

DELIVERABLE T4.1.4

D.T4.1.4

03/2018

State-of-the-art and best practices of financial strategies and schema

Emilia – Romagna

Zlín Region

Tolna County

Mestna Občina Velenje

Koprivnica

Łódź

Gmina Lubawka

Stadtgemeinde Judenburg





D.T4.1.4: State-of-the art and best practices of financial strategies and schema

A.T4.1 Transnational EE financing strategy development

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1. Introduction and aims of the document

This document is the report with past and ongoing practices about financial strategies and solutions related to EE in partners' regions. It will serve for better realisation of D.T4.1.1-Comparative analysis of financial schema (to understand which features will be implemented in the strategy) as well as to smooth definition and elaboration of D.T4.1.2-Transnational EE financing strategy.

The key target groups are local and regional public authorities which will be directly involved in the development of the two outputs of WPT4 (O.T4.1 Transnational EE financing strategy + O.T4.2 EE financing roadmaps for public infrastructures) together with project and associated partners. Target groups from outside the partnership will be reached by communication measures especially newsletters and focus group meetings, where the outputs can be consulted and assessed, and seminars for wider audience and Online Energy Platform (WPT2).

The financing strategy looks at:

- Current practise of financing of energy efficiency in different European regions
- Outline what the partners would like to achieve in three to five years period;
- What strategies need to be implemented to achieve energy efficiency targets
- How to achieve Financial sustainability by maintaining a diversified funding mix

The core part of the documents consists of 5 main sections

- Basic information on the area
- Classification of EE activities and EE funds
- Funding Mix Matrix
- Evaluation of existing experience of EE financing policy implementation in partners regions
- Best practices and investments return models

1.1 Basic information on the area

General overview of each partner's region in order to get a concrete idea of what areas/regions are compared

1.2 Classification of EE activities and EE funds

The following concepts and classifications provide a framework for this financing strategy:

a) Classification of partners EE activities

Energy efficiency activities can be divided into two areas: *EE services* and *EE projects*.



'EE services' are the core activities which must be continuously provided to fulfil partner's EE strategic objectives. These forms may include:

- Development and maintaining energy management
- Energy efficiency central advice service provided by partner
- Training and educational activities in the field of EE
- Monitoring of implementation of energy efficiency policy
- Support citizens / public authorities / companies in the acquisition of EE funds (information dissemination and promotion of co-financing programs and other financial resources)
- Planning and policy (SEAP, SECAP, yearly investment plans, general/city development strategy etc.)
- Changes in behaviour
-

'EE Projects' are defined as 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. These will come and go over time as project funding, partner's priorities and the decisions of partner's decision making bodies.

b) Classification of EE funds

The sources of financing ensuring energy efficiency can be classified according to levels of restriction and the continuity and security of funds. Upon such a classification four categories of EE funds can be identified:

General Fundraising

Short-term and relatively unrestricted income, such as events and public donations, crowdfunding etc.

Project funding

Short-term and relatively restricted funds provided by various institutions ranging from local government to EU funding. Being project-specific, these funds generally last for 1-3 years and are difficult to extend which might be leading to a loss of project continuity.

Programme funding

Existing local/regional financing provided by partners to support EE in their regions or areas where a strong working relationship has been established and where grants are based on programme themes, e.g. municipality own energy efficiency fund etc.

Core financing

Regular and flexible income, i.e. partner's own resources used to core operation of EE services (projects), not so restricted like programme funding.

Note: This classification focuses on the purpose and temporality. All categories may involve different sources regarding external sources, own sources and loans.



1.3 Funding Mix Matrix

		<i>Unrestricted</i>			
		General fundraising		Core financing	
		Short- to medium-term (1 to 3 years) Relatively unrestricted <i>e.g. crowdfunding</i>		Medium- to long-term (3 to 5+ years) Relatively unrestricted <i>e.g., investment income, regular incomes</i>	
Short-term		Project funding		Programme funding	Long-term
		Short to medium term (1 to 3 years) Relatively restricted <i>e.g. Project financed by EU funds, operational Programmes, regional grants, EPC...</i>		Medium- to long-term (3 to 5 years) Relatively restricted <i>e.g. own regional or local programmes based on long term EE strategy</i>	
		<i>Restricted</i>			

1.4 Evaluation of existing experience of EE financing policy implementation in partners regions

- Collection and evaluation of partners’ practice regarding EE financing policy in a structured way common for all partners. The SWOT analysis is the important part of this section and this analysis should be based not only on the experience of BOOSTEE-CE partners but also on a survey with potential main target groups in order to address their needs. The potential target groups involve mainly:
 - Local public authorities
 - Regional public authorities
 - Sectoral agencies
 - Infrastructure and (public) service providers
 - SMEs
 - Business support organisations

Upon the whole logic of the WPT4 project partners are analyzing their own regions/municipalities!

1.5 Best practices and investments return models

Each partner is expected to deliver at least 2 best practice examples upon the questions in the section 2.5 of this document.

Such best practices might be either EE services or EE projects (crowdfunding, EPC, EU projects...). Details regarding financing management should be understandable for general users as well as eloquent and sound in the means of financial management. It is not necessary to concentrate only on the area of the partner; the best practices from the outside area of the consortium are welcomed!

2. State-of-the-art and best practices of financial strategies and schema in partner regions

Partners of the BOOSTEE-CE projects focused on the situation in their own areas

- Emilia – Romagna
- Zlín Region
- Tolna County
- City Municipality of Velenje
- Koprivnica
- Płock
- Gmina Lubawka
- Stadtgemeinde Judenburg

2.1 Emilia - Romagna

2.1.1 Basic information on the region/area:

Name of the region / area: Emilia-Romagna Region – NUTS 2

Population: 4.431.333 (*Source: Eurostat - average 2012-2014)

Area size: 22.453 km² (population density of 198 inhabitant per km²)

GDP: 153.997 mil EUR

GDP per capita: 34.752 EUR

Map of the area:



http://www.investinemiliaromagna.eu/en/Emilia_Romagna_Region/Logistics.asp



2.1.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification off EE finds
Inventory of Regional Thermal Plants - CRITER	monitoring and controlling of energy efficiency and pollutant emissions of thermal plants (Regional Law 26/04 and Regulation nr. 1/17)	3 ML Euro	100% own sources (Regional budget)	Core financing
Regional Energy Building Certification System- SACE	Monitoring of energy performance of buildings (Regional Law 26/04 and European Directive 2002/91/CE)	3 ML Euro	100% own sources (Regional budget)	Core financing

- What **EE projects** have you realised in recent 5 years and how were they financed

EE project	Short description	amount of funds needed	sources of financing (structure)	classification
Energy audits for SMEs	Contribution for the realisation of energy audits or adoption of energy management systems	2,4 MI Euro	100% public fund (25% National, 75% The Three-Year Implementation Plan 2017-2019 of the new Regional Energy Plan)	Project funding
Energy Fund for SMEs*	Financial instrument to financial support projects aimed at improving energy efficiency and increasing the use of renewable sources	36 MI Euro	The Fund provides: new unsecured-loans at reduced rates with mixed provision resulting partly from the public share (70%) and partly from the private share (30%) for each admissible project Regional Operational Programme 2014-2020	Programme funding
Energy efficiency improvement in public buildings and public housing	Promotion of lower energy consumption in buildings and public facilities	36,6 MI euro	The fund covers up to the 30% of the total investments for EE interventions ROP 2014 – 2020	Programme funding



2.1.3 Current funding mix matrix for EE financing in Emilia - Romagna (in 2017)

Unrestricted

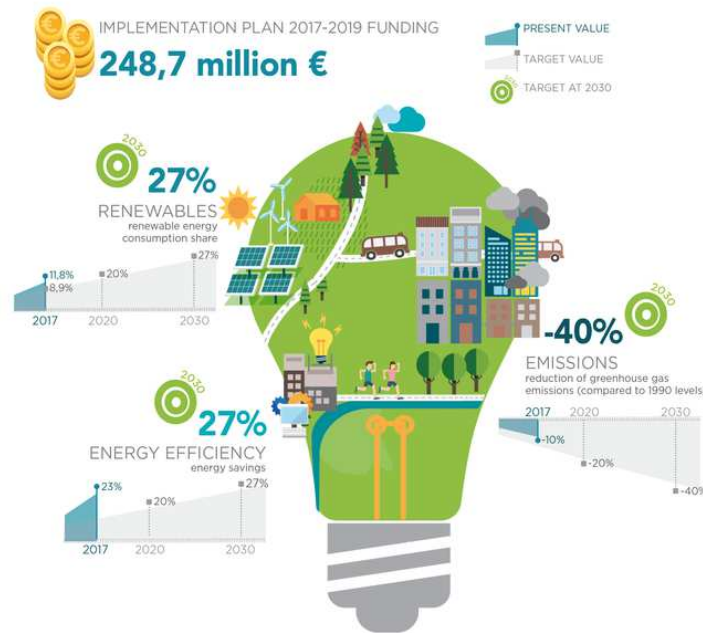
General fundraising			Core financing				
Overall = 0 MI EUR			Overall = 6MI EUR(CRITER+SACE)				
<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>Own 100 %</i>	<i>external 0%</i>	<i>loans 0%</i>		
Short-term	Project funding		Programme funding			Long-term	
	Overall =2.4 MIEUR Energy audits for SMEs		Overall = 72,6 MI EUR				
	<i>own 75%</i>	<i>external (national public funding) 25%</i>	<i>Loans 0 %</i>	Energy Fund for SMEs			
				<i>Own 0%</i>	<i>external 0%</i>		<i>loans 100%</i>
Energy efficiency public buildings							
			<i>Own (Region RER) 30 %</i>	<i>external (other public organisations) 70%</i>	<i>loans 0%</i>		

Restricted

2.1.4 Existing experience in Emilia Romagna

- Is there any EE financial strategy available for your region?

EE financial strategy of Emilia-Romagna Region is part included in the Regional Energy Plan. Since 2007 ERR is adopting a Regional Energy Plan (REP). The last REP was officially approved and adopted the 1st march 2017.



arpae Graphic processing by Arpae Emilia-Romagna
 Infographics: Ariella Battarini Editorial support: Elisa Michelson

The Regional Energy Plan sets the strategy and targets of Emilia-Romagna Region for energy and climate up to 2030, dealing with the enhancing of green economy, energy saving and efficiency, renewable energy development, transport, research, innovation and training.

Renewables

- 27% target value at 2030
- 20% target value at 2020
- 8,9% target value at 2017
- 11,8% present value at 2017

Emissions

- 40% target value at 2030
- 20% target value at 2020
- 10% present value at 2017

Energy efficiency

- 27% target value at 2030
- 20% target value at 2020
- 23% present value at 2017



The main financial instrument of the Regional Energy Plan (PER) is the ROP ERDF for the period 2014-2020.

The more relevant axes of ROP as regards energy efficiency are:

- Axis 4 - Promotion of the low carbon economy in regions and in the production system
- Axis 3 - Production system competitiveness and attractiveness
- Axis 1 - Research and innovation

Axis 4 - Promotion of the low carbon economy in regions and in the production system intends to create incentives for energy efficiency and savings as well as for the development of renewable resources both by public bodies and companies with a view to regional sustainable development.

The final results (in line with REP) include: reducing the energy consumption of production processes for industrial businesses and public buildings by 20% and increasing businesses' energy production from renewable resources by 20% and self-consumption by 25%.

It is based on three objectives:

- 1- to encourage businesses to lower their energy consumption and to produce energy from renewable resources to support self-consumption, including by setting up ecologically equipped production areas;
- 2- to promote lower energy consumption in buildings and public facilities, as well as the introduction of renewable energy production systems;
- 3- to promote sustainable mobility in urban areas.

Axis 3 - Production system competitiveness and attractiveness, intends to stimulate an innovative, attractive process for investments, new entrepreneurial initiatives and talents. This priority axis focuses on supporting the growth of investments in production, business internationalization and new business start-ups, while promoting, among other things, direct incentives and support measures for access to credit.

It is based on six objectives:

- 1- to set up and consolidate micro, small and medium-sized enterprises;
- 2- to support the introduction and effective use of ICT tools in SMEs;
- 3- to support business certification and innovation in the biggest tourist areas and growth opportunities for cultural and creative sectors;
- 4- to revive the willingness to invest in the production system;
- 5- to support internationalization pathways;
- 6- to improve access to credit by serving as a guarantor for growth, diversification and internationalization projects.



Finally, worth to mention also the **Axis 1 - Research and innovation**, that intends to strengthen the regional network for research and technology transfer to businesses. The measures supported by this axis are aimed at increasing businesses' capacity to introduce new solutions and products, including through collaborations with research partners, promoting innovation pathways in strategic areas of the regional production system, strengthening the research of the High-Tech Network¹, facilitating the use of innovation laboratories and centers through international openness and participation in European programs such as Horizon 2020 and COSME, as well as supporting high-tech start-ups.

It is based on four objectives:

- 1-to strengthen the technological capabilities of laboratories in the High-Tech Network by acquiring new instruments;
- 2- to increase businesses' innovation activities by supporting their research projects, the acquisition of technological innovation services, the adoption of innovative process and product solutions, as well as research and development projects in collaboration with research partners (centers, universities, etc);
- 3- to strengthen the regional and national innovation system by supporting participation among regional actors in specialist technological networks and in complex projects;
- 4- to support the creation and consolidation of high-tech start-ups.

- **Who officially approved the EE financial strategy and for how long period?**

Regional General Assembly (REP implementation plan 3 years 2017-2019)

- **Indicative yearly budget for EE financing:**

Total 22,95 ML (considering yearly budget per each measures indicated in table 2.3)

- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

Include the information on a survey with potential main target groups in order to address their needs – see section 1.5., i.e how this survey was carried out and who was questioned.

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
Experiences on Energy planning at regional level	Direct links with Managing Authorities (REP and ROP)
Regional Operative Programmes funds for EE	Synergies on know-how and experiences in the project area
Past and On-going financial instruments for EE	Chance to realise greener lifestyle and change attitudes toward energy consumption
R&D /Innovation policy (Startups and SMEs)	

¹ <https://www.retealtatecnologia.it/en>



Innovation related to technologies	Opportunity to counteract rising energy costs
Weaknesses	Threats
<p>Low level of funding</p> <p>Long-time of return from the initial investment</p> <p>Large perception of risk warned by banks</p> <p>Serious air pollution problems in urban centres</p> <p>Pollution compounded by dense fog trapped in valleys</p> <p>Rigid winters require increased heating, hotter summers have led to rising use of air conditioners</p>	<p>Scarcity of private funds</p> <p>Market uncertainty</p> <p>Lack of permanent public funds in the regions</p> <p>Complicated bureaucratic procedures and little support to potential beneficiaries from PA</p> <p>Businesses not clearly explaining costs/benefits of EE interventions or funding mechanisms</p> <p>Citizens engage in behaviours that reduce benefits of EE intervention (turn up heat more, purchase additional electronic appliances, etc.)</p> <p>Low level of interest in participating in incentive programmes (participating/eligible households)</p>

- **Which EE activities are planned to be supported in next periods (According to existing official strategical documents, action plans etc)**

In line with REP and ROP the EE activities will be focused on:

- EE in buildings and urban areas
- Promotion of Renewable Energy Sources
- EE in industry
- Research and innovation

- **Which of the ways of financing energy efficiency investments do you consider the most effective?**

Ranked in order of effectiveness

1. own resources
2. EU funding
3. loans / grants from national co-financing programs
4. bank loans
5. other (what?): private investments



- **Monitoring process and evaluation of EE financing policy implemented**

How do you monitor and evaluate your EE financing policy. Are there any sets of indicators against which is evaluation carried out, evaluation reports etc., please describe

Main results and output indicators of the actions are set under ROP.

For EE we can recall the following Output and Results indicator for Low carbon Economy:

Type of indicator	Indicator	Unit
Result	Reduction on Industry Energy consumption	GWh
Output	Number of Companies receiving financial support	Nr of Companies
Output	GHG emission reduction	Tons of equivalent CO2
Output	Energy Savings	GWh
Output	Additional Renewable energy power	MW
Output	Reduction of particular matter emission (PM10)	Kg PM10
Output	Reduction of NOx emissions	Kg NOx

2.1.5 Best practices and investments return models in Italy

*Each partner completing this template is supposed to identify **at least 2 best practices** either their own or from the outside of their regions. These best practices will be documented on standardised factsheets later on (depending on collected information from all partners) and displayed on the OnePlace Platform.*

Best practice 1:

- **Name of the action:** Energy Fund (Multyscope Regional Fund of public financing)
- **Time period / year of realisation:** 2013-2014
- **Description of the action** (1500-2000 characters):

It is a Financial Instrument, according to the previous art. 37 of the EU Reg. n.1303/2013, 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.



FINANCIAL CAPACITY Energy Fund of about € 23,750,000 (public 9,5 MI, Private 14,25 MI Euro)

Beneficiaries: SMEs and large companies (registered in the Register of Companies operating ONLY in the sections of the economic activity (ATECO 2007 - B, C, D, E, F, G, H, I, J, L, M, N, R, S) with local units in which the investment project is implemented (ERR) active at the time of submission of the application provided they are not "Undertaking in difficulty" complying with the European Guidelines on State aid for rescuing and restructuring non-financial firms in difficulty (2014 / C 249/01)

During the implementation phase the fund was not attractive for SMEs therefore it was modified by increasing the public share to 70% and the private decreased to 30%

The Fund provides:

- New unsecured-loans at reduced rates with mixed provision resulting partly from the public share (70%) and partly from the private share (30%) for each admissible project.
- Every single funding covers 100% of the project

The amount of funding must be between of a min. of € 75,000 and a max. of € 300,000

The duration of the amortization period is between a min. of 36 months and a max. of 96 months (including any pre-amortization period of up to 12 months).

The facilitation is determined by:

- an interest rate equal to 0% on the part of the public share of the Fund (70%)
- a rate on the private portion (30%) calculated on the basis of the EURIBOR 6 months plus a maximum spread of 4,75%

Eligible initiatives

- Interventions addressed to improve energy efficiency and to reduce gas emissions causing climate change
- Interventions to produce energy from renewable sources, favouring those in self-consumption, as well as high efficiency cogeneration plants, complying with the EU Directive 2012/27 (EU Parliament and Council)

Eligible costs

Costs of:

- a) Works on buildings: expansion and / or restructuring, works functional to the project
- b) Purchase and installation, machine adjustments, plants, equipment, hardware
- c) Acquisition of software and licenses
- d) Technical and targeted consultancy services for the investment project
- e) Costs to preparing an energy audit and / or project development design to carry out the intervention submitted in the application



Expenditures will have to be submitted later than the date of submission of the application, with the exception of preparation costs of technical documents (listed in “e”), which may be dated later than 01/06/2014

Non Repayable grants

The company may, at the time of submitting the application, require a non-repayable grant to be charged on technical costs such as energy audit and / or project, which are necessary for the submission of the investment project. This contribution, which covers up to a maximum of 100% of the aforementioned expenditure, taking into account the chosen aid scheme and the ceiling on the same amount of expenditure, will still be eligible for a maximum of 12,5% of the public funding admitted (up to 8.75% of the funding). In the grant communication, the manager will indicate the amount of the actually disbursed non-repayable grant, specifying the modalities and the timing for the delivery of it. The reimbursement of the expenses will be paid only after the final project finalization, after its verification. In the event of a difference between the intervention granted and the actual intervention, the deferred grant will be remodeled in order to respect the maximum permissible percentages

Documents to submit for the application phase

- Pre-Banking Resolution
- Budget Estimates
- State aid statement
- Energy audit or project
- If available, the last two full balance sheets

Grant benefit and aid regime

The public share of funding, allocated at zero rate and the non – repayable grant create a public benefit for the beneficiary which will be granted on the basis of the choice made by the requesting party and in accordance with the regulatory constraints under the provisions of the “de minimis” regime according to the EU Regulation 1407/2013

Preparation of the energy intervention

At the request of the chosen financial aid, an Energy audit will have to be provided, stamped and signed by a qualified technician, and drawn up in accordance with UNI CEI EN 16247 - (parts 1 a 4)

- Definition of ENERGY AUDIT: "A systematic procedure aimed at obtaining an adequate knowledge of the energy consumption profile of a building or group of buildings, one industrial or commercial activity or plant or of public or private services, to identify and quantify cost-effective energy saving opportunities and report the results “
- Where the Energy audit procedure is not applicable, it will be necessary to attach to the request of the aid selected the project of the intervention, stamped and signed by qualified technician, which can be:
- A Feasibility Study / Preliminary Project / Final Project / Executive Project which shall, however, consist of the following elements:
 - a) Technical report
 - b) Graphic documents
 - c) Analysis of project cash flows, where relevant

Examples



Hereafter an indicative/not exhaustive list of possible and eligible interventions to reduce the Energy consumption:

- Thermal insulation
- Replacement of transparent closures and fixtures
- Replacement of winter air conditioning systems
- Redevelopment of lighting systems
- Installation of automatic management and control technologies for thermal and electrical installations
- Installation of solar thermal collectors
- Installation of photovoltaic systems
- Industrial heat recovery
- Efficiency of refrigeration systems
- Efficiency and replacement of machinery
- Efficiency of the electric engine park of the production site
- Energy Reduction of compressed-air compression plant
- Savings in pumping systems
- Cogeneration plants

- **Partners involved:**

Unifidi Emilia-Romagna <http://www.unifidi.eu/>
 Fidindustria Emilia-Romagna

- **Key results** (300 - 500 characters):

Results obtained in 2015:

47 projects financed with an estimation of:

- Renewable energy: 23.246 MWh
- Reduction of energy consumption of 11.113 TOE/Y
- Reduction of GHG emissions of 26.001 TCO₂ equi/Y

- **Success factors identified** (300 - 500 characters):

- the choice to use a revolving fund is rewarding in terms of sustainability. In general, in fact, the refunds allow to refinance funds;
- the combination of loans and training is winning. Provide training on different aspects on the business development improves entrepreneurial skills, increasing the chances of creating jobs and reducing the risk failures;

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):

- Low level of EE knowledge of financial operators
- EE awareness and information efforts not reaching some target groups
- Complicated bureaucratic procedures and limited support to potential beneficiaries
- Lack of permanent initiatives/programme to capitalise knowledge and experience

- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):

- in order to reach the widest amount of beneficiaries, it is important to highlight the activities communication, both in terms of results and opportunities offered by the Funds;
- it is necessary to assure stability and certainty over the time to the financial instrument.



