energy requalification processes of private developers by granting new volumes, obtaining in exchange a reduction / cancellation of the CO2 emissions, the building requalification (even at the neighborhood level), the "non-consumption of land" and a possible social redevelopment: **if the investment pays for itself with the new volume, the tenants receive the restructuring both energy and building free of charge.**

In this case, the direct funds have financed the study, the technical toolkits and the definition of policy recommendation.

SOME EXAMPLES FOR DIRECT FUNDS





SOME EXAMPLES FOR DIRECT FUNDS

ADORES / CASE STUDIES	ITALY 4250 m²	GREECE 2310 m²	ROMANIA 1160 m²	THE NETHERLANDS 1000 m²	BULGARIA 3720 m²	LATVIA 1650 m²	NORWAY 1076 m²	SPAIN 1480 m²
GROUND		ADDED 210 m²						
TOP	ADDED 2100 m²	ADDED 330 m²	ADDED 366 m²	ADDED 1000 m²	ADDED 446 m²	ADDED 435 m²	ADDED 270 m²	ADDED 756 m2
ASIDE	ADDED 1337 m²	ADDED 1000 m²			ADDED 945 m²	ADDED 715 m²	ADDED 435 m²	
FACADE		ADDED 630 m²	ADDED 254 m²M	ADDED 370 m²	ADDED 416 m²	ADDED 537 m²	ADDED 202 m²	ADDED 270 m2
ASSISTANT BUILDING		ADDED 1800 m²	ADDED 600 m²	ADDED 1000 m²	ADDED 720 m²	ADDED 720 m²	ADDED 900 m²	

SOME EXAMPLES FOR DIRECT FUNDS

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
BOOSTEE-CE

ADD-ONS

ADORES to support investment in renovation

Add-ons and renewables (ADORES) can be built next to existing buildings in a number of ways, according to different contexts and building types.

- **Additional units** and/or surfaces attached to blind facades or the ground
- **Rooftop extensions**
- **Extra living space in existing units**
- **Additional 'assistant buildings'**

JOIN US

- **Join the ABRA community!**
  Exchange knowledge with stakeholders from market and financial actors to policy-makers
- **Learn and exchange at ABRA events**
  Participate in stakeholder community meetings and international workshops
- **Let's combine our thinking!**
  Policy-led and market-led approaches are needed. ABRA will bring these two frameworks together

www.abracadabra-project.eu

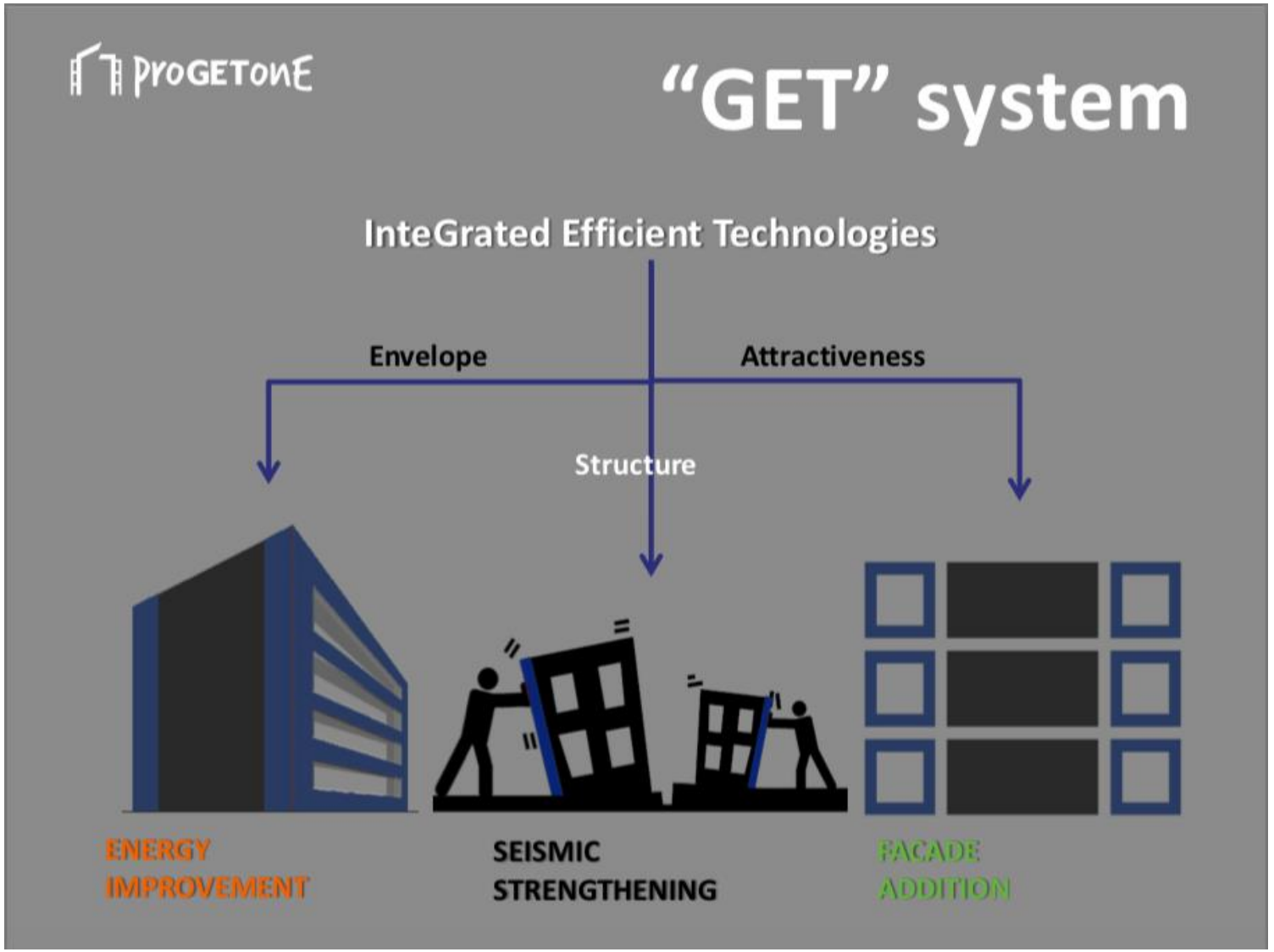
POLICY

Innovation energy renovation initiatives

ABRACADABRA activates market actors and public bodies to support and implement its strategy and achieve:

- **Self financing schemes** with beneficial environmental and societal outcomes for public bodies and citizens
- **Reduced risk in renovation** through standardaised procedures based on reduced payback times
- **Increased investors confidence**

