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BOOSTEE-CE

DELIVERABLE T4.2.1

Transnational methodological framework for a roadmap development

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D.T4.2.1: Transnational methodological framework for a roadmap development

A.T4.2 Development of EE financing roadmaps for participating cities/municipalities

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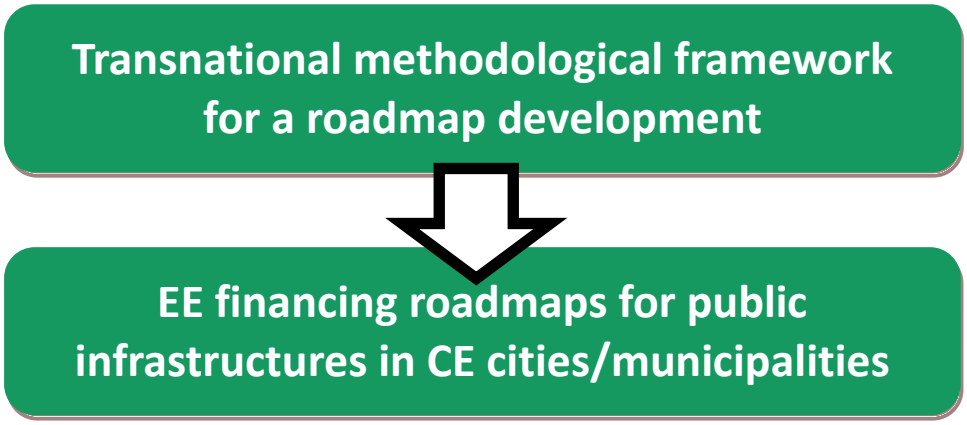
Content

1. Introduction and aims of the document

This document follows the findings of the "Comparative analysis of financial schema" and it is a part of the key output of BOOSTEE-CE project which is the "Development of EE financing roadmaps for participating cities/municipalities".

This key output involves two steps:

1. Creating the Transnational methodological framework for a roadmap development
2. Elaboration of 7 EE financing roadmaps for public infrastructures in CE cities/municipalities



Picture 1 – two steps towards financial roadmaps

1.1 Transnational methodological framework for a roadmap development

Transnational methodological framework for a roadmap development is a common transnational template of energy efficiency financing roadmaps with guidelines for their specific contents and structure. Key target groups are identified with their needs and expectations on which a further development is based.

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

- ***Financial models to minimize the load on public budgets***
- ***Recommendations for decision-makers on identifying and implementing a suitable financing model***
- ***Risks and measures in case of financial investments***
- ***Case studies.***

The methodological framework for the energy efficiency financing roadmap development builds upon two mutually complementary approaches

1. ***The review of national and transnational best practices and financing models***
2. ***The successful partners experience and platform performances***

This will encourage, facilitate and support - as part of broader low-carbon and energy efficiency strategies - coordination and realization of useful energy efficiency investments in Central Europe countries. The documents also highlights experience of BOOSTEE-CE partners in small-scale investment of public funds and how they can bring great improvements in terms of energy savings and buildings performance.

The financial roadmap should thus play an important role in improving energy efficiency in public buildings and overcome the barriers of constrain financial initiatives as well as facilitate and improve connectivity between public authorities, financing models and energy efficient tools (e.g. BOOSTEE-CE OnePlace platform) in order to facilitate and trigger energy efficiency investments.

1.2 Energy efficiency financing roadmaps for public infrastructures

Upon content of this document each partner region is supposed to elaborate its own Energy efficiency roadmap showing a way how to finance energy efficiency actions in their respective regions within a desirable timeframe, identifying subsequent steps and appropriate financial solutions.

Energy efficiency financing roadmap should be based on the approach of continual savings reinvestments in further EE measures. The development of each individual EE financing roadmap on a specific territory (town / municipality / region) should be based on a close cooperation with relevant local authorities and other stakeholders and should be also adopted by these authorities for daily procedures and activities.

Thus, these concrete financial roadmaps, produced in synergy with partners and target groups, are supposed to be adopted by local or regional authorities with large probability for future implementation also in other neighbourhood municipalities / regions with the main purpose to facilitate and trigger new investments in energy efficiency.

Suggested indicative structure of Energy efficiency financial roadmap is included in the Chapter 4 of this document.

2. Funding sources for energy efficiency

Budgetary constraints are often cited as a big barrier in implementing energy efficiency policies and measures in both municipalities and regions. The survey revealed that the municipalities sometimes focus only on a limited amount of existing tools and programmes on European, national or regional level, and the lack of their internal capacity or insufficient awareness about all possible sources available for them are some of the reasons of this situation.

The ambition of this section is to introduce the support for energy efficiency financing on European level in orderly way as well as indicate other possibilities either on national levels or in self-financing.

National sources summary in a comprehensive way for CE countries, namely Italy, Austria, Croatia, Slovenia, the Czech Republic and Poland is described in Transnational Energy Efficiency Financing Strategy, the other crucial output of the BOOSTEE-CE project dealing with energy efficiency financing.

2.1 European level

The European level support for energy efficiency financing is structured in several mutually interconnected measures through which the resources are channelled to Member States in various forms according each country priorities that are also in coherence with EU energy policy targets.

This support is divided in three basic areas:

- ESIF – European Structural and Investment Funds
- European Funding Programmes
- Project development assistance

Each form of support is analysed in the following chapters.

2.1.1 ESIF – European Structural and Investment Funds

There are two major funds covered with ESIF umbrella - **The European Regional Development Fund (ERDF)** and **The Cohesion Fund (CF)**, they both offer wide range of financial support transformed into national operational programmes relevant to municipal and regional energy efficiency priorities. Municipalities interested in accessing the ERDF and CF resources should check the details of the operational programmes available in their countries. The exhausting list of national programmes supported by ESIF is a part of the BOOSTEE-CE Transnational Energy Efficiency Financing Strategy.

ERDF and CF financial support is provided in a form of grants or financial instruments (loan, guarantee, equity, quasy-equity, however, not relying only on the external support is strongly

recommended and municipalities and regions are encouraged to use also other financial instruments to mobilise the private investments.

ERDF and CF can be used in integrated packages at local, regional or national level through the use of territorial integrated instruments such as Integrated Territorial Investments (ITI). [9]

Cohesion Fund

The Cohesion Fund encourages investments in priority trans-European transport networks and investments related to energy or transport that benefit the environment in terms of energy efficiency, use of renewable energy, developing transport and supporting intermodal transport.

The CF has an overall budget of €63 billion for 2014-2020. This support is provided to Member States whose Gross National Income per inhabitant is less than 90 % of the EU average. For the 2014-2020 periods, the Cohesion Fund is available in Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.[11]

Financial instruments can thus contribute to the achievement of the following objectives of the CF:

- promoting the production, distribution and use of energy derived from renewable sources
- supporting energy efficiency and smart energy management
- investing in the waste sector and water sector
- improving the urban environment, including decontamination of brownfield sites
- supporting a multimodal Single European Transport Area
- developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems in order to promote sustainable regional and local mobility
- developing and upgrading comprehensive, high quality rail, river and sea transport, intermodal transport systems and their interoperability

In order to be financed by CF the project has to be in line with the operational programme for each country region/area. Applications can be done to the national managing authorities.[10]

It is also possible to use the CF in the form of financial instruments. For more info refer to the section **2.4 Intermediaries**.

The European Regional Development Fund

The European Regional Development Fund (ERDF) supports economic growth, job creation and reduction of regional disparities. The ERDF focuses its investments on several key priority areas:

- Promoting business investment in Research & Innovation
- Extending broadband deployment and the roll-out of high-speed networks and developing Information and Communication Technology (ICT) products, services and e-commerce
- Supporting the capacity of small and medium-sized enterprises (SMEs) to grow and to engage in innovation processes, including developing new business model;
- Promoting the production and distribution of renewable energy, of energy efficiency and renewable energy in enterprises, in public infrastructure and housing
- Investments for adaptation to climate change
- Investing in the waste and water sectors
- Improving the urban environment, including regeneration of brownfield sites
- Supporting industrial transition towards a low-carbon economy
- Supporting multimodal and environmentally-friendly transport and regional mobility [12]

Organisations that can benefit from ERDF involve public bodies, SMEs, universities, associations, NGOs and voluntary organisations, depending on the operational programme.

Focus areas depend on the operational programmes. In order to be financed by ERDF the project has to be in line with the operational programme for each country area. Applications can be done to the national managing authority.[10]

It is also possible to use the CF in the form of financial instruments. For more info refer to the section **2.4 Intermediaries**.

