

BOOSTEE-CE



<http://www.interreg-central.eu/boostee-ce>



FINAL BOOKLET



BOOSTEE-CE

BOOSTING ENERGY EFFICIENCY
IN CENTRAL EUROPEAN CITIES
THROUGH SMART
ENERGY MANAGEMENT

TABLE OF CONTENTS

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I - OUR MISSION & VISION	5
II - OVERVIEW OF OUR ACTIVITIES	7
III - COUNTRY PROFILES & PILOT ACTIONS	19
ITALY	23
AUSTRIA	27
CZECH REPUBLIC	31
POLISH - CZECH	35
CROSS-BORDER AREA	
SLOVENIA	39
CROATIA	43
HUNGARY	47
POLAND	51
IV - CONCLUSION	55

A message from our Lead Partner

Fabio REMONDINO

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Trento, IT

Poor energy performances of buildings are accountable for large CO2 emissions and large energy consumption. While energy performances of new buildings are already significantly improved, **unnecessary emissions and energy consumption should be decreased in existing buildings.** This is often quite problematic but should be mandatory in order to reduce CO2 emissions and increase energy efficiency.

BOOSTEE-CE aimed to improve the governance of energy efficiency in existing public buildings and, ultimately, to reduce energy consumption

The BOOSTEE-CE project (“Boosting Energy Efficiency in Central European Cities through Smart Energy Management”) **intended to tackle these territorial challenges offering innovative solutions and best practices to undertake actions** for improving energy performance of buildings and accelerate the transition to low-carbon cities. BOOSTEE-CE aimed to improve the governance of energy efficiency in existing public buildings and, ultimately, to reduce energy consumption using two approaches:

- Realising a **web-based platform (OnePlace)** in order to (i) **collect, visualise and query energy-related data** in the engaged municipalities, (ii) present transnational energy strategies and financial schemes, (iii) showcase good practices for policy / energy makers and (iv) connect users to information about electric appliances and energy experts.



- **Raising public awareness related to EE,** energy saving and CO2 reduction with different knowledge transfer events and material. All these activities and tasks were performed under **transnational cooperation and approach** in order to (i) go beyond building styles and urban layout, (ii) realise generalizable solutions usable beyond the project partnership and (iii) reduce know-how disparities and increase capacities for improving EE of public infrastructures of Central European policy makers, public infrastructure managers, energy planners and other actors.

This booklet summarises project activities and achievements, presenting the developed web platform and the performed pilot actions, reporting key messages and lesson learnt in a comprehensive way. We invested lots of energy in our transnational project and in preparing this final communication material, so we do hope you will enjoy reading this booklet!

OUR MISSION & VISION



Buildings are responsible for **approximately 40% of EU energy consumption and 36% of the CO2 emissions**. Even though the Energy performance of buildings directive led to significant improvements and since then new buildings consume only half of the energy compared to those erected in the '80s, there still is a lot to be desired.

the final aim is to improve the governance of EE in existing public buildings

The BOOSTEE-CE project developed and implemented **technical solutions, strategies, management approaches & financing schemes to achieve higher EE in public buildings**. This was achieved through a transnational cooperation and by using geospatial data, smart energy management tools and energy audits to facilitate the implementation of EE in public buildings.

The project (CE906) is funded by the Interreg Central Europe Programme, under the Priority 2 "Cooperating on low-carbon strategies in Central Europe", specific objective "develop & implement solutions for increasing EE & renewable energy usage in public infrastructures". The total budget of BOOSTEE-CE is 2.2 mil. Eur.


PROJECT BUDGET
2.22
MILLION €
ERDF FUNDING
1.84
MILLION €



Who we are?

The project consortium touches 7 Central European countries, with 13 project partners - **FBK Trento** (Italy - coordinator), **E-Institute** (Slovenia), **Energy Agency of the Zlín Region** (Czech Republic), **Regional Energy Agency North** (Croatia), **Mazovia Energy Agency** (Poland), **Tolna County Development Agency** (Hungary), **Emilia-Romagna Region** (Italy), **Municipality of Velenje** (Slovenia), **City of Koprivnica** (Croatia), **Municipality of Judenburg** (Austria), **Energy Agency Upper Styria** (Austria), **European Grouping of Territorial Cooperation NOVUM** (Poland), **Municipality of Plonsk** (Poland) - and 2 associated partners - **Zlín Region** (Czech Republic) and **Municipality of Tolna** (Hungary).



AUSTRIA - JUD; EAO
CROATIA - REAN; COK
CZECH REPUBLIC - EAZK
HUNGARY - TCDA
ITALY - FBK; RER
POLAND - EUWT NOVUM; CMOP; MAE
SLOVENIA - EZVD; MOV

OVERVIEW OF OUR ACTIVITIES

The BOOSTEE-CE Work Packages

BOOSTEE-CE`s activities are divided into Work Packages (WPs) for easier project management and in order to have a clear overview of the many activities the partnership undertook during the three years of joint efforts.

The four WPs of the project are the following:

WP1: Transnational tool for energy audit of public buildings

WP2: The Online Energy Platform - One-Place

WP3: Boosting energy efficiency in pilot actions

WP4: Energy efficiency financing strategies in Central Europe

this booklet presents the results as they are following each other, much like a building`s elements during construction



Our aim is to improve EE governance in public buildings by creating various tools and using different methods, but **our ultimate results are the OnePlace Online Energy Platform containing all relevant project outputs, and the 3D Energy Management System**, which was the most ambitious effort the partnership undertook.

In this booklet we will start our journey by presenting our most important product, **the OnePlace Platform and its various modules and some background information: WP1 containing all the methodological and practical elements** of our 3D Energy Management System. The subsequently displayed 4 modules of the platform are **part of WP2**. We are also introducing our results about **EE financing (WP4)**. The outcomes of the **Pilot Actions (WP3) and the financial recommendations (WP4)** are presented in a country-specific manner, which helps you to learn more about individual countries.

Please follow a comprehensive exhibition of BOOSTEE-CE's most important outputs on the following pages!



OnePlace

OnePlace: the Online Energy Platform

The Online Energy Platform - OnePlace aims to **enhance public authorities' and energy end-users' knowledge in energy efficiency and sustainable entrepreneurship**. The platform consists of four different modules:

OnePlace aims to enhance public authorities' and energy end-users' knowledge in EE

The first module is the **The Living Energy Marketplace** - an online database **helping energy end-users to choose energy efficient electronic devices** and connect to experts in the field of EE.

Energy Efficient Cities is the second module which enables **the exchange of experience and good practices between cities** for public authorities, municipalities and other public actors.

Financing Energy Efficiency is the third module which has an attractive **visual presentation of the transnational strategy outcomes**, contains examples of best practices and practical steps to use the national and EU-level resources. The module includes also **methods of financing energy efficiency investments** that were **transferred to the participating regions' Energy Efficiency Roadmaps**.

The last, **4th module**, the most innovative feature of OnePlace is the **3D Energy Management System**, a **webGIS system that allows users to visualize 3D city models and query buildings for cadastral and energy information**.

OnePlace offers and presents all BOOSTEE-CE results on an easy-to-use and compelling platform

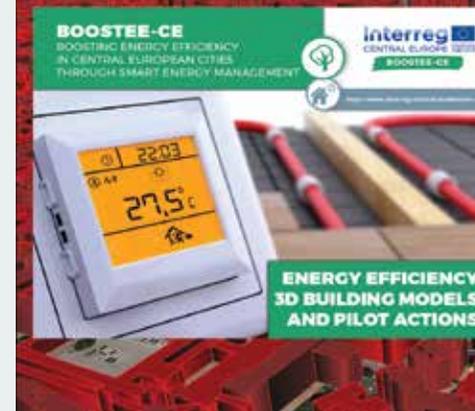


LEARN MORE ABOUT ONEPLACE

3D Building models

The first step on the way to achieve our goals was to develop 3D building models and **a methodology to perform a comprehensive analysis of energy audits** and consequently visualize them in order increase energy efficiency in public buildings. Building upon a review of what is known and had been done so far in past projects the partnership produced **3D building models in urban areas using available geospatial data** collected in the pilot areas **with sufficient levels of detail**. The 3D geometries are used in the project tool (OnePlace Platform) to access and visualize energy-related information and to visually deliver that information in an easy-to-understand language making energy data accessible to non-experts, engaging local users.

we developed a methodology to generate 3D city models, which allow the query of energy-related data, support the assessment of energy performance and increase public awareness on the energy efficiency topic



BOOSTEE - CE

ONLINE VIEWER OF THE PILOT ACTIONS - STORY MAP

The BOOSTEE-CE Story Map is an online viewer which allows browsing BOOSTEE-CE pilot locations and displaying the information about each of them in an easy form on the map (popup window).

Management & monitoring energy flows

in public buildings both in a spatial and a temporal dimension **supports local authorities in EE actions** and increases public awareness through public access to the energy consumption data at the same time.