SOME EXAMPLES FOR DIRECT FUNDS



SOME EXAMPLES FOR DIRECT FUNDS

Time reduction

Energy reduction

Cost reduction

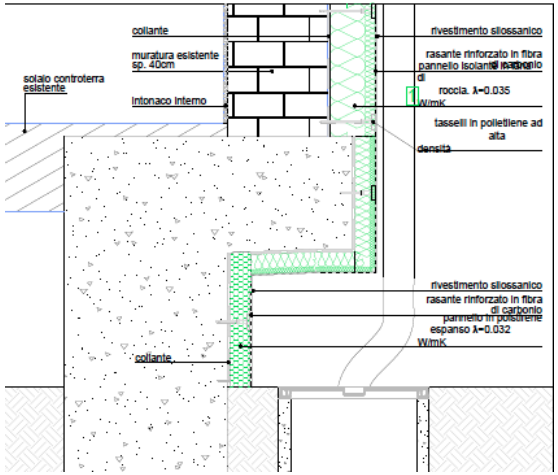
	TYPICAL DEEP RENOVATION			PRO-GET-ONE SYSTEM RENOVATION		
MEET ENERGY REQUIREMENTS	INTERVENTIONS	Cost €/m²	Days	INTERVENTIONS	Cost €/m²	Days
	External thermal insulation + finishing systems	60	90	PRO-GET-ONE standard system (structural not included)	90	60
	Windows replacement	70	30	Windows replacement	80	30
	HVAC and water heating system improvements/replacements	80	90	HVAC and water heating system improvements/replacements, plug and play	80	60
	Related demolitions and reconstructions	30	30	Related demolitions and reconstructions	0	0
	Scaffoldings and safety installations	30	240	Scaffoldings and safety installations	10	0
	New renewable energy systems	100	30	PRO-GET-ONE standard renewable energy systems	100	30
	TOTAL CONSTRUCTION COSTS AND DURATION	360	240	TOTAL COSTRUCTION COSTS AND DURATION	380	60
	Maintenance and replacements (25 years cycle, heating/cooling running costs not included)	135	---	Maintenance and replacements (25 years cycle, heating/cooling running costs not included)	115	---
MEET SAFETY REQUIREMENTS	INTERVENTIONS	Unit Cost €/m²	Days	INTERVENTIONS	Unit Cost €/m²	Days
	New reinforced concrete structures (e. g. shear walls) + foundations	350	180	PRO-GET-ONE steel and wood structure + foundations.	320	60
	Demolitions and reconstructions related to new structures (e.g. floor replacement)	40	60	Demolitions and reconstructions related to new structures	10	10
	TOTAL CONSTRUCTION COSTS AND DURATION	390	240	TOTAL CONSTRUCTION COSTS AND DURATION	330	70
	Maintenance and replacements (25 years cycle)	5	---	Maintenance and replacements (25 years cycle)	25	---
MEET USER REQUIREMENTS	INTERVENTIONS	Unit Cost €/m²	Days	INTERVENTIONS	Unit Cost €/m²	Days
	Inhabitants relocation (no tailored design)	100	360	Inhabitants relocation (user-oriented design)	0	0
ALL REQUIREMENTS	TOTAL CONSTRUCTION COSTS	850		TOTAL CONSTRUCTION COSTS Per m² of existing UFA	710	
				TOTAL CONSTRUCTION COSTS Per m² of existing UFA plus extra surface (+20% of UFA)	560	
	LIFE CYCLE COSTS (after 25 years, excluding energy running costs)	990		LIFE CYCLE COSTS (after 25 years, excluding energy running costs)	850	
	EXPECTED REAL ESTATE VALUE AFTER INTERVENTION	+15%		EXPECTED REAL ESTATE VALUE AFTER INTERVENTION	+50%	

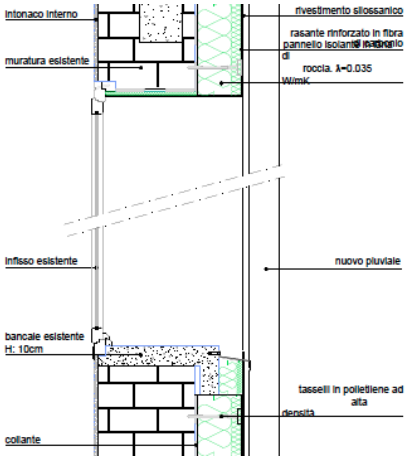
[1 - (710/850)] = **16%**. If we include the value of extra surface by 50%, the reduction will be [1 - (560/850)] = **34%**.

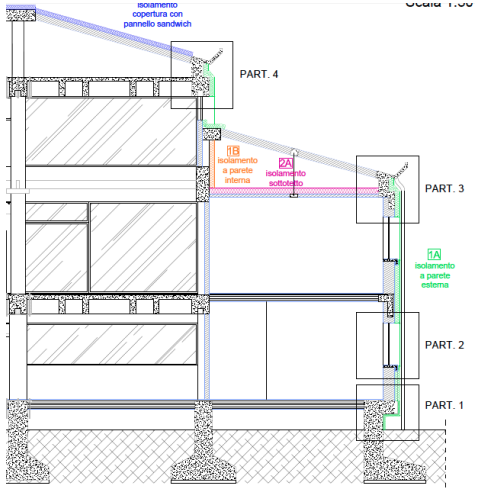
SOME EXAMPLES FOR STRUCTURAL FUNDS

Project: transformation of an existing school building into a NZEB school building

SOME EXAMPLES FOR STRUCTURAL FUNDS

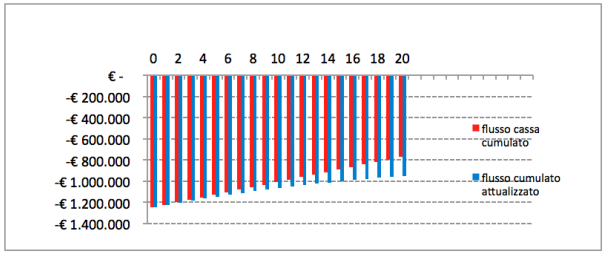






SOME EXAMPLES FOR STRUCTURAL FUNDS

Business plan:
Investment € 1.248.000
Energy saving €/year 23.861
PBP: infinity



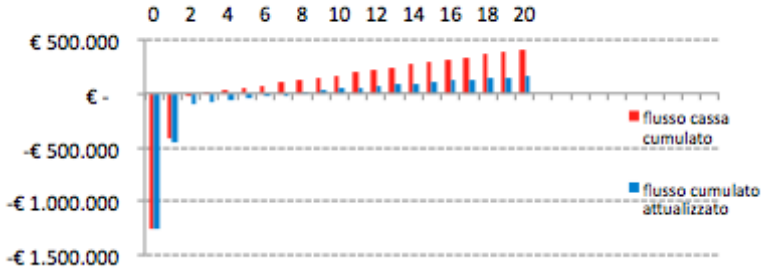
VAN	-€	950.639
TIR		-8%
VAN/Investimento		-0,76
Tempo di rit. semplice		-
Tempo di rit. attualizzato		-

ANALISI FLUSSI DI CASSA *(inserire i valori dei benefici economici e dei costi attesi)*