2.1.2 European Funding Programmes

There are several direct funding opportunities on European level supporting energy efficiency financing. They are provided in a form of grants from the European Commission or its executive agencies for projects with specific objectives. Regarding energy efficiency, following programmes are concerned:

- **Horizon 2020**
- **Connecting Europe Facility (CEF)**
- **LIFE**
- **Territorial Cooperation (INTERREG)**

Horizon 2020

Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.[13]

Horizon 2020 aims to achieve smart, sustainable and inclusive economic growth. H2020 is organised in thematic sections each dedicated to a specific challenge. Among these particularly relevant for energy efficiency increasing in municipalities and regions two so called Societal Challenges (SC) are available:

- Horizon 2020 SC3 Energy
- Horizon 2020 SC5 Environment

Actual calls for proposals are available on the link of actual H2020 calls.[15]

Horizon 2020 SC3 Energy

With the aim of the transition to a competitive energy system, there is a need to overcome several challenges, such as increasingly scarce resources, growing energy needs and climate change.

The Energy Challenge is structured around seven specific objectives and research areas:

- Reducing energy consumption and carbon footprint
- Low-cost, low-carbon electricity supply
- Alternative fuels and mobile energy sources
- A single, smart European electricity grid
- New knowledge and technologies
- Robust decision making and public engagement
- Market uptake of energy and ICT innovation.

A budget of €5 931 million has been allocated to non-nuclear energy research for the period 2014-2020. Out of this figure, more than €200 million is earmarked to support European Institute of Innovation and Technology activities, subject to a mid-term review.[14]

Horizon 2020 SC5 Environment

Activities in this Challenge aim to increase European competitiveness, raw materials security and improve wellbeing. At the same time they strive to assure environmental integrity, resilience and sustainability with the aim of keeping average global warming below 2° C and enabling ecosystems and society to adapt to climate change and other environmental changes.

Innovation in these fields should provide opportunities for growth and jobs, as well as innovative options involving science, technology including of ICT, the economy, society, policy and governance.

Following activities are covered:

- Climate Action - Informed decisions for a climate-resilient low-carbon society
- Cultural Heritage - Engaging a new cultural heritage agenda for economic growth
- Earth Observations - Crucial info on climate, energy, natural hazards and other societal challenge
- Nature-Based Solutions - Providing viable solutions of natural ecosystems
- Systemic Eco-Innovation - Generating and sharing economic and environmental benefits

Connecting Europe Facility (CEF)

The Connecting Europe Facility (CEF) is a key EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level. It supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services.

The Connecting Europe Facility (CEF) supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services. In addition to grants, the CEF offers financial support to projects through innovative financial instruments such as guarantees and project bonds. The CEF is divided into three sectors:

- Energy
- Transport
- Digital service infrastructures (DSIs) and broadband networks

CEF Energy is one of the three core sectors of CEF and is engineered to address both groups of factors behind the investment gap in the energy sector. Financial instruments, by bringing in new classes of investors and mitigating certain risks, will help project promoters to access the necessary financing for their projects. Grants to contribute to the construction costs will be applied to fill in the gaps in commercial viability of the projects that are particularly relevant for Europe.[17]

LIFE

The LIFE programme is the EU's funding instrument for the environment and climate action created in 1992. The current funding period 2014-2020 has a budget of €3.4 billion.

LIFE funds innovative projects that demonstrate new techniques and methods. These 'traditional' style projects are complemented by 'integrated' projects that combine LIFE funding with other sources of support to maximise their impact over a large area.

The LIFE programme is divided in two sub-programmes, one for environment (representing 75% of the overall financial envelope) and one for climate change (representing 25% of the envelope). Regarding energy efficiency the climate action sub-programme supports projects in the areas of renewable energies, energy efficiency, farming, land use, and peatland management.

It provides action grants for best practice, pilot and demonstration projects that contribute to the reduction of greenhouse gas emissions, the implementation and development of EU policy and law, best practices and solutions. The sub-programme also promotes knowledge sharing and integrated approaches, such as for climate change mitigation strategies and action plans at local.

Other supported areas are climate change adaptation, climate governance and information, integrated projects and technical assistance. [18]

Territorial Cooperation – INTERREG

European Territorial Cooperation generally known as Interreg is one of the two goals of cohesion policy and provides a framework for the implementation of joint actions and policy exchanges between national, regional and local actors from different EU Member States. The overarching objective of European Territorial Cooperation is to promote a harmonious economic, social and territorial development of the European Union as a whole. [19]

Interreg covers three types of cooperation:

- cross-border (Interreg A)
- transnational (Interreg B)
- interregional (Interreg Europe)

For the period 2014-2020 there are 60 cross border programmes, 15 transnational programmes and 4 interregional programmes.

Interreg A – cross border cooperation

This cooperation involves 28 EU countries + Norway and Switzerland, energy is one of the supported sectors and support is possible to get for both soft and hard measures of SECAP implementation. List of particular programmes is available online. [20]

Interreg B – transnational cooperation

Interreg B includes 15 different programmers focusing on macro-regional challenges which require an integrated approach. The scope of supported activities related to energy is similar to Interreg A - soft and hard measures of SECAP implementation.[9]

Calls details and projects features are decided under each funding programme.

Adrion	http://www.adrioninterreg.eu/
Alpine Space	http://www.alpine-space.eu/home/
Amazonia	http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/france/2014tc16rftn010
Atlantic Area	http://www.coop-atlantico.com/
Balkan	http://www.interreg.gr
Baltic Sea Region	http://www.interreg-baltic.eu/home.html
Caribbean area	www.interreg.caraibes.fr
Central Europe	http://www.central2020.eu/
Danube	http://www.interreg-danube.eu/
Indian Ocean	http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/france/2014tc16rftn009
Mediterranean	http://interreg-med.eu/en/home/
Northern Periphery	http://www.interreg-npa.eu/
North Sea	http://www.northsearegion.eu/ivb/home/
North West Europe	http://www.nweurope.eu/
South West Europe	http://interreg-sudoe.eu/FRA

Interreg Europe – Interregional cooperation

Interreg Europe helps regional and local administration across Europe to develop and deliver better policy. By creating an environment and opportunities for sharing solutions, the fund aims to ensure that government investment, innovation and implementation efforts all lead to integrated and sustainable impact for people and place.

The fund supports projects around the following themes:

- Research and Innovation
- SME competitiveness
- Low-carbon economy
- Environment and resource efficiency [21]

2.1.3 Project development assistance

Public authorities planning and implementing bankable projects in energy efficiency may also take advantage of EU-funded technical assistance in project development that is available through direct funding grants to public bodies through following channels:

- ➔ European Energy Efficiency Fund – EEEF
- ➔ European Local Energy Assistance – ELENA
- ➔ Horizon 2020 Project Development Assistance
- ➔ Joint Assistance to Support Projects in European Regions - JASPERS

European Energy Efficiency Fund - EEEF

European Energy Efficiency Fund – Technical Assistance Facility supports projects in the sector of energy efficiency and partly small-scale renewable energy.

EEEF-TA aims to bridge the gap between sustainable energy plans and real investments by supporting the beneficiary by way of allocating consultant services to the planned investment programmes (for example for feasibility studies, energy audits and evaluating the economic viability of investments, legal support). It also covers direct staff costs of the TA beneficiaries if required.

To help the TA beneficiaries even more as well as to insure a higher project implementation rate, EEEF makes one step further and provides technical assistance support by way of consultancy services. This means that EEEF selects appropriate experts with the required know-how and expertise via a public tender process, completed entirely by the EEEF, and assigns them to the relevant investment programmes. The technical assistance beneficiaries can use the consultant services to carry out for example feasibility studies, energy audits and evaluate the economic viability of their investments. Legal support for the investment programmes on the other hand, will be mandated by the TA beneficiary directly, while costs to be covered by the EEEF.[22]

European Local Energy Assistance - ELENA

ELENA is a joint initiative by the EIB (European Investment bank) and the European Commission under the Horizon 2020 programme. ELENA provides grants for technical assistance focused on the implementation of energy efficiency, distributed renewable energy and urban transport programmes.

The grant can be used to finance costs related to feasibility and market studies, programme structuring, business plans, energy audits and financial structuring, as well as to the preparation of tendering procedures, contractual arrangements and project implementation units.

The annual grant budget is currently around EUR 20 million. Projects are evaluated and grants allocated on a first-come-first-served basis.

ELENA supports programmes above EUR 30 million over a period of around 2-4 years, and can cover up to 90% of technical assistance/project development costs. Smaller projects can be supported when they are integrated into larger investment programmes.

The ELENA facility is led by a team of experts consisting of engineers and economists with extensive experience in the transport and energy sector. Established in 2009, the ELENA facility has awarded more than EUR 130 million of EU support triggering an estimated investment of around EUR 5 billion on the ground.[23]

Horizon 2020 Project Development Assistance

Horizon 2020 Project Development Assistance (PDA) is a technical assistance facility. The PDA supports building technical, economic and legal expertise needed for project development and leading to the launch of concrete investments, which are the final aim and deliverable of the project.