- offering to the beneficiaries a counseling and tutoring service and accompaniment for the first year of activity, in order to guarantee a more effective use of financial resources;
- simplify documents preparation

- **Contact, website:**
<http://www.fondoenergia.unifidi.eu/>

- **Investment (EUR):**
 - Overall investment costs: 13,46 MI Euro
 - Own sources: -
 - Subsidies (by whom):
 - Public 6,35 MI Euro
 - Private 7,11 MI Euro
 - Loans (including interest rate and payment period): -

- **Operational features (EUR):**
 - Annual operational cost incl. salaries, repairs, maintenance and other specific costs:
 - o Fund commissions: 0,5 MI Euro

2.2 Zlín Region

2.2.1 Basic information on the region/area:

Name of the region / area: Zlín Region

Population: 584 000 inhabitants

Area size: 3 963 km²

GDP 2016: 8.456 mil. EUR

GDP per capita 2016: 8 456 EUR

Map of the area:



2.2.2 Current EE financing situation:



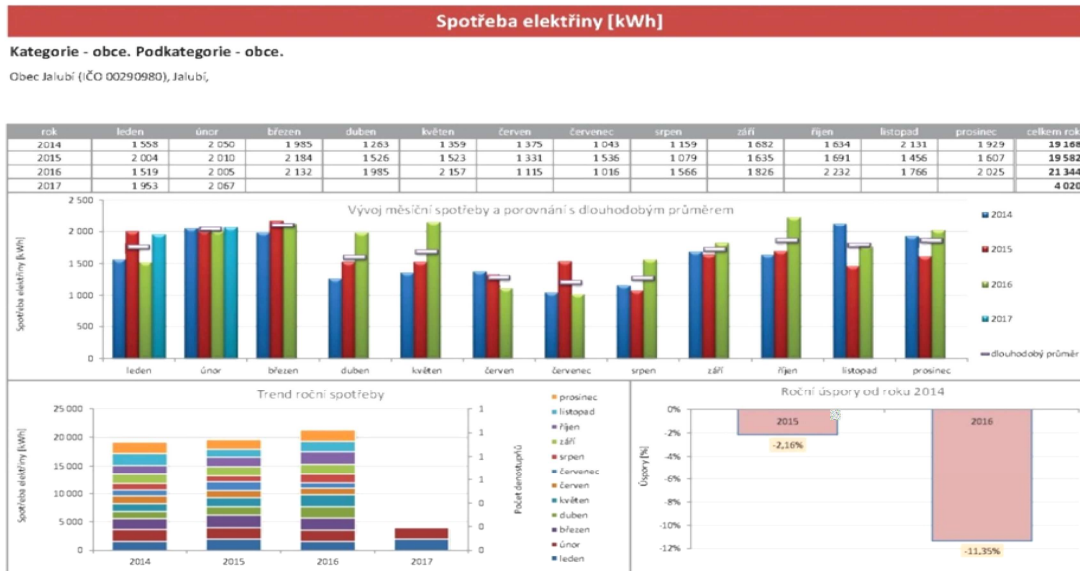
- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification off EE finds
Dissemination and good practice promotion	Organizing seminars, workshops and conferences on energy efficiency, energy planning and RES utilisation with more than	10.000 EUR	Regional budget EU projects	Core financing Project funding
Bulk energy purchase	Initiation and coordination of bulk energy purchase (natural gas and electricity) for organization established by the Zlín Region and towns and villages of the Zlín Region	25.000 EUR	Regional budget EU projects	Core financing Project funding
Technical advisory in energetics	Technical advisory in energetics provided to citizens of the Zlín Region related to energy efficient construction and refurbishment of buildings and RES utilization.	10.000 EUR	Regional budget	Core financing
Energy management	Monitoring and evaluation of data collected in organisations of the Zlín Region and towns and villages of the Zlín Region included in the energy management system.	50.000 EUR	Regional budget	Core financing
Initiation and preparation of EE and RES projects	Initiation, preparation and administration of EE and RES project implemented by the Zlín Region and municipalities of the Zlín Region which are submitted to various operational programmes	70.000 EUR	Regional budget EU projects	Core financing Project funding
International cooperation in the field of energetics	Support to energy planning, RES and EE promotion within the international cooperation with other EU regions	40.000 EUR	Regional budget EU projects	Core financing Project funding



Examples of data monitoring provided for municipalities of the Zlín Region through its monitoring tool:

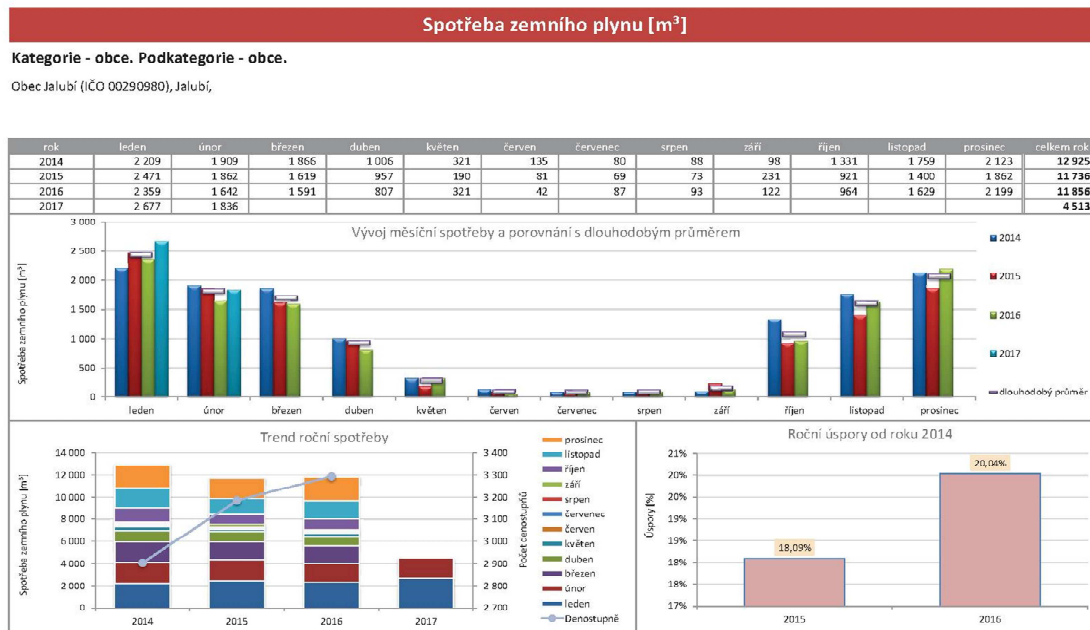
Electricity consumption:



Energetická agentura Zlínského kraje, o.p.s.

1/1

Natural gas consumption including degree day adjustment:



- **What EE projects** have you realised in recent 5 years and how were they financed

Energetická agentura Zlínského kraje, o.p.s.

1/1



EE project	Short description	amount of funds needed	sources of financing (structure)	classification
OP Environment 50 th call (I)	3 investment projects on increasing the energy efficiency in buildings of the Zlín Region (2.615,16 GJ annual energy savings; 145,29 annual CO2 savings)	5.099.000 EUR	Regional budget 58% OP Environment 42%	Programme funding
OP Environment 50 th call (II)	1 investment project on increasing the energy efficiency in buildings of the Zlín Region (2.371,49 GJ annual energy savings; 125,45 annual CO2 savings)	562.000 EUR	Regional budget 58% OP Environment 42%	Programme funding
OP Environment 64 th call	1 investment project on increasing the energy efficiency in buildings of the Zlín Region (486,50 GJ annual energy savings; 27,03 annual CO2 savings)	391.000 EUR	Regional budget 40% OP Environment 60%	Programme funding
OP Environment 19 th call	7 investment projects on increasing the energy efficiency in buildings of the Zlín Region (3.717,6 GJ annual energy savings; 235,11 annual CO2 savings)	4.536.000 EUR	Regional budget 72% OP Environment 28%	Programme funding
OP Environment 39 th call	2 investment projects on increasing the energy efficiency in buildings of the Zlín Region (593,3 GJ annual energy savings; 33,28 annual CO2 savings)	471.000 EUR	Regional budget 71% OP Environment 29%	Programme funding
OP Environment 70 th call	1 investment project on increasing the energy efficiency in buildings of the Zlín Region (2.202,5 GJ annual energy savings; 147,47 annual CO2 savings)	1.675.000 EUR	Regional budget 85% OP Environment 15%	Programme funding



2.2.3 Current funding mix matrix for EE financing in the Zlín Region in 2017

		<i>Unrestricted</i>							
		General fundraising			Core financing				
		Overall = 0 EUR			Overall = 175.080 EUR				
		<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own 100%</i>	<i>external %</i>	<i>loans %</i>		
Short-term		Project funding			Programme funding			Long-term	
		Overall = 112.040 EUR			Overall = 5.090.000 EUR				
		<i>own %</i>	<i>external 100%</i>	<i>loans %</i>	<i>own 68 %</i>	<i>external 32 %</i>	<i>loans %</i>		
		<i>Restricted</i>							

2.2.4 Existing experience in the Zlín region

- **Is there any EE financial strategy available for your region?**

EE financial strategy is partly outlined in the special section of Regional SEAP for 2015-2019 approved by the Council of the Zlín Region on 13th July 2015. This section is just an indicative outline of financial sources available for EE financing, not a detailed financial strategy.

- **Who officially approved the EE financial strategy and for how long period?**

The Council of the Zlín Region

- **Indicative yearly budget for EE financing:**

Regional budget: 3.636.280 EUR

Out of that 3.461.200 EUR investments
 175.080 EUR EE services

- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
External <ul style="list-style-type: none"> - Infrastructure is well developed - Well-established companies - Skilful and adaptive labour 	External <ul style="list-style-type: none"> - Attracting foreign capital - Improving cross-border collaboration within EU



<ul style="list-style-type: none"> - Higher added-value industrial production in comparison with other regions - Existence of the local university - Potential for selected sector development - Existing energy agency helps subjects (citizens, municipalities, SME,...) from the region to gain support from suitable sources (e.g. EU-funds) - Boundary region - There are industrial areas with capacity for further development 	<ul style="list-style-type: none"> - Improving tlevel of innovation, development and modernisation in industrial sector - Services sector development - Eco-tourism development - Space/support for SME development - Maximal utilisation of EU-funds - Improving transport infrastructure - Development of scientific institutions ans universities/colleges - Favourable conditions for tourism and spa development
<p>Internal</p> <ul style="list-style-type: none"> - Own energy agency (EAZK) capable of initiation, design, preparation, implementation and monitoring of energy efficiency and RES projects incl. Houses in low-energy/passive standard - Equipped with communication technologies, technical software for planning engineers and thermo graphic camera - High professionalism and knowledge of local conditions - Communication skills - Collaboration with distribution companies based on personal contacts - EAZK ensure elaboration of REP - EAZK keep database with energy consumptions of buildings owned by the Region or its organisations (since 2008) - EAZK administrates projects focused on building energy efficiency improving - EAZK carries on joint energy (electricity & natural gas) purchases for the Region and its organisations 	<p>Internal</p> <ul style="list-style-type: none"> - Professional approach to REP's goals implementation by projects - Ability to initiate projects, prepare attitudes and opinions towards particular projects submitted for financing - Capacity to coordinate or elaborate projects' proposals for financing - Capability to run and update energy information system in collaboration with Department of Environment - Ability to communicate with allowance organisations of the Zlin Region in the field of energy efficient building use - Facilities for monitoring of development pretentions on emission situation in specific location - Personal reinforcing of EAZK to support implementation of recommended solution for regional energy sector and for energy management of properties owned by the Region - Education of public sector representatives, project engineers and investors in the field of building energy efficiency improving (family houses as well as industrial buildings) - Improvement of thermal-technical characteristics in early phases of building designing - To improve system of energy commodity (electricity & natural gas) purchase



Weaknesses	Threats
<p>External</p> <ul style="list-style-type: none"> - Average wages below national average - Graduate labour rate is below national average - Most of industrial production is concentrated in few bigger companies - Small share of SME on regional GDP - Limited (slow) investment into innovations and infrastructure (energy and transport sector) - Smaller GDP grow than in other regions - Limited amount of high-tech and progressive technologies in the region - Ineffective usage of public sources <p>Internal</p> <ul style="list-style-type: none"> - Lack of internal management institutionalization in energy issues - Absence of energy management according to national standards - A motivation system for organisations which actively saving energy is still missing - An evaluation system for building use (from energy point of view) is not established 	<p>External</p> <ul style="list-style-type: none"> - Inadequate interest of foreign capital - High competition between regions - Inadequate (slow) development of transport infrastructure - Declining education/quality of local labour caused by migration and changes in local education/school infrastructure - Raising unemployment in selected locations after closing local company (former important employer) - Lack of financial sources for projects focused on energy efficiency increasing and RES utilisation - Lack of support for awareness/promotion activities linked with REP in the period of low(decreasing) energy prices <p>Internal</p> <ul style="list-style-type: none"> - Misunderstanding over principles of energy management and insufficient motivation for energy saving - Inadequate support for promotion activities of the Region realised via EAZK - Lack of quality projects aiming implementation of REP of the Zlín region - Lack of regional funds for energy project co-financing - Low energy prices influence project payoff - Historical building refurbishment focused on energy savings is connected with very long (unreal) payback period, this fact aggravates average economic return of energy project in the region

• **Which EE activities are planned to be supported in next periods:**

According to Regional SEAP the priority areas in EE policy of the Zlín Region are

Priority area 1: Support to energy management in the subjects of the Zlín Region

Priority area 2: Support to efficient energy utilisation in the Zlín Region

Priority area 3: Support to RES and non-conventional sources of energy

Priority area 4: Increasing safety and reliability of energy supply in the Zlín Region



These priorities are being implemented by Energy Agency of the Zlín Region through its activities:

- Energetic consultancy leading to increasing of the energy efficiency and self sufficiency
- Dissemination and good practice promotion
- Analytic and conceptual work
- Initiation and preparation of energy focused project
- Support to establishment of the energy management in municipal and regional authorities
- International cooperation on preparation and promotion of energy consultancy and projects

• **Which of the ways of financing energy efficiency investments do you consider the most effective?**

- 1 own resources
- 2 EU funding
- 3 loans / grants from national co-financing programs
- 4 bank loans
- 5 other – EPC

• **Monitoring process and evaluation of EE financing policy implemented**

There is a set of indicators foreseen to evaluate the Regional SEAP which includes indicators:

- Sources of funding identified
- Number of applications developed.
- Number of advisory meetings aimed to providing information on sources of funding available

These indicators are evaluated annually against the measures implemented

2.2.5 Best practices and investments return models in the Czech Republic

Best practice 1:

General:

- **Name of the action:** Case study - Waste incinerator upgrade in Uherské Hradiště hospital
- **Time period / year of realisation:** 2018-2019
- **Description of the action** (1500-2000 characters):

Uherské Hradiště hospital is one of four regional hospitals established by the Zlín region. In recent years the massive reconstruction of the whole hospital are is taking place and increasing the capacity of the existing waste incinerator is one of the considered measures which would improve the economy of the hospital as well as contribute to the energy efficiency of the region and reduction of the waste disposed in landfills.



The project outlined should resolve the upgrade of the currently technically and morally obsolete device of hospital waste incinerator in the hospital area.

The case study and financial analysis is serving as a necessary basis for investor in his decision-making process in case increasing of the capacity of the existing hospital waste incinerator. The investor (the Zlín Region) is considering to increase the capacity from actual capacity 300 tons/year to 500 tons/year, eventually up to 1000 tons/year.

The incinerator will dispose the waste produced by the hospital as well as by other external sources of combustible waste. The supporting fuel is natural gas and this source will be preserved. There are two scenarios considered:

- scenario A with annual processing capacity of waste in amount of 500 t/year
- scenario B with annual processing capacity of waste in amount of 1.000 t/year

Technological parameters:

Parameter	Value
Annual processing capacity of waste scenario A / scenario B	500 / 1000 tons/year
Fund of working time	5400 hours/year
Thermic capacity var. A / var. B, during calorific value of waste 10 MJ/kg and during natural gas consumption 6 mN3/h, or 10 mN3/h	0,87 / 1,64 GJ/hour
Max. concentration of pollutants in output exhaust	According by Czech Directive no. 415/2012 Sb.

- **Partners involved:**

EVECO Brno, s.r.o.,
Uherské Hradiště hospital
Zlín Region
Energy Agency of the Zlín Region

- **Key results**

Hospital will have upgraded and modernised its source of heating which will ensure heat supply
Hospital will improve its economy and self-independence in energy supply
The amount of combustible from sources outside the hospital waste will be reduced

- **Success factors identified**

Understanding and support from regional policy makers
General consent from the side of public
Financial support from OP Environment



- **Barriers / restrictions / obstacles encountered**
 Resistance of NGO sector to the waste combustion
 Lack of understanding from the general public related to usefulness of this project and negative ecological aspects of waste disposals to landfills
- **Ways to deal with barriers / obstacles / problems**
 Feasibility study
 Report on the project effects on the environment
 Educational campaign
- **Contact, website:** Energy Agency of the Zlín Region, info@eazk.cz

Investments return models

Scenario A - Annual processing capacity of waste incinerator is 500 t/year

Investment (EUR)

- Overall investment costs: 38.500.000 CZK (1.540.000 EUR)
 From that...
 - Own sources: 26.950.000 CZK (1.078.000 EUR)
 - Subsidies (by whom): 11.550.000 CZK (462.000 EUR) by OP Environment (30 %)
 - Loans (including interest rate and payment period): 0
- Lifetime (service life): 20 years
- Depreciation period: 20 years

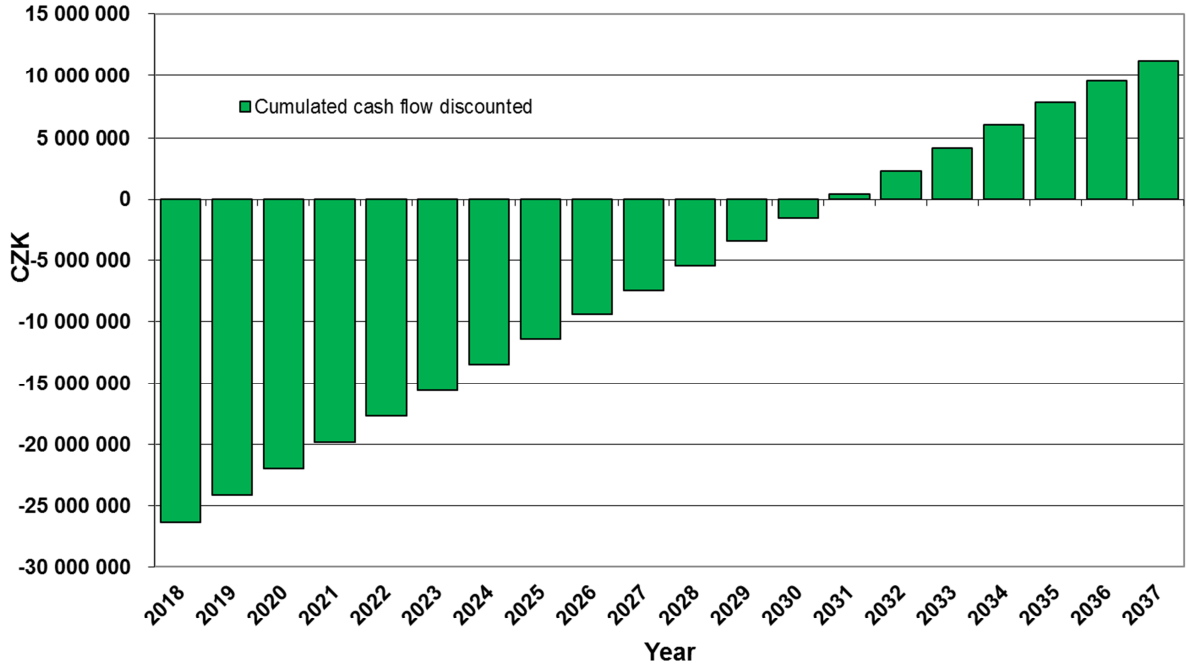
Operational features (EUR):

- Annual operational cost incl. salaries, repairs, maintenance and other specific costs: 3.400.000 CZK (136.000 EUR)
- Annual revenues – please specify which and how much in EUR: 5.800.000 CZK (232.000 EUR)
 - Thermal energy: 2 300 000 CZK (92.000 EUR)
 - Waste: 3 500 000 CZK (140.000 EUR)

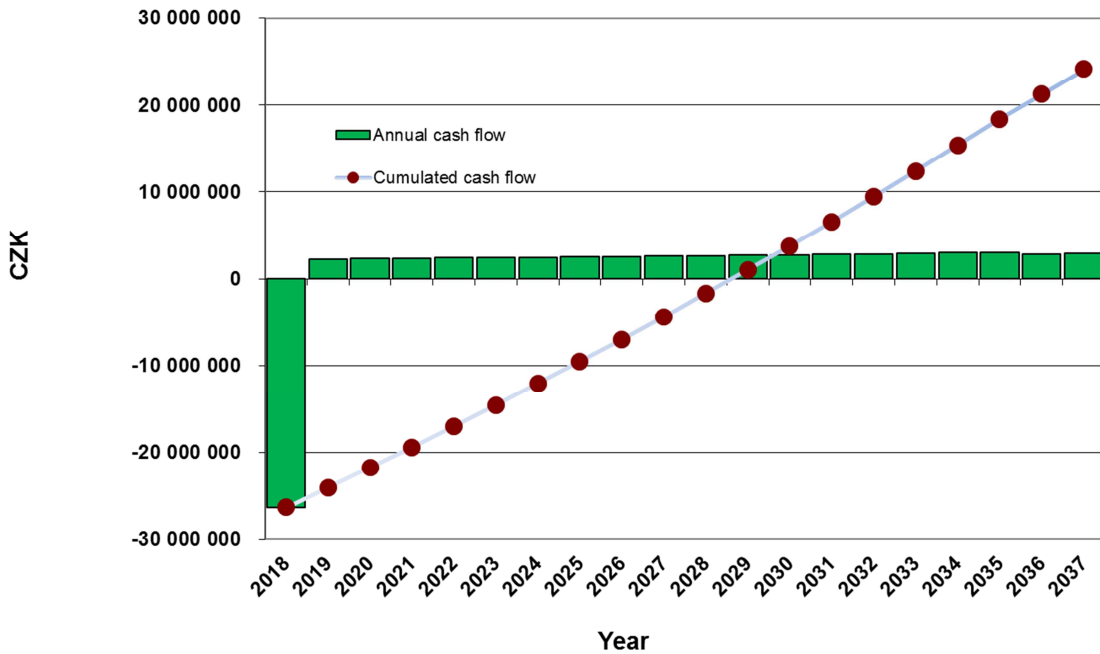
Financial indicators	
Net present value - NPV	11 208 366,07 CZK
Internal rate ratio - IRR	7,13%
Payback period - simple	11 years
Payback period - discount	13 years
Evaluation year	2018
Lifetime period	20 years
Discount	3,00 %



Uherské Hradiště hospital waste incinerator with a capacity of 500 t/ year
 Cumulated cash flow discounted - with 30% subsidy



Uherské Hradiště hospital waste incinerator with a capacity of 500 t/ year
 Investor's cash flow - with 30% subsidy



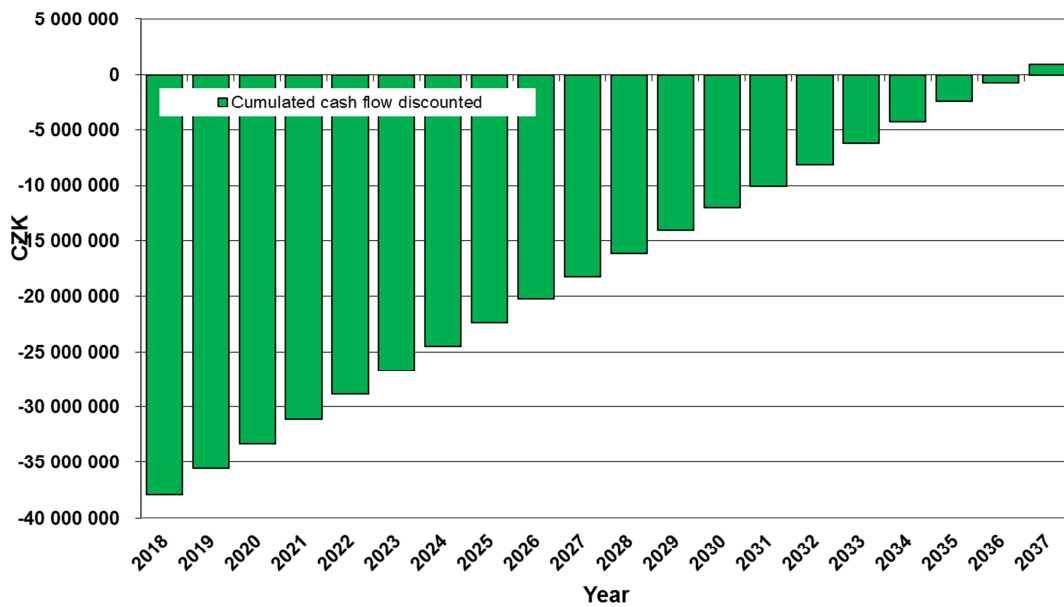


When no subsidy is considered, the project is still returnable even with lower capacity of the incinerator 500 t

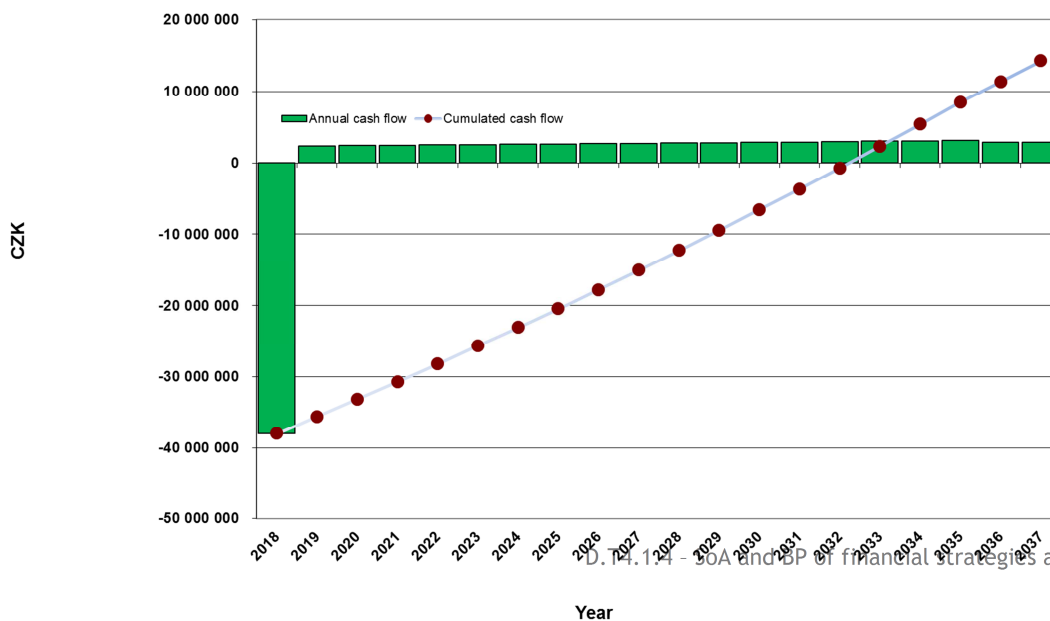
Scenario A – without subsidy

Financial indicators	
Net present value - NPV	961 811,79 CZK
Internal rate ratio - IRR	3,27%
Payback period - simple	15 years
Payback period - discount	19 years
Evaluation year	2018
Lifetime period	20 years
Discount	3,00 %