T (anni)	Benefici economici attesi	INVESTIMENTO	Costi attesi	FLUSSO DI CASSA NETTO	FLUSSO DI CASSA CUMULATO	FLUSSO NETTO ATTUALIZZATO	FLUSSO CUMULATO ATTUALIZZATO
0		-€ 1.248.000		-€ 1.248.000	-€ 1.248.000	-€ 1.248.000	-€ 1.248.000
1	€ 23.861	€ -		€ 23.861	-€ 1.224.139	€ 22.725	-€ 1.225.275
2	€ 23.861	€ -		€ 23.861	-€ 1.200.278	€ 21.643	-€ 1.203.633
3	€ 23.861	€ -		€ 23.861	-€ 1.176.417	€ 20.612	-€ 1.183.021
4	€ 23.861	€ -		€ 23.861	-€ 1.152.556	€ 19.631	-€ 1.163.390
5	€ 23.861	€ -		€ 23.861	-€ 1.128.695	€ 18.696	-€ 1.144.694
6	€ 23.861	€ -		€ 23.861	-€ 1.104.834	€ 17.805	-€ 1.126.889
7	€ 23.861	€ -		€ 23.861	-€ 1.080.973	€ 16.958	-€ 1.109.931
8	€ 23.861	€ -		€ 23.861	-€ 1.057.112	€ 16.150	-€ 1.093.781
9	€ 23.861	€ -		€ 23.861	-€ 1.033.251	€ 15.381	-€ 1.078.400
10	€ 23.861	€ -		€ 23.861	-€ 1.009.390	€ 14.649	-€ 1.063.752
11	€ 23.861	€ -		€ 23.861	-€ 985.529	€ 13.951	-€ 1.049.801
12	€ 23.861	€ -		€ 23.861	-€ 961.668	€ 13.287	-€ 1.036.514
13	€ 23.861	€ -		€ 23.861	-€ 937.807	€ 12.654	-€ 1.023.860
14	€ 23.861	€ -		€ 23.861	-€ 913.946	€ 12.051	-€ 1.011.809
15	€ 23.861	€ -		€ 23.861	-€ 890.085	€ 11.478	-€ 1.000.331
16	€ 23.861	€ -		€ 23.861	-€ 866.224	€ 10.931	-€ 989.400
17	€ 23.861	€ -		€ 23.861	-€ 842.363	€ 10.410	-€ 978.990
18	€ 23.861	€ -		€ 23.861	-€ 818.502	€ 9.915	-€ 969.075
19	€ 23.861	€ -		€ 23.861	-€ 794.641	€ 9.443	-€ 959.632
20	€ 23.861	€ -		€ 23.861	-€ 770.780	€ 8.993	-€ 950.639

SOME EXAMPLES FOR STRUCTURAL FUNDS

Business plan:
Investimento € 1.248.000
Energy saving €/year 23.861
Regional funds (POR FESR): 389.261 €
State funds (conto termico): 835.261 €
PBP: 3 years



VAN	€	153.551
TIR		10%
VAN/Investimento		0,12
Tempo di rit. semplice		3
Tempo di rit. attualizzato		8

T (anni)	Benefici economici attesi	INVESTIMENTO	Costi attesi	FLUSSO DI CASSA NETTO	FLUSSO DI CASSA CUMULATO	FLUSSO NETTO ATTUALIZZATO	FLUSSO CUMULATO ATTUALIZZATO
0		-€ 1.248.000		-€ 1.248.000	-€ 1.248.000	-€ 1.248.000	-€ 1.248.000
1	€ 835.261	€ -		€ 835.261	-€ 412.739	€ 795.487	-€ 452.513
2	€ 389.261	€ -		€ 389.261	-€ 23.478	€ 353.071	-€ 99.442
3	€ 23.861	€ -		€ 23.861	€ 383	€ 20.612	-€ 78.830
4	€ 23.861	€ -		€ 23.861	€ 24.244	€ 19.631	-€ 59.200
5	€ 23.861	€ -		€ 23.861	€ 48.105	€ 18.696	-€ 40.504
6	€ 23.861	€ -		€ 23.861	€ 71.966	€ 17.805	-€ 22.698
7	€ 23.861	€ -		€ 23.861	€ 95.827	€ 16.958	-€ 5.741
8	€ 23.861	€ -		€ 23.861	€ 119.688	€ 16.150	€ 10.409
9	€ 23.861	€ -		€ 23.861	€ 143.549	€ 15.381	€ 25.790
10	€ 23.861	€ -		€ 23.861	€ 167.410	€ 14.649	€ 40.439
11	€ 23.861	€ -		€ 23.861	€ 191.271	€ 13.951	€ 54.390
12	€ 23.861	€ -		€ 23.861	€ 215.132	€ 13.287	€ 67.677
13	€ 23.861	€ -		€ 23.861	€ 238.993	€ 12.654	€ 80.331
14	€ 23.861	€ -		€ 23.861	€ 262.854	€ 12.051	€ 92.382
15	€ 23.861	€ -		€ 23.861	€ 286.715	€ 11.478	€ 103.859
16	€ 23.861	€ -		€ 23.861	€ 310.576	€ 10.931	€ 114.790
17	€ 23.861	€ -		€ 23.861	€ 334.437	€ 10.410	€ 125.201
18	€ 23.861	€ -		€ 23.861	€ 358.298	€ 9.915	€ 135.116
19	€ 23.861	€ -		€ 23.861	€ 382.159	€ 9.443	€ 144.558
20	€ 23.861	€ -		€ 23.861	€ 406.020	€ 8.993	€ 153.551