Proposals should focus on one or more of the following sectors:

- existing public and private buildings including social housing, with the aim to significantly decrease energy consumption in heating/cooling and electricity;
- energy efficiency of industry and service;
- energy efficiency in all modes of urban transport (such as highly efficient transport fleets, efficient freight logistics in urban areas, e-mobility and modal change and shift);
- energy efficiency in existing infrastructures such as street lighting, district heating/cooling and water/wastewater services.

Proposals should include the following features:

- an exemplary/showcase dimension in their ambition to reduce energy consumption and/or in the size of the expected investments;
- deliver organisational innovation in the financial engineering (e.g. on-bill financing schemes, guarantee funds, or factoring funds) and/or in the mobilisation of the investment programme (e.g. bundling, pooling or stakeholder engagement);
- demonstrate a high degree of replicability and include a clear action plan to communicate experiences and results towards potential replicators across the EU;
- build on the experiences from previous PDA projects.

This PDA facility focuses on small and medium-sized energy investments of at least EUR 7.5 million to EUR 50 million.[24]

Joint Assistance to Support Projects in European Regions - JASPERS

Joint Assistance to Support Projects in European Regions (JASPERS) helps cities and regions absorb European funds through top-quality projects. JASPERS offers free of charge assistance for local authorities and promoters, this assistance covers:

- Project review and recommendations
- Horizontal tasks
- Strategic support
- Capacity building
- Implementation support
- Independent quality review

Regarding the energy efficiency JASPERS supports projects in area called Energy and solid waste and supports projects to

- expand or upgrade gas distribution and storage facilities to improve security of supply in case of restrictions
- build wind farms, solar rooftops, geothermic and biomass facilities to increase the share of renewable energy in the energy mix
- rehabilitate district heating plants and networks to reduce energy losses and thus improve energy efficiency
- retrofit old buildings for a higher energy performance to improve comfort and reduce energy consumption
- decontaminate polluted sites to reduce risks to population and environment
- establish and extend integrated waste management systems to improve recycling and dispose of residual waste properly
- build waste-to-energy facilities to recover energy from waste and reduce landfilling of waste

JASPERS focuses on large projects with total costs exceeding EUR 50 million for environmental projects and EUR 75 million for transport or other sectors. However, there is flexibility about these thresholds in the case of small countries or where projects serve as pilot actions to establish best practice.

To access JASPERS' services public authorities should contact the Managing Authorities. These are in contact with the JASPERS Regional Offices or contact the different offices directly.[25]

2.1.4 Special Support Instruments

Joint initiatives were developed by the European Commission (Directorate General for Regional Policy) in co-operation with the European Investment Bank group and other financial institutions in the framework of the 2007-2013 programming period in order to make cohesion policy more efficient and sustainable, they are:

- ➔ JEREMIE
- ➔ JESSICA
- ➔ JASMINE

Two of them refer to the promotion of financial engineering instruments (JEREMIE and JESSICA) and JASMINE (as well as JASPERS) operate as technical assistance facilities.[49]

JEREMIE

JEREMIE (Joint European Resources for Micro to Medium Enterprises) is an initiative of the European Commission developed together with the European Investment Fund, set up in 2007. It promotes the use of financial engineering instruments to improve access to finance for SMEs via

Structural Funds interventions. Contributions from the European Regional Development Fund (ERDF) are allocated to loan, guarantee or venture capital funds to invest in enterprises. These investments can take the form of equity, loans and/or guarantees.

All EU Member States can use part of their European structural fund allocations to invest in revolving instruments.

These funds that can support creation of new business or expansion of existing ones, access to investment capital by enterprises (particularly SMEs) to modernize and diversify their activities, develop new products, secure and expand market access, business oriented research and development, technology transfer, innovation and entrepreneurship, technological modernization of productive structures to help reach low carbon economy targets, productive investments which create and safeguard sustainable jobs.

The main benefiters are micro, small and medium-sized enterprises (SMEs). JEREMIE enables structural fund managing authorities to benefit from the expertise from the banking and private sectors and so enhance the effectiveness of their investments in businesses.[50]

JESSICA

Joint European Support for Sustainable Investment in City Areas (JESSICA), is an initiative of the European Commission's Directorate General for Regional Policy (DG REGIO) developed in co-operation with the European Investment Bank (EIB) and the Council of Europe Development Bank (CEB) which is aimed at supporting sustainable urban development and regeneration through financial engineering mechanisms. The "JESSICA mechanism" offers to Member States and regions the possibility to invest some of their Structural Funds allocations in revolving funds and so to recycle financial resources in order to enhance and accelerate investments in Europe's urban areas.

All European Union countries can use the programme. JESSICA promotes sustainable urban development by supporting projects in the urban infrastructure - including transport, water/waste water, energy, heritage or cultural sites (for tourism or other sustainable uses), redevelopment of brownfield sites (including site clearance and decontamination), creation of new commercial floor space for SMEs, IT and/or R&D sectors, university buildings (medical, biotech and other specialized facilities) and energy efficiency improvements.

Organizations that can benefit from JESSICA are Local and Regional authorities, Administrations States, Agencies Chambers and SMEs. The principal benefits are recycling of funds, leverage, flexibility and expertise and creativity. [51]

JASMINE

JASMINE (Joint Action to Support Microfinance Institutions) is an EU program managed by EIF to help non-bank microfinance institutions to scale up their operations and maximize the impact of

microfinance products on microenterprises development and unemployment reduction within the European Union. JASMINE has been successfully implemented in the period 2007-2013 and extended in the framework 2014-2020 programming period. Its objective is to disseminate good practice in the EU as regards microcredit lending, support the development of microcredit providers active in the European Union in various fields such as institutional governance, information systems, risk management and strategic planning (capacity building) and help these intermediaries become sustainable and viable operators on commercial terms.

Countries that can benefit from JASMINE are Belgium, Bulgaria, France, Germany, Greece, Hungary, Italy, Latvia, Malta, Poland, Romania, The Netherlands, Spain, Slovakia, Sweden and UK with their microfinance institutions.

JASMINE was created to support the development of microcredit providers and microfinance institutions in various areas, such as institutional governance, information systems, risk management and strategic planning and help these intermediaries become sustainable operators on commercial terms.

Target providers are non-bank financial institutions (Greenfield MFIs willing to improve their internal processes and mature MFIs willing to increase the quality of their operations) and licensed Banks never rated by specialized microfinance rating agencies.[52]

2.1.5 Energy Efficiency Financing Support on EU level – brief summary

Type of support	Name of the support	Brief specification
European funds channelled through Operational Programmes in Member States (ESIF)	Cohesion Fund	Investments on key priority areas – see managing authorities:[10] • promoting the production, distribution and use of energy derived from renewable sources • supporting energy efficiency and smart energy management • investing in the waste sector and water sector • improving the urban environment, including decontamination of brownfield sites • supporting a multimodal Single European Transport Area • developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems in order to promote sustainable regional and local mobility • developing and upgrading comprehensive, high quality rail, river and sea transport, intermodal transport systems and their interoperability.

	ERDF	Investments on key priority areas – see managing authorities: [10] • innovation and research • information and communication technologies • competitiveness of small and medium-sized enterprises (SMEs) • the low-carbon economy
Direct funding from the European Commission	Horizon 2020	Projects focused on "*Secure, Clean and Efficient Energy*":[14] • energy efficiency • low carbon technologies • smart cities and communities Projects focused on "*Climate Action, Environment, Resource efficiency and Raw materials*" building a low-carbon, climate resilient future. [16]
	Connecting Europe Facility (CEF)	Projects of common interest in the energy sector, namely in electricity and gas. The support projects geared at the following objectives: • ending energy isolation • increasing competitiveness by promoting the integration on the internal energy market and the interoperability of electricity and gas networks across borders • enhancing the Union's security of supply • integrating energy from renewable sources and developing smart energy networks • eliminating energy bottlenecks • completion of the internal energy market
	LIFE	Traditional projects are best-practice, demonstration, pilot, information, awareness-raising or dissemination projects that cover the following priority areas: • Nature & Biodiversity Environment & Resource Efficiency • Environmental Governance & Information • Climate Change Mitigation • Climate Change Adaptation • Climate Governance & Information
	Territorial cooperation (INTERREG)	Support for • SECAP implementation (soft measures, e.g. awareness raising, stakeholders' involvement) • SECAP implementation (hard measures) • SECAP preparation • SECAP development