Uherské Hradiště hospital waste incinerator with a capacity of 500 t / year
 Cumulated cash flow discounted - without subsidy



Uherské Hradiště hospital waste incinerator with a capacity of 500 t / year
 Investor's cash flow - without subsidy





Scenario B - Annual processing capacity of waste incinerator is 1000 t/year

Investment (EUR):

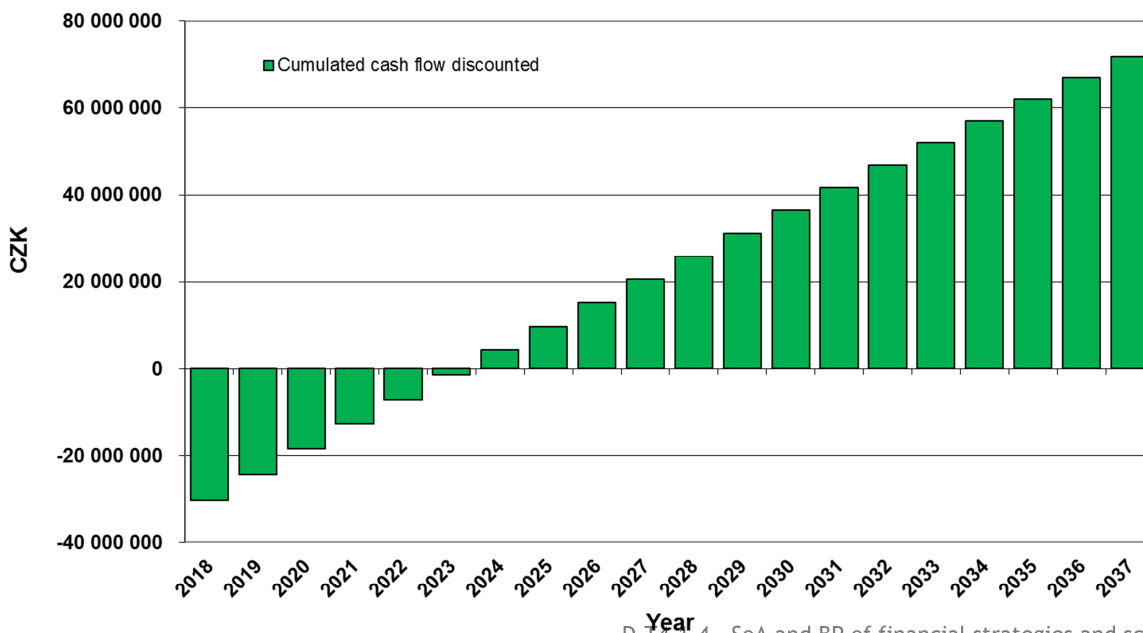
- Overall investment costs: 44.500.000 CZK (1.780.000 EUR)
 - From that...
 - Own sources: 31.150.000 CZK (1.246.000 EUR)
 - Subsidies (by whom): 13.350.000 CZK (534.000 EUR) by OP Environment (30 %)
 - Loans (including interest rate and payment period): 0
- Lifetime (service life): 20 years
- Depreciation period: 20 years

Operational features (EUR):

- Annual operational cost incl. salaries, repairs, maintenance and other specific costs: 4.300.000 CZK 172.000 EUR
- Annual revenues – please specify which and how much in EUR: 11.400.000 CZK (456.000 EUR)
 - Thermal energy: 4 400 000 CZK (176.000 EUR)
 - Waste: 7 000 000 CZK (280.000 EUR)

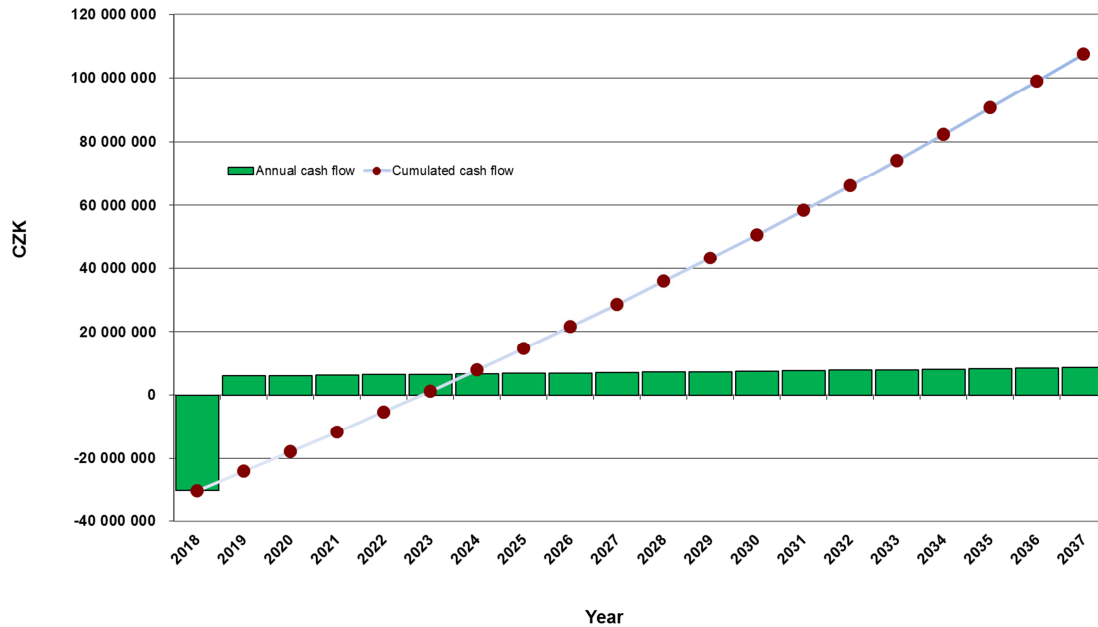
Financial indicators	
Net present value - NPV	71 968 603,40 CZK
Internal rate ratio - IRR	21,27%
Payback period - simple	5 years
Payback period - discount	6 years
Evaluation year	2018
Lifetime period	20 years
Discount	3,00 %

Uherské Hradiště hospital waste incinerator with a capacity of 1000 t / year
 Cumulated cash flow discounted - with 30% subsidy





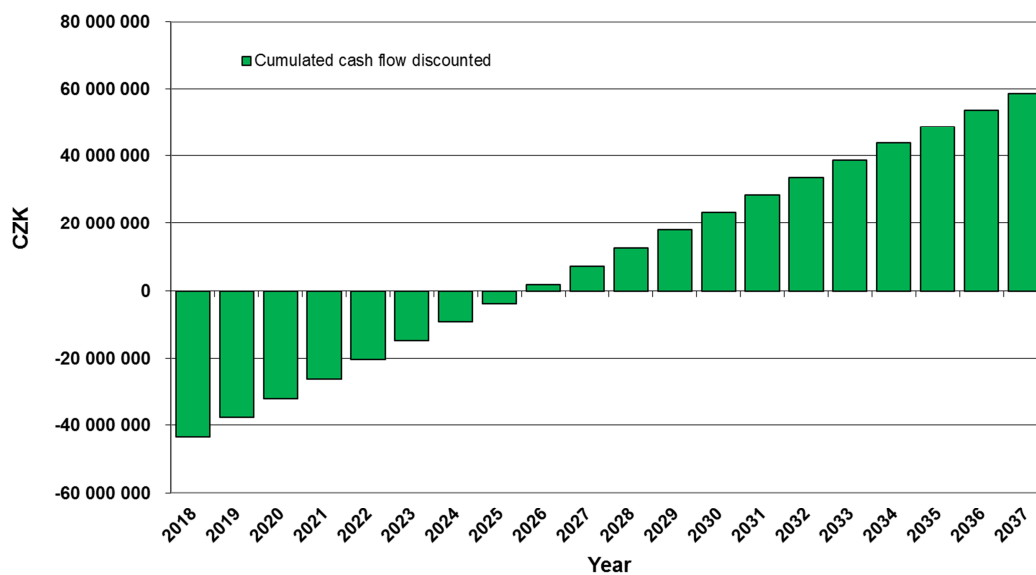
Uherské Hradiště hospital waste incinerator with a capacity of 1000 t / year
 Investor's cash flow - with 30% subsidy



Even without subsidy, scenario B with the annual waste incinerator capacity 1000 is still financially favourable solution:

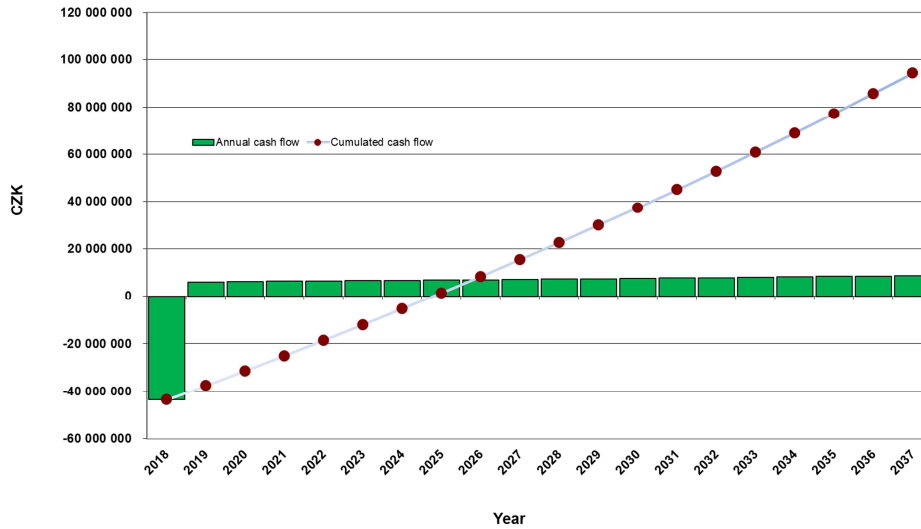
Financial indicators		
Net present value - NPV	58 618 603,40	CZK
Internal rate ratio - IRR	14,27%	
Payback period - simple	7 years	
Payback period - discount	8 years	
Evaluation year	2018	
Lifetime period	20 years	
Discount	3,00 %	

Uherské Hradiště hospital waste incinerator with a capacity of 1000 t / year
 Cumulated cash flow discounted - without subsidy





Uherské Hradiště hospital waste incinerator with a capacity of 1000 t / year
 Investor's cash flow - without subsidy



2.3 Tolna County

2.3.1 Basic information on the region/area:

Name of the region / area:	Tolna County	(NUTS: HU233)
Population:	221 799	(12/2016, Source: Hungarian Central Statistical Office)
Area size:	3 703.23 km ²	(12/2016, Source: Hungarian Central Statistical Office)
GDP 2016:	1.900 million EUR	
GDP per capita 2016:	8.566 EUR	
Map of the area:		



1. Figure: Location of Tolna County in Hungary [Source: www.madricon.hu]



2. Figure: Map of Tolna County [Source: www.sioagard.hu]

2.3.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

The project is implemented in Tolna County (NUTS 3 level classification unit), which is governed by the Municipality of Tolna County. This is one actor that should be observed for this chapter, as an EE service provider. Besides, the project is implemented by the Tolna County Development Agency (owned by the Municipality of Tolna County in 100%), therefore it also has to be observed what services the Agency provides on the field of energy efficiency.

These organisations don't manage or monitor the energy supply or consumption of any buildings in their geographical territory of operation, and they don't run energy management systems to optimise their consumption. However, as a part of their regional development activity, they develop and manage energy related projects that contribute to the overall energy consumption' reduction by increasing the energy performance of public buildings, installing RES power supplies and organising trainings. When these projects are implemented by the County or its Agency, but the target area for the development is a municipality, they can be considered as EE services.

Besides, these organisations insert energy efficiency aspects into the county level development policies, such as the Tolna County Regional Development Programme 2014-2020, Tolna County Development Strategy and the Climate Strategy of Tolna County. The Territorial and Settlement Development Operational Programme – one of the state level OPs of Hungary - also gives possibility to elaborate SECAP on county level. We've also considered these activities in the table below.



EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification of EE funds
Training and educational activities in the field of EE	Organising trainings for municipal employees and experts on energy efficiency investments, planning, and related duties.	Ca. 4000 EUR per training	EU projects and national OPs (Territorial and Settlement Development OP, Environment and Energy Efficiency OP)	Programme funding (The operational programmes as TSDOP, EEEOP provide financing for more projects)
Monitoring of implementation of energy efficiency policy	The Council of Tolna County is responsible to deliver this activity, and update the county's development plans as a general role.	Covered by the operational budget of the County.	100% own sources	Core financing
Support citizens / public authorities / companies in the acquisition of EE funds (information dissemination and promotion of co-financing programs and other financial resources)	Awareness raising for citizens, promoting behavioural change for achieving savings in energy consumption and higher level of EE. TCDA is eligible to submit proposals for the relevant OP.	3.225.806 EUR is the programme's budget on national level. One project can apply for max 16.130 EUR.	Environment and Energy Efficiency Operational Programme (national level); call 5.4.1	Programme funding (OP for more projects)
Planning and policy (SEAP, SECAP, yearly investment plans, general/city development strategy etc.)	Supporting the adhesion of settlements to the CoM and developing SECAPs.	Ca. 9.600 EUR in average per settlement.	Financed by the municipalities. Elaboration of SE(C)APs can be financed under TSDOP	Core financing Programme funding (OP for more projects)



- What **EE projects** have you realised in recent 5 years and how were they financed

As BOOSTEE-CE works on county level (NUTS3) in Hungary, it is not possible to give an exhaustive answer for this question. There are 109 settlements located in the county, therefore we cannot list all EE projects realised by these settlements in the past 5 years. Therefore the EE investments of the pilot settlement, Tolna (same name as the county) have been observed by BOOSTEE. The table below shows, that infrastructural investments haven't been implemented by the County, as in Hungary the local municipalities of settlements are responsible for such investments. The County was responsible to set the guidelines for these developments by elaborating the Climate Strategy of the county:

EE project	Short description	amount of funds needed	sources of financing (structure)	classification
Elaboration of Tolna County's Climate Strategy	The aim of the project is to help adapt to climate change in Tolna county, help local governments. The development of the Climate Strategy of Tolna County, the expansion of climate adaptation and climate change prevention of local government leaders, the strengthening of local capacities and the clarity of the Tolna County population is of paramount importance. The long-term goal is to apply climate change adaptation and climate change considerations at county level spatial development and town-level urban planning. In order to achieve the above goals, it is essential to involve local communities through a wide-ranging awareness-raising program. We are planning the establishment of a Climate Change Platform for Tolna County, whose professional coordination and consultation tasks will be provided by the Secretariat of the Tolna County Government. In the elaboration of the Tolna County Climate Strategy, the county cooperates with the Klímabara Settlement Association. During the development of the climate strategy, 11 conferences were organized. Between May and October 2017, a series of outline of	ca. 96.700 EUR (30.000.000 HUF)	100% financing of the Environmental and Energy Efficiency Operational Programme, Project id: KEHOP-1.2.0-15-2016-00009	Project funding



	<p>15 stations was developed, covering the entire Tolna County area. The local leaders held training at Szekszárd on 5 locations (Tamási, Dombóvár, Szekszárd, Paks, Bonyhád) and environmental NGOs. Finally, county climate protection contests were organized in the county's general and secondary schools. The programs are accompanied by continuous communication activities (press coverage, online counseling, reports and radio interviews). Publications and presentation materials were made for the attitude formation programs.</p>			
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2.3.2 Current funding mix matrix for EE financing in Tolna County (in 2017)

<i>Unrestricted</i>						
General fundraising			Core financing			
Overall = 0 EUR			Overall = 0 EUR			
<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own 100%</i>	<i>external %</i>	<i>loans %</i>	
Short-term	Project funding		Programme funding (Environment and Energy Efficiency OP)			Long-term
	Overall = 96.700 EUR		Overall = 9,4 million EUR			
	<i>own 0%</i>	<i>external 100% (financed by project fund and state)</i>	<i>loans 0%</i>	<i>own 100% (county budget of TSDOP)</i>	<i>external 0%</i>	
<i>Restricted</i>						



2.3.4 Existing experience in Tolna County

Provide structured and exhaustive information on following aspects of financing EE in your area/region, regardless any concrete EE financing strategy is approved or not

- **Is there any EE financial strategy available for your region?**

We work on **county level**, therefore the at this question the development programmes on county level and on settlement level have to be considered. On county level there's no strategic document that is dedicated directly to EE, but several documents integrate EE aspects into their priorities and interventions:

- The Tolna County Regional Development Programme 2014-2020 was approved in Jun 2013.
- The Tolna County Regional Development Concept gave baselines for the strategy, it was approved in Febr 2013.
- The Climate Strategy of Tolna has been approved by the General Assembly in 2017. It gives guidelines for the adaption and mitigation actions planned for the next couple of years.
- The Territorial and Settlement Development OP also has to be mentioned, as it finances wide-scale of regional development actions, and its budget is broken down for counties. The 3rd priority of the OP is dedicated for energy efficiency and renewables (Low carbon economy, ERDF).

On **settlement level** the SEAPs of the municipalities located in the administrative geographical territory of the county have to be indicated. These are:

- Municipality of Szekszárd, SEAP was approved on 27 Aug 2014, and submitted for the CoM om 10 Dec 2015
- Municipality of Paks, SEAP was approved on 12 March 2014-03-12 and submitted for the CoM on 11 Nov 2015
- Besides, the Integrated Settlement Development Plans of the municipalities located in the county can be also mentioned, as they also contain energy efficiency considerations at different chapters.

From the above-mentioned programmes only the Territorial and Settlement Development OP provides financing for EE investments and activities, the other documents define the priorities and set the list of necessary interventions, but they don't provide financing.

- **Who officially approved the EE financial strategy and for how long period?**

The county level documents are approved by the Council of Tolna County. They cover the period of 2014-2020. The SEAPs and Integrated Settlement Development Plans are approved by the General Assemblies of the settlements.

- **Indicative yearly budget for EE financing:**

Tolna County's budget under the Low Carbon priority (3) / Action 3.2 Improving the energy efficiency and share of renewables at municipalities of the Territorial and Settlement Development Operational Programme for 2014-2020 is 4,336 billion HUF. The funds were announced from 2016, therefore we can calculate in average 867,2 million HUF as annual budget, which is 2,8 million EUR for 2017.

- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**



We have analysed the SWOT of Tolna County from the following aspects: natural resources, economic situation, infrastructure, regulatory framework, organisational, educational and innovative features, transport and social considerations.

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
<ul style="list-style-type: none"> - Good quality arable lands are suitable basis for biomass cultivation - The high number of sunshine hours and the amount of irradiated solar heat provides good conditions for the installation of photovoltaic and solar collector systems. - High utilizable geothermal potential - plugged wells, thermal baths - High degree of forest cover, wood processing capacity - Municipality-owned forests - possibility of the utilization of firewood in public facilities - Proper regulation of rivers - flood, drainage is not common, presents no risk - Significant hydropower potential (Danube, Dráva) - Increase in the number of companies interested in innovation in the environmental industry - The raw material needs of biomass and biogas plants and power plants, meet largely the intra-regional transport - High number of municipal improvements - Bioethanol plants have been established in recent years (Dunaföldvár, Mohács) - CHP plants operate in the region - Adequate density electricity transmission network, which in recent years has been expanded with new connections - Several settlements have operating district heating system, which allows for more economical heating and DHW production than the individual heat supply - Part of the district heating systems utilize 	<ul style="list-style-type: none"> - Utilization of hydropower potential of Danube and smaller streams with the aspect of conservation in mind - Utilization of solar energy potential for producing thermal energy and electricity, in both private and government sectors - A higher degree of utilization of geothermal potential with the operation of closed wells and the establishment of cascade systems (e.g. in the case of thermal baths) - Utilization of unused agricultural lands for growing energy crops - Energetic utilization of agricultural and municipal waste, which also reduces costs of waste treatment processes - Due to the environmental benefits the CO2 balance of the region and the country is positive, use of resources from CO2 quota trade to create technological competitiveness that means advantage in the long-term - Gas/oil price increase can boost renewable energy developments - Support for innovative SMEs, venture capital mobilization - Arable farming optimization – e.g. including lower quality lands in the cultivation of energy crops - Exploitation of international loan programs for energetic purposes (e.g. ELENA) - Spread of organic farming – low energy intensity producing method - With the expansion of Paks Nuclear Power Plant further environmentally unfriendly power plants' production capacities can be replaced, thus decreasing the national CO2 emissions – quota trading - Planned developments in horticulture



<p>renewable energy</p> <ul style="list-style-type: none"> - The energy efficiency issues has been integrated to some extent into the county regional development strategies - Strong scientific base, regional research infrastructure - Major international research programmes are available for the region's municipalities, research institutes and enterprises - Competitive research centres - Regional innovation organizations professionally supporting the energetic tenders e.g. STRIA - Cross-border scientific energetic co-operations, especially with Croatia - Leaderships of municipalities are generally open to energetic innovation - Several settlements in the region are members of the Climate-Friendly Cities - Active clusters and civil organizations monitoring the environmental impacts of energy projects, recommendations of relevant technologies - Centre for Energy, Energy Club, and technical assistance provided by NGOs - Well-functioning LEADER groups to develop joint energy action plans (SEAPs) - Developed higher education system (University of Pécs, Kaposvár University) - Helsinki-corridors pass through the region - Navigable waters border the region - Railway core lines reach the inner areas of the region too - From the direction of the capital city the northern part of the region is available through the M7 and its southern part through the M6 motorway. - Pannon Power heating plant is accessible via rail (fuel embarking) - Developed road network between small settlements and implemented/planned power plant sites 	<p>(geothermal energy - greenhouse, foil tent)</p> <ul style="list-style-type: none"> - Development of livestock farming and the establishment of related biogas plants - Strengthening of international and cross-border relations - Higher rates of use of international innovation development funds (HORIZON2020) - Deployment of district heating networks – it is possible to switch to renewable energy resources (biomass, geothermal) - Tender opportunities, e.g. buildings' energy efficiency, renewable energy, financing downpayment - Appropriate development/implementation of METÁR (reformed compulsory feed-in system for heat and electricity produced from renewable and alternative energy sources) - Establishment of renewable energy law in Hungary - Multiple use of economic incentives to motivate the use of renewable energy sources (e.g. tax incentives) - High-volume support of the environment industry sector due to EU priorities (EU resources) - The National Education Law initiates the popularization of technical careers - The Natura 2000 areas and other environmental measures encourage the energetic utilization of manure - The national legislation seeks to promote compliance with the EU building energy requirements and EU2020 Strategy expectations - Set up of Regional / County level Energy Agency, that has a proper database related to the region's energy potential, consumer needs, tender and other funding opportunities and applicable technologies - Development of energetic education - Municipalities joined the Covenant of Mayors initiative – strategic co-operations, exchange of experience - Utilization of botanical and technological researches of Kaposvar University and the
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<ul style="list-style-type: none"> - Awareness-raising activities of NGOs and national parks (campaigns, trainings, playful workshops) - Community-building and educational functions of municipal energy developments 	<ul style="list-style-type: none"> - University of Pécs during energetic developments - Availability of unskilled labour – e.g. wood and biomass collecting
<p>Weaknesses</p>	<p>Threats</p>
<ul style="list-style-type: none"> - The energetic utilization of the River Danube is very limited - Proper practices of hydropower utilization are not developed in the region (and in the country) - Due to degraded livestock farming the energetic utilization of manure is limited - General undercapitalisation - Negative entrepreneurial attitude - Indebted municipalities are unable to provide the downpayment/pre-financing of the energetic developments - The high household loan portfolio inhibits energy investments - Lack of technological production requires more expensive imported technologies - Low efficiency municipal buildings - In some municipalities the district heating systems are obsolete - Lack of regional and local energy strategies - Low number of Corporate R&D projects - Parallel, non-coordinated operation of bridging organizations - Lack of energetic training; post-secondary education system and vocational training supply not satisfying the market demand - Lack of municipal energetic professionals - Many tender writing companies – low-quality applications - Municipalities' co-operation practices are not developed; lack of information exchange between settlements - Low degree technology transfer, which 	<ul style="list-style-type: none"> - Conflict between food industry and biomass based energy production (land use) - If developments fall short local and global environmental damages can occur - 50% of the forests are privately owned – in these cases, the management is not properly coordinated - Utilization of hydropower still does not come to the fore due to energy conservation and political reasons - The unfavourable, uncertain domestic economic environment of local businesses deters investors too (e.g. ESCO companies) - The foreign price and supply trends have strong influence - Investment delayed due to the protracted economic crisis - Foreign exchange risk make it difficult to calculate ROI - Uncertain development resources – without developments it is not possible to create price advantage compared to import technologies, thus the foreign price impact increases - Currently there is no source for modern, environmental regulations compliant domestic lignite-coal and uranium mining - Lack of additional financing (loan) – downpayment coverage is problematic - Life cycle thinking is not widespread, each technology is recommended by few manufacturers – limited latitude afforded. - The vulnerability of the domestic environment industry, foreign multinationals energetic dominance - Energy suppliers' conflicting interests prevent the building up of an infrastructure required to exploit renewable energy resources



<p>complicates energy research</p> <ul style="list-style-type: none"> - Universities do not offer their research capacity and results to enterprises effectively - The region is unexplored due to the lack of east-west expressway connections - Particularly isolated, not easily accessible internal and external peripherals - Danube has no permanent bridges southward from Baja - Structure of transport network is not favourable regarding the inner interoperability of the region - Technical condition of railway tracks is deteriorating, railway services regress, deficient inter-regional and international connections - Deterioration of the competitiveness of public transport - The road surfaces of side routes and local government roads are in poor condition - Unfavourable infrastructural and logistics conditions (lack of higher capacity airport, M6/M60 motorway is not connected to the Croatian motorway network - "dead Highway", outdated railway and side road networks) - Energy efficiency of public transport is inadequate, obsolete vehicle fleet - General lack of information about technologies, related effects, energy costs, etc. - The population is not interested in issues of energy efficiency and conservation 	<ul style="list-style-type: none"> - Complex and lengthy licensing procedures in connection with equipment utilizing renewable energy - Complexity of energetic tender systems, slow payments - Regional aspects do not appear in the calls for energetic application (e.g. extra points for the existence of a local energy concept) - Compulsory feed-in system is not encouraging enough - Implementation of the measures listed in the Utilization of Renewable Energy Action Plan is slow - Lack of coherence between ministries concerned about energetic issues - University funding system does not provide opportunity to conduct researches - The region's representation in Brussels weakened (termination of STRDA and STRIA offices in Brussels), which makes it difficult to develop international research collaborations - Growing motorization increasingly burden the existing road network - Increase of private transport at the expense of public transport - Quantity of transported goods increase and most of the increase is linked to the public road network - Anomalies of the funding of public transport are not solved by the government - The necessary legislative modifications for establishing region-based public transport systems are not made - Temporary cessation and permanent closure of rail lines - Emigration of skilled labour - Risks of social acceptance of renewables: fear of landscape destructive effects, emissions (odour and noise etc.), and increases in turnover all hinder investments. - Energy Poverty: single occupancy households are unable to maintain the low energy efficiency sometimes large buildings.
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- **Which EE activities are planned to be supported in next periods:**

The energy efficiency investment' preparation and planning will be supported by the Recommendations of the County's Climate Strategy. The County and the Agency intends to support the adhesion of municipalities to the Covenant of Mayors and the elaboration of SECAPs.