SOME EXAMPLES FOR FINANCIAL OPPORTUNITIES

ESCO AND EPC CONTRACT

Before

600 MWh/a

ESCO

After

600 MWh/a

50 % = 300 MWh/a

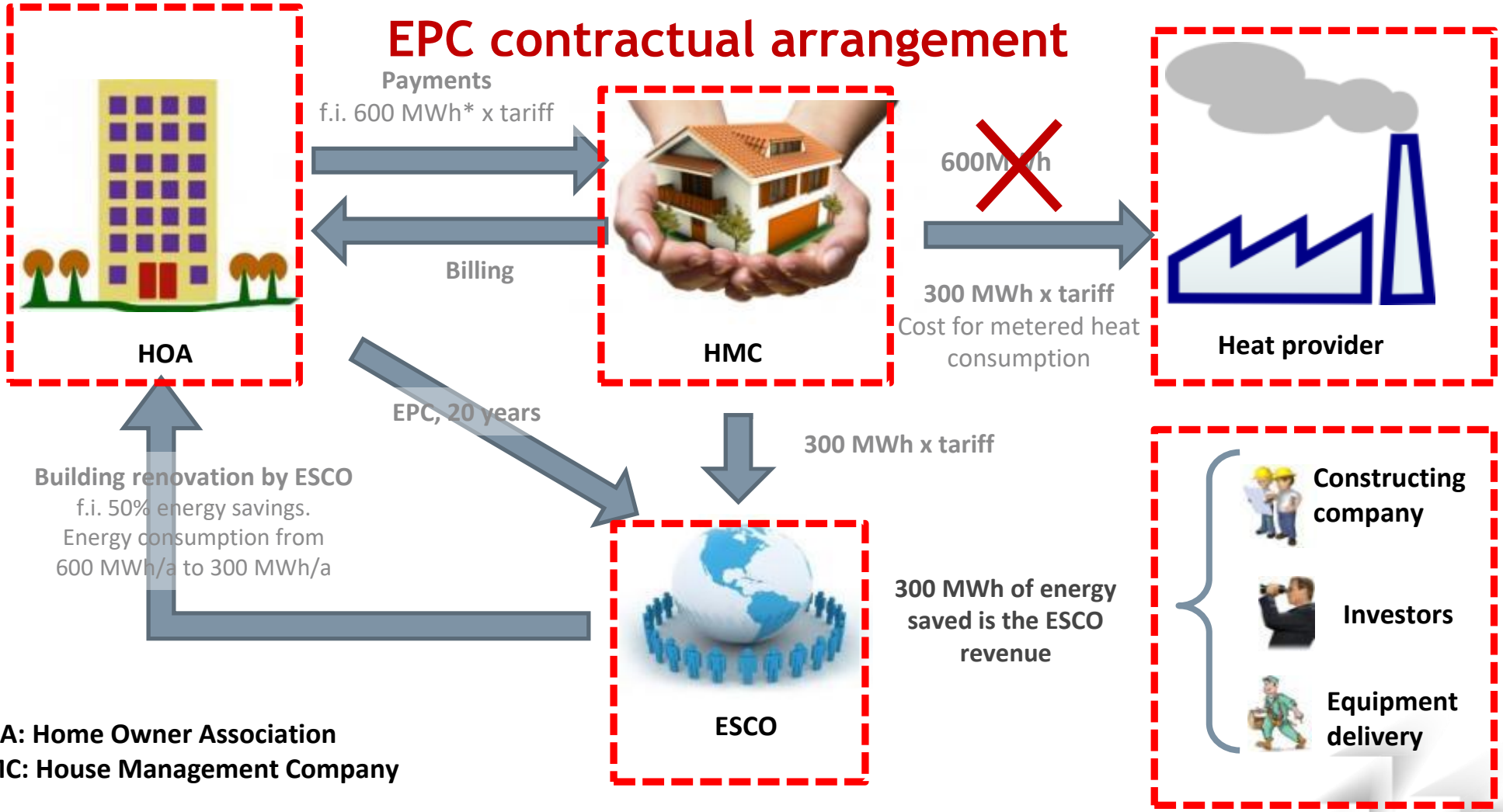
\+ =

600 MWh/a

50 % = 300 MWh/a

SOME EXAMPLES FOR FINANCIAL OPPORTUNITIES

EPC contractual arrangement



HOA: Home Owner Association
HMC: House Management Company

2006/32/CE Directive

Energy Performance Contract (EPC)

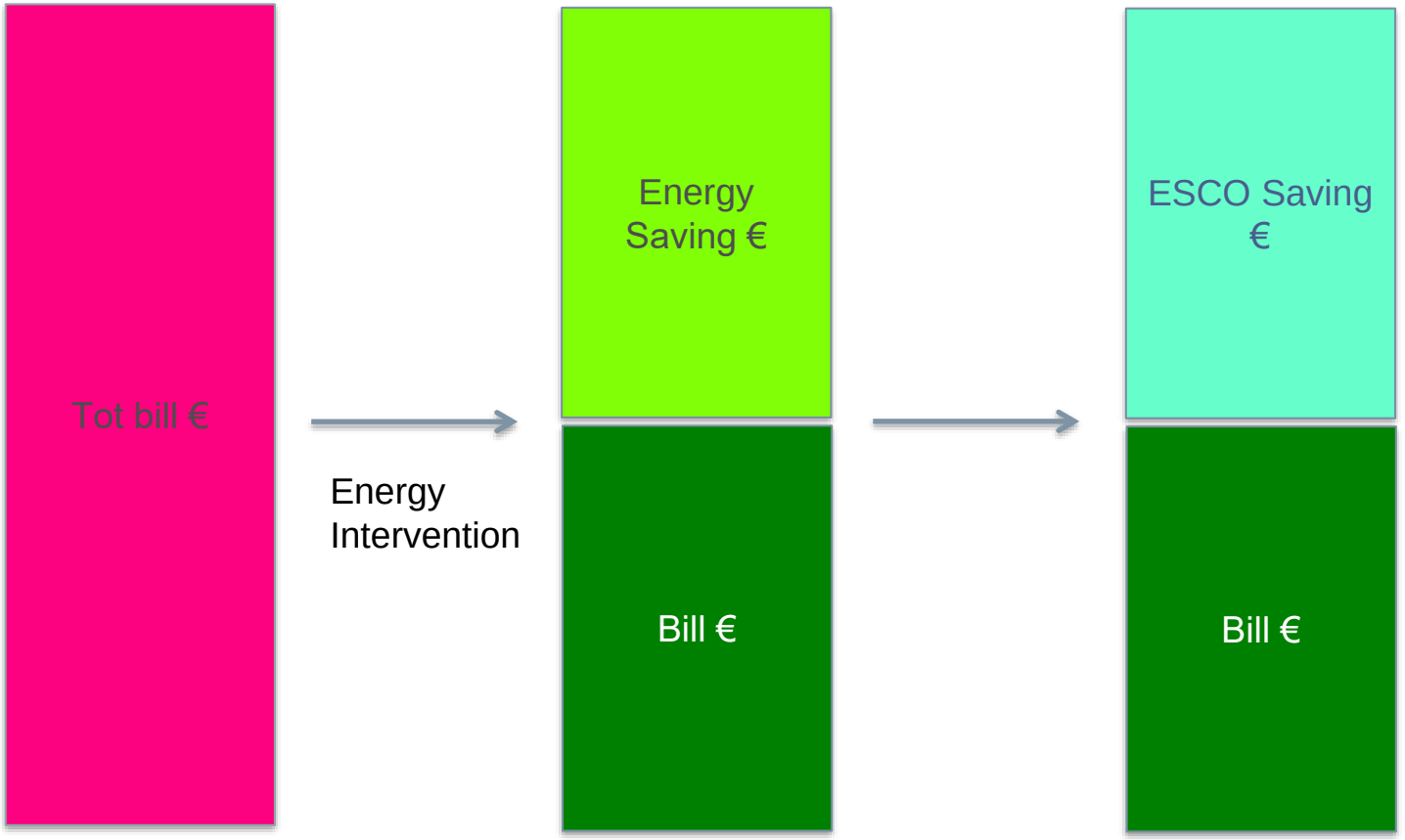
The main types of contracts:

- **First out**: global sale
- **Shared savings**: shared savings
- **Guaranteed savings**: shared savings

First Out Contract - EPC

- the ESCo itself provides the capital or uses third party lenders.
- The energy savings achieved are entirely used to repay the financing of the intervention and remunerate the activity of the ESCo;
- the contract usually lasts about **3-5 years**.
- On expiry of the contract, the savings go entirely to the customer who becomes the owner of the plants and the works performed.
- With this type of contract, the ESCo collects 100% of the savings actually obtained up to the contractual expiry; all costs and profits are declared in advance and the savings are used first of all for the complete coverage of these costs.
- The ESCo retains ownership of the plant until the expiry of the contract, after which it transfers to the customer's ownership;