The project developed **a database focusing on energy consumption** and a geospatial database (from municipalities' databases and surveys). **3D building models** in urban areas were created using available geospatial data with sufficient levels of detail. **PV potential was estimated and presented on 3D geometries as well as energy flows and heating losses**, highlighting problematic areas such as windows or roofs. A transnational methodology was elaborated to collect energy information and create their visualization using 3D building models establishing the replicability of the project results.

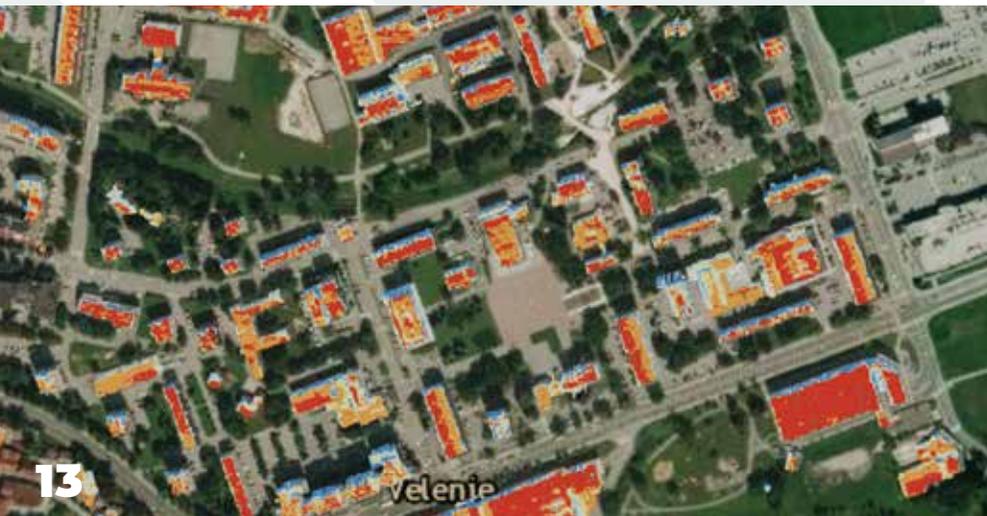
The 3D building were used in the One-Place platform and during the implementation of the Pilot Actions. Local public authorities and key target groups supported and validated the results.

3D Energy Management System

The 3D Energy Management System (EMS) is one of the four modules of the BOOSTEE-CE OnePlace platform. **3DEMS is probably the most important and technological tool developed by the project consortium.** It is a simple yet powerful GIS-based tool that provides a **3D representation of a selected set of buildings** and **is able to display energy-related information** (i.e. consumptions, energy audits, building attributes, solar power potential, etc.) available for a building.

Why create such an online system?

The main advantage of the 3DEMS over more traditional applications is its **simpleness and intuitive online solution** that building operators, energy planners and municipality staff can use everywhere and everytime without the need of special expertise. It is accessible without having to install any program, as it is a web-based tool requiring only a web browser to function.



What is it useful for?

The main function of the 3DEMS is **to help building operators**, energy & urban planners, municipality staff to **better understand energy use and flows** within a building in a much more graphical way, having a view also to the surrounding of a building and its location in the city. **3DEMS allows to share, visualize and query** energy-related information to citizens and public authorities. It **can be combined with smart metering live energy data**, and being customizable a wide range of data can be stored, displayed and managed within the platform. The module can be easily replicated and adapted to any municipality.

3DEMS combines the most important functionalities of a GIS/CAD application into an easy-to-use web application



Financing Energy Efficiency

BOOSTEE-CE strives to provide **upgraded financial tools to local municipalities and regional authorities** by giving a visual presentation of the transnational strategy outcomes, financial roadmaps, examples of the best practices **and practical steps how to use the national and EU-level resources. All this material is available in the One-Place module named Financing Energy Efficiency.**

new financial approaches are explored and developed with regards to public institutions

High initial costs, relatively long payback periods, credit risks and more efficient EE investments are the challenges that need to be addressed by different (or even combined) flexible financial tools such as grants, preferential or commercial loans, guarantees, bonds, tax incentives, EPC, etc. Moreover, technical considerations like different building sizes, locations and uses or diverse upgrade and retrofit needs, should be taken into account when planning and applying a long-term action.

BOOSTEE-CE thus delivers a transnational strategy for EE financing in CE which defines, structures and reviews 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. These findings can be explored in the next section 'Country profiles'.

the methodological framework builds upon the practical knowledge of public institutions and provides an overview of financing models used

6 specific outputs were created by the partnership to help local authorities in financing EE investments. Based on a comparative analysis of the partner countries, a review of the existing energy financing solutions and models was made. **Financing roadmaps were designed to achieve the desired goal of energy efficiency in public infrastructures.** A selected collection showcases the best practices from CE countries on financial investments return models. For the end-user, an Energy Efficiency Financing Project Calculator gives a basic indicative idea of the profitability and advisability of the investment into an energy efficiency or RES project.

CLICK HERE TO READ ABOUT THE EE ROADMAPS!

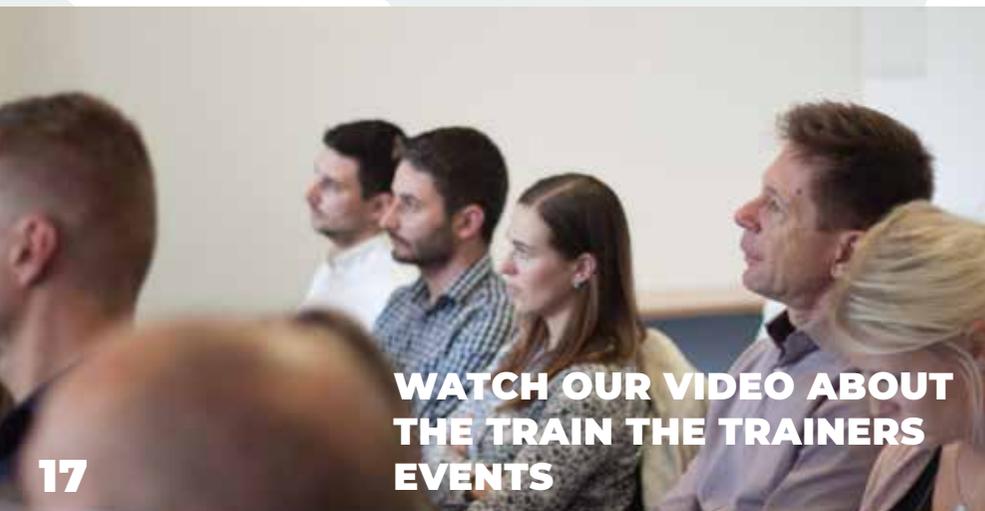


Knowledge transfer to increase capacities

Tools, strategies, roadmaps and an online platform were created **to promote Energy Efficiency** in public buildings. We also effectively promoted the results of the project by organizing **two transnational events** called **Train the Trainers** which took place in Warsaw (Poland) and Bled (Slovenia). Both events were aimed at those project partners and stakeholders who will be the **ambassadors of BOOSTEE-CE and EE in public buildings**. A specific training material which was developed to (i) give **an overview about the tools and actions in EE** as well as insights to the decision-making process regards EE actions, RES investments, (ii) **introduce the OnePlace platform**, how to use it and how to navigate between the different sections and lastly (iii) to give **a practical introduction into EU funding sources** and financial models for applying energy efficiency in public buildings. The training **materials were adapted and translated** by BOOSTEE-CE partners to suit country-specific particularities and were **used in national trainings as well as made available on our website**.



The national trainings were organised in five participating countries and in one cross-border region (Poland – Czech Republic) and were attended by more than **110 participants** on six occasions so far. **On the other hand, an excess of 250 EE experts participated on our seminars and Focus Group Meetings**, aimed to disseminate our actions in smaller groups as well as **receiving feedback from our stakeholders** on the outcomes of the project and for learning about the **shortcomings that need to be addressed in their work with EE**.