- **Which of the ways of financing energy efficiency investments do you consider the most effective?**

1. EU funding
2. ESCO financing
3. loans / grants from national co-financing programs – completing EU funds
4. bank loans
5. own resources – very limited

- **Monitoring process and evaluation of EE financing policy implemented**

Evaluation can be done by analysing the submitted, approved and closed projects of the Territorial and Settlement Development OP's municipal projects under its 3rd Priority (Low Carbon Economy), mostly at interventions 3.2.1 and 3.2.2 which support settlements in their energy efficiency actions and renewable energy investments. The projects have to describe the expected volume of energy saving and related reduction of CO2 emissions.

Moreover the County may ask for information on the fulfilment of the actions of the SEAPs of those settlements, which has joined the CoM.

2.3.5 Best practices and investments return models in Hungary

Best practice 1:

- **Name of the action:**

Geothermal energy utilization and public utility installation at Tamási

- **Time period / year of realisation:**

Dec 2014 – Oct 2015

- **Description of the action** (1500-2000 characters):

The aim of the project was to replace the gas heating of public institutions to geothermal heating. The core element of the system is the 830 meters deep production well on the campsite, providing 47 °C thermal water used for heating. The permissible yield is 75 m³ / h. This water is pumped through a 4.7 km long pipeline by high pressure pumps. The heat exchangers in the 17 connecting public buildings are installed on this piping system, where heat exchangers with low heat drop transfer the heat energy of thermal water to local heating systems. With intelligent remote control, the system is able to provide total heating energy up to an average outdoor temperature of 2 °C to 5 °C every day, back-up gas heating is only operating on colder days. The thermal water drawn through the city is transferred back to the ground and to the natural water stream by a 750 m deep reinjection well located about a thousand meters away from the production well. The production well provides 1200 litres of water at 47 °C per minute, and the capacity of the well is fully utilized during the peak heating period. The geothermal



heating system operates under 8 bar pressure, so that hot water can be passed without heat loss. With thermal water, the city's kindergarten and schools (Würtz Ádám Elementary School, Béri Balogh Ádám Secondary School, Vályi Péter Vocational School), the medical center, land office, court, library, cultural center, mayor's office, Gyulaj Zrt. office building and the police station - a total of 17 buildings - are heated.

- **Partners involved:** *not relevant*
- **Key results** (300 - 500 characters):
By exploiting geothermal energy, 60% of the natural gas consumption of local government institutions is saved, which means 16,000 GJ of heat each year. With this, the greenhouse gas emissions of the settlement is reduced by 570 tonnes of CO₂ annually. Non-governmental institutions spend 20% less on heating as a result of this system.
- **Success factors identified** (300 - 500 characters):
Thermal water at 47 ° C available in Tamási. Public institutions are close to each other, which provides the possibility to transfer heat with minimal heat losses. The necessary call of the relevant operational programme was available to support the financing of the investment. Gas heating is a costly heating mode, thus replacing it to a renewable energy based system can generate remarkable savings. It is also possible to further develop the system: the transmission line has been constructed so that it can be extended later to the housing estates and is planned to use the thermal water later for heating greenhouses.
- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):
Due to the relatively low temperature of the thermal water, the existing gas boilers of the building have to be kept as back-up boilers to support the heating system on colder days. The thermal water is able to heat up the buildings up to an outside temperature of 2 - 5 °C.
At a too high secondary return temperature, there is a risk of reheating the thermal water.
Big (expensive) heat exchangers are required for performance. DHW production from thermal water is not advisable.
- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):
Existing boilers have been integrated in the control technology of the thermal system and can be put into operation if necessary.
- **Contact, website:**
Ms Zita Hamar, Tel.: 0036 74570800/106. E-mail: hamar.zita@tamasi.hu

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- Pictures of the action





BOOSTEE-CE

Investment (EUR):

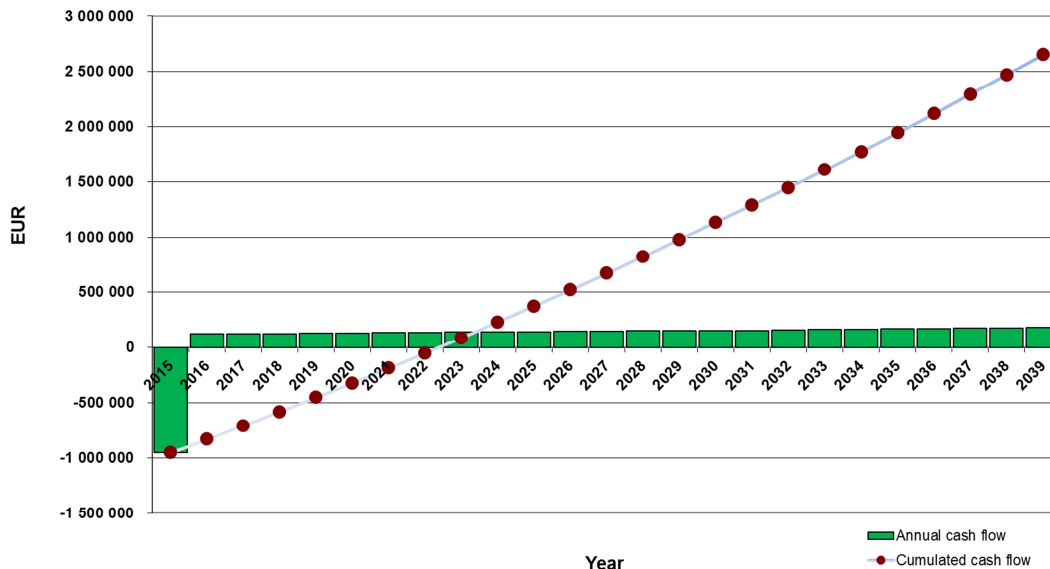
- Overall investment costs: 3.650.628 EUR + VAT = **4.635.917 EUR**
 - From that...
 - Own sources: **985.589 EUR**
 - Subsidies (by whom):
 - **1.825.164 EUR** (Environment and Energy Operational Programme, ERDF)
Project code: KEOP-4.2.0/B/09-2010-0030
 - **1.825.164 EUR** (state support for covering partly own contribution of EEOP project)
 - Loans (including interest rate and payment period): not relevant
 - Lifetime (service life): **25 years**
 - Depreciation period: **15 years**

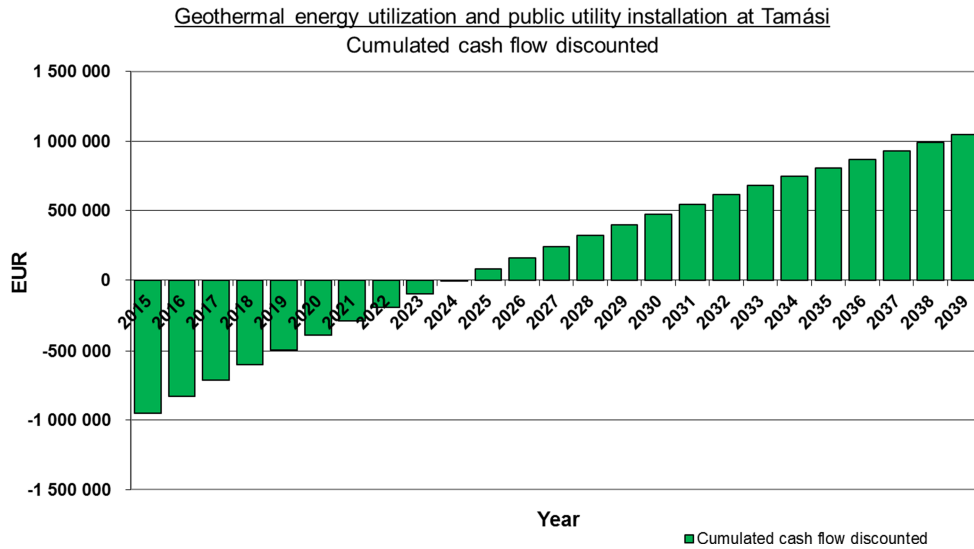
Operational features (EUR):

- Annual operational cost incl. salaries, repairs, maintenance and other specific costs: **45.240 EUR**
- Annual revenues – please specify which and how much in EUR: **172.492 EUR** (result of savings in gas supply)

Financial indicators	
Net present value - NPV	1 042 391,40 EUR
Internal rate ratio - IRR	13,72%
Payback period - simple	8 years
Payback period - discount	10 years
Evaluation year	2015
Lifetime period	25 years
Discount	5,00 %

Geothermal energy utilization and public utility installation at Tamási
Investor's cash flow





2.4 Mestna Občina Velenje

2.4.1 Basic information on the region/area:

Name of the region / area: **Mestna Občina Velenje, Savinjska regija (Municipality of Velenje, Savinjska region)**

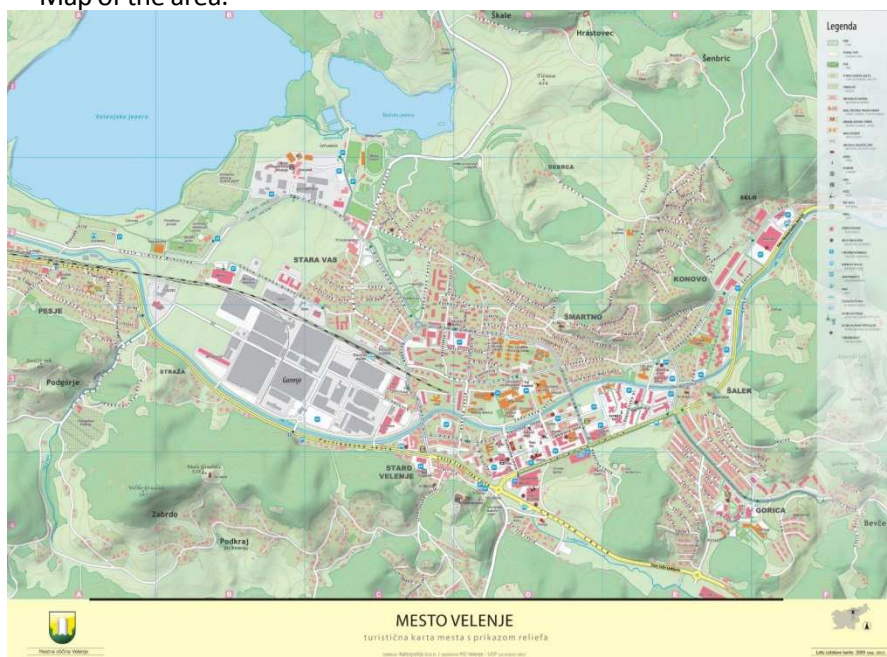
Population: **34.597 inhabitants**

Area size: **83,5 km²**

GDP 2016: **624 mil EUR**

GDP per capita 2016: **18.050 EUR**

Map of the area:





2.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification off EE finds
Energy management (for running of local energy agency- KSSENA)	Sustainable energy development, renewable energy sources, efficient energy use	50.000 EUR annually for salaries	municipal sources (municipal budget)	Core financing

- What **EE projects** have you realised in recent 5 years and how were they financed

EE project	Short description	amount of funds needed	sources of financing (structure)	classification
Energy renovation of 2 kindergartens	facade renovation, Installation of new windows and roof insulation	502.765 EUR investment costs	15 % Municipality of Velenje 85% cohesion fund from Ministry of infrastructure (EU funding)	Project funding
Energy renovation of healthcare Centre in Velenje	facade renovation, Installation of new windows on the south and north side of the building, instaling air recuperation, new electric and other installations	1.288.616 EUR Investment costs	15 % Municipality of Velenje 85% cohesion fund from Ministry of infrastructure (EU funding)	Programme funding
Energy renovation of vila Rožle	facade renovation, installation of new windows and roof insulation	273.134 EUR Investment cost	85% EE Culture 10% national funds 5% Municipality of Velenje	Project and Programme funding
Energy renovation of regional gallery of Velenje	Energetic facade renewal and all the installations were renovated	1.381.977 EUR investment costs	70% EU and regional development funds 30% Municipality of Velenje	Project, Programme and core financing
Renovation of bussines center Standard	Complete indoor and outdoor renovation of the place	1.695.975 EUR Investment costs	85% EU and regional development funds 15% Municipality of Velenje	Project, programme and core financing



2.3 Current funding mix matrix for EE financing in Mestna Občina Velenje (in 2017)

		<i>Unrestricted</i>							
		General fundraising			Core financing				
		Overall = 0 EUR			Overall = 172.528 EUR				
		<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own</i> 100%	<i>external</i> 0 %	<i>Loans</i> 0 %		
<i>Short-term</i>		Project funding			Programme funding			<i>Long-term</i>	
		Overall = 0 EUR			Overall = 0 EUR				
		<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own %</i>	<i>external %</i>	<i>loans %</i>		
		<i>Restricted</i>							

2.4.4. Existing experience in Mestna Občina Velenje

- **Is there any EE financial strategy available for your region?**
 - Local energy concept (LEK), year of approval is 2004, updated in 2012
 - SEAP , year of approval 2012
 - Covenant of mayors, year of approval 2010

Note: Not any particular one dealing with just EE
- **Who officially approved the EE financial strategy and for how long period?**
 City councillors approved all documents.
- **Indicative yearly budget for EE financing:**
 50.000 EUR constantly to Energy agency Kssena,
 Other funds varies from year to year, depending on approved ongoing projects (national end EU)
- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

SWOT analysis based on interviews with different stakeholders (discussions and distributed questionnaires) and findings within EU EE projects. Stakeholders included: municipal employees dealing with EE projects renovations (Blaženka Čujež; Alenka Rednjak, Danijel Petric; Branka Gradišnik etc.); municipal project team for implementation of EU projects; head of investment departments and experts from the department; personnel of our local energy agency KSENA and another firm ADESCO; representatives of civil engineering, building and household sector; employees of department for Environment; local architects and landscape architects and general public.



Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
<ul style="list-style-type: none"> - Spreading awareness of the benefits of greater energy efficiency in buildings - Following the activities and plans within the prepared and approved Sustainable Energy Action Plan (SEAP) and Local Energy Concepts - LEC - Working groups: regional agencies have been established with the aim of best practices exchange, facilitating/coordinating the procedures - Possibility to obtain funds from EU and national programmes (Eco Fund etc.) - Information and incentives for increased energy efficiency by energy suppliers - Examples of good practices are drawn from the example - Reserve funds established in multi-dwelling buildings - Reducing the level of energy poverty among the population - Improving living conditions for residents - Lower energy costs 	<ul style="list-style-type: none"> - National Law for Energy Efficiency - Rapid development of technology - Utilizing European funds (also for owners of a non-profit rent fund) - Greater emphasis on energy efficiency at European level (tightening requirements and incentives) - Establishment of a State Guarantee Scheme - Introduced possibility of sharing the benefits of energy efficiency measures between the owner and tenant of the dwelling - 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
Weaknesses	Threats
<ul style="list-style-type: none"> - lack of interest in energy contracting: inadequate conditions for introducing innovative energy efficiency services - energy contracting (contractual provision of energy supply and contractual provision of energy savings) - Still relatively poor information (especially on the organizational and implementation part of the renovation) - Difficult collusion in multi-dwelling buildings (the problem of poor owners...) - The lack of interest by owners of rented apartments for energy renovation - Too many partial renovations compared to comprehensive energy renovations - Conducted comprehensive energy refurbishment of the outdoor (outer shell of the building) without taking into account the changed needs for user behaviour (e.g. deterioration of air quality without ventilation system or unchanged habits with the introduced 	<ul style="list-style-type: none"> - Inadequate qualifications of energy service providers - Longer periods of relatively low energy prices - Uncertainty about future energy prices - Instability of legislation - Inadequate conditions for introducing innovative energy efficiency services - energy contracting (contractual provision of energy supply and contractual provision of energy savings) - Very limited budget during financial crisis - No standardized EE guidelines for products and services – high performance risk - Financial restrictions due to Local and European Financial Crisis according to the implementation of sustainable procurement and also to advancements



<p>recovery system)</p> <ul style="list-style-type: none"> - Difficulty to obtain financial resources for the renovation (especially of multi-apartment buildings -there are no suitable credit instruments or are inhibited by legislation)... - Administrative and regulatory barriers 	
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• **Which EE activities are planned to be supported in next periods:**

- Renovation of public buildings (kindergartens and schools) according to ESCO model
- EE renovation within ongoing EU projects (BOOSTEE: E-Central, projects of local energy agency KSEENA)
- EE activities planned in **Integrated Territorial Investments** (ITI; in Slovenian language CTN): Cohesion funds-(EFRR-Regional development funds) for realization of selected projects on the topic of energy efficiency and sustainable development of cities--- 3 public building are planned to be renovated

• **Which of the ways of financing energy efficiency investments do you consider the most effective?**

- 1 EU funding
- 2 loans / grants from national co-financing programs
- 3 bank loans
- 4 own resources
- 5 other (what?)

Our municipality participates in the EU project eCentral (Central Europe). Within this project, we will test a new way of financing – crowdfunding and implemented a pilot action aimed to prove the effectiveness of the nZEB standards.

So far we already realized that financing with crowdfunding is too complicated in Slovenia because of the unfavourable legislations.

• **Monitoring process and evaluation of EE financing policy implemented**

- Yearly reports of realized activities within Local energy concept (reported to mayor and city council)
- Yearly reports of realized activities within EU projects (reported to mayor and city council)



2.4.5 Best practices and investments return models in Slovenija

Best practice 1

- **Name of the action:**

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

- **Time period / year of realisation:**

The cooperative was founded in the spring of 2016 and is registered as a social enterprise.

In 2016 it acquired a concession for the construction of district heating with wood biomass in Hrib center.

At the end of November 2017 biomass district heating with local wood chips supply began to operate in the center of Hrib.



- **Description of the action** (1500-2000 characters):

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.

Planned activities:

- District heating with wood biomass (cooperative)
- Exploitation of wind potential (cooperative)
- Public transport with electric vehicles

The reason for the establishment of a wood co-operative:

There are several reasons, but the most important one is that Wood cooperative Loški potok should work for the benefit of the locals, carrying out activities that encourage the use of renewable energy sources and the development of the green economy.

The settlement Hrib is in the middle of a forest area, with a lot of poor quality wood that foresters can not use. The harvest costs more than the wood, so usually this wood remains in the forest. But it can be used for wood chips and in this way energy money remains in the local environment, thus following the commitments of Slovenia to the EU on the transition to renewable sources. Since combustion causes a problem with hard particles, the Institut "Jožef Stefan" developed the particle filter for small combustion plants – also the district heating with wood biomass will be equipped with such a filter.

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 and then successfully applied to the public tender of the Ministry of Infrastructure for subsidies for the use of renewable resources DO OVE 2016.

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.

- **Partners involved:**
Municipality of Loški potok
Ministry of infrastructure and members of the cooperative
- **Key results** (300 - 500 characters):
11 facilities are connected to the district heating system, the largest heat consumers are public buildings (both shops and restaurants are privately owned).
Since October 2017, the cooperative also manages the local post office 1318 Loški Potok, which would otherwise be closed.
The Wood Cooperative successfully applied for a public tender for cutting wood in state forests for the period until the end of 2018.
- **Success factors identified** (300 - 500 characters):
The heating season lasts 300 days a year and 90 000 litres of heating oil is used for municipal facilities (marked in the figure below).



Figure 1: Municipal facilities connected to district heating with biomass



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- **Barriers / restrictions / obstacles encountered** (300 - 500 characters): /
- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):

The most difficult problem in the construction was the changing Karst terrain, since it was necessary to place storage for chips (approx. 150m³) under the boiler room.

- Contact: Director Darko Šega darko.sega@gmail.com

Investment (EUR):

- Overall investment costs: 798.000 EUR
 From that...
 - Own sources: 10 000 EUR
 - Subsidies (by whom): 65% (518 000 EUR) Ministry of infrastructure
 - Loans (including interest rate and payment period): 270 000 EUR, payment period of 15 years, interest rate 3,75% + 3 month Euribor rate
- Lifetime (service life): pipes - 40 years,
 Boiling room equipment - 30 years
 Building – 50 years
- Depreciation period: 15 years

Operational features (EUR):

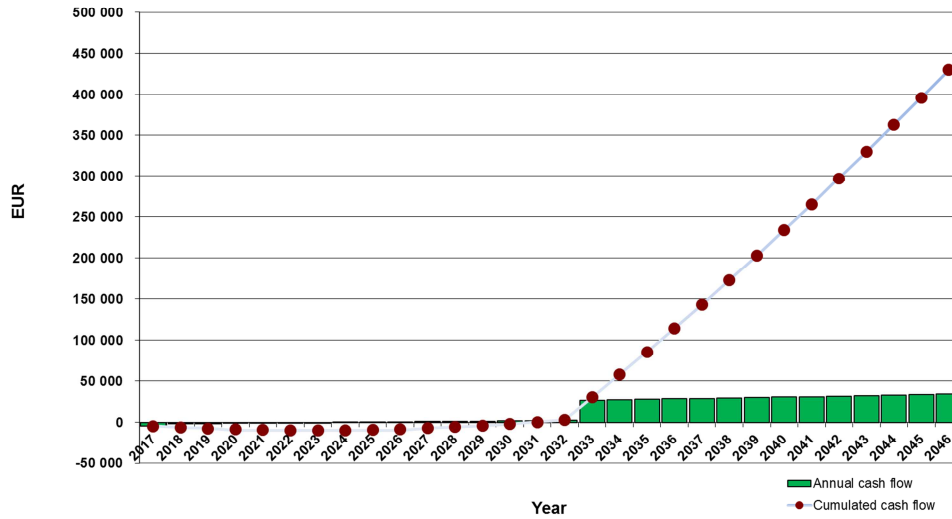
- Annual operational cost:
 Energy 25.000
 Maintenance 4.000 ,
 Operating costs 8.000.
 The total expenditure is planned at 43.200 (without loan)
- Annual revenues – please specify which and how much in EUR:
 Approximately 65,000 EUR from the sale of heating

Note: When the cooperative took over a € 800,000 worth investment, it had only one (1) working year behind it and 4,000 EUR in its account.