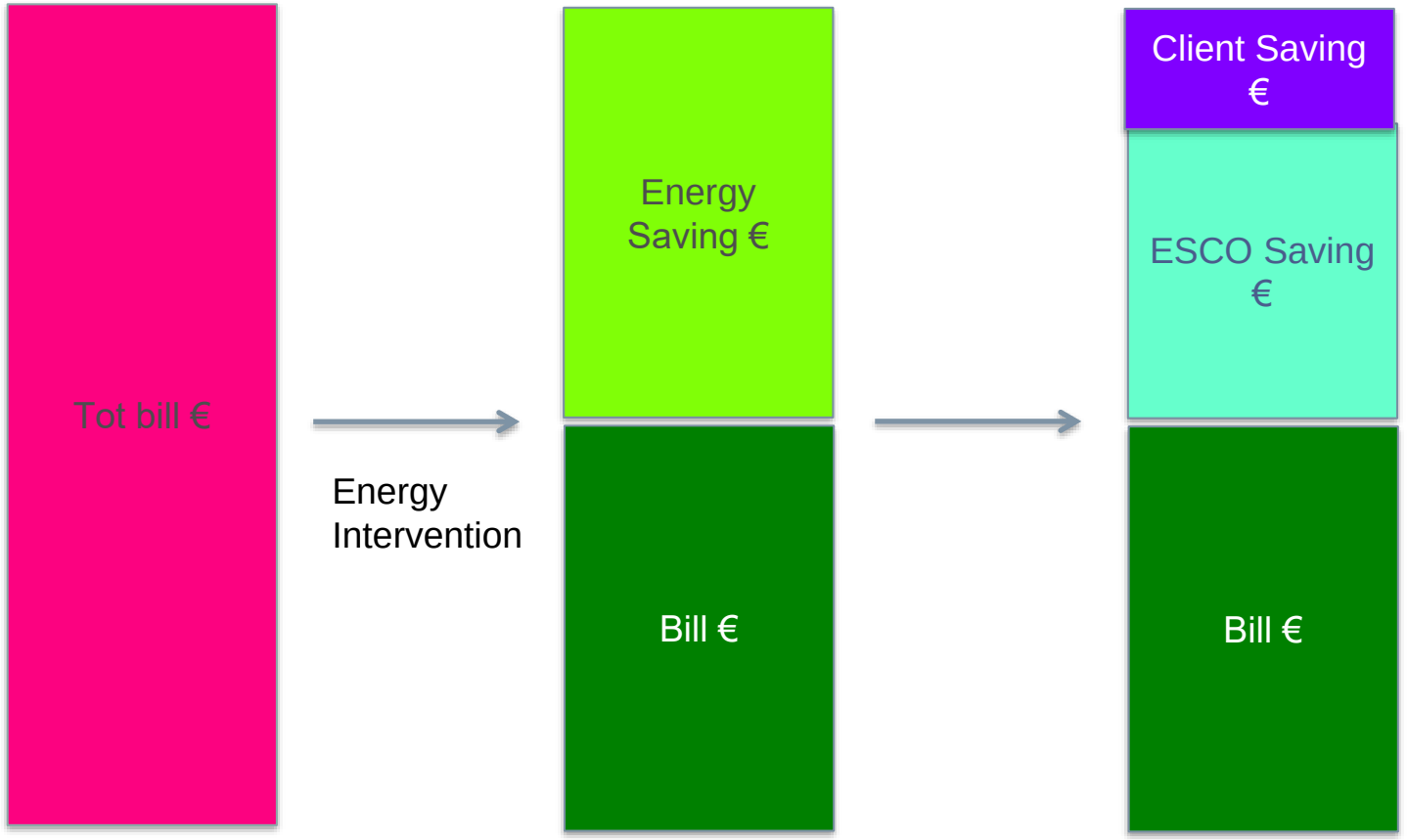
First Out Contract - EPC



Shared Savings Contract – EPC

- the ESCo supplies the capital with its own sources or through third party financers;
- the parties agree on the division of the proceeds of savings.
- The contracts have a duration of about 5-10 years in consideration of the fact that only a portion of the savings contributes to the recovery of the initial investment.
- During the execution of the contract, the ownership of the plants and works remains with the ESCo and at the contractual expiry it is transferred to the customer.
- In a contract with shared savings, therefore, the investment is repaid on the basis of an agreement, between the ESCo and the end user, to divide the savings amount determined by the feasibility study.
- As in the First Out model, the ESCo, in addition to the technical risk inherent in the performance to which its remuneration is linked, also assumes the financial risk;