WATCH OUR VIDEO ABOUT THE TRAIN THE TRAINERS EVENTS



COUNTRY PROFILES & PILOT ACTIONS



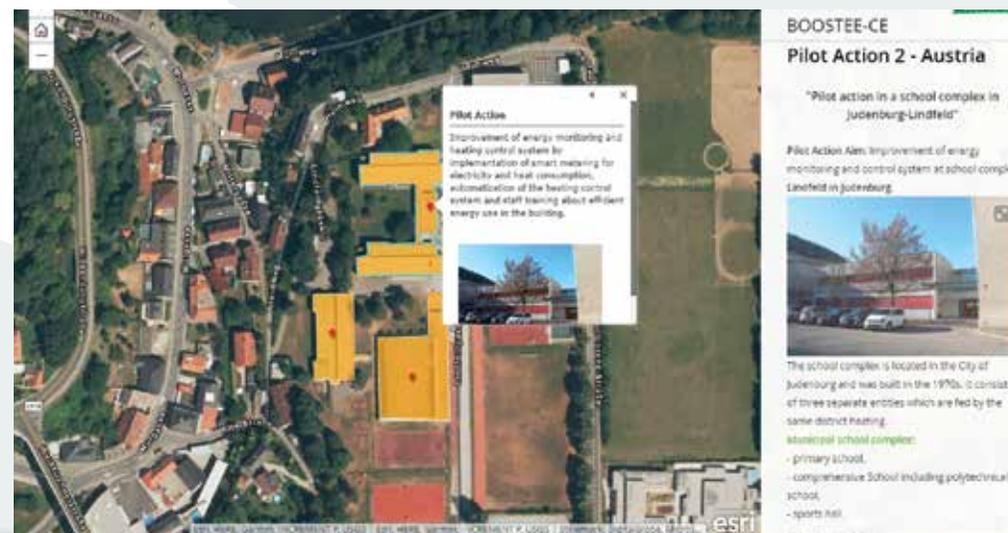
The partnership of BOOSTEE-CE created various country-specific outputs to assist local authorities, Municipalities and local actors in implementing EE actions offering concrete technical solutions and details on financing opportunities. On top of that, the partnership realized **8 Pilot Actions** in total. In this section we will present our Pilot Actions and highlight a few of the most important project outcomes for each participating country.

smart metering, building management and preparation of building retrofits were explored in 8 Pilot Actions

Pilot Actions allow promotion and implementation of the platform and EE measures in different local/regional contexts.

Project partners and associated partners specified the scope of the investments for the PAs based on their energy management needs. EE measures such as **smart metering, building management and preparation of building retrofits were explored** and carefully selected based on what was foreseen as the best value for money. **5 small-scale investments** pilots (Austria, Poland, Hungary, Croatia, Slovenia) performed in buildings run by local municipalities (supported by technical partners or national agencies), **one similar pilot** in the Czech Republic **with external funds** and **2 pilots** (Italy, Polish-Czech border area) **with tests, demos and feedback** for new investments in public buildings were implemented.

The usability of the platform for planning future EE investments was evaluated by the various stakeholders involved in the realization of the Pilots. **Each Pilot Action provided crucial information and feedback on stakeholders' opinions and the effect of specific activities with respect to energy saving and cost effectiveness was evaluated.** PA Fact Sheets reports are included in the platform OnePlace as best practices for the project stakeholders to assess real case situations. A handbook for energy planners demonstrates how to integrate OnePlace and its modules into daily use to reach significant energy savings with modern approaches was created as well.



Story Map

The BOOSTEE-CE Story Map is an online viewer which was built using the „Story Map Tour storytelling template“ and ArcGIS Online. This online viewer allows browsing 8 BOOSTEE-CE pilot locations and displaying the information about each of them in an easy form on the map (popup window). The viewer is used to showcase the pilot actions of the project.

CLICK HERE TO SEE THE STORY MAP

Country Profiles

In the following section, we are giving a short preview of country-specific outputs, which are using various results of the project:

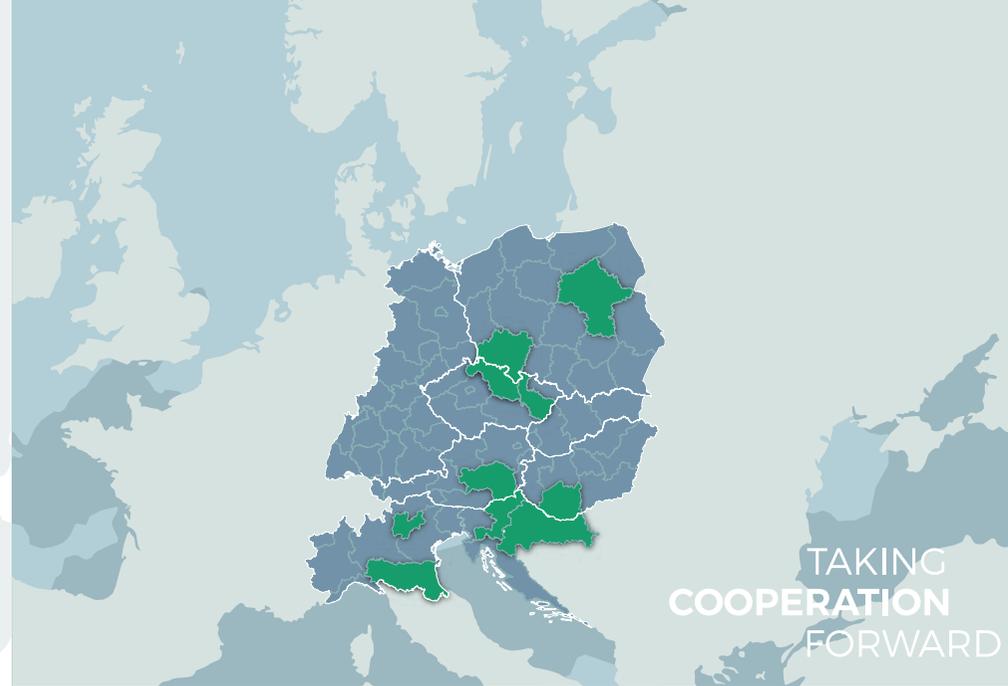
- the Pilot Actions;
- the Energy Efficient Cities module of the OnePlace platform;
- the Comparative analysis financial schema;
- and the Energy Efficiency financing roadmaps for public infrastructures in Central European cities and municipalities

All these outputs are building upon the deliverables the partnership had created and are only a brief summary of the outputs that are available on our website.

The Country Profiles **follow the same layout from country to country**. Presented are the most important aspects of the **SWOT-analyses** that **highlight critical features** with regards to energy efficiency issues.

This is followed by **a short overview of the actions proposed** in Energy Efficiency financing roadmaps building upon the findings of the country specific analyses.

this booklet is a brief summary of the outputs the partnership had created and which are available on our website



Recommendations are made considering the more problematic areas and the funding opportunities outlined in the document Transnational methodological framework for a roadmap development.

Good Practices showcased in these pages are taken from Catalogue of Best Practices available in the module Energy Efficient Cities and the Best practices of financial strategies found in the Financing Energy Efficiency module.

Lastly, **Pilot Actions are presented** with their respective Implementation of pilot actions for EE improvement.

The information presented here is also available on our webpage in greater detail, so **don't hesitate to visit our webpage if you would like to learn more about our achievements.**

CLICK HERE TO READ ABOUT OUR OUTPUTS



ITALY - EMILIA ROMAGNA REGION

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Italian partners:

Strengths

- Above average EE in energy-intensive sectors
- Increasing RES share
- APEA industrial development model
- Municipalities engage in EE

Weaknesses

- Energy dependence of the region
- Low propensity to the use of innovative schemes of financing or management
- Poor spread of the culture of savings in EE
- Complex administrative procedures

Opportunities

- Stimulation of the implementation of Action Plans for Sustainable Energy by the Municipalities
- Synergies with environmental planning tools
- Waste prevention and recovery agreements
- Stimulus for the development of the ESCO system

Threats

- Investments in energy efficiency slowed down by difficult of access to credit
- Frequent political changes
- Difficulties in interventions on the public buildings



Action Plan

The main objective of the Region, in line with the European and national policy of promoting energy efficiency, is **the reduction of energy consumption and the improvement of energy performance** in the various sectors.

The increase in energy efficiency from the technical, economic and social point of view represents the most effective tool to ensure the availability of energy at reduced costs and promote the reduction of greenhouse gas emissions.

With reference to energy issues, **objectives specifically dedicated to the Low Carbon Economy** are pursued by promoting the sustainable development of the regional energy system and the mitigation of climate change, through the correspondence between the energy produced, its rational use and the load capacity of the territory and the environment.

Recommended Actions

The main areas of intervention concern the **support to the energy qualification of production processes and companies**, the use of renewable sources, the energy requalification of public buildings and the promotion of sustainable mobility, as follows:

Regione Emilia-Romagna



FONDAZIONE BRUNO KESSLER

POPULATION:

4.431.333

AREA:

22.453 km²

BOOSTEE-CE

PROJECT PARTNERS:

BRUNO KESSLER FOUNDATION

EMILIA-ROMAGNA REGION

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- **promotion of energy efficiency and use of renewable energy in companies** (energy saving and upgrading of energy systems in companies, also promoting systems for energy management, and in production facilities)
- **support for energy efficiency, intelligent energy management** and use of renewable energy in public infrastructure (promotion of energy saving and rational use of energy together with the introduction of new renewable energy production systems in public buildings and public residential buildings)
- **promotion of strategies for low carbon emissions** in the territories, particularly in urban areas (the energy rationalization of local transport and the emergence of a new sustainable mobility in urban areas, also through innovative info mobility interventions and infrastructure for low environmental impact vehicles).
- **regional support, at national level**, for initiatives aimed at defining minimum energy performance requirements for existing buildings; interventions to achieve these minimum requirements should be preceded by an assessment of technical and economic feasibility which shows that they will not entail any increase in costs to be borne by the end user and can also be achieved through the use of ESCO.