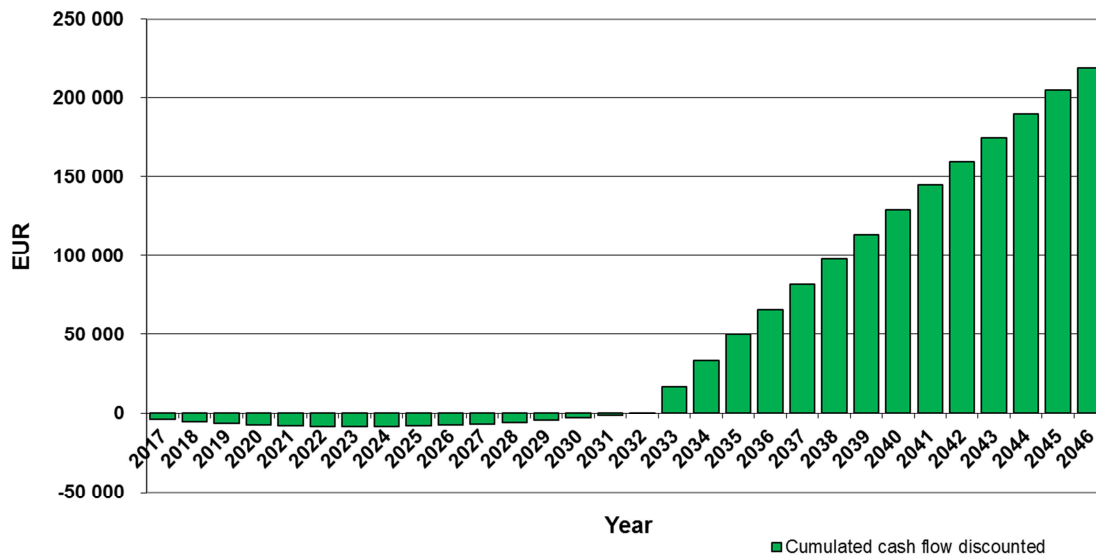
Financial indicators	
Net present value - NPV	219 193,72 EUR
Internal rate ratio - IRR	21,93%
Payback period - simple	14 years
Payback period - discount	16 years
Evaluation year	2017
Lifetime period	30 years
Discount	3,00 %



Wood Cooperative Loški potok: District heating with wood biomass in Hrib center
 Investor's cash flow



Wood Cooperative Loški potok: District heating with wood biomass in Hrib center
 Cumulated cash flow discounted



- **Pictures of the action:**



Figure 2: Excavation for wood chips storage



Figure 3: Pipes for district heating in front of the municipality building

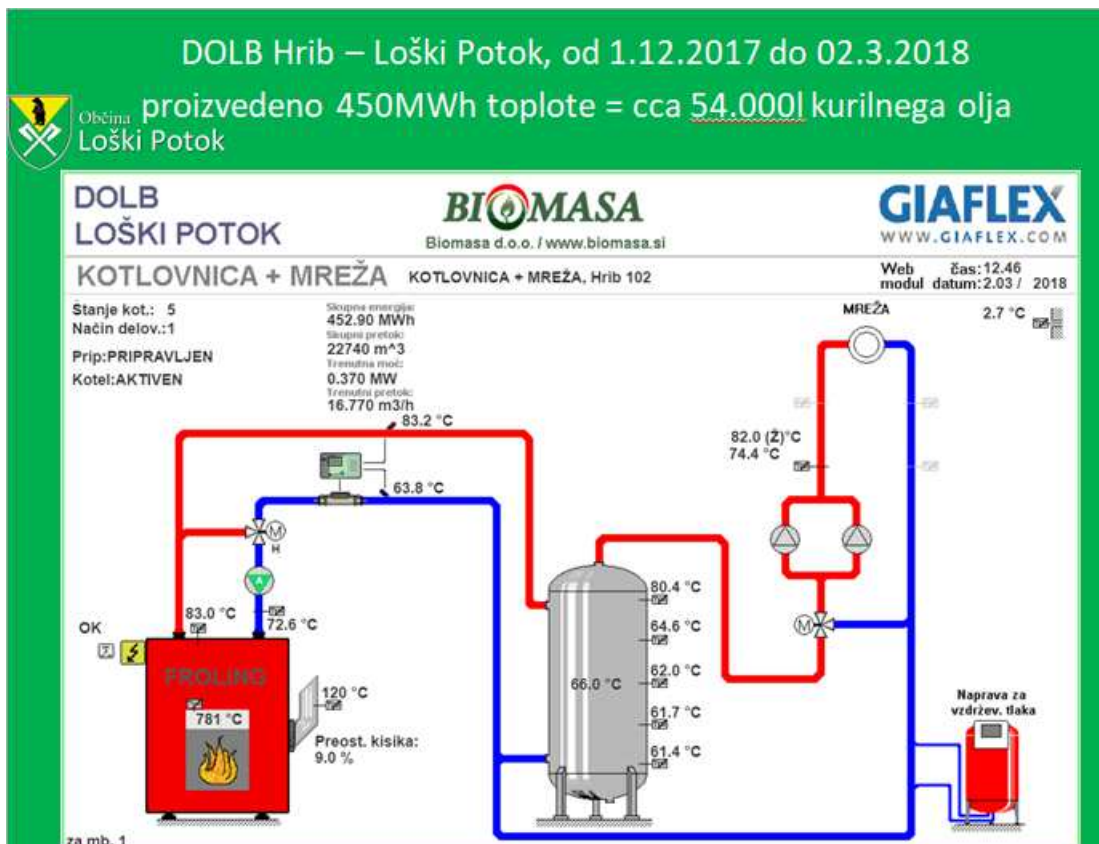


Figure 4: Data of District heating system with wood biomass



Figure 5: Beginning of the construction works – 6.7.2017



Figure 6: Boiler room, the first phase of a multipurpose facility that will be built until the end of 2018. Under the boiler room there is a 150 m³ storage for wood chips.

2.5 Koprivnica

2.5.1 Basic information on the region/area:

Name of the region / area: **City of Koprivnica**

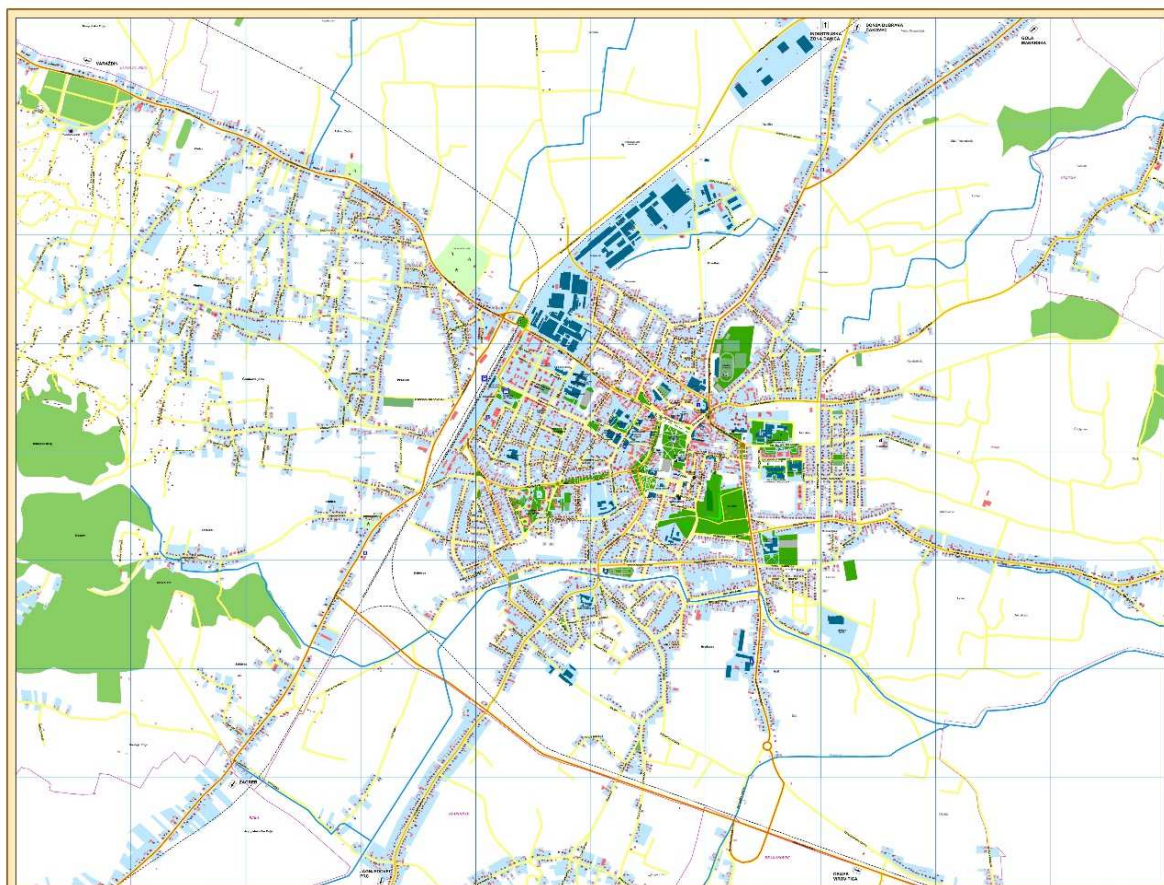
Population: 30.854

Area size: 91,05 km²

GDP 2016: 263,7 mil EUR

GDP per capita 2016: 8.548 EUR

Map of the area:





2.5.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification off EE funds
Energy services provided by partner – REA North	Project development, project and investment management, technical advices etc.	60.000 EUR annually for services	100% own sources (municipal budget)	Core financing
In-house energy expertize	Energy related administration, energy investments, EU projects etc.	50.000 EUR annually for salaries	100% own sources (municipal budget)	Core financing
Capacity building and promotion (employees, private sector and citizens)	Energy efficiency, energy planning , renewable energy sources etc.	10.000 EUR annually for expenses	Own sources (municipal budget) + external sources	Project funding

- What **EE projects** have you realised in recent 5 years and how were they financed

EE project	Short description	amount of funds needed	sources of financing (structure)	classification
Primary school “A.N. Gostovinski” – lighting system reconstruction	Replacement of fluorescent and filament lighting initially installed in 1990 with LED technology + sensors	21.000 EUR investment costs	100% own sources (municipal budget)	Core financing
Open university Koprivnica, Domoljub odeum hall – New HVAC system	Reconstruction project where old situation was gas heating boiler 170 kW initially installed in 1973 and no air conditioning while the new situation is condensing boiler 49 kW, + heat pump air/air 41 kW + new ventilation chambers + recuperation	95.000 EUR	30% own sources and 70% national ministry	Core financing + project funding
Library „Fran Galovic” and movie theatre „Velebit” – heating system	Reconstruction project where old situation was two low-efficiency and oversized natural gas boilers installed in 1997 while the new situation is one condensing boiler + improved insulation of thermal fluid	20.000 EUR	100% own sources	Core financing



	supply system + new distribution pumps			
Public lighting in the City of Koprivnica	Continuous reconstruction of public lighting (polls + bulbs)	130.000,00	100% own sources	Core financing
Solar panels for preparation of hot water	Solar panels for preparation of hot water in educational institutions in the City of Koprivnica (kindergarten + institution of education and rehabilitation)	15.000 EUR	60% own resources and 40% national co-financing	Core financing + project funding
Reconstruction of KC poduzetnik	Reconstruction works of incubator building that included: new façade, new windows, heating separators and PV plant	230.000 EUR	15% own sources and 85% national co-financing	Core financing + project funding
Partial reconstruction of Primary school "Brace Radic"	Installation of new windows on primary school.	100.000 EUR	100% own sources	Core financing
Partial reconstruction of Community centre "Dom mladih"	Reconstruction of flat roof that includes: new surface + heat insulation + hydro protection.	130.000 EUR	100% own sources	Core financing
nZEB University building	Reconstruction of od military building based on nZEB standard for University purposes.	2M EUR	100% sources	Core financing
Smart metering in public buildings	Installation of smart metering in two public buildings: indoor public pool and University building.	10.000 EUR	15% own sources and 85% EU funding	Core financing + project funding
Bike sharing in the City of Koprivnica	Installation of seven bike sharing terminals and few dozen of bikes (regular + electric)	200.000 EUR	15% own sources and 85% EU funding	Core financing + project funding
Electric car pool	Purchase of five electric cars and set up of car pool based on purchased electric cars.	130.000 EUR	1/3 own sources, 1/3 national co-financing and 1/3 EU funding	Core financing + project funding
Electric public transport	Purchase of two electric buses and set up of public transport based on purchased electric buses.	200.000 EUR	1/3 own sources, 1/3 national co-financing and 1/3 EU funding	Core financing + project funding



2.5.3 Current funding mix matrix for EE financing in Koprivnica (in 2017)

		<i>Unrestricted</i>							
		General fundraising			Core financing				
		Overall = 0 EUR			Overall = 2.713.500 EUR				
		<i>own</i> 0%	<i>external</i> 0%	<i>loans</i> 0%	<i>own</i> 100%	<i>external</i> 0%	<i>Loans</i> 0%		
Short-term			Project funding			Programme funding			Long-term
			Overall = 677.500 EUR			Overall = 0 EUR			
	<i>own</i> 0%	<i>external</i> 100%	<i>loans</i> 0%	<i>own</i> 0%	<i>external</i> 0%	<i>loans</i> 0%			
		<i>Restricted</i>							

2.5.4 Existing experience in Koprivnica

Provide structured and exhaustive information on following aspects of financing EE in your area/region, regardless any concrete EE financing strategy is approved or not

- **Is there any EE financial strategy available for your region?**
REA North has developed Sustainable Energy Action Plan (SEAP) for the City of Koprivnica in 2011. EE Financial Strategy as a document or one whole is not part of SEAP. However, SEAP contains energy EE measures in variety of sectors that have predicted value (investment cost) and other financial elements as well as potential sources of financing.
- **Who officially approved the EE financial strategy and for how long period?**
City of Koprivnica officially approved its SEAP through decision of the City Council in 2011 while SEAP covers period up to 2020.
- **Indicative yearly budget for EE financing:**
It varies from year to year where lowest was around 100.000 EUR and highest few M EUR.
- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
<ul style="list-style-type: none"> - Dedication towards EE and rational use of energy - Experienced and topic specific 	<ul style="list-style-type: none"> - External co-financing opportunities (EU + national) - Positive perception of the City



<p>competent employees</p> <ul style="list-style-type: none"> - Wide and competent network of in-house partners - Good image in the field of energy - High number of EU + national projects (in the field of energy) - Set up business model of preparation and implementation of energy related projects/investments (internal energy revolving fund) 	<ul style="list-style-type: none"> - Innovations in the field of financing, technology and project realization etc. - Wide and competent network of national and EU partners
Weaknesses	Threats
<ul style="list-style-type: none"> - Lack of interest for challenging projects - Fear of new topics, approaches etc. - Unwillingness to change - Control addiction - Lack of financial sources - No long hanging fruits - Inadequate use of internal energy revolving fund 	<ul style="list-style-type: none"> - Competition that acts quicker and more concrete - Unsuitable criteria for approved co-financing of projects/actions - Poor preparation and implementation of co-financing programmes and calls from the national government and responsible ministries

• **Which EE activities are planned to be supported in next periods:**

City is most probably going to focus on energy refurbishment of existing public buildings, especially schools, kindergartens and other buildings from educational sector.

• **Which of the ways of financing energy efficiency investments do you consider the most effective?**

While own funding provides the most independence when it comes to planning and realization of EE investments, other ways are more effective in terms of cost. EU funding (most often at 85% rate) is mostly used for financing staff and documentation (action plans, strategic documents, project designs etc.) with very rare investments into equipment and refurbishment. However, city does have great experience with EU funding of smart metering, electric cars and buses, energy refurbishments etc. At the same time grants from national co-financing programs are the most effective means of financing energy efficiency investments as they co-finance real investments (equipment, materials, work...) at substantial percentage and in high total amounts.

• **Monitoring process and evaluation of EE financing policy implemented**

For many years City did not monitor and evaluate its EE policies as well as its implemented EE investments. This partially changed in 2011 (SEAP) and 2015 (set up of internal energy revolving fund) but also with effective use of National information system of energy mgmt. (ISGE). SEAP and revolving fund were developed by Regional Energy Agency North and approved by City Council where ISGE is supervised by Agency as well.

2.5.5 Best practices and investments return models in Croatia



Best practice 1:

General:

- **Name of the action:**
Reconstruction of boiler room plant in General County Hospital “Dr. Tomislav Bardek” Koprivnica

- **Time period / year of realisation:** 2016

- **Description of the action:**
This project was a result of a trust among Hospital’s management and Agency and successful implementation of several energy related projects on hospital’s buildings (reconstruction of hospital’s roof, solar plant for hot water etc.). Biggest challenge and high investment project identified as low hanging fruit (quick return on investment) was reconstruction of boiler room plant that is all purpose, has oversized steam boilers of total 10,5 MW & 16 t/h of steam, installed in far 1979. After a six months preparation period, implemented most economically advantageous tender, signed contract with business entity, works were finally executed in 2016. New situation after reconstruction is the following – three specialized blocks of boilers (steam production, heating, consumer hot water) of total 3,5 MW & 3,4 t/h of steam + connection with existing solar thermal collector plant, steam condensate recovery (hot water return).

- **Partners involved:**
General County Hospital “Dr. Tomislav Bardek” Koprivnica
Regional Energy Agency North

- **Key results:**
For Hospital first successfully implemented most economically advantageous tender, reconstructed boiler room plant, unburdened Hospital’s technical staff, substantial energy and maintenance costs savings

- **Success factors identified:**
Trust among partners as well as their successful prior cooperation, project involvement of competent and relevant individuals, secured financing from the investor (Hospital), detailed and thorough preparation of the investment

- **Barriers / restrictions / obstacles encountered:**
Hospital management’s lack of focus on non-medical issues, securing sufficient funds for investment, private sector unprepared for new approach in public procurement process (most economically advantageous tender), Hospital technical staff’s left out of major decision making processes and influence on project design, procurement and works

- **Ways to deal with barriers / obstacles / problems:**



Agency's experience is that it was critical that Hospital trusted Agency that it can and will successfully carry out the entire project. In this case, trust was earned by prior successful cooperation and implementation of EE projects/investments. Very important aspect of problems solving and removal of barriers was punctual and on-time communication with evidences (emails), regular meetings and more important always ready solutions. Agency always had ideas and propositions for problems and barriers so it was much easier for Hospital's management to plan and make decisions.

- **Contact, website:** www.obkoprivnica.hr

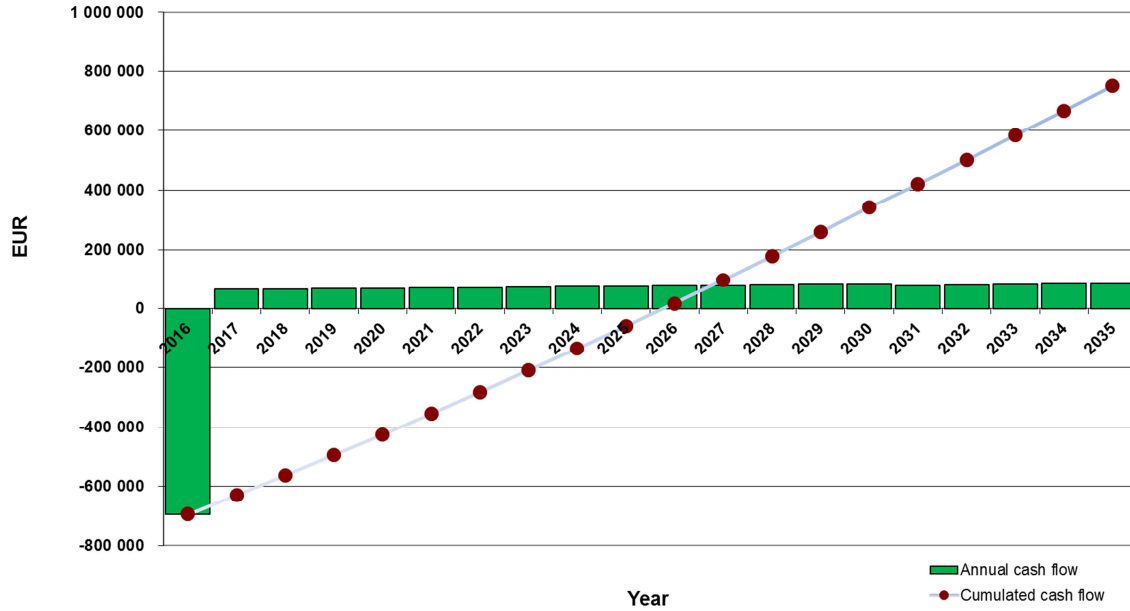
Investment (EUR):

- Overall investment costs: 707.000 EUR
 - From that...
 - Own sources: 100
 - Subsidies (by whom): 0
 - Loans (including interest rate and payment period): 0
- Lifetime (service life): 20+ years
- Depreciation period: 4 years
- Annual operational cost incl. repairs, maintenance and other specific costs: 12.000,00 EUR
- Yearly energy savings: 2.500.000 kWh or equivalent to 80.000 EUR

Financial indicators	
Net present value - NPV	382 925,50 EUR
Internal rate ratio - IRR	8,25%
Payback period - simple	10 years
Payback period - discount	12 years
Evaluation year	2016
Lifetime period	20 years
Discount	3,00 %

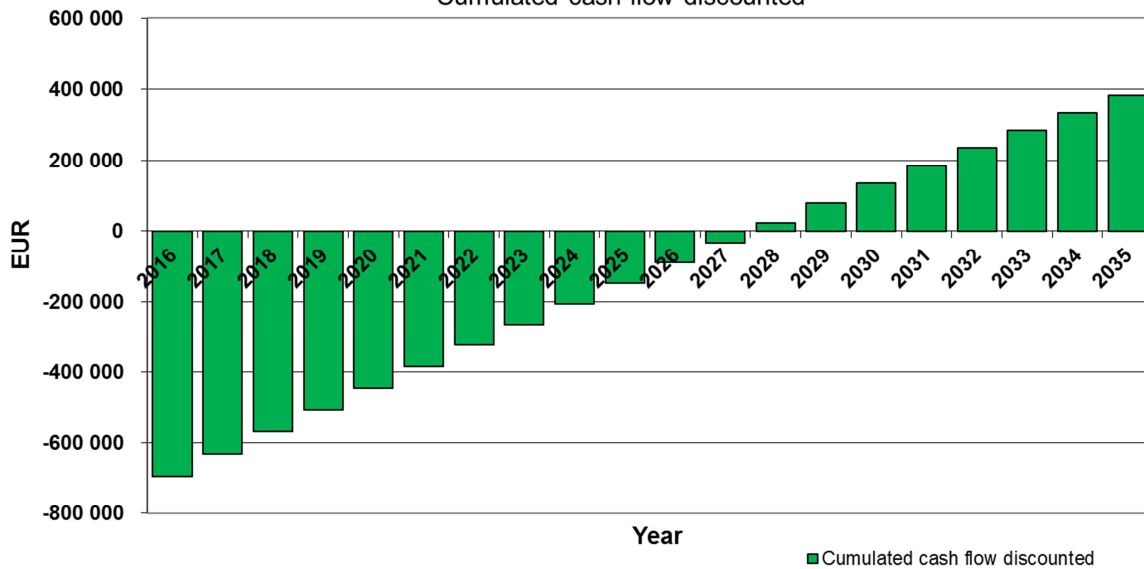


Reconstruction of boiler room plant in General County Hospital "Dr. Tomislav Bardek" Koprivnica
 Investor's cash flow



Reconstruction of boiler room plant in General County Hospital "Dr. Tomislav Bardek"
 Koprivnica

Cumulated cash flow discounted





- Pictures of the action





Best practice 2:

- **Name of the action:**
New HVAC system at Open university Koprivnica, Domoljub odeum hall

- **Time period / year of realisation:** 2016

- **Description of the action:**
Starting position/situation with mechanical engineering system was installed gas heating boiler of 170 kW (initially installed in 1973) and no air conditioning. After years of attempts to solve HVAC problems through variety of different approaches and different partners Open University teamed up with REA North to prepare and implement works in the most efficient way. Agency got involved from the early start with full confidence from Open University management and it executed energy audit and proposed potential solution that was accepted by University's management. Besides, they jointly tackled the potential for co-financing and successfully managed to get some. After preparation of procurement and its implementation, works were successfully executed by a domestic (local) company. New situation with mechanical engineering systems is condensing boiler of 49 kW, + heat pump air/air 41 kW + new ventilation chambers + recuperation. At the end of the investment University added (Agency proposal) thermal insulation of the ceiling (planned as subsequent measure) at cost of only 1.500 EUR.

- **Partners involved:**
Open University Koprivnica
Regional Energy Agency North

- **Key results:**
New and extended HVAC system, confirmed successful cooperation among partners, successfully used co-financing funds from national ministry, successfully implemented subsequent energy efficiency measure

- **Success factors identified:**
Agency's involvement from an early start (energy audit...) and control of the preparation and implementation process, secured sufficient funding, adequate local competences and experience (within private sector) needed for executions of works

- **Barriers / restrictions / obstacles encountered:**
Complicated structure of the building, legal barriers and restraints in terms of technical and security regulations



- **Ways to deal with barriers / obstacles / problems:**

Critical aspects for dealing with barriers/obstacles/ problems were detailed analysis of starting position/situation, extensive understanding of legal framework and good network of individuals and organizations that can help/assist in the process and that is exactly what Agency secured. Regular communication and meetings between involved partners and individuals was critical as well.