Direct funding to public bodies and SMEs for developing bankable projects	EEEF	Supports projects in the sector of energy efficiency and partly small-scale renewable energy
	ELENA	Support for • costs related to feasibility and market studies • programme structuring, business plans • energy audits and financial structuring • preparation of tendering procedures, contractual arrangements and project implementation units
	Horizon 2020 PDA	Technical assistance for proposals focusing on: • existing public and private buildings including social housing, with the aim to significantly decrease energy consumption • energy efficiency of industry and service • energy efficiency in all modes of urban transport • energy efficiency in existing infrastructures such as street lighting, district heating/cooling and water/wastewater services
	JASPERS	Technical assistance for proposals focusing on: • expansion of gas distribution and storage facilities ions • building wind farms, solar rooftops, geothermic and biomass facilities • rehabilitating district heating plants and networks • retrofit old buildings for a higher energy performance • decontaminating polluted sites • establishing and extending integrated waste management systems • building waste-to-energy facilities to recover energy from waste and reduce landfilling of waste
	JEREMIE	Support for • creation of new business or expansion of existing ones • access to investment capital by enterprises (particularly SMEs) to modernise and diversify their activities, develop new products, secure and expand market access • business oriented research and development, technology transfer, innovation and entrepreneurship • technological modernisation of productive structures to help reach low carbon economy targets • productive investments which create and safeguard sustainable jobs

	JESSICA	Supporting projects in the following areas: • urban infrastructure - including transport, water/waste water, energy • heritage or cultural sites - for tourism or other sustainable uses • redevelopment of brownfield sites - including site clearance and decontamination • creation of new commercial floor space for SMEs, IT and/or R&D sectors • university buildings - medical, biotech and other specialised facilities • energy efficiency improvements.
	JASMINE	Its objective is to: • disseminate good practice in the EU as regards microcredit lending. • support the development of microcredit providers active in the European Union in various fields such as institutional governance, information systems, risk management and strategic planning (capacity building). • help these intermediaries become sustainable and viable operators on commercial terms.

2.2 National level

Each Member State supports energy efficiency on its national level from national budget as well co-finances various supporting programmes based on the ESIF funding. The Member States are responsible for managing programmes that are supported by the Cohesion Policy. A designated managing authority provides information on the programme, selects projects and monitors implementation. European Commission provides transparent overview of all managing authorities per type of the support as well as per country and period of interventions.[10]

Many countries offer also additional support including grants or low-interest rate loans that and are channelled through national environmental funds, national development banks or other intermediaries. Also regional governments often provide its support from their tailored programmes and schemes which sometimes even exceeds support from the EU funds.

Comprehensive list of contemporary existing financial support of energy efficiency available on national level in Italy, Austria, Croatia, Slovenia, the Czech Republic and Poland is available in the ***BOOSTEE-CE Transnational Energy Efficiency Financing Strategy***, the other core output of the BOOSTEE-CE project dealing with energy efficiency financing.

2.3 Self-financing and alternative schemes

Besides external sources on European or national level there is a great variety of financing schemes that can be utilised for financing energy efficiency projects. As the above-mentioned European and national sources for financing energy efficiency depend on political environment and are subject to change in the course of time, it is highly advisable to utilise these self-financing and alternative sources to a greater extend as it used to be so far. This section would like to shortly introduce suitable alternative schemes only to put some of them in a context of concrete examples of energy efficiency financing in the Chapter 3 of this document.

The following list of self-financing and alternative schemes is rather indicative than exhaustive as the variety is great and they may be sometimes also combined with each other:

- Citizen cooperatives
- Crowdfunding
- Energy Performance Contracting
- Green municipal bonds
- On-bill financing
- Revolving loan funds

Citizen cooperatives

Citizen cooperatives can be defined as cooperatively-owned renewable energy projects whose financial revenues stay within the local community. One of their important roles is transforming from a centralised market dominated by large utilities to a decentralised market with millions of active energy citizens. Without active involvement of citizens and their participation on benefits coming out of cooperatives this energy transition is not possible.

More concretely, after purchasing a cooperative share and becoming a member or co-owner of local RES and EE projects, members share in the profits and often are given the opportunity to buy the electricity at an affordable/moderate price. In addition, members can actively participate in the cooperative. They can decide in what and where the cooperative should invest, and are consulted when setting the energy price.[9 27]

A detailed description of this model including a model example is available in the Chapter 3.4 of this document.

Crowdfunding

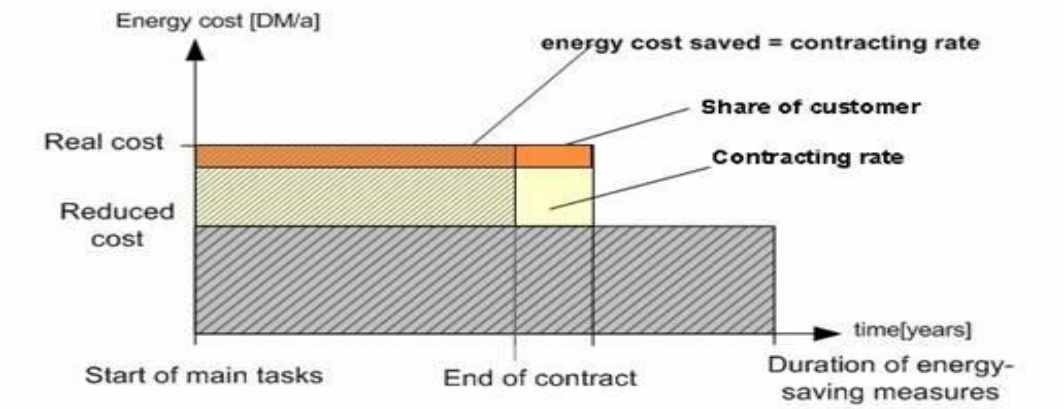
Crowdfunding is the collective effort of a large number of individuals who network and pool small amounts of capital to finance a new or existing business venture. Each campaign is set for a goal amount of money and a fixed timeframe, each day is counted down and the money raised will be

tallied up for visitors to follow its success. The number of crowdfunding platforms worldwide is on the increase.[8]

Crowdfunding for sustainable energy and climate projects is the natural extension of the citizen cooperative model to even larger communities. With the help of the internet, crowdfunding can draw support from people across entire countries and increasingly internationally. A detailed description of this model including a model example is available in the Chapter 3.5 of this document.

Energy Performance Contracting

Energy Performance Contracting (EPC) is a form of creative financing for capital improvement which allows funding energy upgrades from cost reductions. Under an EPC arrangement, an external organisation (Energy Service Company - ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings or the renewable energy produced to repay the costs of the project (including the costs of the investment). Essentially, the ESCO will not receive its payment unless the project delivers energy savings as expected.



Picture 2 – Energy Performance Contracting (source: Berliner Energieagentur GmbH)

The approach is based on the transfer of technical risks from the client to the ESCO based on performance guarantees given by the ESCO. In EPC ESCO remuneration is based on demonstrated performance; a measure of performance is the level of energy savings or energy service. EPC is a mean to deliver infrastructure improvements to facilities that lack energy engineering skills, manpower or management time, capital funding, understanding of risk, or technology information.[30]

A detailed description of this model including a model example is available in the Chapter 3.3 of this document.

Green municipal bonds

Bond is a debt investment in which an investor loans money to an entity (typically corporate or governmental) which borrows the funds for a defined period of time at a variable or fixed interest rate. Bonds are issued by companies, municipalities, states and sovereign governments to raise money and finance their projects and activities. Green bonds are all those instruments which are used exclusively to fund qualifying green investments. They can be made attractive via tax-exemptions.[9]

More detailed info on green municipal bonds available in the Chapter 3.6 of this document.

On-bill financing

On-bill lending is a method of financing energy efficiency improvements that uses the utility bill as the repayment vehicle. Energy suppliers collect the repayment of a loan through energy bills. It leverages the relationship, which exists between a utility and its customer in order to facilitate access to funding for sustainable energy investments.[9]

More detailed info including concrete example of on-bill financing available in the Chapter 3.7 of this document.

Revolving loan funds

A revolving loan funds are defined as sources of money from which loans are made for multiple sustainable energy projects. Revolving funds can provide loans for projects that do not have access to other types of loans from financial institutions, or can provide loans at a below-market rate of interest (soft loans).[9]

BOOSTEE-CE consortium identified 2 best practice examples of multiscope funds financing energy efficiency on regional level. More detailed info on these models of financing available in the Chapter 3.8 of this document.

2.4 Intermediaries

Financial intermediaries can play an important role in supporting or providing energy efficiency investments.

2.4.1 European Investment bank - EIB

The European Investment Bank (EIB), for instance, has identified energy efficiency finance as one of its priorities. It offers multiple instruments to both public and private sector, including dedicated credit lines through local financial intermediaries or direct framework loans to promote projects. EIB also manages and/or co-finances several funds and facilities, such as

- European Fund for Strategic Investment
- Private Finance for Energy Efficiency (PP4EE)
- European Energy Efficiency Fund
- Municipal loans

European Fund for Strategic Investment (EFSI)

EFSI is an initiative launched jointly by the European Investment Bank, European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

EFSI is a EUR 26 billion guarantee from the EU budget, complemented by a EUR 7.5 billion allocation of the EIB's own capital. The total amount of EUR 33.5 billion aims to unlock additional investment of at least EUR 500bn by 2020. EFSI is implemented by the EIB Group and projects supported by it are subject to usual EIB procedures.