GOOD PRACTICE FROM ITALY

Energy Fund (Multiscope Regional Fund of public financing):

A Financial Instrument set up with public resources on the ROP ERDF of ERR 2007–2013. The Fund is a revolving fund of soft loan financing, privately-funded for the purpose of providing loans at a reduced rate. Beneficiaries are SMEs and large companies, the amount of funding must be between of a min. of € 75.000 and a max. of € 300.000.

Keys to success:

- highlighting activities both in terms of results and opportunities offered
- assuring stability and certainty over time
- offering counseling and tutoring service to the beneficiaries and accompaniment for the first year of activity,
- simplifying document preparation requirements.

GOOD PRACTICE FROM ITALY

'Sesto Senso': patented smart multisensory metering system with self-learning capability

'Sesto Senso' is an intelligent multisensory system with scalable learning capacity. In addition to monitoring energy carriers, the system includes: a sensory device able to count access to a room and therefore manage attendance so as to be able to administer the users: a virtual CO2 sensor that exploits the measured temperature values, humidity, number of hours/presence and opening/closing of doors and windows, which all feed in to a neural network of which the sensors are part of.

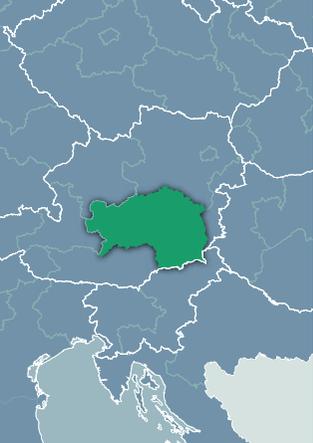
A detection system can independently activate or deactivate lights, appliances, shutters in the building, and also has a sensor that analyzes the percentage of CO2 and warns if you need to open the windows. Sesto Senso is composed of a series of environmental monitoring sensors that acquire data on temperature, humidity, luminosity, CO2 values, information on movements and noise. Sesto Senso can use sensors already installed for other purposes, thus integrating other functions aimed at safety, home automation, protection against fire and flooding, and finally assistance to user in need.

Pilot Action

The OnePlace platform and the pilot action were **presented to the regional stakeholders as a useful tool** to improve awareness of the characteristics and state of conservation of public assets and the potential for improving energy efficiency.

The 3D Energy Management System module has been **implemented with the model of three residential regional buildings** connected to non-spatial information such as: type of building, year of construction, type and requirements of the energy carriers and data regarding the reduction in energy needs thanks to efficiency measures. A tool like OnePlace developed in this project provides the possibility of bringing this information together in a single environment, making them easily accessible to interested parties.

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION



AUSTRIA - MUNICIPALITY OF JUDENBURG

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Austrian partners:

Stadtgemeinde
Judenburg



POPULATION:
10.063

AREA:
63,77 km²

BOOSTEE-CE
PROJECT PARTNERS:
**MUNICIPALITY
OF JUDENBURG**

**ENERGY AGENCY
OF UPPER
STYRIA**

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Strengths

- Many years of experience and competent institutions in the field of sustainability
- Good data situation on energy consumption of public buildings
- Commitment to sustainable development
- Strong partners with an interest in implementing renewable energy projects

Weaknesses

- Low awareness of climate protection among commercial enterprises
- Often lack of coordination in large projects
- Sustainable energy projects receive too little public attention
- Lack of cooperation between business and public administration

Opportunities

- Public buildings with energy saving potential
- Economically strong industrial companies (steel industry) as well as commercial companies with savings potential
- The municipality acts as a role model for other public and private infrastructure managers

Threats

- Excessive costs for renewable technologies
- Lack of own funds and pre-financing for RE projects in public buildings
- Appeals for climate protection are not heard
- Increasing demand in the steel industry.

GOOD PRACTICE FROM AUSTRIA

District heating grid based on waste heat from pulp&paper mill Zellstoff Pöls AG
The Zellstoff Pöls AG processes approximately 2 million cubic meters of wood annually into both pulp and paper. Together with the Bioenergie Wärmeservice GmbH from Köflach, an expert for district heating and waste heat recovery systems, a joint company was formed: Biowärme Aichfeld GmbH. The objective was to use the waste heat combined with an existing biomass heating plant and a storage solution with large-district-pressure reservoirs. The result was sustainable, environmentally friendly regional heat supply for more than 15.000 households in the greater Aichfeld area. The joint venture invested € 18 million and laid over 18 km of piping for the district heating project. The main success factors are innovative ESCO as heat supplier and the availability of direct non-refundable funds as a part for financing the investment.

Action Plan

The implementation of the strategic goals of the municipality of Judenburg in the areas of energy efficiency and climate protection is concentrated on **eight major fields of action:**

- Reduction of the energy consumption of buildings: municipal buildings, facilities and equipment
- Reduction of the energy consumption of buildings: residential buildings
- Reduction of the energy consumption of public lighting
- Expansion of green electricity production
- Increasing the security and reliability of energy supply in the region/community
- Creation of framework conditions for energy improvements, promotion of renewable energy sources (RES)
- Awareness raising and networks for the sustainable use of energy
- Reduction of CO₂ emissions and energy consumption of mobility



Recommended Actions

The pilot action of the Austrian partners aims at **energy accounting of public buildings**, recording of the consumption of electricity, district heating and water

- **Heating conversion of school** buildings and sports hall, thermal insulation for top floor ceiling of school building
- **Overhaul of ventilation and heating systems**, new glazing of the gallery with semi-permeable PV elements **in the Event centre VAZ**
- **Heating conversion** from electricity to central heating with district heating **in the music school and the former Franciscan monastery**
- Thermal insulation of commercial building Murkauf, the Stadium building, the Building yard and the Kindergarten Strettweg

Pilot Action

The pilot action of the Austrian partners aims at improving EE and the heating system in the municipal school complex at Judenburg, Lindfeld, which consists of two buildings which house primary school, comprehensive school as well as polytechnical school and a sports hall.

Smart meters were installed to refine the energy monitoring of heat and electricity consumption. To measure electricity **three smart meters** with load profiles at a quarterly hour basis **were installed** in three main parts of the buildings. Consumption data is integrated into the municipality's energy monitoring system. Analyses of the smart meter data have shown that **the actual energy consumption of the buildings is significantly lower than the calculated numbers** in the energy certificates. Before making improvements in the technical equipment the overall energy consumption should be lowered as much as possible through energetic improvements of the building envelope.

Annual energy consumption

2.025.236 kWh

Expected reduction of energy consumption

250.000 kWh in 2022

Expected financial saving

30.000 € in 2022



Judenburg

Building type: **Educational**

Electricity consumption [kWh/year]: **75699**

Energy audit: **YES**

Energy consumption (heating) [GJ/year]: **1566**

Energy efficiency measures already implemented in the building: **reducing heating demand: reducing ventilation losses**

Energy source type (heat): **District heating**

Estimation of the amount of heating losses in the building: **959**

Official name: **Comprehensive School Lindfeld**

Recommended energy efficiency measures for the building: **reducing heating demand: selecting efficient heating system**

Technology used to harvest a renewable energy source: **waste heat from a pulp mill**

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

Extended attributes (7)

Metadata (2)

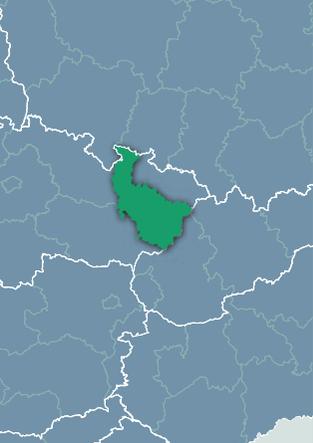
Smart metering and energy monitoring for electricity and heat will provide detailed data necessary to set energy efficiency targets and measures. Also energy monitoring and controlling of established measures can be improved by modern smart metering systems. Failures in technics and rising energy consumption can be recognized at an early stage to save energy consumption and costs.

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION

GOOD PRACTICE FROM AUSTRIA

The klimaaktiv building database informs about practical examples of exemplary new buildings and comprehensive refurbishments of residential and service buildings. In the database you will find all buildings planned or already constructed in Austria according to the klimaaktiv criteria. In addition to energy efficiency, the klimaaktiv building standard also assesses and evaluates the planning and execution quality, the quality of building materials and construction as well as central aspects of comfort and indoor air quality from a neutral perspective.