- Contact, website: www.pou-kop.hr
- Pictures enclosed separately

Investment (EUR):

- Overall investment costs: 95.000,00
 - From that...
 - Own sources: 28.000 EUR
 - Subsidies (by whom): 67.000 EUR by Ministry of Culture
 - Loans (including interest rate and payment period): 0
- Lifetime (service life): 20 years
- Depreciation period: 4 years
- Annual operational cost incl. repairs, maintenance and other specific costs: 1.000,00 EUR
- Yearly energy savings: 46.000 kWh or equivalent to 1.000 EUR

Note: This project is not focused on investment retur models - it is a great example how additional funding was used. In addition this investment was „must do“ because of the legal framework as the past system did not fulfill legal requirements.

2.6 Płońsk

2.6.1 Basic information on the region/area:

Name of the region / area: **Gmina Miasto Płońsk (City Municipality of Płońsk)**

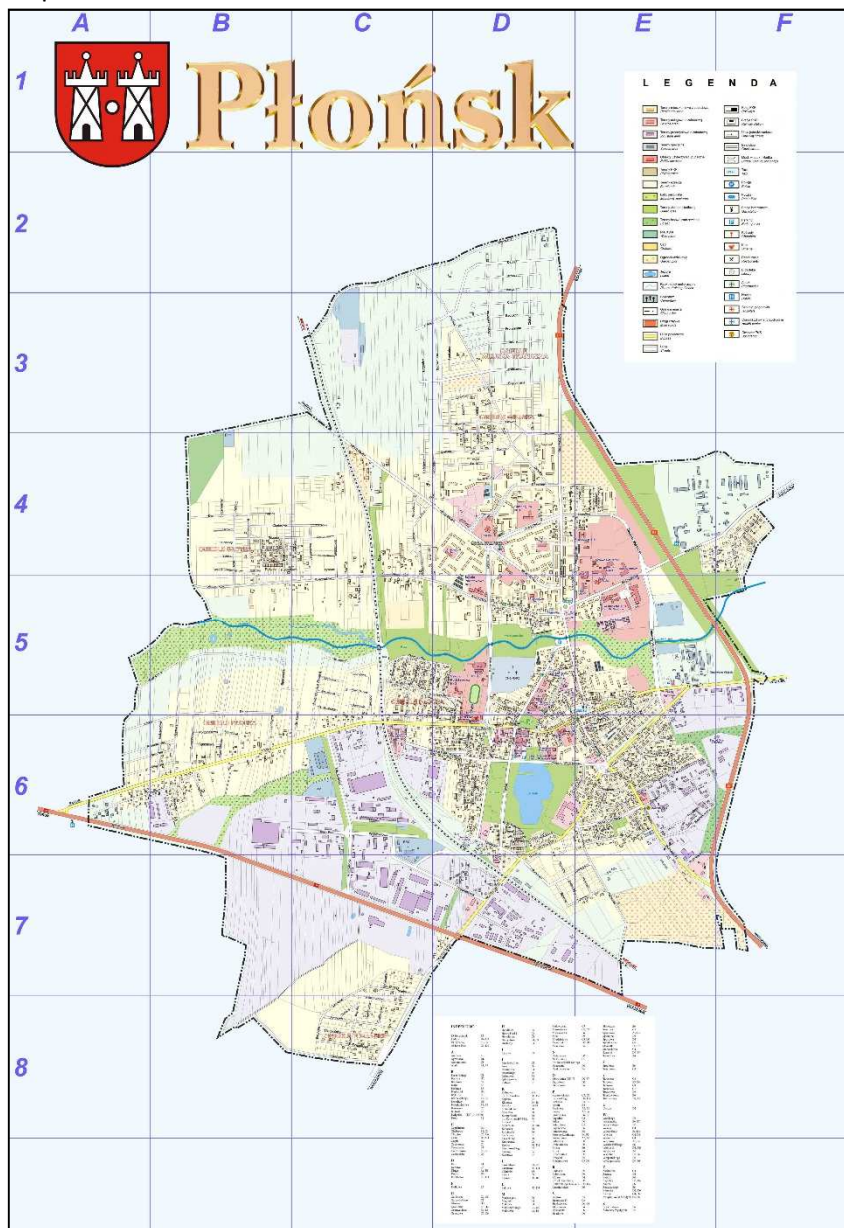
Population: 22.500 inhabitants

Area size: about 12 km²

GDP 2016: 379 mil EUR

GDP per capita 2016: 17.646 EUR

Map of the area:





2.6.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.2 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification off EE finds
Planning and policy – City Development Strategy	Framework for investment realization Strategy includes ecological policy, which set up targets related to EE – e.g. increasing usage of renewable energy sources, boosting energy efficiency in public and housing sector	1 300 000 EURO for future investments (within strategic tasks) related to EE	own sources (municipal budget), EU funds	Core financing, project funding
Planning and policy – City Revitalization Program	Framework for investment realization	2 000 000 EURO for future investments related to EE	own sources (municipal budget), EU funds	Core financing, project funding
Educational activities	Lectures in schools and special events (e.g. Earth Day with Ecological Week)	5000 EURO annually	own sources (municipal budget),	
Partnership within Płoński Energy Cluster (other partners are Płoński Municipality, University of Ecology and Management in Warsaw, municipal companies)	Aims of Cluster are to promote and initiate local projects in the field of energy production, implement energy-saving and highly-efficient technologies, support the production of electricity and heat in combination (cogeneration) obtain local energy balancing, increase in innovation resulting from the cooperation of local enterprises with scientific-research units, educate residents in the field of renewable energy sources and building human		own sources (municipal budget),	



	capital, create sustainable and self-sufficient energy areas, develop energy strategy.			
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- What **EE projects** have you realised in recent 5 years and how were they financed

EE project	Short description	amount of funds needed	sources of financing (structure)	classification
Insulation of public facilities in Płońsk	Insulation of the buildings of Primary School No. 3 and Junior High School No. 1 in Płońsk and the adaptation of the former school in <i>Goszczyce Średnie</i> to the function of the Center of Education, Prevention and Integration of the Municipality of Płońsk. Project covered building expansion, renovation and thermo-modernization and additionally land development.	417.202,18 EUR	30% own municipal sources 70% European regional development fund	Project funding
Insulation and purchase and assembly of solar collectors for the Municipal Sports and Recreation Center in Płońsk	- insulation of the flat roof and replacement of aluminum joinery of external walls with a basin for swimming; - wall insulation and replacement of window joinery and hall runway gates; - roof insulation; - comprehensive modernization of the heating system, including: replacement of internal installations (heating + hot water) of sports hall, installation of solar collectors on the roof with modernization of the substation; - modernization of the water system; - modernization of the lighting system with adaptation of internal electrical installations.	913.636,67 EUR	30% own municipal budget 70% EEA grants funds	Project funding
Improving the energy efficiency of public buildings in the Commune of the City of Płońsk	The project includes a deep energy modernization of 4 public buildings: Primary School No. 2, Primary School No. 3, Primary School No. 4 (at Grunwaldzka Street), and Kindergarten No. 1. The project includes insulation of roofs and flat roofs, insulation or replacement of floors, insulation of walls, replacement of windows and	1.262.721,49 EUR	20% own municipal budget 80% European regional development fund	Project funding



	doors, replacement of lighting for energy-saving, modernization of heating systems, replacement of radiators, installation of photovoltaic cells, installation of subsonic valves and thermostats, and even installation of a weather monitoring unit.			
Low-Emission Economy Plan for the City of Płońsk	<p>The goal of the Low-Emission Economy Plan for the City of Płońsk is to present a range of actions that can be implemented due to the reduction of final energy consumption and reducing emissions of pollutants and greenhouse gases into the atmosphere. This goal is convergent with the current environmental policy of the Municipality of Płońsk and fits in with its current energy policy.</p> <p>The purpose of the document is to present the results of the emission inventory greenhouse gases and analysis of the measures adopted for implementation. Specific purposes include:</p> <ul style="list-style-type: none"> • further development of energy planning and development of energy management in the commune, • reduction of end-use energy consumption and fuels in particular sectors of energy usage, • reduction of emissions to the air related to energy consumption and fuels in the commune, • implementation of the "exemplary role of the public sector" in the rational energy management area (in accordance with the Energy Efficiency Act), • involvement of all participants in the local energy market in activities reducing energy consumption and greenhouse gas emissions, • ensuring broadly understood energy security of the commune, • meeting the requirements of the National Fund for Environmental Protection and Aquatic Economy 	15.952,38 EUR	85% European regional development fund 15% own municipal budget	Programme funding



	concerning the form and scope of the Low Carbon Economy Plan.			
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2.6.3 Current funding mix matrix for EE financing in Płońsk (in 2017)

		<i>Unrestricted</i>							
		General fundraising			Core financing				
		Overall = 0 EUR			Overall = 3 300 000,00 EUR				
		<i>own 0%</i>	<i>external 0%</i>	<i>loans 0%</i>	<i>own 0%</i>	<i>external 0%</i>	<i>loans 0%</i>		
<i>Short-term</i>		Project funding			Programme funding			<i>Long-term</i>	
		Overall = 2 593 560,34 EUR			Overall = 15 952,38 EUR				
		<i>own 27%</i>	<i>external 73%</i>	<i>Loans 0%</i>	<i>Own 15%</i>	<i>external 85%</i>	<i>Loans 0%</i>		
		<i>Restricted</i>							

Low-Emission Economy Plan for the City of Płońsk is the document that helps us to apply for external funds.

2.6.4 Existing experience in Płońsk

- **Is there any EE financial strategy available for your region?**

The City Municipality of Płońsk doesn't have the EE financial strategy. It doesn't exist any other EE financial strategy for the region. We have only strategic plans for the city for example, City Development Strategy which includes the main ecological investments and their financing. Generally, the City Municipality of Płońsk has to apply for the European or National funds to realise the EE investments. The programmes could provide max.80% of the projected cost on the proviso of the CMoP granting 20% of the cost

- **Who officially approved the EE financial strategy and for how long period?**

Generally, all strategic plans have to be signed by the mayor and then approved by the city council. In the case of creating strategic documents, we always take into account a wider time perspective, eg. The City Development Strategy covers 2014-2020 and City Revitalization Program 2016-2023.

- **Indicative yearly budget for EE financing:**

- 2017 – 390 607,85E
- 2018 – 228 857,81E (projected costs)
- 2019 – 1 104 188,31E (projected costs)



- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
<ul style="list-style-type: none"> – Planning by the local self-government authorities of the development of the energy sector at the municipal level. – Creating low-emission economy goals and instruments by local government. – Ecological and innovative sources of heat generation and electricity in PEC in Płońsk Sp. Z o.o. – The existence of modernized heating networks in the area of the Płońsk Municipality. – Extensive experience of LGUs and municipal companies in obtaining external financial resources. – Large potential in terms of electricity and cold demand. – Large potential for improving energy efficiency in housing and street lighting. – High awareness of the transformation of the energy market in self-government authorities. – Extensive experience of self-government authorities in the implementation of renewable energy projects. – Cooperation with other Polish and international clusters. -Links with scientific and research institutions guaranteeing access to new technologies and improving existing technological solutions. -High technological potential of some Cluster entities guaranteeing the possibility of creating innovative solutions in the area of energy and closed circuit management. -Active participation of the Municipality of Płońsk and its municipal companies in innovative 	<ul style="list-style-type: none"> -The climate and energy policy of the European Union, which promotes the development of distributed energy, including renewable energy and projects aimed at improving energy efficiency. -Striving for a wider use of renewable energy sources in the country, including transport biofuels. -Development of competitive fuel and energy markets in Poland. -Systematic development of technologies enabling storage of surplus energy generated from RES. - The demand for innovative activities in the Polish economy which is growing due to the challenges of global competitiveness. -The existence of economic instruments stimulating cooperation between enterprises and science and research units. -The growing awareness of entrepreneurs and representatives of LGUs of the benefits of participating in the implementation of R & D projects. -Possibilities of using research infrastructure by enterprises being Cluster Partners. -Progressive increase in innovation in the field of technological solutions in the field of distributed energy, including RES.



<p>international projects.</p> <ul style="list-style-type: none"> -Cooperation with universities offering the opportunity to train specialists with a profile consistent with the expectations of Cluster Partners. -Good experience of the Płońsk Municipality in cooperation with universities. 	
<p>Weaknesses</p> <ul style="list-style-type: none"> -Absence (or insufficient) of production capacity for waste management for energy purposes. -No electric transport, fueled by ecological fuels or biofuels. -No transport powered by LNG and CNG. -Lack of (or insufficient) capacities associated with energy storage. -Lack of data base for heat / cold demand for electricity, gas fuels and transport fuels. -Insufficient potential to carry out activities in the field of energy generation and distribution, and in the area of energy efficiency improvement. -Lack of infrastructure for supplying cold to public buildings and business entities. -Unfavorable cooperation of local government units with the local power distribution grid. -Failure to adapt the operator system, in particular the MV / LV network infrastructure for the development of the island electricity market (in the field of automation and infrastructure control). -Unexplored research and development potential of municipal and private enterprises. -Insufficient cooperation of research and development units and universities with entrepreneurs operating on the local market. -Insufficient financial potential for carrying out R & D activities as well as for implementation of developed solutions. -Little experience in implementing innovative 	<p>Threats</p> <ul style="list-style-type: none"> -Lack of stability of energy law (sense largo) and law regulating economic activity, including tax law. -Uncertain support system for energy from RES and cogeneration, which generates risks related to the economic viability of investments in this area. -No government document "Poland's energy policy until 2050", which should set strategic directions for the development of the Polish energy sector. -Possible incompatibility of Polish energy policy with the European Union's energy and climate policy. -Lack of a systemic approach to the fight against low emissions, which hinders the development of optimal solutions at the local level. -Strong position of the lobby supporting conventional energy production methods, which results, inter alia, in lack of equal treatment of entities in the energy sector -Conflict of interests of local energy producers and prosumers (including Cluster Partners) with large energy companies. -A large, in many cases difficult to overcome, technological gap between Polish and foreign enterprises. -Long period of commercialization of innovative solutions, causing in many cases "aging" of developed solutions. -Problems with obtaining effective and effective patent protection by Polish entrepreneurs outside the country. -Lack of reliable, supporting R & D, solutions in the field of tax law.



solutions in business practice.

-Relatively weak security for Polish enterprises, research and development units and universities against economic espionage and cybercrime.

• **Which EE activities are planned to be supported in next periods:**

- Revitalization of the buildings located on the city square – CMoP already received a financial grant for complex revitalization of 3 tenement buildings located on the city square (renovation includes: insulation of roofs and flat roofs, insulation or replacement of floors, insulation of walls, replacement of windows and doors, replacement of lighting for energy-saving, modernization of heating systems, replacement of radiators etc.) Project implementation is planned on 2018-2020.
- Within the frames of “Płoński energy cluster” CMoP foresees the development of the following documentation:
 - Energy balance for the Płoński Energy Cluster.
 - Analysis of the conditions and potential for the development of distributed energy.
 - Estimation of the potential of RES energy production.
 - Energy efficiency improvement plan.
 - Energy management system (EMS) - Analysis and implementation of the management system; controlling and registering energy and media consumption, monitoring of energy efficiency indicators, among others in public buildings, in outdoor and street lighting systems, etc. This study can be treated as a basis for activities towards the construction of intelligent networks.
- “Płoński energy cluster” recommends conducting the continuous insulation of public utility buildings.

• **Which of the ways of financing energy efficiency investments do you consider the most effective?**

- 1 **EU funding**
- 2 loans / grants from **national co-financing programs**
- 3 bank loans
- 4 own resources
- 5 other

• **Monitoring process and evaluation of EE financing policy implemented**

Projects financed from external funding are monitored on a yearly basis. Evaluation is carried out using indicators from the projects, e.g. energy production from renewable energy sources, reduced emission of carbon dioxide, energy savings.



2.6.5 Best practices and investments return models in Poland

Best practice 1:

- **Name of the action:**

Reconstruction and extension of the tenement building located at Kościuszki Street 3b in Płock. Change of the way the ground floor of the building is used for the needs of the Audiovisual Department of Książnica Płock.

- **Time period / year of realisation:** 30.09.2018 – 31.03.2020

- **Description of the action (1500-2000 characters):**

A tenement house located at Kościuszki Street 3b in Płock is located on a plot of 3 473 m². The area of buildings after the project implementation will amount to 578,4 m² (the building in the present state covers 220,9 m²). It is a building built on a rectangular plan with dimensions of 12,52 m x 20,69 m, partly with a basement and a one-storey attic. The purpose of the reconstruction is the revalorisation and modernization of the existing building at Kościuszki Street 3b and giving it new functions residential and service building. On the ground floor, the Mediateka - Audiovisual Collections Department of the Płock Library will be located. On the first floor and attic there will be a residential part. The ground floor of the building will be adapted to the needs of disabled people. The media library will be a public utility, fulfilling a social function, providing music resources and other digital resources and offering an educational program. The usable area of Mediateka will be 481,9 m².

The scope of work under this project includes:

- construction works - foundations of the ground floor, basements will be filled up
- electrical installations - power supply of the facility, main switch, electricity measurement, switchgears and electrical boards, power supply of fire devices, internal power lines, power supply and control of sanitary equipment, electrical installations on the ground floor, electrical installations in heat node, emergency lighting installation, installation of external lighting, installation of earthing and equipotential bonding, lightning protection installation, installation of protection against shocks, laying of cables in the ground
- sanitary installations - cold water, hot water and circulation installations with sanitary facilities, hydrant installation, central heating installation, technological heat installation, mechanical ventilation and air conditioning installation, sanitary sewage system; external sanitary plumbing installations
- teletechnical installation
- substation will supply the entire building
- investor supervision

The technical condition of the foundations, walls and basements is unsatisfactory, and locally bad (moisture, mold, salinity, numerous installation punctures have weakened the structure of the walls). The technical condition of the walls of the above-ground part of the building is unsatisfactory and locally bad (scratches and cracks as a result of uneven settling, low thermal insulation, moisture and mold, plaster losses). The technical condition of the ceilings above the basements is unsatisfactory (beams from railway rails are corroded, the vault fragment has collapsed). The technical condition of the ceilings of the ground floor and the attic is bad (wooden elements have been subject to biological corrosion under the influence of moisture, lack of parts of supports, collapsed fragments). The technical condition of the wooden structure and covering



the roof, stairs and floors is bad. The technical condition of the door and window joinery is varied (satisfying new ground floor windows, bad attic windows and doors). The building was equipped with the following installations: sanitary desalination, water installation. Other residual installations partly dismantled.

- **Partners involved:**

Inwestycje Miejskie Spółka z o.o. - municipal company (100% ownership of Local Government Units)
BGK (Bank)

- **Key results** (300 - 500 characters):

The tenement house will be revitalized and restored for exploitation. Thanks to the launch of Mediateka in the new location, the availability of the Mediateka offer will increase, and it will be expanded with new activities. The project will have a positive impact on environmental protection and energy consumption. The building, after reconstruction and extension, will meet current energy efficiency standards in the field of heat transmission. In addition, LED lamps will be used for lighting in the Mediatek. The EP demand indicator for the planned building is to be 129,30 kWh/m²/year.

The project will affect:

- increasing the access of residents to various forms of spending free time, mainly related to culture.
- will create a place accessible to people of all ages and will be a place of social integration and self-development of the inhabitants of Płock.
- as a result, the project will contribute to the development of human and social capital, social integration and counteracting social exclusion as well as equalizing educational opportunities.
- improvement of aesthetics, land development and building in accordance with the needs of residents; implementation of the project will contribute to the improvement of the spatial order and aesthetics of this part of the city, as well as to save from the total degradation of the tenement building.
- improvement of the quality of the natural environment due to meeting current energy efficiency standards in the field of heat transmission and the use of LED lighting
- adaptation of the building to the needs of disabled people (wheelchair ramps, toilet etc.).

- **Success factors identified** (300 - 500 characters): The investor has a valid building permit and detailed designs. The building is not an object entered into the register of monuments and is not covered by conservation protection. The tenement house is currently out of service.

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters): The building is located in the area of the old part of the city, the urban and architectural complex and cultural layers of the city of Płock, entered into the register of monuments under number 51/182 / 59W, the date of entry on November 16, 1959. A small risk of non-payment of the loan on time.

- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):

The way to deal with problems and obstacles is the developed plan took into account some flexibility in the implementation of the investment. The economic analysis and the investment concept has set the appropriate prices for renting buildings.

- **Contact, website:** sekretariat@inwestycjemiejskie.pl, a.leonow@inwestycjemiejskie.pl
<http://www.inwestycjemiejskie.pl/kontakt>

Investment (EUR):

- Overall investment costs: 820 050,25 EUR
 - Own sources: 0 EUR
 - Subsidies (by whom): 0 EUR
 - Loans (including interest rate and payment period): I loan under the RPO WM 2014-2020 (Jessica Initiative) – 639 636,80 EUR and II commercial loan – 180 413,45 EUR

The loans from the Jessica Initiative were calculated under the following conditions:

- NPB reference rate 1,50%
- "Social indicator" at the level of 80%
- Resulting interest rate on the financial forecast (fixed) 0,3%
- Grace period for repayment of principal installments until 30/04/2020
- Repayment period 10 years from April 30, 2020.
- Quarterly installments

Commercial loan on market terms:

- Floating interest rate - 3 p.p. above the reference rate
- Commission – 930,30 EUR (4,000 PLN).
- Repayment period - 10 years
- Quarterly installments.

- Lifetime (service life): 10 years

Operational features (EUR):

- Annual operational cost incl. salaries, repairs, maintenance and other specific costs: without depreciation 72 139,39 EUR ; with depreciation 354 397,58 EUR
- Annual revenues – please specify which and how much in EUR: improvement of the energy efficiency of the building, 1 065 517,04 EUR

Financial indicators:

The adopted discount rate is 4%.

NPV = 211 054,73 EUR (909 667 PLN)

IRR = 7,7%



Building view (state before demolition)



Visualization of the building after reconstruction and expansion



Best practice 2:

- **Name of the action:**

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

- **Time period / year of realisation:** 15.06.2006- 31.12.2007

- **Description of the action** (1500-2000 characters):

The modernisation of Płońsk'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 into the atmosphere, and the production of clean electricity is compliant with the guidelines in the Polish National Energy Policy, which promotes the production of energy from renewable resources. The fundamental objective related to the erection of a combined heat and electrical energy production system based on biomass firing is to decrease the emission of greenhouse gases by replacing the type of fuel combusted from fine coal to biomass, that is wood cuttings. The most important element for the project implementation was the modernisation of the existing central heating source in order to convert it to become biomass fired, modernisation of the heat distribution networks and heating substations. 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 Płońsk was adjusted to be wood cuttings fired. The Energy Globe awarded technology allows for the production of energy considered to be 100% ecological. The annual energy production will be equal to 11,000MWE. The annual combustion will include 25,000 tonnes of biomass and the consumption of fine coal will decrease by 70%. The CHP Station will be able to manage and combust biomass from an area of around 800 hectares of cultivated energetic plants. As part of the investment, about 8000 m of traditional networks were replaced with pre-insulated pipe networks and 15 single-function nodes and 14 dual-function nodes were built. This allowed to significant reduce of transmission losses and distribution of the heating medium. A biomass-fired boiler was installed, cooperating with the turbogenerator. Almost 80% of heat energy and 100% of electricity is produced from RES. The heating network is one of the few effective networks in the country. The project of the municipal company consisting in the comprehensive modernization of the Płońsk heating system in 2007 was awarded the global Energy Globe award. The total investment cost was over 8,5 mln euro. Płońsk was the first town in the country to invest in such a modern and comprehensive renewable green fuel energy.

- **Partners involved:**

Ecofound – 2 819 750,00 Euro - subsidy,

National fund for environmental protection and water management - 4 456 250,00 E - loan,

City municipality of Płońsk - loan security and recapitalization of the Company,

Heating System Company - 1 154 500,00 E - own funds of the Company



- **Key results** (300 - 500 characters): Thanks to the investment, it was possible to lead to:
 - reduction of pollutant emissions due to the increased efficiency of production and combined economy as well as the replacement of coal with biomass
 - Reduction of CO₂ - 35.000 Mg / year, ie 77.2%
 - Reduction of SO₂ - 144 Mg / year, ie 63.8%
 - Reduction of NO_x - 54 Mg / year, i.e. 63.3%
 - Reduction of Dust - 151 Mg / year, ie 76.7%
 - Reduction of CO - 29.8 Mg / year, ie 19.3%
 - Reduction of soot - 4.8 Mg / year, ie 76.5%
 - reduction of the emission of the secondary pollution from stored coal, whose storage inventory has decreased by approx. 50%
 - reduction in the amount of noise emitted - as a result of a smaller number of devices emitting noise located outside the building
 - reduction of solid waste (slag and ash) by approx. 65%.

- **Success factors identified** (300 - 500 characters):

Over the period of 10 years of operation of the Heating Power Plant, approximately 2.3 million GJ of heat were produced and approx. 60 thousand MWh of electricity. Around 250,000 tons of biomass were burned. Burning biomass, the amount of burnt coal was reduced by 125 thousand tons. It allowed to reduce the emission of:

- Carbon dioxide - 275,000 tons,
- Sulfur dioxide - 1530 tons,
- Nitrogen oxides - 450 tons,
- Dust - 3250 tons,
- Ashes - 17,500 tons.