With EFSI support, the EIB Group is providing funding for economically viable projects, especially for projects with a higher risk profile than usually taken on by the Bank. It focuses on sectors of key importance for the European economy, including:[37]

- Strategic infrastructure including digital, transport and energy
- Education, research, development and innovation
- Renewable energy and resource efficiency
- Support for small and mid-sized businesses

To benefit from EFSI resources deployed through the EIB, the projects need to undergo the standard EIB due diligence process. This process helps to verify if your project is eligible for EIB financing. If it is and the operational department proposes that it be backed by EFSI, it will be presented to the independent Investment Committee to decide on the use of the EU-guarantee.[9]

In particular, EFSI projects need to be:

- Economically and technically sound
- In at least one of the EFSI eligible sectors
- Contributing to EU objectives, including sustainable growth and employment
- Mature enough to be bankable
- Priced in a manner commensurate with the risk taken

Link - How to apply for EFSI financing

Private Finance for Energy Efficiency (PP4EE)

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

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

The PF4EE instrument's two core objectives are:

- to make energy efficiency lending a more sustainable activity within European financial institutions, considering the energy efficiency sector as a distinct market segment,
- to increase the availability of debt financing to eligible energy efficiency investments.

The instrument is managed by the EIB and funded by the Programme for the Environment and Climate Action (LIFE).

The LIFE Programme committed EUR 80m to fund the credit risk protection and expert support services. The EIB will leverage this amount, making a minimum of EUR 480m available in long term financing.

The PF4EE instrument provides:

- a portfolio-based credit risk protection provided by means of cash-collateral (Risk Sharing Facility)
- long-term financing from the EIB (EIB Loan for Energy Efficiency)
- expert support services for the Financial Intermediaries (Expert Support Facility)

Picture 3 - PF4EE Instrument (source: European Investment Bank)

One PF4EE operation shall be implemented per country. The EIB has already signed an operation in the following countries - the Czech Republic, Spain, France, Belgium, Italy, Portugal, Croatia, Greece and Cyprus.[38]

European Energy Efficiency Fund (eeef)

EEEF is an overlapping tool that belongs to both Intermediaries and funding sources, for more the Chapter 2.1.3 of this document.

Municipal loans

Municipal loans are another financial tool provided by the EIB. In principle, there can be two basic types of these loans:

- Investment loans for single large investment projects

  When a single large investment project needs long-term funding, the European Investment Bank (EIB) can provide dedicated project-specific loans, which are known as Investment loans. EIB lends to individual projects for which total investment cost exceeds EUR 25m. EIB support is often the key to attracting other investors. These loans can cover up to 50% of the total cost for both public and private sector promoters, but on average this share is about one-third.[39]

- Multi-component loans

  Multi-component leans are the loans for financing multi-component, multi annual investment programmes using a single “framework loan”. This funds a range of projects, usually by a national or local public sector body, most frequently regarding infrastructure, energy efficiency/renewables, transport and urban renovation.

  The project must be in line with lending objectives and must be economically, financially, technically and environmentally sound. Financing conditions depend on the investment type and the security offered by third parties (banks or banking syndicates, other financial institutions or the parent company).

  Interest rates can be fixed, floating, revisable or convertible (i.e. allowing for a change of interest rate formula during the lifetime of a loan at predetermined periods).[40]

2.4.2 Commercial banks

The biggest problem dealing with financing energy efficiency projects is a large upfront investment needed. Especially for smaller municipalities and for those which want to keep flexibility and responsibility it is a big barrier for financing sustainable and profitable projects.

Eventually, many municipalities, whose own funding resources are limited, obtain debt which is paid back from the municipal budget, e.g. tax revenue of municipalities, saved energy costs etc.

Municipalities can sometimes obtain low-interest loans from low-interest rate lending programs offered by a national development banks, dedicated funds, or by the European banks and funds such as the European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD) or the European Energy Efficiency Fund. These are widely used for energy efficiency investments by municipalities in Central Europe. [36]

However, these opportunities are not always available on the national level, or, the municipality is not able to reach for them from various reasons including lack of experience, capacities or limited budgets of public lending programmes.

As a result, commercial loans are obtained at a market interest rate from commercial banks for municipalities´projects, including financing energy efficiency. The interest rate doesn´t depend on anything else but the credit record of the concrete municipality as assets given under energy efficiency projects are irrelevant for obtaining the loan.

However, in this situation there are several tips municipality can follow so that the commercial loan was eventually obtained for affordable interest rate such as:

- Utilizing existing credit record history the municipality has at a concrete bank. Applying for the loan from a bank where the municipality has its banking accounts may increase the credibility of municipality and willingness of the bank to provide the loan with moderate conditions.
- Consolidation of existing bank loans the municipality already has is another way how to improve current cash-flow and in some cases the municipality after the consolidation and with an additional bank loan for an energy efficiency project may pay even lower instalments than before the consolidation.
- Public procurement for a bank loan also increases the likelihood of getting an affordable bank loan with lower interest rates than is actually usual.

3. Financing models for energy efficiency

3.1 General principles & popularity of specific models

3.1.1 General principles

The suitability of EE projects and activities financing model depends on its specific advantages and disadvantages, as well as on the existing economic, market and legal conditions. Large industrial region with many inhabitants will target different goals and options than small rural municipality with a couple of thousands of inhabitants. Therefore, the adequacy of a model chosen depends on the specific characteristics of the municipality or region. Some of the key considerations in choosing a financing model are the availability of own resources; the municipality's borrowing capacity, project size and bankability; the maturity of the market of energy service providers and energy service companies (ESCOs); and, finally, policies at European Union (EU), national and sub-national levels and financial incentives. [36]

Availability of public funding

Public funding in the form of national or European programmes is commonly the first option municipalities and regions are searching for and applying for as it provides finance at the lowest cost compared to resting commercial options and, last but not least, smaller risk of a financial failure. This option is mainly suitable for such public projects whose risk profile or size are not interesting for private investors and have a potential to get funding from these programmes.

Depending on the funding source, municipalities can use it to finance project costs directly or to design a revolving scheme to multiply and leverage additional private capital. National incentives and policies like energy efficiency obligation schemes offer an option to finance energy efficient projects with the help of utilities or other actors participating in the scheme. If available public funding is not sufficient, municipalities can consider working with the private sector and commercial finance providers.

Bankability and availability of commercial financial instruments

By definition, the project is bankable if it has as sufficient collateral, future cash flow, and high probability of success, to be acceptable to institutional lenders for financing.[41]

The larger the project is the higher the need is for an external funding and a private sector engagement. Also, complexity of financing arrangements may increase with the project size. To obtain a commercial debt the projects need be financially sustainable. Furthermore, municipality should have a credit profile and decision-making authority allowing to obtain debt on the

municipality's balance. The cost of capital depends of the project profile, type of financial instrument and maturity of the local financing sector.

In contrast to public funding, private investors have specific risk-return requirements for projects. Investments into energy efficiency may have very variable forms and each one needs to be pre-evaluated properly regarding the technology required, generation of savings, payback period etc.

Energy efficiency projects are usually interesting for energy service companies (ESCOs) or other private investors. Other financial instruments are available as well and they are increasingly being used, e.g. citizen cooperatives, crowdfunding, green municipal bonds, on-bill financing, revolving loan funds.