All winners of the Austrian State Prize for Architecture and Sustainability are also part of the database. The database contains 771 buildings at the time. klimaaktiv supports building owners or planners in developing economic energy saving potentials in new or existing residential and service buildings and advises according to the klimaaktiv building standard. For more information, please visit: <https://klimaaktiv-gebaut.at/> or <https://www.oegut.at/en/>



CZECH REPUBLIC ZLÍN REGION

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Czech partner:



POPULATION:
584.000

AREA:
3.963 km²

**BOOSTEE-CE
PROJECT PARTNER:
ENERGY AGENCY
OF THE ZLÍN
REGION**

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Strengths

- Local energy agency, experienced team with long-term experience in international low-carbon technology projects, action plans, evaluation of buildings and search for sources of financing
- Support of rational energy management and environmental care by regional authorities
- Domestic base for production, supply and repair of most technologies for the use of renewable energy sources
- Permanent trend of increasing the share of RES in the energy balance

Weaknesses

- High percentage of solid fuel combustion in local furnaces
- Low energy recovery of municipal waste
- Lack of experience in renewable energy and passive construction
- High energy losses in final consumption

Opportunities

- Restructuring of the economy towards lower energy demand of the produced production
- Creating conditions for building small RES, especially in rural areas
- Promoting inclusion of energy efficiency and environmental protection issues in education

GOOD PRACTICE FROM THE CZECH REPUBLIC

Smart metering of indoor climate in the Zlín Region

Public authorities like the Zlín Region faced particular challenges resulting from the need to obtain data from multiple organizations to develop and monitor their energy consumption. Energy management is an essential tool in the field of economical as well as therefore environmental friendly energy consumption which leads to low carbon economy. Nowadays 120 organizations from the whole Zlín Region are included in the EM system developed by the Energy agency of Zlín Region. Thanks to the EM the bills for energy consumption are crosschecked and verified and also several malfunctions were indicated from year 2008 like spontaneous leak of water and natural gas, functionless electricity meters etc.

Threats

- Insufficient support for energy efficiency and RES
- Insufficient capacity of public sector experts
- Reluctance of private and public sector cooperation
- Risk of failure to implement energy efficiency improvement measures due to lack of funds

Action Plan

- The EE Action Plan of the Zlín Region outlines on 5 priorities that are based on the Regional Energy Strategy:
- Support for efficient use of energy in buildings owned by the Zlín Region;
 - Support for efficient use of energy in the region;
 - Promoting the use of renewables, secondary and prospective energy sources;
 - Increasing security and reliability of energy supply;
 - Measures to support the implementation of the Action Plan;





Wherever appropriate, projects will be identified in buildings owned by the Zlín Region where it would be possible to demonstrate the effectiveness, economy and other benefits of the implemented measures (and projects). These projects will then be published and serve to motivate other entities in the territory of the Zlín Region.

A fundamental condition for the successful implementation of all planned activities in the spirit of the **“Zlín Region by Example”** will be a coordinated and, if possible, united approach of the regional organizational units at all levels.

Recommended Actions

- **Providing energy management to organizations of the Zlín Region**, informing about legislative duties in the field of energy as prescribed by Act No.406/2000 Coll., on energy management as amended.

- **Initiation of energy efficiency and efficiency projects**, including the search for sources of EU funding and other grant titles, including the use of additional tools and methods for the construction of new buildings and the modernization of existing buildings, systems and sources of heat and water heating

Pilot Action

The pilot action to improve energy efficiency is implemented in 8 buildings.

The pilot action includes an **investment into the energy management system** in the hospital building and the connection to existing central boiler room. **Thermo-modernization of buildings was carried out**, consisting of the **replacement of windows, heat insulation** of the roof with mineral wool or EPS in the minimum thickness of 22 cm and the walls with EPS and 16 cm thickness. Historical buildings have been modernized with regards to the care of historical monuments.

Teachers, janitors and the students were trained in compliance with established energy management.

The quality of the indoor environment is monitored by CO₂ sensors and proper ventilation of classrooms ensured.

Renovation of the buildings means annual savings of more than 1 million CZK for heating. BOOSTEE-CE contributed to the investment by energy management and energy audits. Energy management allows **to optimize the contracted capacity**, selection of a cost-effective tariff, energy monitoring and **provides knowledge about energy flows in the buildings.**

Estimated reduction of energy consumption

953.919 kWh

Expected financial savings

55.060 €

Annual reduction of CO₂ emission

190.695 t

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION





POLISH - CZECH CROSS-BORDER AREA

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Polish partner:

Strengths

- Municipalities engage in energy efficiency (EE)
- Quite some experience in building thermomodernization projects
- Creating low emission economy goals and instruments by local government.

Weaknesses

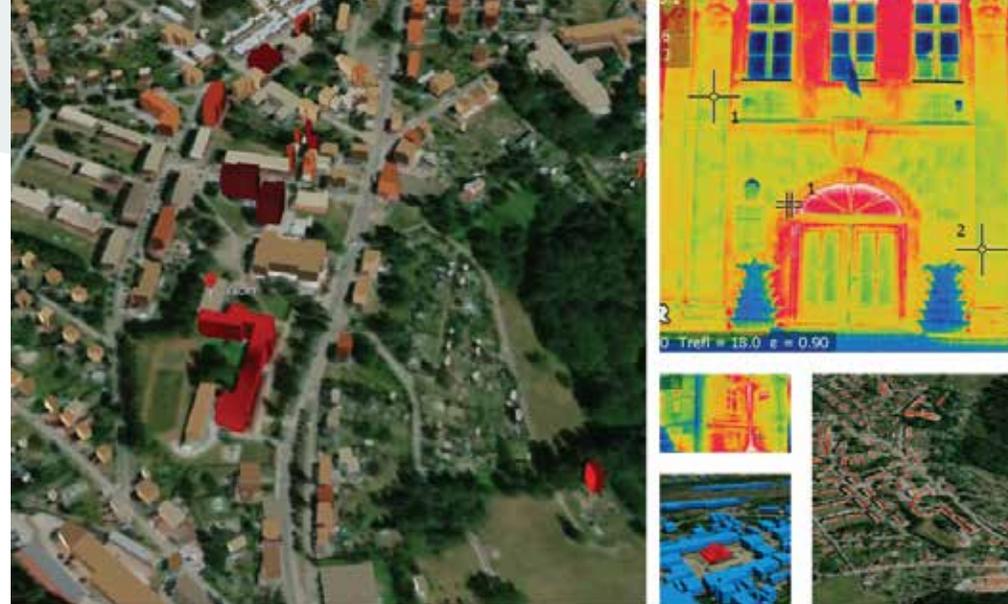
- Energy dependence of the region
- Low propensity to the use of innovative schemes of financing or management
- Poor spread of the culture of savings in EE
- Complex administrative procedures

Opportunities

- Increasing of the implementation of Action Plans for Sustainable Energy by the Municipalities
- Synergies with environmental planning tools
- Waste prevention and recovery agreements
- Raising awareness among residents regarding their impact on the local energy efficient economy

Threats

- Investments in energy efficiency slowed down by difficult of access to credit
- Frequent political changes
- Insufficient municipal resources for EE improvements
- Difficulties in interventions on public buildings



Action Plan

The one of the main objective of the Polish-Czech cross-border cooperation, in line with **the Strategy of Integrated Cooperation of the Czech-Polish Border**, is (i) jointly **promoting the efficient use of energy** and raw materials sources, (ii) supporting measures to **improve energy efficiency** and (iii) supporting the **reduction of energy consumption** in buildings.

The activities are aimed at **mutual cooperation between Polish and Czech institutions** in the use of energy and raw material resources, including synergy in the case of **development opportunities for the use of renewable and alternative energy sources**, aiming at the transition to a low-carbon economy. The activities also aim at mutual **support and exchange of experience** in the field of energy and raw material resources as well as information, education and awareness-raising activities.



PILOT AREAS

LUBAWKA

POPULATION:
10.935

AREA:
138,08 km²

ŻACLÉŘ

POPULATION:
3.134

AREA:
21,82 km²

BOOSTEE-CE
PROJECT PARTNER:
EGTC NOVUM

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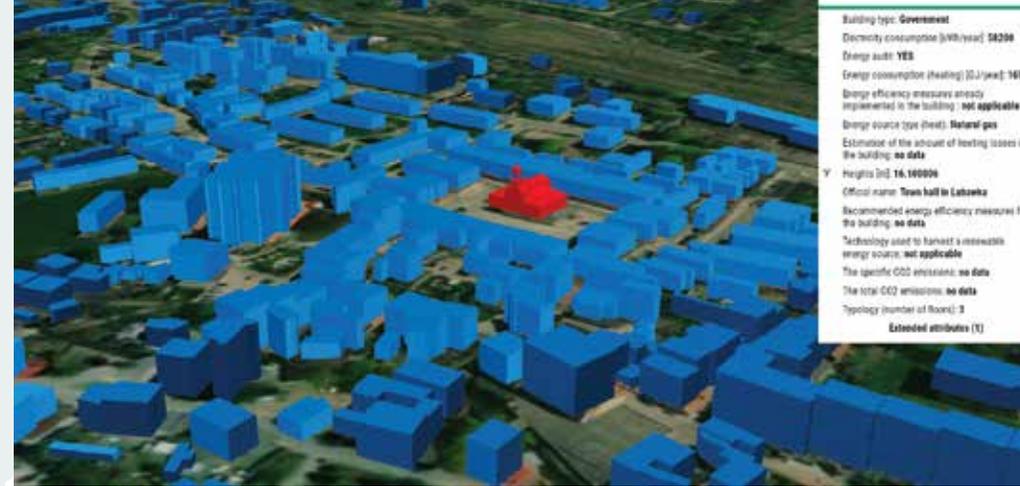
Pilot Action

The pilot action focuses on the **use and test the OnePlace platform**. The OnePlace modules 3D Energy Management System (3DEMS), Energy Efficient Cities, Living Energy Marketplace and Financing Energy Efficiency were tested in Lubawka / Poland and Žacléř / - Czech Republic.