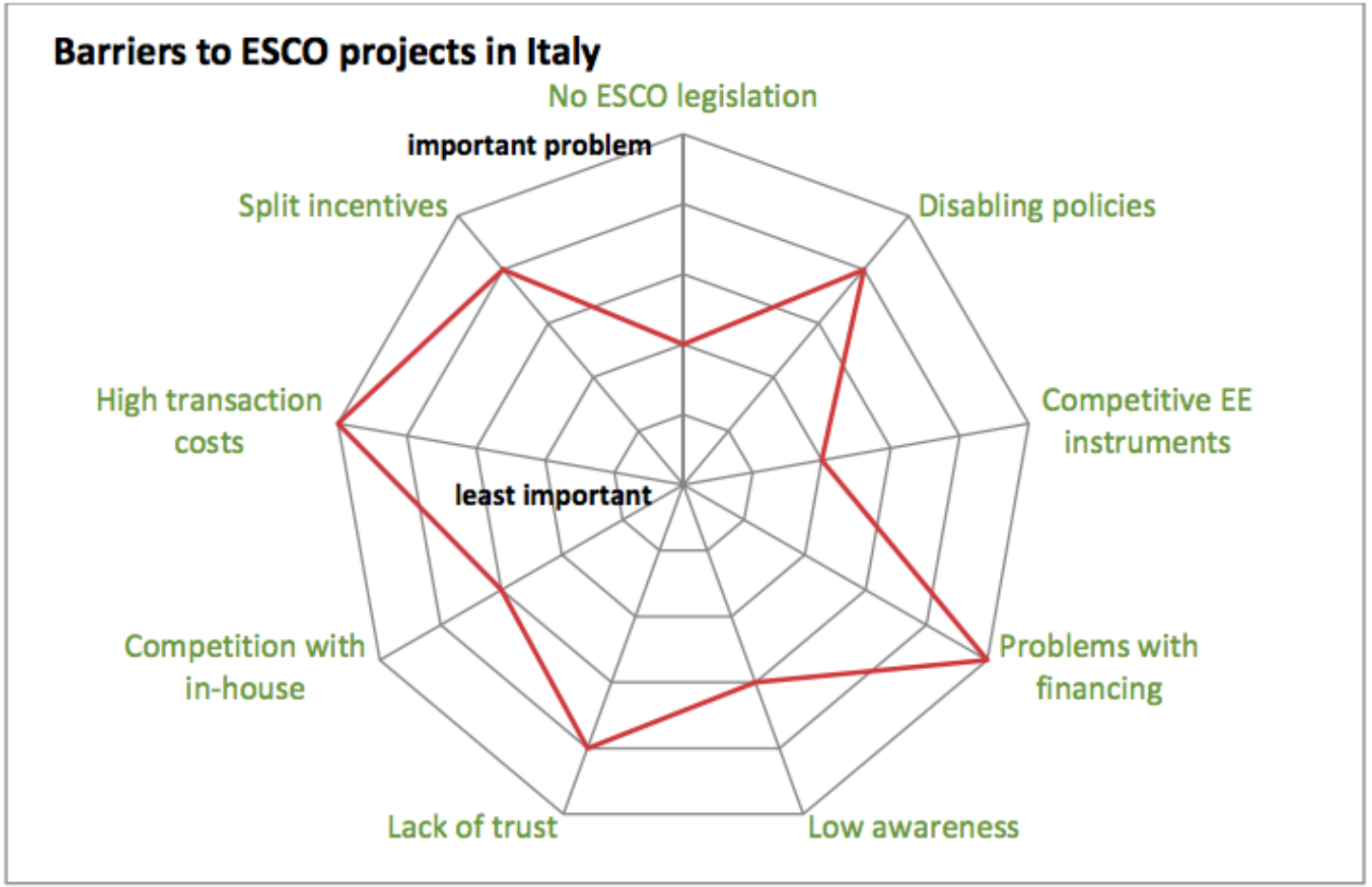
Shared Savings Contract - EPC



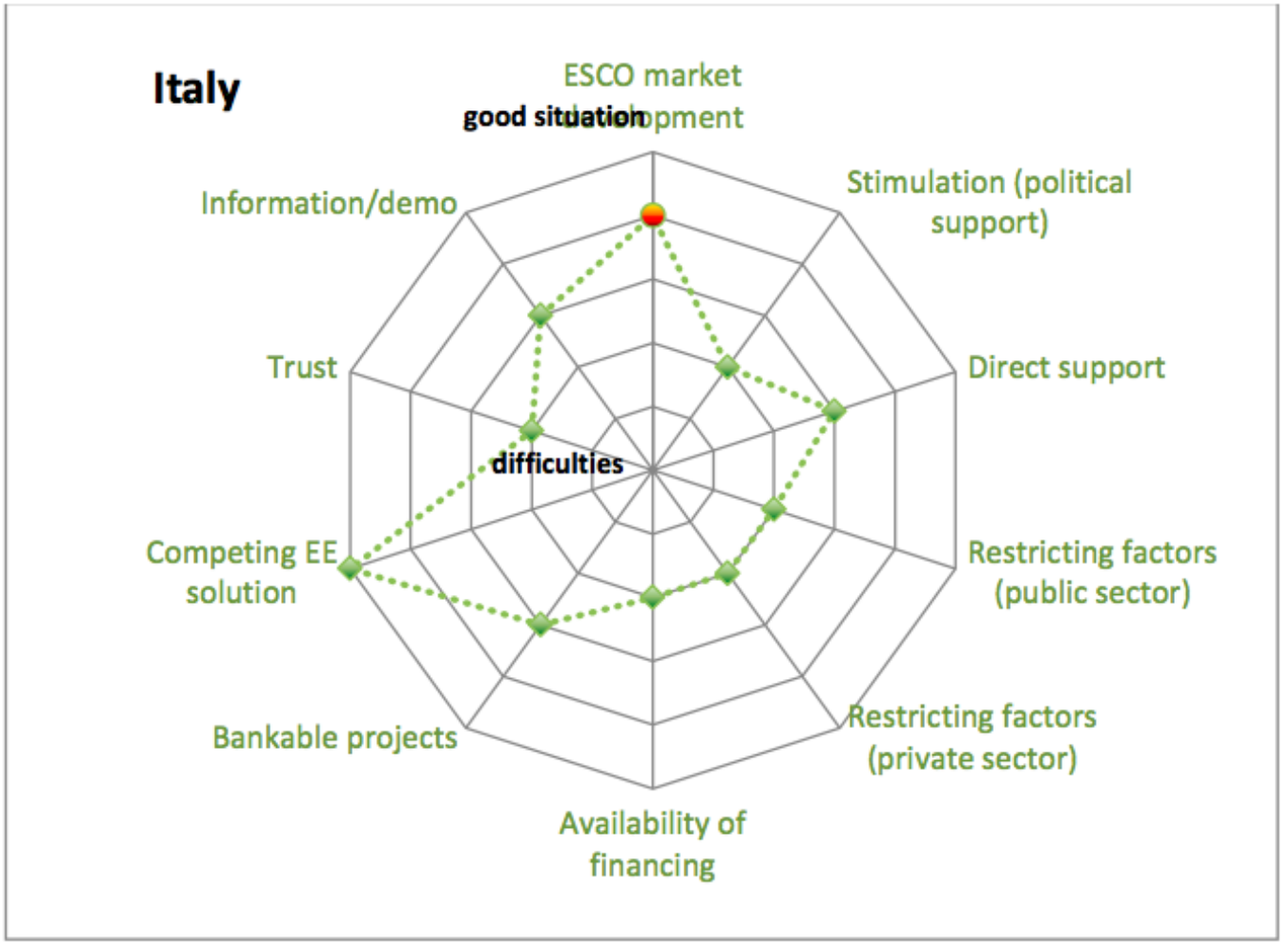
Guaranteed Savings Contract - EPC

- the lender is a third party other than the ESCo and the customer
- it is the customer who signs the loan, while the ESCo normally assumes the role of finding and organizing the loan, as well as guaranteeing a certain level of return based on which it receives the compensation from the customer.
- The contract normally lasts about 4-8 years.
- the ESCo undertakes essentially to guarantee that the savings are not lower than an agreed minimum, established on the basis of the feasibility analysis.
- The savings guarantee is expressed through formulas that provide for compensation in favor of the customer in the event of greater consumption than those guaranteed; if, on the other hand, savings are achieved that exceed those expected, these will normally benefit the customer.

Italian Situation – ESCO and EPC



Italian Situation – ESCO and EPC



SOME EXAMPLES FOR FINANCIAL OPPORTUNITIES

The credit assignment: some interventions of energy restructuring of existing buildings give the right (in Italy) to a tax relief up to 65%. In this way, whoever supports the energy renovation of the building, can take advantage of a tax discount of up to 65% in 10 years. Some ESCOs are offering the energy redevelopment of buildings by "anticipating" the tax credit of the tenant who assigns this credit to the ESCO.

By this way, the tenant can take advantage of the entire tax credit at the beginning of the entire tax credit, with a lower initial cost. The rest of the investment (reduced by over 50%) can be supported by the tenant or anticipated by the ESCO in the form of an EPC contract.

Thanks to this "financial" mode, it is also possible to propose all those interventions, above all of a building nature, which would have very long PBPs but which nevertheless contribute to increasing the value of the building (for example, the replacement of windows or coats).