Maturity of the ESCO and energy service providers market

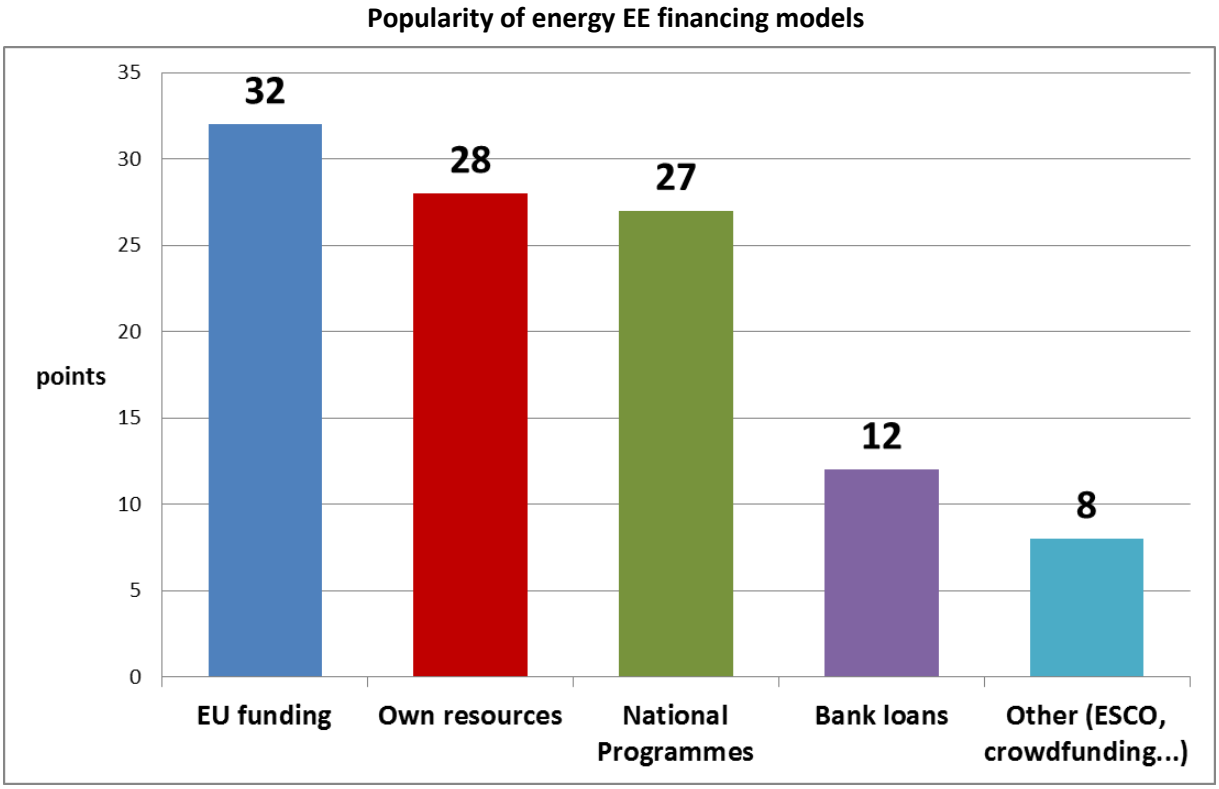
If ESCOs and energy service providers are active on the country market, they can offer advantageous terms for energy performance contracting (EPC). To be attractive for ESCOs, the projects must deliver high energy savings and municipalities need be able to pay the contract fees over time. Using ESCOs or other service outsourcing models allows implementing EE projects without peaks in budget spending and with transferring investment risks on the private partner. However, if the ESCO market is not mature enough or the project does not offer sufficient scale, energy savings or payback period for ESCO interest, other debt-instruments need to be explored. [36]

3.1.2 Popularity of specific EE financing models

The survey was carried by BOOSTEE-CE consortium on the opinion of EE projects implementing bodies about effectiveness of EE financing models. The result of the survey reflects the common situation when the most used and therefore the most popular and effective are considered to be conventional ways of EE financing which are funding from EU programmes or grants from programmes on national level, eventually self-financing through energy savings.

As the following graph reveals, the combination of self-financing with European funds and national programmes is the most popular and used model of EE financing by far. The main reason for this situation is a wide availability of grants on both European and national level. As a result, the alternative financing models are for municipalities and regions only a marginal option and the market with these alternative schemes is many times not well developed or mature.

However, in the future these public sources might not be available in such a range and amount as they are nowadays and municipalities should definitely look for the extension of their of EE financing models portfolio.



Picture 4 – popularity of financing models (source: survey conducted by BOOSTE-CE partners)

Following chapters 3.2 – 3.8 describe particular mapped models of EE financing with the aim to specify the models as closely as possible (but also in a concise way) on concrete examples, where possible.

3.2 Conventional models of EE projects financing

With the term *Conventional models of EE financing* the three the most typical ways are understood municipalities and region are financing their EE policies as revealed in the previous Chapter 3.1. They are:

- Self-financing through energy savings
- Debt financing
- European funds and operational programmes

3.2.1 Self-financing through energy savings

Self-financing is the most straightforward EE financing model when the investment is covered from own funds of municipalities and regions and the payback is ensured by energy savings generated by the projects, eventually by the energy sales or feed-in-tariffs claimed when implemented EE projects are producing clean energy. The great advantage of these projects is the fact there is not any additional burden laid on taxpayers but the opposite, these projects can themselves even improve municipal budgets.

However, the main assumption for implementing this model is enough own sources for the upfront investment as well as sufficient savings or revenues generated by the project which happens only rarely.

One of such cases is the **Reconstruction of boiler room plant in General County Hospital "Dr. Tomislav Bardek" Koprivnica, Croatia** which is documented as the **Best Practice Factsheet #5** of the BOOSTEE-CE EE financing best practices.

Investment costs	707.000 EUR
- Own sources	707.000 EUR
- Subsidies	-
- Loan	-
Lifetime (service life	20 years
Annual operational costs (incl. repairs, maintenance and other specific costs	12.000 EUR
Annual revenues – energy savings	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 %

Picture 5 – Reconstruction of the boiler room plant in Koprivnica

This project met the crucial conditions for self-financing, having enough own sources available and generating sufficient energy savings to ensure simple payback period of 10 years.

Among other important factors belonged project involvement of competent and relevant individuals and detailed and thorough preparation of the investment.

The factsheet to this investment project is available on BOOSTEE-CE OnePlace Place platform, in the section Financing Energy Efficiency and involves comprehensive information on measures implemented, barriers encountered, success factors, graphs of cash flow etc.

3.2.2 Debt financing

Municipalities and regions, whose own funding resources are limited, obtain debt which is then paid back from the tax revenues of municipalities and saved energy costs and revenues generated by the projects themselves. Municipalities can obtain a loan from available public lending programs (municipal loans, for instance), a commercial loan from a commercial bank, or they can issue municipal bonds.

Among the advantages of debt-financing belongs access to capital which the municipality lacks for financing from own sources, possibility to combine the loan with other ways of financing, for example EU funding or revolving funds. On the other hand, the level of interest rate can considerably influence the profitability of the EE project implementation so this way of financing is suitable mainly for financially sustainable infrastructure projects of various sizes.
BOOSTEE-CE consortium mapped and documented 3 best practices on debt financing:

Reconstruction and extension of the tenement building in Płock , Poland

The overall investment costs were 820.000 EUR and the implemented measures included construction works - foundations of the ground floor, extensive electrical installations, sanitary installations, tele technical installation etc. The project was co-funded with the support of a commercial loan and the loan under 2014 – 2020 Jessica Initiative.

Investment costs	820.050,25 EUR
- Own sources	-
- Subsidies	-
- Loan	-
- Loan under the RPO WM 2014-2020 (Jessica Initiative)	639.636,80 EUR
- Commercial loan	180.413,45 EUR
Lifetime (service life)	10 years
Annual operational cost incl. salaries, repairs, maintenance and other specific costs	72 139,39 EUR
Annual revenues – energy savings	1.065.517,04 EUR

Financial indicators	
Net present value - NPV	211.054,73 EUR
Internal rate ratio – IRR	7,7%
Evaluation year	2018
Lifetime period	20
Discount	4,00 %

Picture 6 – Reconstruction and extension of the tenement building in Płock

Best practice Factsheet #6 to this investment project is available on BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency and involves comprehensive information on bank loans details, measures implemented, barriers encountered, success factors, etc.

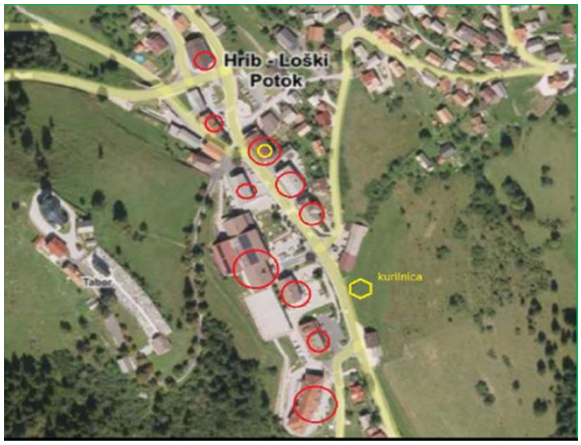
Wood Cooperative Loški Potok: District heating with wood biomass in Hrib center, Slovenia

With the objective of the municipality of Loški Potok being energetically self-sufficient by 2015 and obtaining all the energy gained from renewable sources the particular activities this project is part of a wider concept including district heating with wood biomass (cooperative), exploitation of wind potential (cooperative) and public transport with electric vehicles.

The overall investment costs were 790.000 EUR and the project is co-funded with the support of a commercial loan.

The key results included 11 facilities connected to the district heating system. Since October 2017 the cooperative also manages the local post office 1318 Loški Potok, which would otherwise be closed.

The Wood Cooperative also successfully applied for a public tender for cutting wood in state forests for the period until the end of 2018.