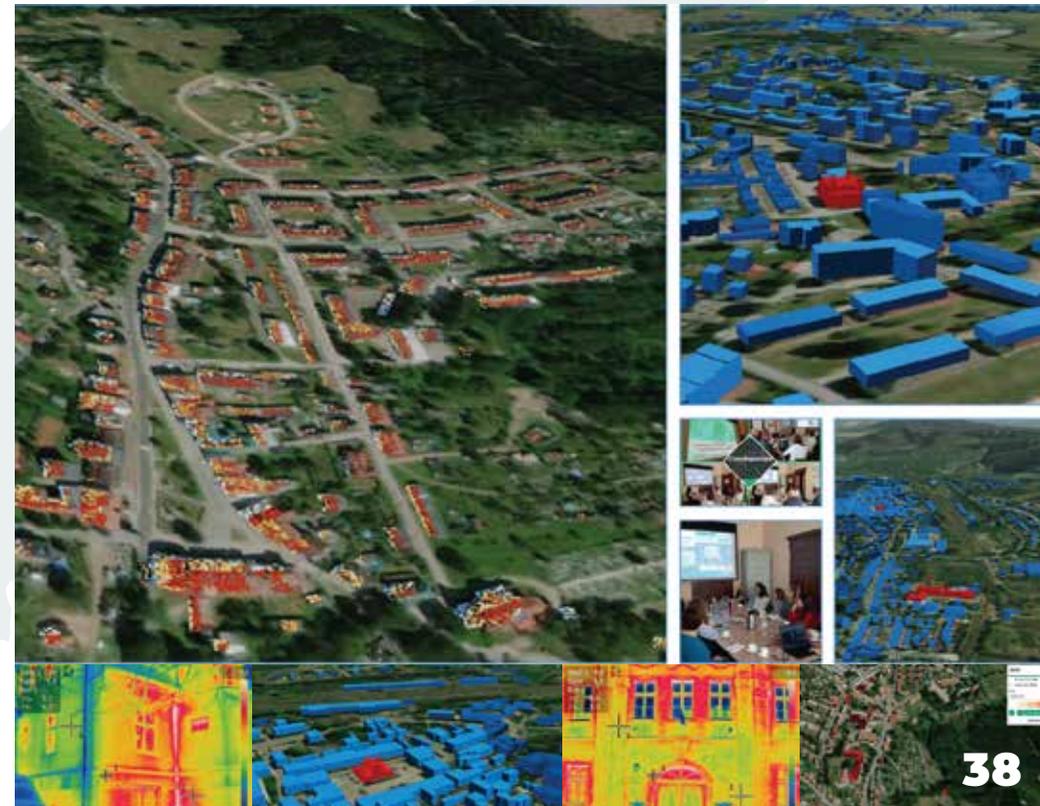


Within the 3D Energy Management System (EMS) module, which is a tool for a better assessment of energy use within a building and sharing information to citizens and public authorities, the **3D building models were developed and connected with non-spatial information** such as: type of the building, year of construction, heating source type, heating consumption, estimated photovoltaic potential of building roofs and etc. **The tool allows users to virtual walk-through buildings**, select a building of interest and retrieve energy and other cadastral / building information and analyze the solar maps, visualized as additional building texture.

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION



As part of Pilot Action, in addition to planned activities, the thermal imaging camera was used to obtain **thermal imagery in order to analyze for heat loss** due to poor insulation, material exposure, building orientation and shading.





SLOVENIA - VELENJE

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Slovenian partners:

Strengths

- Working groups: regional agencies have been established with the aim of best practices exchange, facilitating/coordinating the procedures
- Information and incentives for increased energy efficiency by energy suppliers
- Following the activities and plans within the prepared and approved Sustainable Energy Action Plan (SEAP) and Local Energy Concepts LEC

Weaknesses

- Lack of interest in energy contracting: inadequate conditions for introducing innovative energy efficiency services & energy contracting
- Too many partial renovations compared to comprehensive energy renovations
- Still relatively poor information (especially on the organizational and implementation part of the renovation)

Opportunities

- National Law for Energy Efficiency
- Establishment of a State Guarantee Scheme
- Training activities should include refreshing courses and allow a wider exchange of best practices and experiences among different regions and local authorities as well as with the National level

Threats

- Inadequate qualifications of energy service providers
- Longer periods of relatively low energy prices
- No standardized EE guidelines for products and services – high performance risk



MESTNA OBČINA
VELENJE



VELENJE

POPULATION:
34.597

AREA:
84 km²

BOOSTEE-CE
PROJECT PARTNERS:

**MUNICIPALITY
OF VELENJE
& E-ZAVOD**

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GOOD PRACTICE FROM SLOVENIA

Wood Cooperative Loški potok: District heating with wood biomass in Hrib center

The area of the municipality of Loški potok is 134,5 km² and has less than 2.000 inhabitants, 88% of the area is covered with forest. Objective: By the year 2025, the municipality of Loški Potok should become energetically self-sufficient, with all the energy gained from renewable sources. The Wood Cooperative Loški potok acquired in 2016 a concession for the construction of the district heating with wood biomass for the center of Hrib. At the end of November 2017, district heating on wood biomass (chips) for the center of Hrib started to function. Currently the heating is used for 11 buildings, most of them are public (an elderly home, 2 shops, a health center, a school, a municipality building, office building with post office, Cultural and tourism center, the Pri Birtku Inn, the Marin Inn and the multi-apartment building Hrib 7). The investor is the Wood Cooperative Loški Potok, which invested some 800.000 euros in this project, 70% were grants. The cooperative was given a concession for 15 years, after which the entire system will be passed to the municipality Loški potok.

Action Plan

The Sustainable Energy Action Plan of the Municipality of Velenje summarizes measures for achieving energy goals and is aimed primarily to reduce CO₂ emissions by 2020 in the area of the Municipality of Velenje. **The most important measures to reduce CO₂ emissions in the public buildings are:**

- Educational events, awareness raising and information on EE and RES in public buildings (estimated energy reduction by 5-10%)
- Construction of solar power on public buildings / areas (100kWp/a)
- Installation of thermal solar energy systems for public facilities
- Optimization of district heating system (estimated CO₂ emission reduction by 8%)
- Optimization of lighting in public buildings (estimated saving of electricity for 2%)
- Replacing electrical appliances in public buildings with energy efficient ones (estimated reduction of energy and emissions for 5%)

Pilot Action

The Music school Fran Korun Koželjski Velenje, was built in 1987 with an addition finished in 1998. The school has 47 classrooms and five halls on 6360 m². Due to its large spatial dimensions, it is extremely suitable for conducting major concerts, competitions and summer schools. In the framework of the Pilot Action in Slovenia the following problems were identified:

Annual energy consumption

960.599,1 kWh

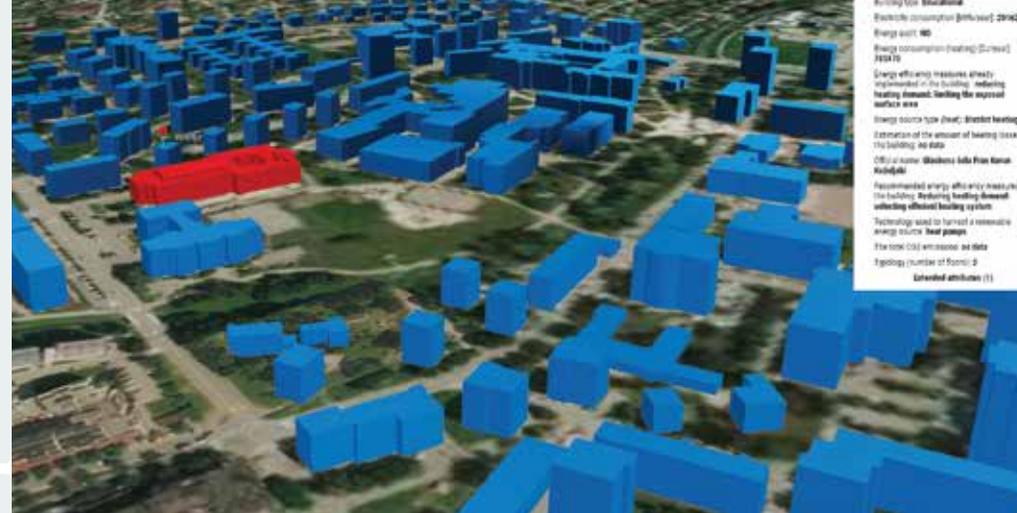
Estimated reduction of energy consumption

51.300 kWh

- High energy consumption due to large dimensions of the building and old systems;
- A lot of investments funds for energy recovery needed;
- No educated staff (e.g. energy manager in the building), lack of proper control and energy management;
- Lack of knowledge and energy awareness among managers and users of the building.