ENERGY MANAGEMENT FOR PA

Europe – Regions – Municipalities

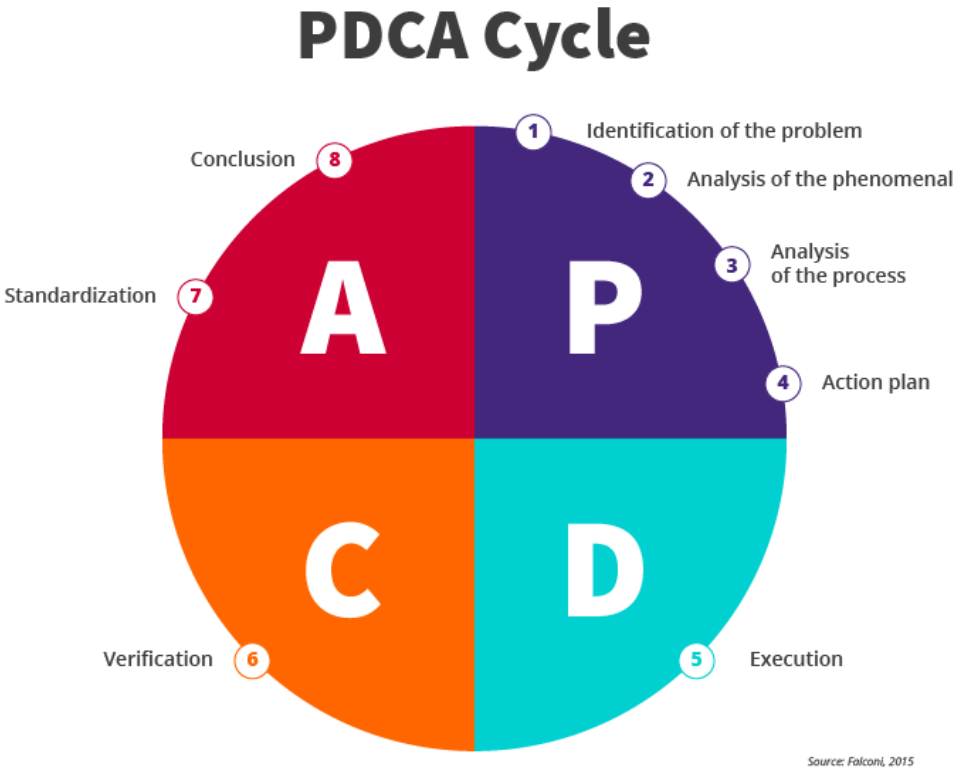
Energy management: figures with similar skills are needed at European level, as envisaged for the figure of Energy Management Expert by CEI UNI 11339. Similar figures speak a similar language and analyze the issue of energy efficiency in a similar way. For example, energy audits must comply with UNI 16247.

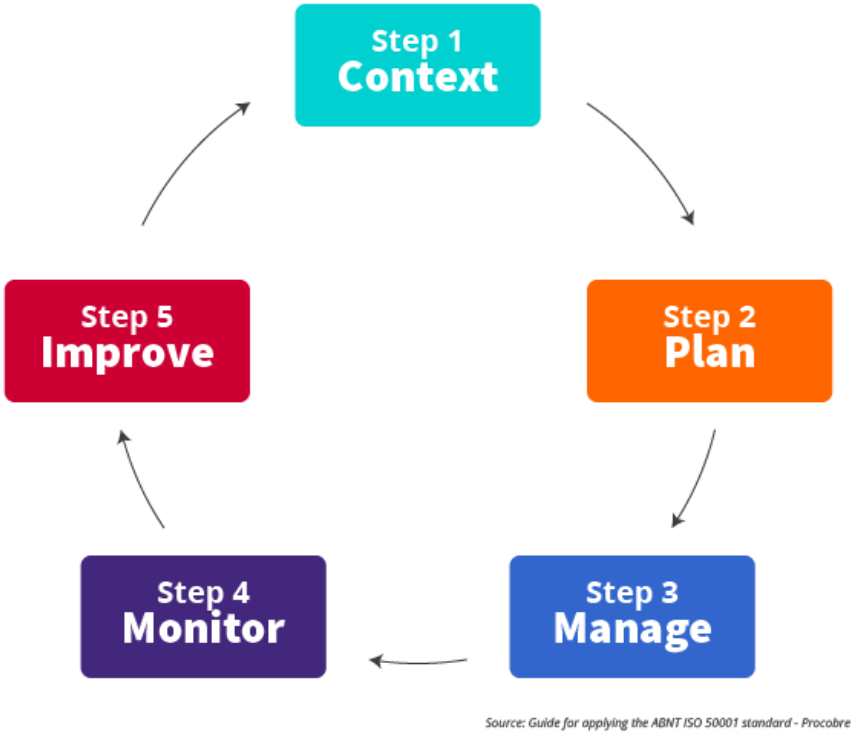
By December 2015, all energy-intensive companies or large companies (over € 50,000,000/years and more than 250 employees) will have to deliver energy audits while Public Administrations are not required to do so. Why? There Public Administrations (for example Paris Habitat that manages 125238 accommodations) that have Quality Management System (ISO 9001) and an Energy Management System (ISO 50001).

What do you think if the PAs adopted an EMS? Can't find the EMS similar to the Sustainable Energy Action Plan?