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):

- lack of qualified engineering staff - necessity of employing a substitute investor - increase of investment costs,
- difficulties in familiarizing with a similar, working installation,
- negotiation of the amount and quality of loan collateral from National fund for environmental protection and water management - necessity of joining the City,
- conviction of the City Council to establish collateral for a preferential loan from the National fund for environmental protection and water management
- difficulties with complete financial closure - the need to obtain a trade credit,
- ensuring decent working conditions for the crew during the implementation of the investment, in particular during the winter,
- significant increase in prices of materials at the turn of 2006/2007 - convincing the contractor to continue the investment on contractual terms from 2005,
- a problem with choosing a turbine,
- problem with obtaining a license for electricity production and start-up of a combined heat and power plant.

- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):
efficient coordination of activities, development of a plan, taking into account some flexibility in the implementation of investments, compliance with the schedule, support of the city.
- **Contact, website:** kontakt@pecplonsk.pl, Przedsiębiorstwo Energetyki Ciepłej Sp. Z o.o., ul.Przemysłowa 2,09-100 Płońsk
- **Pictures of the action**





Investment (EUR):

- Overall investment costs: 8 430 500,00 Euro (1 Euro = 4 Zlotys)
From that...
 - Own sources: 1 154 500,00 Euro (own resources of the company)
 - Subsidies: 2 819 750,00 Euro (resources of the Ecofund)
 - Loans (loan taken out for the period of 10 years with interest rate of 2%): 4 456 250,00 Euro - National fund for environmental protection and water management

- Lifetime (service life): 25 years



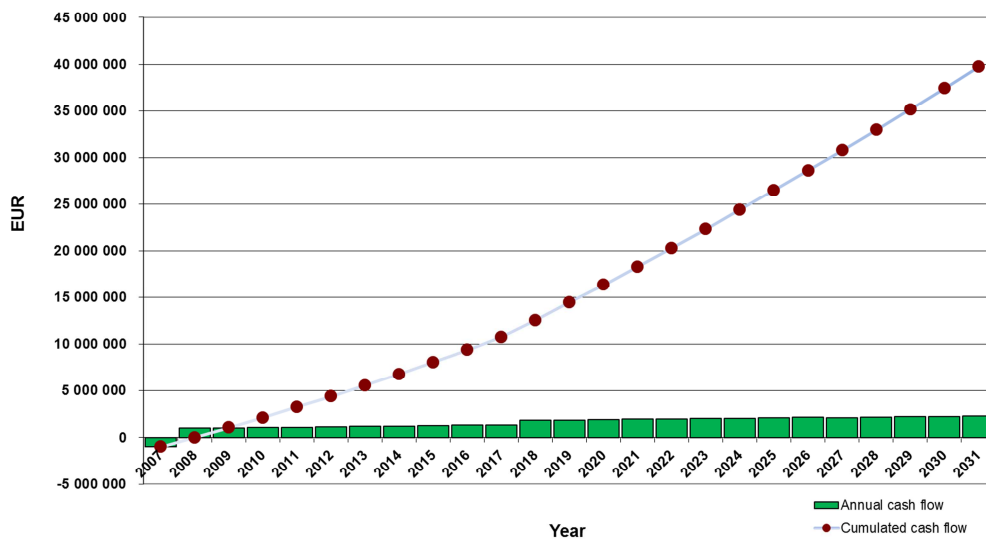
BOOSTEE-CE

Operational features (EUR):

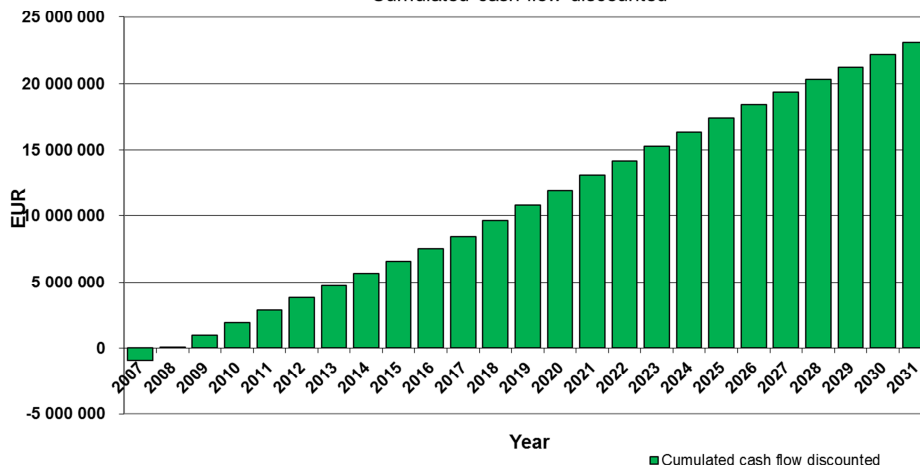
- Annual operational cost incl. salaries, repairs, maintenance and other specific costs: 42 766 825,75 Euro
- Annual revenues – please specify which and how much in EUR: 44 274 191,00 Euro

Financial indicators	
Net present value - NPV	23 066 650,35 EUR
Internal rate ratio - IRR	109,12%
Payback period - simple	1 years
Payback period - discount	1 years
Evaluation year	2007
Lifetime period	25 years
Discount	4,00 %

Modernization of the Heating System of Płońsk



Modernization of the Heating System of Płońsk
 Cumulated cash flow discounted





2.7.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)
n/a			

- What **EE projects** have you realised in recent 5 years and how were they financed

EE project	Short description	amount of funds needed	sources of financing (structure)	Classification of EE funds
Reconstruction, thermo-modernization of the Health Center building in Chełmsko Śl. (2013)	Insulation of walls, replacement of windows and doors, replacement of central heating and hot water installations with a change of heat source to heat pump, replacement of sanitary installation, roof covering with insulation and chimneys reconstruction	PLN 499,664.20	EU Regional Operational Programme (ca. 85%) and municipal sources	project funding
Modernization of sanitary facilities, heating installation and boiler rooms in the Daycare Centre In Bukówka (2013)	reconstruction and renovation of sanitary facilities and replacement of the building heating system along with heaters	PLN 60,116.15	EU Regional Operational Programme (ca. 50%) and municipal sources	programme funding
Modernization with the enlargement of the Public Schools Complex at Mickiewicza St. 4 in Lubawka, stages V and VI (2014)	V: Sewer connection VI: Installation of windows, façade and insulation of the building	PLN 645,329 (stage V and VI)	municipal sources	project funding
Purchase and installation of a steam boiler in the Public Schools Complex in Chełmsko Śląskie (2015)	New steam boiler installation	PLN11,542	municipal sources	project funding
Reconstruction, thermo-modernization of the primary school building in	roof covering with insulation, chimneys reconstruction insulation of walls, replacement of windows and doors, replacement of central heating and hot water installations,	PLN557,221	EU Regional Operational Programme (ca. 75%) and municipal	project funding



BOOSTEE-CE

Miskowice (2014-15)	replacement of heaters and installation of thermostatic valves, replacement of two solid fuel boilers of 50kW, each with control and weather automation, installation of a hot water tank of 400 l, installation of solar collectors; installation of PV panels with electrical installation		sources	
Increasing the energy efficiency of the building of the Public Schools Complex in Chełmsko Śląskie (2017)	insulation of external walls and flat roof, vertical insulation of foundation walls, roofing and renovation of stairs, central heating and hot water installations, boiler rooms, electricity supply, indoor lighting installations, together with accompanying construction works	PLN2,833,018.77	EU Regional Operational Programme (ca. 82%) and municipal sources	project funding
Improving conditions of primary and secondary education through building enlargement and reconstruction of the Public School Complex in Lubawka, 1st stage (2017-18)	A large school modernization including among others a reconstruction of: a heating system: heaters and pipes, equipment and fittings of the boiler installation, devices in the boiler room, smoke channels, insulation: a hot water preparation system: hot-water pipes and appliances in the boiler room, insulation.	Heating system: PLN382,013.16 Hot water system: 35,867.78	EU Regional Operational Programme (ca. 80%) and municipal sources	project funding
Increasing energy efficiency of the historic City Hall building in Lubawka (2017-18)	replacement of windows and window sills, a new floor on a part of the ground floor with insulation, replacement of doors, insulation of window niches, insulation of internal walls adjacent to unheated rooms, roof insulation over heated rooms and ceilings under heated rooms, modernization of the roof, replacement of light sources for LEDs, correction of the heaters location and their installation	PLN864,461.01	EU Regional Operational Programme (ca. 85%) and municipal sources	project funding



2.7.3 Current funding mix matrix for EE financing in your area (in 2017)

		<i>Unrestricted</i>							
		General fundraising			Core financing				
		Overall = 0 EUR			Overall = 0 EUR				
		<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own %</i>	<i>external %</i>	<i>loans %</i>		
Short-term		Project funding			Programme funding			Long-term	
		Overall = ca. EUR741,000*			Overall = 0 EUR				
		<i>own ca. 20%**</i>	<i>external ca. 80%</i>	<i>loans %</i>	<i>own %</i>	<i>external %</i>	<i>loans %</i>		
		<i>Restricted</i>							

*Budget realization document for 2017 has not been issued by the Municipality yet. Usually, it is issued in midyear. Therefore, the overall value given in the Table is an estimation based on the investment realization reports prepared for certain parts of the investments. A budget plan for 2017 and the estimation of budget realization are given below.

EE financing in 2017 (according to the budget plan):

- Increasing energy efficiency of the historic City Hall building in Lubawka - PLN880,000
- Increasing the energy efficiency of the building of the Public Schools Complex in Chełmsko Śląskie - PLN1,840,000
- Improving conditions of primary and secondary education through building enlargement and reconstruction of the Public School Complex in Lubawka - PLN3,180,000 (this is a large school modernization including among many others a reconstruction of heating and hot water systems)

Estimation of EE financing in 2017 (according to investment realization reports and other information):

- Increasing energy efficiency of the historic City Hall building in Lubawka - the investment did not start in 2017; a call for tender was issued with a deadline of March, 2018
- Increasing the energy efficiency of the building of the Public Schools Complex in Chełmsko Śląskie - PLN2,882,909.56
- Improving conditions of primary and secondary education through building enlargement and reconstruction of the Public School Complex in Lubawka - PLN229,259.19 for modernization of heating and hot water systems (partial value)

Total: PLN 3,112,168.75= ca. EUR741,000

For comparison EE financing in 2016 (according to budget realization document issued by the Municipality) is given below:

- Increasing energy efficiency of the historic City Hall building in Lubawka - feasibility study and project application: PLN4,305.00
- Increasing the energy efficiency of the building of the Public Schools Complex in Chełmsko Śląskie - feasibility study and project application: PLN7,380.00
- Improving conditions of primary and secondary education through building enlargement and reconstruction of the Public School Complex in Lubawka - feasibility study and project application: PLN30,889.24



– Increasing the energy efficiency of the Lubawka kindergarten building - the investment did not start
 ** Financial sources defined as “own sources” might be and in fact are, at least in some part, bank loans taken for the implementation of programs, projects or tasks financed with funds from the European Union budget (so called “own contribution”) what is in accordance with the Polish Public Finance Act. It is hard to define how much money comes from those bank loans in case of specific projects.

2.7.4 Existing experience in partners regions

• **Is there any EE financial strategy available for your region?**

The Town and Municipality of Lubawka do not have a separate strategy for energy efficiency improvement and its financing, however, these issues have been addressed in several other strategic documents. These are:

- Low Emission Economy Plan for 2014-2020 with an outlook until 2030 for 15 municipalities of the Wałbrzych Agglomeration – Lubawka Municipality is one of the 15 municipalities covered by this Low Emission Economy Plan
- Lubawka Municipality Development Strategy 2017 – 2023
- Local Revitalization Program of Lubawka Municipality 2017-2022

• **Who officially approved the EE financial strategy and for how long period?**

The above mentioned documents have been approved by the Municipal Council as municipal resolutions. They are binding for 6-7 years depending on the type of the document.

• **Indicative yearly budget for EE financing:**

According to the strategic documents energy efficiency improvements are financed as concrete actions and for these specific actions indicative budgets are usually given. Therefore, the annual budget can range between several dozen thousand and a few million PLN depending on the scope of actions realized.

• **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths	Opportunities
<ul style="list-style-type: none"> - quite some experience in building thermo-modernization projects - good implementation of an idea of a model role of the public sector in energy efficiency management - energy cost savings due to realized EE projects 	<ul style="list-style-type: none"> - EU funding in frame of Regional Operational Programme available for energy efficiency improvements at least until 2020 - raising awareness among residents regarding their impact on the local energy efficient economy - national policy supporting the transformation towards the economy low-carbon in all sectors



Weaknesses	Threats
<ul style="list-style-type: none"> - dominance of an outdated heating system (individual heating systems prevail) - technical infrastructure partly requiring modernization and reconstruction or lack infrastructure - high degradation of transmission networks: electricity, water, waste water and gas (gas network exists only in the town of Lubawka) - low awareness of residents regarding environmental protection and flood risk - low income of the municipality - municipal budget deficit - lack of experience of financing energy efficiency in other way than EU projects - relatively slow RES development, - poor communication accessibility, - lack of bypass roads, - low awareness of residents regarding environmental protection and flood risk, - insufficient and energy inefficient lighting 	<ul style="list-style-type: none"> - significant decrease or lack of EU funding after 2020 - insufficient municipal resources for EE improvements - high prices of fuels and energy efficient equipment - dominance of an outdated heating system - high concentration of suspended dust in the air - low technical parameters of local and district roads - - technical infrastructure partly requiring modernization and reconstruction or lack infrastructure, - high degradation of transmission networks: electricity, water, waste water and gas.

• **Which EE activities are planned to be supported in next periods:**

"Low Emission Economy Plan for 2014-2020 with an outlook until 2030 for 15 municipalities of the Wałbrzych Agglomeration"

List of proposed actions concerning energy efficiency (apart from the ones that have been already realized and included in the table "EE project" in the chapter 2.2):

- Increasing the energy efficiency of the Kindergarten building at Dworcowa 27 in Lubawka. Implementation date: 2017-2018 Estimated financial expenditure of PLN 1.5 million
- Increasing energy efficiency of the historic City Hall building in Lubawka. Implementation date: 2015-2017 Estimated financial expenditure of PLN 2 million
- Revitalization of historical monuments, including historical urban layouts inhabited by socially excluded, economically and culturally people. Implementation date: 2015-2017 Estimated financial expenditure of PLN 5 million
- Thermo-modernization of multi-dwelling buildings. Implementation date: 2016-2020 Estimated financial expenditure: not specified

Lubawka Municipality Development Strategy 2017 – 2023

Specific objective in the Strategic Area SECURITY AND ENVIRONMENT: Environmental protection, in particular maintaining high air quality and increasing energy efficiency. Proposed tasks in the areas of strategic intervention:



- Exchange coal heating in the municipality. Deadline for implementation: 2019-2023. Sources of financing: Municipal budget and external funds. Indicators: Number of replaced boilers
- Control of the raw material used as fuel. Deadline for implementation: 2019-2023. Sources of financing: Municipal budget and external funds. Indicators: Measured air quality

Local Revitalization Program of Lubawka Municipality 2017-2022

Objective III: Modernization and development of infrastructure to improve its functionality and increase its usefulness for the revitalized area. List of proposed actions concerning energy efficiency

- Modernization of a residential building in Lubawka (at Al. Wojska Polskiego St.) with EE improvement – estimated costs PLN62,000
- Modernization of a residential building in Chełmsko Śl. (at Kamiennogórska St.) with EE improvement - estimated costs PLN 540,000
- Increasing energy efficiency of the historic City Hall building in Lubawka – costs PLN864,461.01

• **Which of the ways of financing energy efficiency investments do you consider the most effective?**

So far, in the Municipality of Lubawka EU funding has covered the majority of expenses for EE investments with own resources of the municipality playing the complementary role (forced by the rules of the EU Operational Programmes and partly financed from the bank loans). There is not much experience of financing energy efficiency in other ways.

• **Monitoring process and evaluation of EE financing policy implemented**

The most relevant ways of monitoring of local EE policy implementation are defined in the Low Emission Economy Plan for 2014-2020 with an outlook until 2030 for 15 municipalities of the Wałbrzych Agglomeration. The Mayor of the municipality is responsible for the plan implementation. Periodic evaluation of the implementation at the municipal level should examine:

- **a degree of implementation of listed projects and tasks,**
- a level of implementation of the assumed goals,
- discrepancies between the assumed goals and actions, and their implementation,
- reasons for the above discrepancies

There are several indicators defined for particular tasks such as: energy saving effect [MWh/yr], effect of reducing CO₂ emissions [Mg/yr], cost savings [PLN/yr] and overall implementation indicators such as: the number of thermo-modernized buildings, the number of revitalized historic buildings, the number of modernized facilities.

Other indicators that can be used for monitoring of the Low Emission Economy Plan implementation are for instance: total energy consumption in public buildings; the total area of installed solar collectors; the amount of electricity generated through local installations; the number of enterprises providing services related to energy and energy efficiency and companies operating on the renewable energy market; the employment level in the above mentioned enterprises, their revenues; number of inhabitants participating in various types of events dedicated to energy efficiency and/or use of renewable energy sources; number and value of green public procurement.

2.7.5 Best practices and investments return models

Best practice 1:

- **Name of the action:**
KAWKA - liquidation of the local heat source fired with solid fuel - the city of Jelenia Góra

- **Time period / year of realisation:** 2013-2016

- **Description of the action** (1500-2000 characters):

The main objective of the program is to reduce people's exposure to the impact of pollution, in particular PM10, PM2.5 and benzo(a)pyrene, threatening the health and life of people in zones in which there are significant exceedances of permissible and target concentration levels of these pollution and for which air protection programs have been developed. National Fund for Environmental Protection and Water Management (NFEPWM) allocated 400 million zlotys to subsidies granted for this purpose by the Voivodeship Funds for Environmental Protection and Water Management (VFEPWM). By implementing this program in their regions, VFEPWM determines the conditions of the contest and the types of final beneficiaries who qualify to co-funding. The total amount of subsidies may be up to 90 percent of eligible costs (the remaining 10 percent must be covered by the beneficiary), of which up to 45 percent comes from NFEPWM subsidies, and another 45 percent from VFEPWM.



The program has been operating since 2013. Up till now, two rounds of submitting applications to VFEPWM have taken place. There were 12 proposals for projects in urban areas where PM10 and benzo(a)pyrene concentrations exceeded standards and for which air protection programs are needed (36 cities in the first call and 48 cities in the second call for proposals). The beneficiaries of the majority of projects are self-governments, which allocate funds for the elimination of coal-fired heat sources in municipal buildings and houses belonging to individuals and housing communities. In many projects, the partners were local heating companies. In most cases, the projects concerned connecting consumers previously using coal-fired boilers and ovens to urban heating, and replacing coal (individual and central) heating with gas heating. In many cases, multi-family buildings have also been subjected to thermo-modernisation in order to achieve savings in energy consumption and reduce heating costs. In several projects was planned the installation of solar collectors as emission-free sources for the production of hot water.

- **Partners involved:**
National and Voivodeship Fund for Environmental Protection and Water Management
Direct beneficiary - property owner
Beneficiary of aid funds: City of Jelenia Góra

- **Key results** (300 - 500 characters):
Estimated reduction of CO2 emissions
Reduction of low emissions through the elimination of over 500 sources fired by solid fuels.
Estimated reduction of CO2 emissions: 134,000 Mg / year



Realization - status on 15.09.2016

Liquidation of emissions	PM 10 [Mg/year]	PM 2,5 [Mg/year]	CO ₂ [Mg/year]
EFFECT Proposal I	2,47	2,34	296,60
EFFECT Proposal II	1,41	1,34	144,70
EFFECT Proposal III	1,47	1,39	149,64
EFFECT Proposal IV	3,72	3,53	372,11
EFFECT Proposal V	2,84	2,70	295,71
EFFECT Proposal VI	5,39	5,11	1344,99
EFFECT Proposal VII	4,99	4,71	515,15
Sum	22,28	21,12	3118,90

	Number of units [pcs.]	Value of co- financing [PLN]	The number of decommissioned coal / coke furnaces [pcs.]
Proposal I	28	274 967,00	56
Proposal I - thermomodernisation of building DPS "Pogodna Jesień" st. Lesna 3	-	680 000,00	-
Proposal II	35	308 016,74	53
Proposal III	36	392 282,92	59
Proposal IV	102	1 043 246,51	155
Proposal V	79	795 748,33	128
Proposal V - thermomodernisation of building st. Chrobrego 9	-	54 129,81	-
Proposal VI	163	1 733 264,49	270
Proposal VI - connection to the heating network st. Grottgera 6	-	13 221,28	-
Proposal VI - thermomodernisation of building st. Boguslawskiego 26	-	76 798,38	-
Proposal VII	154	1 756 023,61	235
Sum	599	7 127 699,07	956

- **Success factors identified** (300 - 500 characters):

This is the only program also targeted at individuals. It allows for support and includes a package of incentives available where the individual heating system is the main source of low emissions. The beginning of the program was preceded by an information and promotional campaign, including: publishing a brochure,

organizing meetings, broadcasts on local radio and television, advertisements in the local press and on the website of the city of Jelenia Góra.

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):

Insufficient funds. Due to the very large interest in participating in the program, had to be created waiting lists. The decisive criterion for inclusion in the relevant list was the date when the inhabitants submitted their declaration of participation in the program. City of Jelenia Góra created regulations setting out detailed rules for granting co-financing.

- **Contact, website:**

<http://jeleniagora.pl/content/kawka-likwidacja-lokalnego-%C5%BAr%C3%B3d%C5%82-ciep%C5%82-opalanego-paliwem-sta%C5%82ym-1>

Detailed information is available from the Investment and Public Procurement Department City of Jelenia Góra, tel. 75 75 49 890, 75 75 46 315.

- **Pictures of the action**



Building of the social welfare house "Pogodna jesień" after thermomodernization. Thermomodernization works for the entire building were performed, the roof was insulated and the solar installation for hot tap water was assembled.

Investment (EUR):

- Overall investment costs:

The total value of the project for Jelenia Góra: 10 397 041,81 PLN = ca. 2 475 486,15 EUR

From that...

- Own sources:

Participation of program participants: 3 269 341,81 PLN = ca. 778 414,70 EUR

- Subsidies (by whom):

Subsidies VFEPWM in Wrocław (15%): 1 425 550,00 PLN = ca. 339 416,67 EUR

Subsidies NFEPWM (45%) : 4 276 650,00 PLN = ca. 1 018 250,00 EUR

- Loans (including interest rate and payment period):

Loans from VFEPWM in Wrocław (15%): 1 425 500 PLN = ca. 339 404,76 EUR



Best practice 2:

- **Name of the action:** Energy Management System in educational facilities in Sosnowiec (Silesia Region in southern Poland)

- **Time period / year of realisation:** 2013

- **Description of the action** (1500-2000 characters): A solution that increases energy efficiency of educational buildings was implemented under an agreement in the form of EPC between the Town Office of Sosnowiec and Siemens company. The contract with Siemens was concluded in 2013 for a period of 10 years as a result of a public procurement procedure conducted in a form of a competitive dialogue. The subject of the contract is an energy management service carried out in educational buildings of the city of Sosnowiec with use of an integrated energy management system that monitors consumption of energy and other utilities. The contract includes optimization of energy system parameters and operation of energy-consuming installations and other *utility equipment*. Siemens guaranteed a reduction in energy consumption in 81 educational buildings by 30.83% for heat and 25.17% for lighting. If the guaranteed savings are not achieved, Siemens covers them with its own resources.

- **Partners involved:** The Town Office of Sosnowiec and Siemens company

- **Key results** (300 - 500 characters): The contracted modernization included:
 - installation of control cabinets with on-line access in 81 objects
 - installation of thermostatic valves in 81 objects
 - installation of pump mixing systems in 33 objects
 - room control system with temperature regulation in 31 buildings
 - replacement of luminaires with energy-efficient ones in 33 objects
 - installation of electronic ballasts in luminaires in 15 buildingsInstalled power of light sources together with the ignition system before modernization was 1,743.39 kW. During the modernization a total of 19,224 lighting fixtures with ignition systems were replaced. The total power of lighting after modernization is 1,275.81 kW. A Monitoring and Energy Management Centre was established where technicians can optimize energy consumption in real time.

- **Success factors identified** (300 - 500 characters):

The energy modernization did not include any thermo-modernization (such as insulation of walls and ceilings or replacement of windows). The key solution for achieving such significant energy savings is the use of room temperature control systems in schools and the replacement of lighting.

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):
- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):
- **Contact, website:**

Investment (EUR):

- Overall investment costs: The town of Sosnowiec did not cover any investment costs. The cost of modernization and operation of energy management system is only covered by a part of the savings



obtained in the project, as more than 20% of the savings remain at the disposal of the city. The contract has a value of PLN 17.022 million and was concluded for 10 years.