To mitigate these issues, the Municipality of Velenje implemented a cost-effective Pilot Action consisting of:

- installation of energy monitoring system;
- installation of smart meters in the Music School Fran Korun Koželjski Velenje;
- education of building managers.



The implementation of the central monitoring system consisted of installation of **heating meters on three parts of the building and installation of electricity meters on main distribution boxes**. Parallel activities were **education of the head staff of school and maintenance team**, motivating them to analyze energy consumption and reduce energy consumption through various organizational measures. In addition, **activities also focused on raising awareness** among the building's employees and users regarding the Rational Use of Energy (RUE). A PLC computer was also installed which is connected with smart meters through smart metering system.

The data gathered by the smart meters **is used by an energy management system** that keeps track of the consumption, therefore the detailed energy flows help us to determine malfunctions, to reveal over-consumption periods and make recommendations to decrease energy use, to ease the operation of the building and most importantly to increase comfort.

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION





CROATIA - KOPRIVNICA

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Croatian partners:

Strengths

- Experienced employees and experts who are familiar with the topic and new requirements in the field of energy efficiency
- A wide and competent network of employees within the various departments involved in project implementation
- Experience in establishing an alternative source of financing - energy revolving fund-
- Commitment of the City of Koprivnica to projects that increase energy efficiency

Weaknesses

- The absence of an internal financing program to ensure continuity in the implementation of EE projects
- Slow adaptation to new energy efficiency requirements – e.g. nZEB commitments
- High dependency on own financing
- Poor use of alternative funding sources

Opportunities

- Establishment of a system of energy efficiency obligations
- Innovative financing and project implementation mechanisms
- Dissemination of good practices in implementing energy efficiency projects to less developed cities in the region and beyond - lighthouse city

Threats

- Inconsistent calls for national co – financing
- Inconsistency of important legislative acts
- New stricter conditions in the field of energy efficiency



KOPRIVNICA

POPULATION:
30.854

AREA:
91 km²

BOOSTEE-CE
PROJECT PARTNERS:
**MUNICIPALITY OF
KOPRIVNICA
& REGIONAL
ENERGY AGENCY
NORTH**

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GOOD PRACTICE FROM CROATIA

Low energy reconstruction and repurpose of existing building in former military complex

The subject of this project was the reconstruction and repurpose of existing building in the former "ban Krsto Frankopan" military complex in Koprivnica for the purpose of forming a study space for the Media University - journalism studies, media design studies and business and management studies in media. Former military complex "ban Krsto Frankopan" is intended for the establishment of the University Campus. The Kampus complex is ultimately designed as a complex in the concept of zero carbon dioxide emissions. The investor's request was that the building must be a low-energy building. Reconstruction included:

- Removing the existing wooden roof and forming a heat-insulated flat roof
- Thermal insulation of external walls
- Replacement of external windows and doors
- Mechanical ventilation with heat recovery

Action Plan

Within the financing plan for energy efficient public infrastructure projects in the City of Koprivnica strategic goals have been defined which are in line with the goals defined in the EU and national strategies, plans and directives.

These strategic goals are increasing energy efficiency, use of renewable energy sources and reduction of fossil fuel use and reducing the impact of climate change.

Based on BOOSTEE-CE outputs, **sources of financing have been identified** that will be considered for the implementation of projects that will ensure the achievement of strategic goals defined for the City of Koprivnica. Based on an analysis of the existing situation of the City of Koprivnica it emerges that own funding and external sources of funding (national and EU sources of funding) are represented in approximately equal proportions.

As EU co-financing rates are planned to be reduced in the next programming period (2021-2027), **alternative sources of financing will be proposed** in order to offset the difference in the future due to reduced co-financing rates. The structure of funding sources is presented in the EE financing roadmaps, which you can find [here](#).

Recommended Actions

A series of measures (activities or projects) were identified that increase energy efficiency and reduce CO₂ emissions. **Special attention was given to the financial component of each project.** For each measure, a description, time of implementation, an estimate of the total resources needed to implement the measure, and a description of the financing method are provided. The opening of new calls, both from European and national programs, will intensify one to two years after the start of the new seven-year period (2021 - 2027). Since it is also planned to reduce co-financing rates from EU sources, **these potential projects also suggest some alternative sources of funding** to help offset the difference in the future due to reduced co-financing rates.



Pilot Action

The pilot action to improve energy efficiency is implemented in the Kindergarten Loptica with an area of 1.035,46 m², volume of 3.037 m³ and Primary school Braca Radic building with an area of 6.681,31 m², volume of 15.540 m³. The kindergarten is a two-story building (basement and ground floor), while the primary school is a three-story building (ground floor, first floor and attic).

The pilot action includes an **investment in smart metering and monitoring system installation for demonstrating energy management and consumption control.** The main electricity meter, central water meter, connection of the gas meter and an air quality meter are installed in the kindergarten. In the primary school, the main electricity meter and 3 other electricity meters for sports hall, kitchen, distribution cabinet were installed. The connection of two gas meters is made in the kitchen and boiler room. In addition, **the integration of measuring variables such as external temperature, solar irradiance, wind speed, power generation from the existing PV system is also carried out.**

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION





HUNGARY TOLNA COUNTY

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Hungarian partners:

Strengths

- energy efficiency issues have been integrated into the county regional development strategies
- Part of the district heating systems utilize renewable energy (biomass & geothermal)
- Most apartment buildings are already refurbished to some extent
- Abundance of support schemes for EE investments

Weaknesses

- Different EE investments are not connected to each other, synergies are not exploited
- Underfinanced or indebted municipalities are unable to pre-finance energy investments
- The high household loan portfolio inhibits energy investments
- Official household energy prices are low, decreasing the willingness to invest into EE

Opportunities

- High utilizable geothermal potential - plugged wells, thermal baths
- Companies show increased willingness in applying renewable energy based technologies
- Utilization of agricultural and municipal waste, reducing costs of waste treatment processes

Threats

- Unfavourable domestic economic environment of local businesses deters investors (e.g. ESCOs)
- Regional aspects do not appear in the calls for energetic application (e.g. extra points for the existence of a local energy concept)
- Complexity of energetic tender systems, slow payments



TOLNA COUNTY

POPULATION:
221.799

AREA:
3.703 km²

BOOSTEE-CE
PROJECT PARTNER:
**TOLNA COUNTY
DEVELOPMENT
AGENCY**

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GOOD PRACTICE FROM HUNGARY

Refurbishment of the “Village House”, Óbuda, Budapest, Hungary

The so-called Village House is the biggest single apartment building in Hungary. Waste of energy and high upkeep costs are huge issues for the residential blocks built in the socialist era when resource efficiency was not a top priority. Since the share towerblock flats is around 20% of the total buildings stock it is quite a widespread issue concerning 1.741.577 as of 2011.

From 2001 a development programme (the current being the third iteration now involving financial instrument backed by EU-funds) involving direct government finance and financial instruments supports insulation, refurbishment of doors and windows, improvement of technical building systems, such as heating and installing RES. The renewal of the Village House also involved socioeconomical research as the ultimate goal of project STACCATO was to provide replicable good practices & renovation concepts and accelerate the spread of RES. The heating costs had reduced by around 45-50% and related energy use decreased by the same degree whereas as an additional benefit of the project CO2 emission had decreased by an estimated 243 tonnes.

Action Plan

With the relation to the legislative and strategic framework – mainly the Climate Strategy of Tolna County – and the SWOT analysis outlined in the previous sections, the following strategic targets and priority areas to be pursued in Tolna County with regards to energy safety, competitiveness, economical, societal and environmental sustainability can be identified:

- Establishment and financing of a county level climate protection institution
- Increasing of the energy efficiency in public buildings and reducing their GHG emissions
- Increasing the share of renewable energy in the local energy mix
- Increasing the level of climate awareness both in the private and public sector



Recommended Actions

Based on the consultations with the County Municipality and local stakeholders, we have identified the following recommendations for the planned EE actions in general:

- the County Council operates a Climate Office for awareness raising and to articulate the needs of local stakeholders;
- The financial roadmap has to envisage potential funds that will be expectedly available in the 2021-2027 period
- Life Cycle Assessment aspects also have to be considered, particularly at installing PV panels;
- Social media tools have to be involved in large extent into the communication campaigns to reach the younger generation;
- It is important to use the technologies of the building efficiently, otherwise the refurbishments won't achieve the saving targets;
- The EE investments have to be always complex programs. For example insulating only a part of the facade (one wall) has no saving effect compared to the related expenditures;
- In order to avoid the above mentioned anomalies, **the Climate Office has to be involved into the preparation of all energy efficiency investments'** planning process in Tolna County.