ENERGY MANAGEMENT FOR PA

Europe – Regions – Municipalities



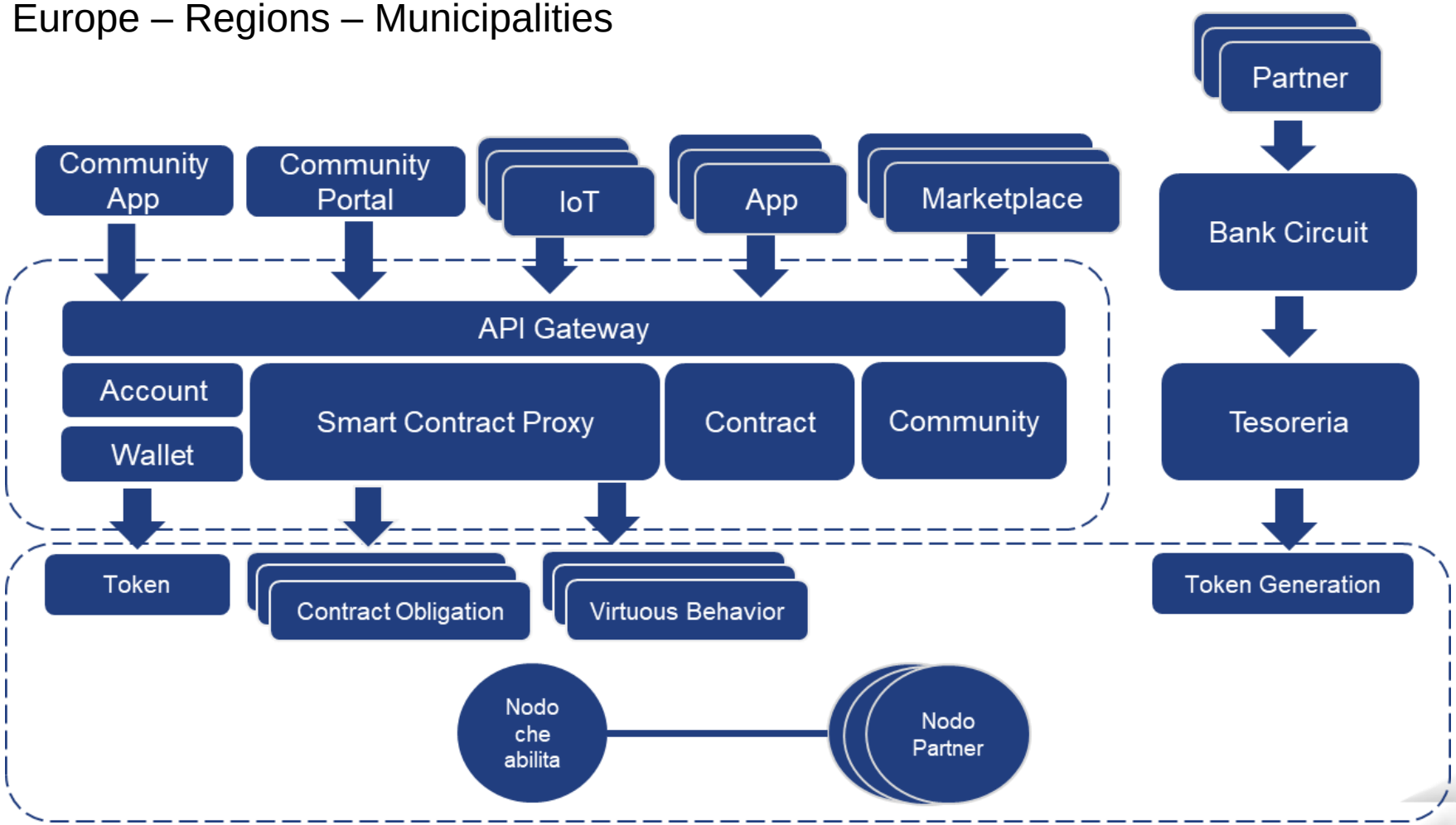


BLOCKCHAIN FOR BUILD

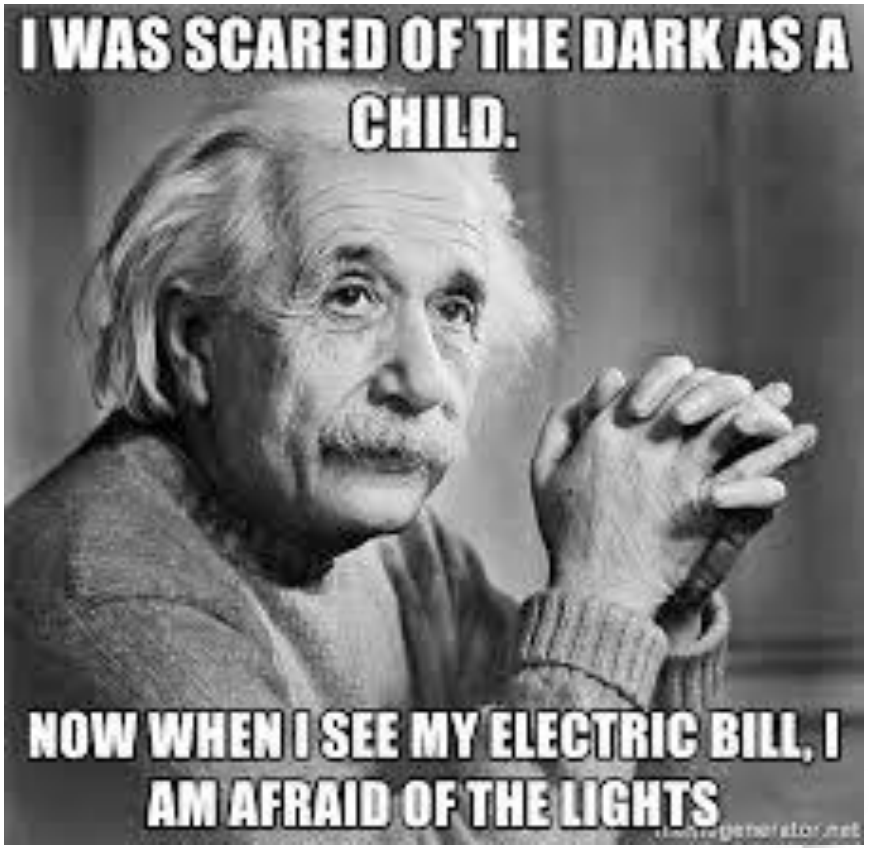
Europe – Regions – Municipalities

BLOCKCHAIN FOR BUILD

Europe – Regions – Municipalities



Thanks for your attentions



Annex 3 - Questionnaire

BOOSTEE-CE TRANSNATIONAL TRAINING
EVALUATION QUESTIONNAIRE

Please select your country:

- ☐ Austria
- ☐ Croatia
- ☐ Czech Republic
- ☐ Hungary
- ☐ Italy
- ☐ Poland
- ☐ Slovenia
- ☐ Other

1. **To which of the following themes do the activities of your organization relate ?**
   - ☐ energy performance
   - ☐ buildings management
   - ☐ urban planning / land use
   - ☐ cadastral / GIS data
   - ☐ administrative units
   - ☐ utility and governmental services

2. **To what extent do you use the following aspects of training in your organization ?**

		1	2	3	4	
a) Energy and climate planning in public buildings	Not at all	●	●	●	●	Every day
b) GIS tools	Not at all	●	●	●	●	Every day
c) External databases / repositories on experts and devices	Not at all	●	●	●	●	Every day
d) Funding sources and financing energy efficiency	Not at all	●	●	●	●	Every day

3. **Was the selected form of training suitable ?**

	1	2	3	4	
Not at all	●	●	●	●	Definitely

Do you have any suggestion for improvement ?

……
……
……

4. **Was the duration of the training suitable ?**

	1	2	3	4	
Not at all	●	●	●	●	Definitely

Do you have any suggestion for improvement ?

……
……
……

5. **Did you find the training content appropriate and adequate ?**

	1	2	3	4	
Not at all	●	●	●	●	Definitely

Do you have any suggestion for improvement ?

……
……
……

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BOOSTEE-CE TRANSNATIONAL TRAINING
EVALUATION QUESTIONNAIRE

6. Was the content of the training provided in a comprehensible and accessible way ?

1 2 3 4

Not at all ● ● ● ● Definitely

Do you have any suggestion for improvement ?

……
……
……

7. Was the quality of the training rewarding ?

1 2 3 4

Not at all ● ● ● ● Definitely

8. Was the training material pertinent, clear and exhaustive ?

1 2 3 4

Not at all ● ● ● ● Definitely

9. Did the training meet your expectations ?

1 2 3 4

Not at all ● ● ● ● Definitely

10. Do you think that training could facilitate the understanding of energy efficiency planning and help to better define energy efficiency actions ?

1 2 3 4

Not at all ● ● ● ● Definitely

11. Has your knowledge and skills increased thanks to the training ?

1 2 3 4

Not at all ● ● ● ● Definitely

12. Do you think that the acquired knowledge and skills will be useful in your daily work ?

1 2 3 4

Not at all ● ● ● ● Definitely

13. Could you please select the field where training could help your organization or your city/region ?

- ☐ promote energy performance
- ☐ give an information
- ☐ support urban planning
- ☐ indicate financial incentives / loans and facilitate their acquisition
- ☐ increase the rate of refurbishment
- ☐ other ……..

14. Would you recommend this training to other employees / organizations ?

1 2 3 4

Not at all ● ● ● ● Definitely

If you have additional comments or suggestions, share them with us

……
……
……

Thank you for participating in the survey!

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