The estimated yearly savings for heating:

- Total heat consumption - 163 501 GJ in a base year
- The total cost of heat - variable (gross) - 6 837 611 PLN
- Annual savings (guaranteed) - 30%
- Expected annual savings - PLN 2,403,814

The estimated yearly savings for electricity:

- Installed power of lighting - 1,743 kW in a base year
- The cost of electricity (power * 1300h (the assumed lighting time in h/a) * 0.51 PLN) - 1,155,868 PLN
- Annual savings (guaranteed) - 25.17%
- Expected annual savings - PLN 290,919

The estimated savings in 10 years:

- Savings in total after 10 years - PLN 23,742,650
 - Annual management fee - PLN 1,745,871
 - Total contract value - PLN 17,022,244
- Lifetime (service life): The contract was concluded for 10 years.

Operational features (EUR):

- Annual operational cost incl. salaries, repairs, maintenance and other specific costs: Annual management fee - PLN 1,745,871 (EUR 404,681)
- Annual revenues – please specify which and how much in EUR:

Savings in thermal energy consumption in the period from October 2013 to March 2014 - PLN 1,461,762 net (EUR 338,826)

Savings in electricity consumption generated as a result of lighting replacement = PLN 125 097,00 net (EUR 28,997)

2.8 Stadtgemeinde Judenburg

2.8.1 Basic information on the region/area:

Name of the region / area: Municipality of Judenburg

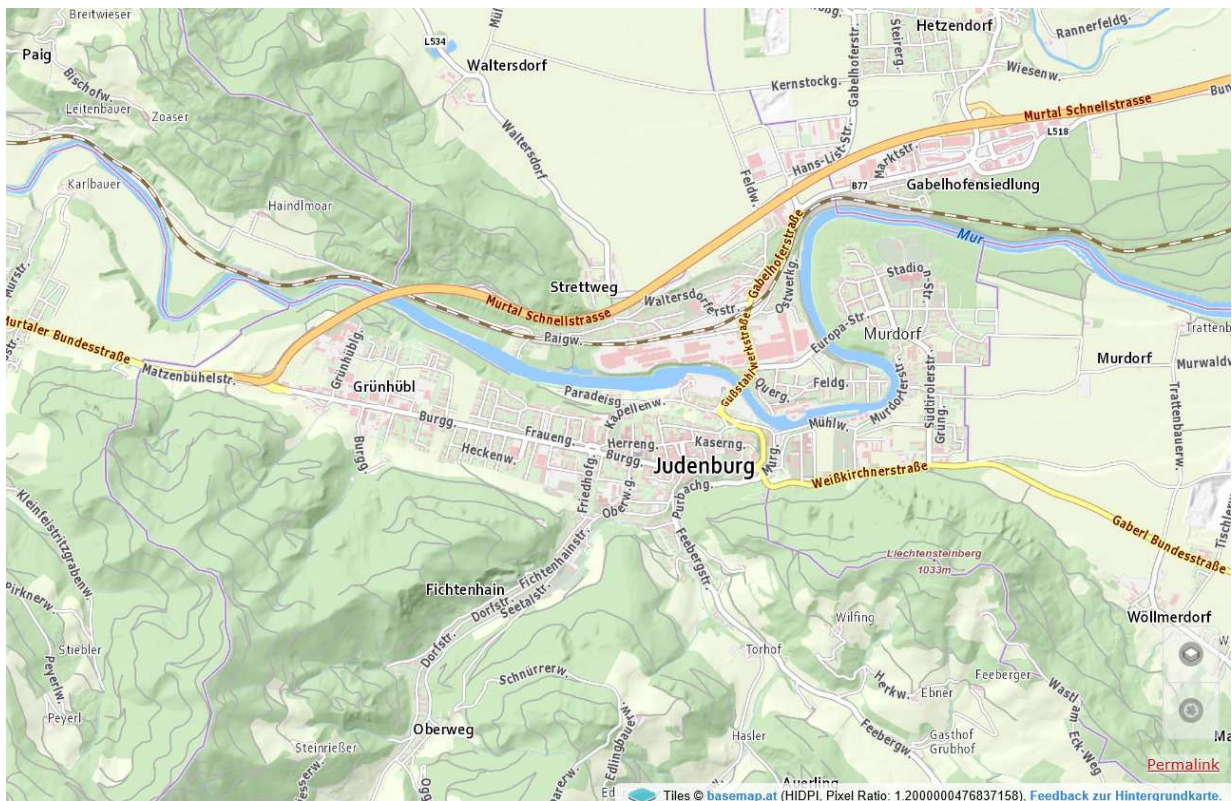
Population: 10,063 inhabitants

Area size: 63.77 km²

GDP 2016: 361,74 mil EUR

GDP per capita 2016: 35.948 EUR

Map of the area:



Source: basemap.at



2.8.2 Current EE financing situation:

- What **EE services** are you providing upon the classification from the section 1.1 and how are they financed (scale of services, amount of funds needed, sources of financing)

EE services	Scale of services	amount of funds needed	sources of financing (structure)	Classification off EE finds
Financial support for EE	Subsidies for thermal insulation, installation of biomass heating systems, thermal solar energy and PV-systems for households and businesses	15,000 € (budget for 2018)	100% own sources (municipal budget)	Core financing
Development and maintaining of energy management	energy accounting for public buildings: monitoring of electricity, gas, district heating, water consumption in town hall, building yard, museum, fire brigade, 3 kindergartens, 2 gyms, 3 schools, stadium, venue centre, cultural centre	5,000 EUR annually for salaries and maintaining the monitoring system	100% own sources (municipal budget)	Core financing
<ul style="list-style-type: none"> • Energy efficiency advice • training and educational activities in the field of EE • information dissemination and promotion of co-financing programs and other financial resources 	Part of ongoing tasks of municipality's environmental department	20,000 EUR annually for salaries	100% own sources (municipal budget)	Core financing
Planning, implementation and monitoring of EE-policies (SEAP, eea-annual plans)	Part of ongoing tasks of municipality's environmental department	15,000 EUR annually for salaries	100% own sources (municipal budget)	Core financing
Planning and monitoring of EE	Part of ongoing tasks of municipality's infrastructure	15,000 EUR annually for	100% own sources	Core financing



investments in public buildings	department	salaries	(municipal budget)	
Planning and monitoring of city development strategy	Revision of spatial planning	15,000 EUR for external spatial planners 5,000 EUR for software (3 years running 25,000 EUR annually for salaries)	100% own sources (municipal budget)	Core financing

- What **EE projects** have you realised in recent 5 years and how were they financed

EE project	Short description	amount of funds needed	sources of financing (structure)	classification
Conversion of public lighting to LED technology	Public lighting is gradually replaced with LED from 2016 to 2024.	230,000 € (2016-2018) Whole project: 1,010,160 €	100 % own municipal sources Refund of 9,600 € energy bonus under Energy Efficiency Law	Project funding
Conversion of Christmas lighting to LED	Exchange of 40 year old lightbulb Christmas lighting in inner city for new LED technology	220,000 €	100 % own municipal sources	Project funding
Renovation of kindergartens Spielgasse, Strettweg, Jägersteig	Change of windows, new lighting, e-installation	56,500 €	30% own municipal sources 70% funding by Province of Styria	Project funding
Renovations in kindergartens without funding	Lighting, thermal insulation	9,400 €	100 % own municipal sources	Core financing
Primary school City and	Roof and WC renovation	26,400 €	100 % own municipal sources	Project funding
Town hall	Roof renovation	7,000 €	100 % own municipal sources	Core financing
Primary school Lindfeld	Renovation of WCs, roof, lighting and heating system	66,500 €	100 % own municipal sources	Core financing
Comprehensive	Renovation of WCs, lighting and	65,000 €	100 % own	Core



and polytechnical school	heating system, partial thermal insulation		municipal sources	financing
Venue centre	Renovation of lighting, ventilation and heating system, partial thermal insulation and roof renovation	35,000 €	100 % own municipal sources	Core financing
Sports hall Lindfeld	Renovation of WCs and heating system	4,400 €	100 % own municipal sources	Core financing
Construction of a district heating grid	Build up a district heating grid for delivering industrial waste heat from a pulp and paper mill to municipality buildings, households and enterprises	Approx. 4 Mio €	30 % funding, 70 % investment from the Stadtwerke Judenburg, which is an ESCO, 100 % owned by the city	Project financing

2.8.3 Current funding mix matrix for EE financing in your area (in 2017)

Expenses including services!

Unrestricted					
General fundraising			Core financing		
Overall = 0 EUR			Overall = 722,300 EUR		
<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own 100 %</i>	<i>external %</i>	<i>loans 0 %</i>
Short-term	Project funding		Programme funding		
	Overall = 532,900 EUR		Overall = 0 EUR		
	<i>own 91 %</i>	<i>external 9 %</i>	<i>loans 0 %</i>	<i>own %</i>	<i>external %</i>
Restricted					
			Long-term		



Expenses only for projects

		<i>Unrestricted</i>							
		General fundraising			Core financing				
		Overall = 0 EUR			Overall = 187,300 EUR				
		<i>own %</i>	<i>external %</i>	<i>loans %</i>	<i>own 100 %</i>	<i>external %</i>	<i>loans 0 %</i>		
<i>Short-term</i>		Project funding			Programme funding			<i>Long-term</i>	
		Overall = 532,900 EUR			Overall = 0 EUR				
		<i>own 91 %</i>	<i>external 9 %</i>	<i>loans 0 %</i>	<i>own %</i>	<i>external %</i>	<i>loans %</i>		
		<i>Restricted</i>							

2.8.4 Existing experience in partners regions

• **Is there any EE financial strategy available for your region?**

Sustainable Energy Action Plan “Judenburg 2020” for municipality
Approved in 2012

Allocated budget

1. Staff costs of the Municipality of Judenburg and Energy Agency (EAO) for the development of the action plan and key projects: 94,640 € (September 2011 until December 2013)
2. Material costs for the implementation of environmental measures in Judenburg: 114,000 € (per year until 2020)
3. Staff costs for municipal staff for the realisation of planned measures (budget is included in the yearly municipal household): circa 50,000 € (per year until 2020)
4. plus additional project oriented investment budget of the town administration for extraordinary measures like sanitation of public buildings etc. (costs must be ascertained in the planning process)
5. plus project oriented costs for measures of the Energy Agency (EAO) and the Municipal Utilities (Stadtwerke Judenburg)

Foreseen financial sources for the investment within the action plan

1. development of the action plan and key projects: financed by subsidies from the European Union / Programme IEE within the project eReNet (RURAL WEB ENERGY LEARNING NETWORK FOR ACTION) plus own funds of the Municipality of Judenburg and the Energy Agency Upper Styria (EAO)
- 2-3. Material and staff costs for the implementation of environmental measures in Judenburg: annual municipal household of the Municipality of Judenburg
4. financing of extraordinary measures like sanitation of public buildings etc.: individual authorization by the municipal council for each extraordinary measure
5. financing of projects of the Energy Agency (EAO) and the Municipal Utilities (Stadtwerke Judenburg): own funds of the institutions



- **Who officially approved the EE financial strategy and for how long period?**
Municipal council and Covenant of Mayors
Period 2012-2020
- **Indicative yearly budget for EE financing:**
Total budget: approx. 2.350,000 €, yearly average: approx. 300,000 € (according to costs declared in SEAP)
- **SWOT analysis of both internal and external conditions & environment for EE financial strategy development and implementation.**

Internal and external conditions & environment for EE financial strategy development and implementation	
Strengths <ul style="list-style-type: none"> • Long-time experience of municipality and Energy Agency in sustainability • Good knowledge of EE behaviour of public buildings • Municipality committed to sustainable development • Strong partners who have an interest in the implementation of EE projects (Municipality, ESCO etc.) • Good and encompassing public relations work about climate protection by municipal environmental department • Environmentally conscious citizens • Awareness-raising activities reach different age groups (from kindergarten to retirement homes) • Municipal utilities are strong investor and 100 % owned by Municipality 	Opportunities <ul style="list-style-type: none"> • Public buildings with energy saving potential • Strong industrial enterprises (steel industry) and business enterprises with energy savings potential • Municipality sets good example for other public and private infrastructure providers
Weaknesses <ul style="list-style-type: none"> • Lack of environmental consciousness in business enterprises • Often lack of coordination between stakeholders in the implementation of bigger projects • Sustainable energy projects are noticed too little by the general public • Lack of cooperation between economy and public administration 	Threats <ul style="list-style-type: none"> • Lack of (pre-)financing for investments in EE in public buildings • Costs for EE technologies are too high • Municipal budget for climate protection and energy is too small • Appeals for climate protection are not heard

- **Which EE activities are planned to be supported in next periods:**
Conversion of heating systems from electric heating to district heating in town museum, primary school Judenburg-Stadt and Kaserngasse 22 (youth hostel, music school and other users)



- **Which of the ways of financing energy efficiency investments do you consider the most effective?**
 - Loans / grants from national co-financing programs
 - own resources
- **Monitoring process and evaluation of EE financing policy implemented**
 - Energy accounting for public buildings with benchmark system (EBO)
 - Reporting to Covenant of Mayors
 - Audits in European Energy Award programme e5

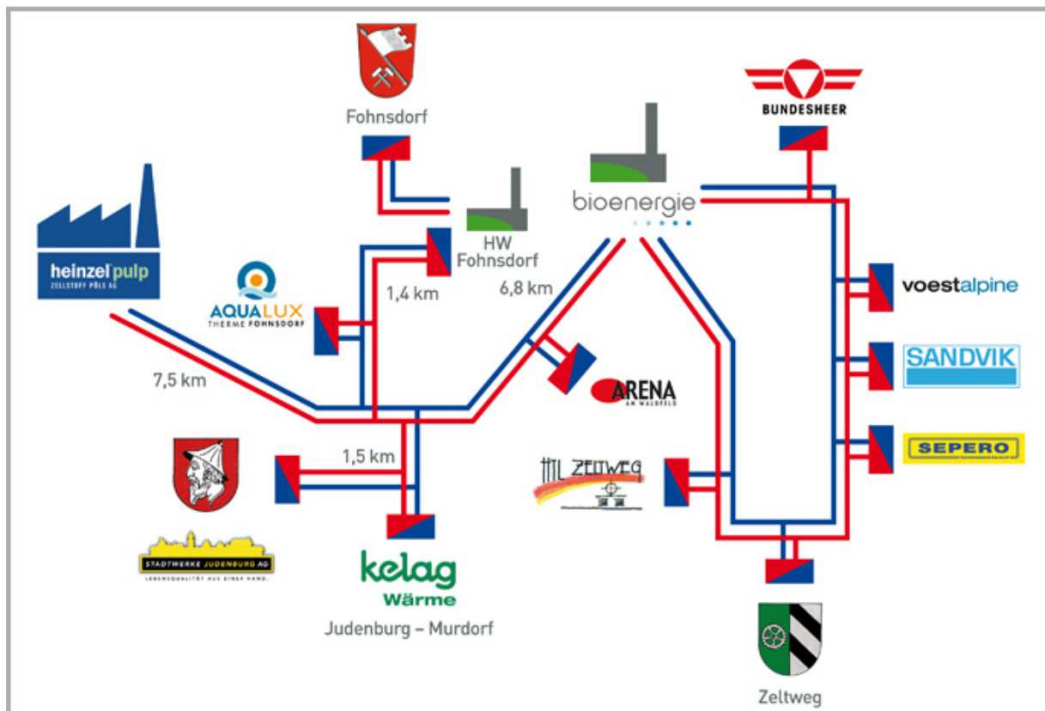
2.8.5 Best practices and investments return models

Best practice 1:

- **Name of the action:**
District heating grid based on waste heat from pulp&paper mill Zellstoff Pöls AG
- **Time period / year of realisation:** 2011 onward
- **Description of the action** (1500-2000 characters):
 - The Zellstoff Pöls AG annually processes approximately 2 million cubic meters of thinning wood and sawn timber into both pulp and paper. Together with the know-how partner "Bioenergie Wärmeservice GmbH" from Köflach, an expert for district heating and waste heat recovery systems, a joint venture was formed into the company "Biowärme Aichfeld GmbH". The objective was to use the waste heat sensibly, in combination with an existing biomass heating plant and a storage solution with large-district-pressure reservoirs. The result was allowing a sustainable, environmentally friendly and regional heat supply for more than 15,000 households in the greater Aichfeld area. For this purpose, the joint venture partners invested € 18 million and laid over 18 km of piping for the district heating project. This is a heat grid infrastructure project, to connect the cities, business and industrial parks in the region. The cities, business and industrial parks are served by ESCOS, which take over the heat from the infrastructure heat grid, and distribute the heat to the customers.
- **Partners involved:**
 - Zellstoff Pöls AG and Biowärme Wärmeservice GmbH forms the Biowärme Aichfeld GmbH, which is the operator of the infrastructure heat grid, connecting the sub-heat grids of the region. It is a private company acting as an ESCO, providing energy services for the municipalities.
 - ESCO's like Stadtwerke Judenburg AG, Biowaerme Wärmeservice GmbH, Energie Steiermark AG, Kelag Wärmeservice GmbH or Fernwärme Fohnsdorf by the heat from Biowärme Aichfeld GmbH, and delivers the heat to their customers.
 - Energy Agency Upper Styria – EAO and other consultants assists in energy advice



- Kommunalkredit Public Consulting GmbH provides public subsidies to the district heating grid operators and Zellstoff Pöls AG for recovering the waste heat from the pulp&paper mill. These subsidies are non-repayable grants for the investments, up to 30 % of the investment costs.
- **Key results (300 - 500 characters):**
In 2011 Zellstoff Pöls AG realised a large district heating project and now delivers district heating to the communities Pöls, Fohnsdorf, Judenburg and Zeltweg through an 18 km long supply network. With this we came closer to the goal of annual CO2 savings of 25.000 tons and the slogan „Q² your heating advantage from Pöls“ has become reality for approx. 15.000 households. The district heating supply currently is at 23.0 MW.
- A infrastructure heat grid was formed for the connection of the company which has the waste heat available, and the district heating grids in cities, business and industrial parks of the region
- District heating grids in the cities and business and industrial parks have been installed, to subsidise fossil fuels by regional available waste heat
- **Key figures of the infrastructure heat grid**
 - 18 km infrastructure head grid for the connection of cities, business and industrial parks
 - 15.000 households are served with waste heat at the moment, additional potential available
 - 25.000 t CO2-reduction
 - 30 MW power capacity of the heat recovery and heat decoupling
 - 18 Mio. € investment of the main infrastructure heat grid
 - 6 month of construction period





- **Success factors identified** (300 - 500 characters):
 - o The main success factors are innovative ESCO's as heat supplier, and an innovative company Zellstoff Pöls AG, which made the decision to take private money and invest it into the projects
 - o The competence of these people to convince stakeholders of the overall strategy and investment project
 - o The availability of direct non repayable funds as a part for financing the investment
 - o Involvement of the important regional stakeholders from municipalities, politics, enterprises and other local organisation was very important

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):
 - o Some stakeholders and decision makers are not easy to convince for innovative projects
 - o Economic questions, because the project have to be competitive with low prices for heating oil and natural gas at the moment
 - o Some regional players haven't been satisfied, like chimney wipers, because the lost business

- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):
 - o Detailed preparation of projects, including economic and ecologic analysis
 - o Preparation of arguments with the advantages and disadvantages of the project
 - o Transparent information politics to the public and potential partners and customers
 - o Involvement of relevant stakeholders with can help as catalysts or inhibitors of the projects

- **Contact, website:**
Bioenergie Aichfeld GmbH, Dr. Luigi-Angeli-Straße 9, A-8761 Pöls
E-Mail: info@waerme-vorteil.at
<http://www.wärme-vorteil.at/>

The following figures are valid only for the main infrastructure heat grid. The subgrids in the cities, business and industrial parks are not included.

Investment (EUR):

- Overall investment costs: 18 Mio €
From that...
 - Own sources from the Zellstoff Pöls AG and Biomasse Wärmeservice GmbH as shareholders of the Biowärme Aichfeld GmbH
 - The Biowärme Aichfeld GmbH also takes long term loans from banks (amount and interest rate is not for public). It's an private company, acting as an ESCO.
 - Subsidies (by whom): Kommunalkredit Public Consulting GmbH provided national and European non repayable subsidies to the project via their program "Umweltförderungen im Inland – UFI" which is available for district heating grids, and for recovering the waste heat from the industrial process. The funding rate consists of a basis rate of 25 % and 5 % sustainability surcharge according to the law of environmental subsidies. The actual program can be seen at <https://www.umweltfoerderung.at/betriebe>

Financial and other benefits of the project:

- The companies Zellstoff Pöls AG and Biowärme Aichfeld created additional business, income and jobs.
- The benefit of the customers like households, enterprises and municipalities are in a way, that they get heat from renewable energy (biomass) for a competitive price. The heat tariff is bound in a long term contract over 15 years, bound to an official index based on a mix of fuels, monthly published by the Statistik Austria. So the development of the price is transparent. They pay just the heat they use, and a small part of a fixed price based on the load demand. They will not have any risk as they have in operation their own heating facilities, and no additional costs for maintenance, service or chimney wiper
- New regional economic cycles are established for additional income and value creation at local level, and this by energy and climate actions, by replacing fossil oil and gas-heating by renewable energy, which saves a lot of CO₂-emissions
- **Pictures of the action**





Best practice 2:

- **Name of the action:**
PV-Installation as PPP-model

- **Time period / year of realisation:** 2013

- **Description of the action** (1500-2000 characters):
The Stadwerke Judenburg AG (ESCO, 100 % owned by the municipality of Judenburg) planned and installed a PV – system on a green field at the west-end of the City of Judenburg. The PV-system has a power of 500 kWp and consists of 2.000 PV-modules. The area of the field is 3.500 m². The PV-system was built in accordance to the green energy law, this means the electricity is feed into the public electricity grid, financed by subsidised feed-in tariffs.
The innovative part is that the citizens of city and customers of the Stadtwerke can participate in this model in a public private partnership PPP. The PPP-model is called SALE & LEASE BACK, this means people can buy 1 to max 10 PV modules for a price of 650 €/unit, maximum investment per person is 6.500 €. These people get an interest rate of 3,125 % on their investment, which is significant more compared to a bank account, without any risks. The minimum time of the partnership will be five years. This amount of money will be balance on the electricity bill for the customers.

- **Partners involved:**
 - o Stadwerke Judenburg AG, as initial investor and operator
 - o City of Judenburg, as 100 % owner of the Stadtwerke, the assist in the model and marketing
 - o Customers and citizens as investors in the PPP-model, they buy and own the modules, but lease them back to the Stadtwerke, therefore they get the interest rate of 3,125 % on their investment.

- **Key results** (300 - 500 characters):
 - o The project is installed; citizens are partners and owners of the module and get profit from them. The Stadtwerke has the investment sum of the people available for covering the initial investment costs.
 - o The model is profitable for participating customers as well as the Stadtwerke, because they get also the feed-in tariff by the green electricity law.

- **Success factors identified** (300 - 500 characters):
 - o Available feed-in tariffs by the green electricity law
 - o Innovative PPP model based on SALE and LEASE BACK
 - o Trust into a strong public owned ESCO Stadtwerke for a long term partnership

- **Barriers / restrictions / obstacles encountered** (300 - 500 characters):
 - o Investment only possible, if feed-in tariffs are available

- **Ways to deal with barriers / obstacles / problems** (300 - 500 characters):
 - o No significant obstacles identified in this project

- **Contact, website:**

Stadtwerke Judenburg AG
Burggasse 13
8750 Judenburg, Austria
office@stadtwerke.co.at
www.stadtwerke.co.at

- **Picture of the action**



Investment (EUR):

- Overall investment costs: 700.000.- €
 - From that...
 - Customers of the Stadtwerke bought 1 – 10 PV-modules for a fixed price of 650 €/unit, the Stadtwerke leased back the modules and operate the system. Minimum period for partnership is 5 years.
 - Customers get an interest rate of 3,125 % on their investment from the Stadtwerke, balanced on their energy bill
 - Subsidies (by whom): The Stadtwerke get a feed-in tariff of 0,1659 €/kWh delivered to the public grid, based on the green electricity law
- Lifetime (service life): 30 years
- Depreciation period: 20 years, according to the rules of the ministry of finance



Operational features (EUR):

- Annual operational cost incl. salaries, repairs, maintenance and other specific costs are approx.. 1 % of the investment costs.
- Annual revenues – please specify which and how much in EUR: approx.. 92.000 €/year from the feed-in tariffs according to the green electricity law. With this money the Stadtwerke pay the interest rate to the customer, and the other part they have to reserves for buying back the modules from the people at the end of the lifetime of the sale & lease back contract.

3 Conclusions

During the realization of BOOSTEE-CE project, it became clear that municipalities/cities of various countries have different level of knowledge on the energy efficiency as well as the ways of energy efficiency actions financing.

The provided document is the first step towards elaborating “O.T4.1 Transnational EE financing strategy” which will describe how to look for, find and adopt different financing solutions for energy efficiency improvement.

Next step will be elaborating the comparative analysis D.T4.1.1 which is defined as Analysis & elaboration of differences among financial schema in partner countries, considering EU grants/funds, possible normative obstacles, investment return, models, etc. The document will also highlight market-enabling actions for large investments.

Comparative analysis should try to summarize the findings of DT4.1.4 i.e. try to summarize and analyze all the information collected above. Additionally, it can highlight the approaches (strategies and/or practices) towards EE financing which our PPs finds the best.