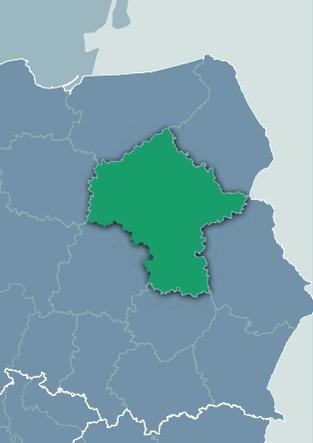
Building type: Office building
Electricity consumption (kWh/year): data to be added soon
Energy audit: audit or certification was not conducted
Energy consumption (heating) (kWh/year): data to be added soon
Energy efficiency measures already implemented in the building: Replacement of doors and windows, solar panels were installed.
Energy source type (heat): Natural gas
Official name: Town Hall of Municipality of Tolna
Recommended energy efficiency measures for the building: Renovation of heating system, improving the insulation, LED lights, LED activities, installation of thermostatic valves, installing motion sensors for lighting
Technology used to harvest a renewable energy source: PV panels on the roof
The total CO2 emissions: data to be added soon
Typology (number of floors): 3
Extended attributes (2)

Pilot Action

As part of the investment, smart meters were installed to refine the energy monitoring and increase the capacities of the municipal staff to oversee specific utilities. The exact technical details were finalized together with the Municipality and the contractor to reflect the needs of the building operators and the technical possibilities for installation. The cafeteria (operated by a third party), the overall consumption of the hall and the outer reflectors are metered separately. RES capacities were installed in the Town Hall in 2015. The data provided by the inverters will be incorporated into a common software environment facilitating easier use and planning of the electricity generation/consumption. And finally the gas and electricity consumption of the Lovarda Cultural Centre is measured by separate meters. **Displays were handed over to the Municipality showing actual consumption data in the buildings.** An energy certification process was carried out during the implementation of the investment using the data coming from an audit.

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION





POLAND - CITY OF PŁOŃSK

Please find the most important aspects of the regional EE SWOT-analysis on internal and external conditions for EE financial strategy development and implementation chosen by our Polish partners:

Strengths

- EE planning by the local municipalities/authorities at the municipal level
- Energy efficiency issues have been included in regional / local development strategies
- Sufficient amount of information about public buildings in the field of energy efficiency
- Targeted actions carried out in order to raise awareness

Weaknesses

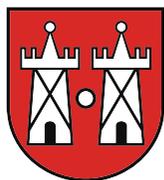
- Insufficient public interest in energy efficiency
- Lack of local energy experts and advisors supporting public administration
- Projects regarding sustainable energy development are not well noticed by the society
- Technical infrastructure partially in need of modernization

Opportunities

- Use of international loan programs for energy purposes (e.g. ELENA)
- Strengthening international and cross-border relations
- Systematic development of technologies enabling storage of surplus energy generated from RES

Threats

- Lack of private funds
- Long payback period of EE refurbishment of historical buildings
- Significant decrease or lack of EU funding after 2020



PŁOŃSK
POPULATION:
22.500

AREA:
12 km²

BOOSTEE-CE
PROJECT PARTNERS:
CITY MUNICIPALITY OF PŁOŃSK & MAZOVIA ENERGY AGENCY

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GOOD PRACTICE FROM POLAND

Modernization of the Heating System of Płock - Combined generation of electricity and heat from biomass

The modernisation of Płock's heating system is an example of a model solution, the target of which is to decrease emissions of CO₂, ash and other combustion gases, and to produce clean electricity. The fundamental objective related to the implementation of a combined heat and electrical energy production system based on biomass is to decrease the emission of greenhouse gases by replacing the type of fuel combusted from fine coal to biomass.

The financial resources from the National Fund were utilised to partly cover the cost of the delivery and assembly of the steam, biomass-powered boiler with nominal power of 10.2MW, delivery and assembly of the steam turbine and the costs of the majority of works and deliveries of devices used in the modernisation of CHP and the heating system. The combined heating and power station in Płock was adjusted to be wood cuttings fired. The Energy Globe awarded technology allows for the production of energy considered to be 100% ecological.

Action Plan

The priority areas set out in the EE Financing Roadmap are the following:

- Maintenance protection zone (historical centre of Płock)
- Insufficient use of RES capacities
- Lowering emissions
- Harmful substances
- Transport-related emissions

The Action Plan builds on these areas which were identified as improvable. The energy efficiency roadmap shows how activities are funded by identifying appropriate financial solutions. The selection of actions aimed at achieving the strategic goals was also analyzed. **The organizational and financial aspects of possible actions were considered too,** as well as the estimated ecological effects.

Recommended Actions

Based on the analysis of available co-financing programs, some recommendations were made for the area of the Płońsk Municipality. It is pointed out that **in the face of difficulties in obtaining subsidies, other forms of financing** energy-efficiency measures such as ESCO - contracts for improving energy efficiency, loan funds and leasing **can be useful**. Loan funds indicated as an equally helpful form of obtaining financing are an energy loan under the JESSICA and JEREMIE initiatives, which is intended for local government units as well as micro, small and medium enterprises. Leasing can be developed on the example of a PolSEFF program, which offers entrepreneurs access to finance and knowledge necessary for the implementation of modernization investments, the goal of which is, among others improving the company's energy efficiency or implementing technologies in the field of renewable energy sources. The list of tasks and projects is a certain commitment, although it is open, which means that if necessary it should be modified and updated during the implementation of the Plan so that in the next few years Płońsk authorities can respond to problems encountered in the field of air protection and energy efficiency .



Płońsk	
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 girth walls - insulated with a layer of polystyrene with a thickness of 10 cm	
Energy source type (heating): gas boiler	
Estimation of the amount of heating losses in the building: 0.150616	
Heights [m]: 12	
Official name: Primary School No. 1 in Płońsk	
Recommended energy efficiency measures for the building: Modernization of lighting for energy-efficient	

Pilot Action

The pilot action to improve energy efficiency is implemented in the Primary School No. 1 in Płońsk with an area of 2.155,25 m², volume of 15.760 m³. The school is a four-story building (basement, 2 floors and attic). The building is used by 416 people. **The pilot action includes an investment in a demonstration installation consisting of the use of LED lighting and smart metering in two classrooms and two toilets**, implementation the 3D Energy Management System as a part of OnePlace platform.

The equipment installed includes four LED lamps 56W, three LED lamps 12W, four electricity meters LE-01M MID and two converters.

The intelligent remote energy meters enable automatic data transmission on energy consumption. The owner of the building receives bills for actual energy consumption, not forecasted. In addition, it can monitor energy consumption on an ongoing basis, which in turn will allow to manage this consumption and reduce electricity bills.

Annual energy consumption

26.667 kWh

Estimated reduction of energy consumption

1787,76 kWh

Expected financial savings

241,10 €

CLICK HERE TO READ MORE ABOUT THE PILOT ACTION



BOOSTEE-CE set an ambitious goal - to enhance EE in Central European public buildings. Have we reached that goal? Not yet and above all not by ourselves. There are still buildings needing renovation, there are still municipalities not knowing enough about EE to make educated decisions and there are still cities and towns not having Energy Management Systems or smart meters installed.

But we have certainly succeeded in creating a useful toolbox which can be used to make improvements in EE. Our training material on the topic, translated also in 7 consortium languages, can be effective in introducing the concept of EE to municipality staff.

the tools offered by BOOSTEE-CE help municipalities in Central Europe to increase EE

5 partners carried out pilot actions with investments directly financed by the project and deployed smart metering systems which allow the building operators to identify overconsumption associated with building usage, technical malfunctions and to formulate plans for future investments.



The results of the project are available on the BOOSTEE-CE webpage. The OnePlace platform still offers a lot to explore, especially within the 3D EMS that is already demonstrating the usefulness of implementing GIS-based Energy Management Systems by cities and municipalities.

Outstanding knowledge on EE finances is available, enabling finding appropriate funding sources while the EE financing roadmaps can also be adapted by other regions.



FONDAZIONE
BRUNO KESSLER



MESTNA OBČINA
VELENJE



ENERGETICKÁ AGENTURA
ZLÍNSKÉHO KRAJE, o.p.s.



Mazovia Energy
Agency



Stadtgemeinde
Judenburg

Energie
agentur

OBERSTEIERMARK



NOVUM



TOLNA COUNTY
Development Agency

Nonprofit Public Ltd.

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