Investment costs	798.000 EUR
- Own sources	10.000 EUR
- Subsidies (Ministry of Infrastructure) - 65%	518.000 EUR
Loan - payment period 15 years, interest rate 3,75% + 3 month Euribor rate	270.000 EUR
Lifetime (service life	30 - 50 years
Annual operational costs (incl. energy, maintenance and operating costs	43.200 EUR
Annual revenues – sale of heat	65.000 EUR

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 %

Picture 7 - Municipal facilities connected to the district heating with biomass in Loški Potok

Best practice Factsheet #4 to this investment project is available on BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency and involves comprehensive information on bank loans details, measures implemented, barriers encountered, success factors, graphs of cash flow etc.

Modernization of the Heating System of Płońsk, combined generation of electricity and heat from biomass, Poland

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 overall investment costs were 8.430.500 EUR and the project was co-funded with the support of the loan from National fund for environmental protection and water management. **Best practice**

Factsheet #7 to this investment project is available on BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency and involves comprehensive information on loans details, measures implemented, barriers encountered, success factors, financial indicators etc.

Investment costs	8.430.500 EUR
- Own sources - Subsidies (Ecofund) - Loan - National fund for environmental protection and water management; 10 years, interest rate 2%	1.154.500 EUR 2.819.750 EUR 4.456.250 EUR
Lifetime (service life	25 years
Annual operational costs (incl. repairs, maintenance and other specific costs	12.000 EUR 180.413,45 EUR
Annual operational cost incl. salaries, repairs, maintenance and other specific costs	42.766.825,75 EUR
Annual revenues	44.274.191,00 EUR

Picture 8 - Modernization of the Heating System of Płońsk

3.2.3 European funds and operational programmes

If available, European funds and national operational programmes are widely utilised which has a considerable effect on the whole financing of the EE projects. Undisputable advantage of these funds is the financial stability, certainty and relatively short payback period. However, when European funds and operational programmes form massively prevailing way of EE financing, the dependency on them can create potential problems in sustainability of EE policy after availability of these funds is diminishing.

BOOSTEE-CE consortium mapped and documented 2 best practices on EU and OP financing:

Geothermal energy utilization and public utility installation in Tamási, Hungary

The project is the example of the effective usage of own sources combined with the support from Operational Programmes. The aim of the project was to replace the gas heating of public institutions to geothermal heating. 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. The overall investment costs were 4.635.917 EUR and the project was supported by the Operational Programme Environment and Energy.

Best practice Factsheet #3 to this investment project is available on BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency and involves comprehensive information on state support details, OP funds details, measures implemented, barriers encountered, success factors, financial indicators, cash flow etc.

Investment costs	4.635.917 EUR
- Own sources	985.589 EUR
- Subsidies	
- Environment and Energy OP (EEOP)	1.825.164 EUR
- State support for covering partly own contr. of EEOP	1.825.164 EUR
- Loans	-
Lifetime (service life	25 years
Annual operational costs (salaries, repairs, maintenance etc.)	45.240 EUR
Annual revenues – savings in natural gas supply	172.492 EUR

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 %

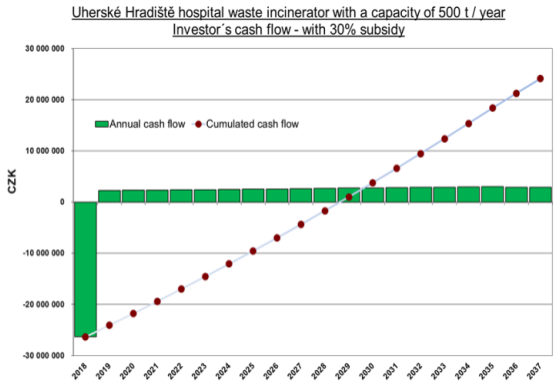
Picture 9 - Geothermal energy utilization and public utility installation in Tamási

Case study of the waste incinerator upgrade in Uherské Hradiště hospital, the Czech Republic

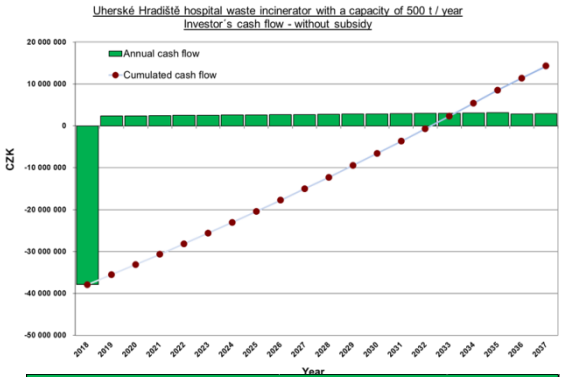
This example is actually a case study of EE project with various scenarios with/without subsidy. The project should resolve the upgrade of the currently technically obsolete device of the hospital waste incinerator in the hospital area.

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



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 %



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 %

Picture 10 - Preview of the case study on the waste incinerator upgrade in Uherské Hradiště

Both scenarios are analysed in two alternatives – with and without the support from Operational Programme Environment. **Best practice Factsheet #1** to this case study is available on BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency.

3.2.4 Effects of subsidies and loans – the case study

In the previous three sections 3.2.1 – 3.2.3 three conventional models of financing were analysed – self-financing through energy savings, debt-financing and financing by EU funds and Operational Programmes.

Municipalities and region often combine all three together and following simple case study wants to show the way loans and subsidies, i.e. the most common external ways of financing of EE projects, have an effect on the financial sustainability and profitability.

For the purpose of our analysis, we consider a fictional EE project with investment costs 100.000 EUR into heat insulation and installation of FVE. This project generates annual energy savings 6.000 EUR as well as it has annual revenues from energy sales (FIT for instance) 4.000 EUR. There is 20 years project life-time period expected the same period is counted for the depreciation.[42] The discount rate is 3%, the very low level which might be tenable just for the public sector.

The bank loan is calculated to be taken for 5 years with the interest rate 6%.

Taxes are not considered.

Putting the data to the table we get the following overview and if not stated otherwise, for all the graphs and tables in this chapter 3.2.4 following features of the case study are valid:

Input*	Value
Capital Costs	**€ 100 000,00**
Annual Energy Savings + Annual Energy Revenues	**€ 10 000,00**
Annual Operational Costs	**€ 3 200,00**
Discount Rate	**3%**
Investment Lifetime Period	**20 years**
Depreciation Period	**20 years**
Bank Loan – Interest rate **– Payoff period**	**6%** **5 years**

* For definitions consult the Chapter 5 Terms and definitions of this document

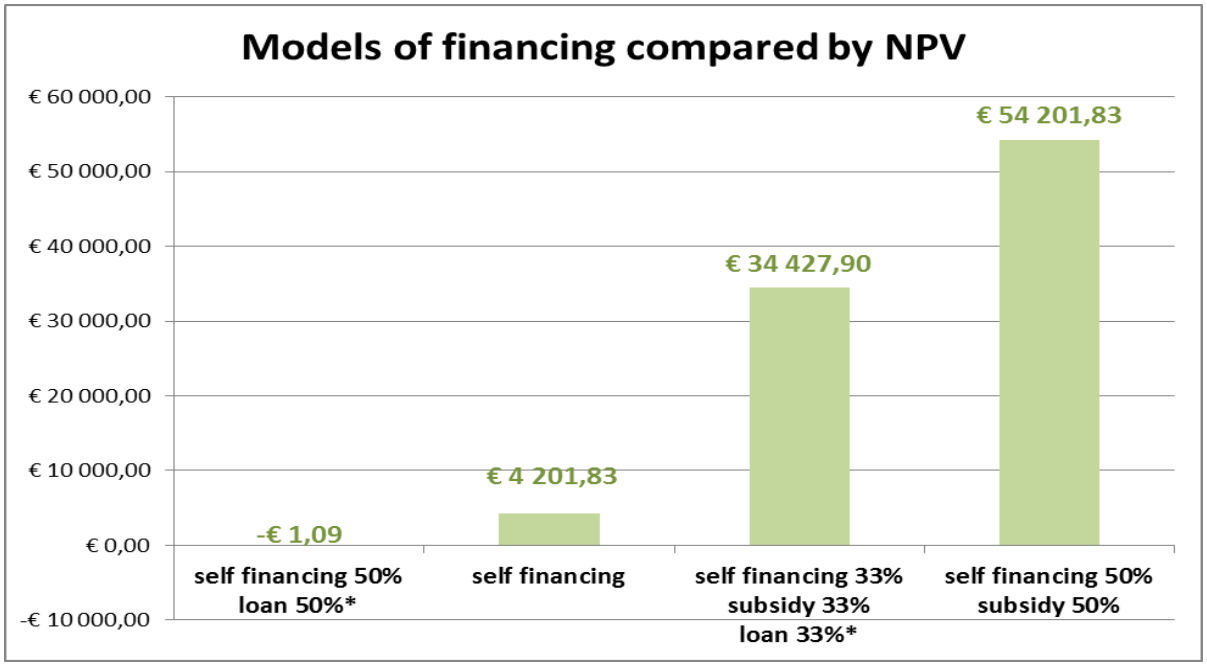
We will consider different share of loans and subsidies and analyse how they affect project profitability. After calculation of crucial indicators for each scenario we get following numbers*:

Indicator*	self-financing 50% bank loan 50%*	self-financing only	self-financing 33% subsidy 33% loan 33%**	self-financing 50% subsidy 50%
Net Present Value (NPV)	-€ 1,09	€ 4 201,83	€ 34 427,90	€ 54 201,83
Internal Rate Ratio (IRR)	3,00%	3,50%	9,96%	14,55%
Simple Payback Period	16	14	10	7
Discounted Payback Period	21	18	12	8

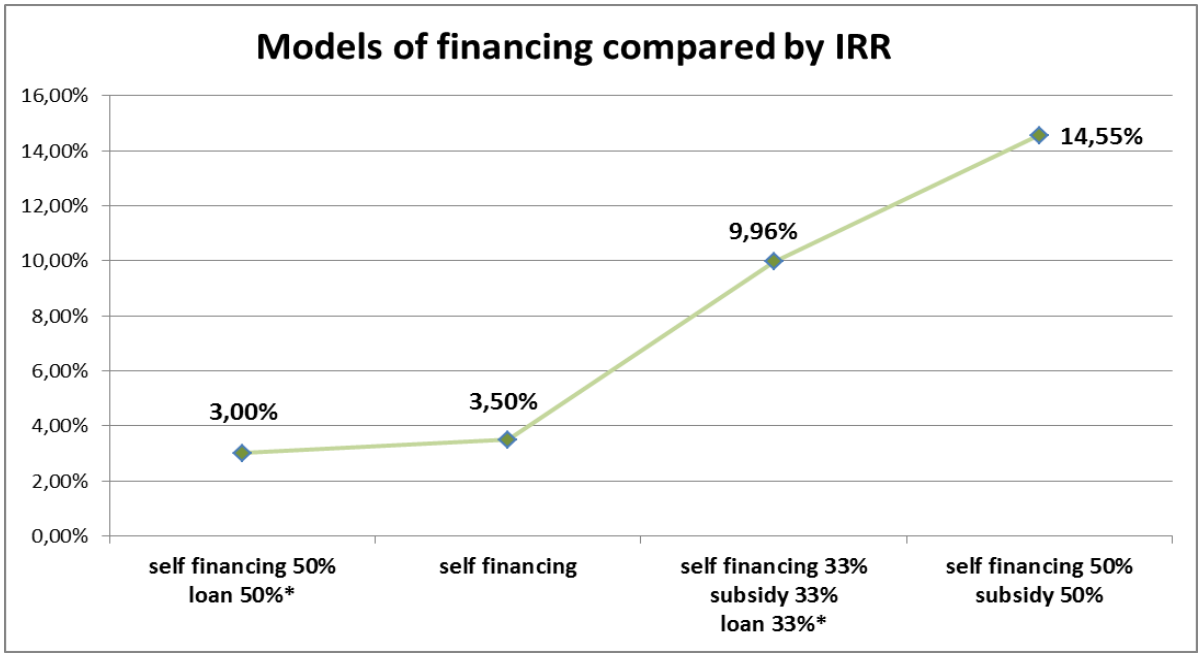
* Consult the Chapter 5 Terms and definitions of this document

** Interest rate 6% for 5 years payoff period

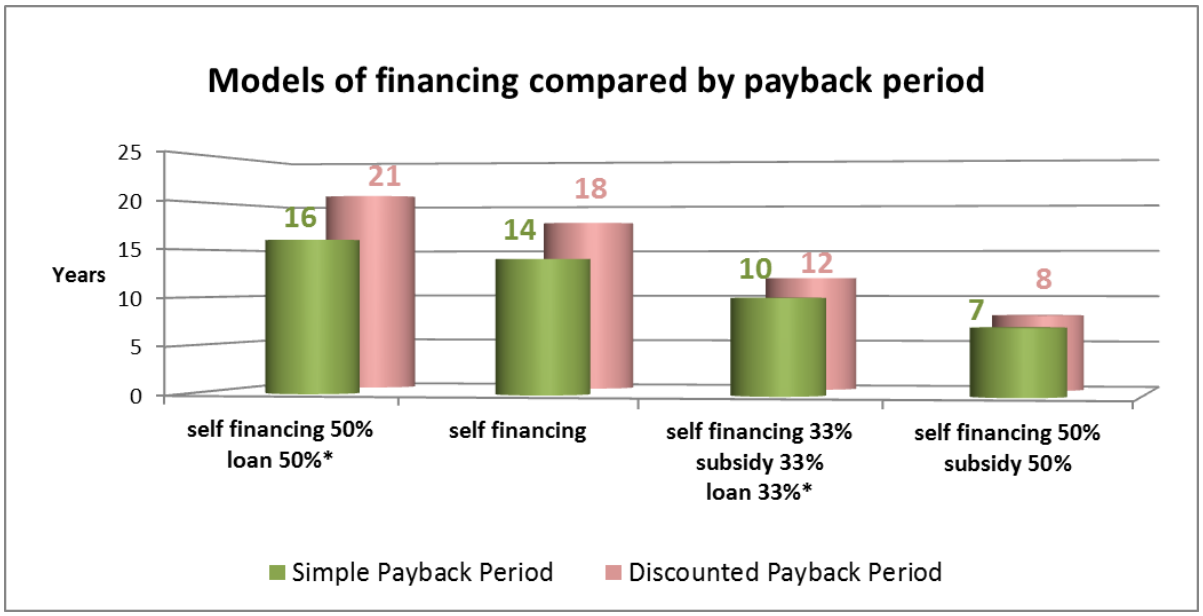
Putting the data from the table above into the graphical form we can see even more clearly how particular indicators are influenced by the model of financing.



Picture 11 – Net Present Value in relation to the way of project financing



Picture 12 – Internal Rate Ratio in relation to the way of project financing

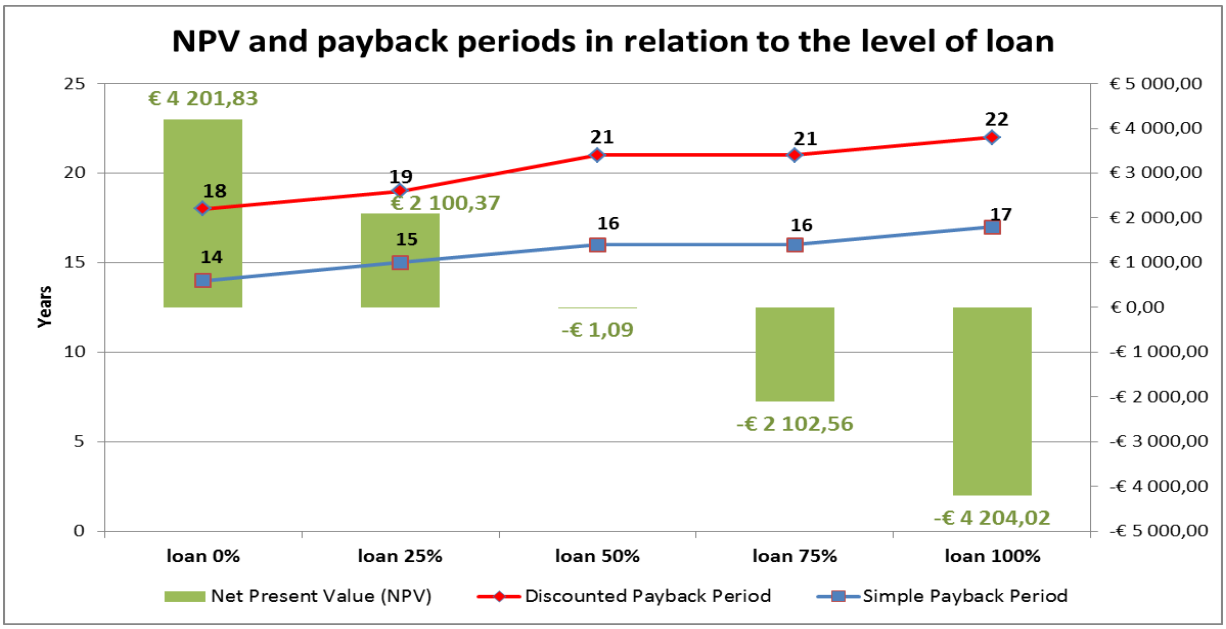


Picture 13 – Comparison of selected conventional EE financing models by payback period

On this hypothetical case we can see that for instance with 50% loan this project would not be refundable, however, if we exchange the 50% loan for 50% subsidy, the dicounted payback period drops from 21 years to 8. Another interesting conclusion would be that the 100% self financing through energy savings is much less interesting for the investor than the situation with 33% loan, 33% subsidy and 33% own sources.

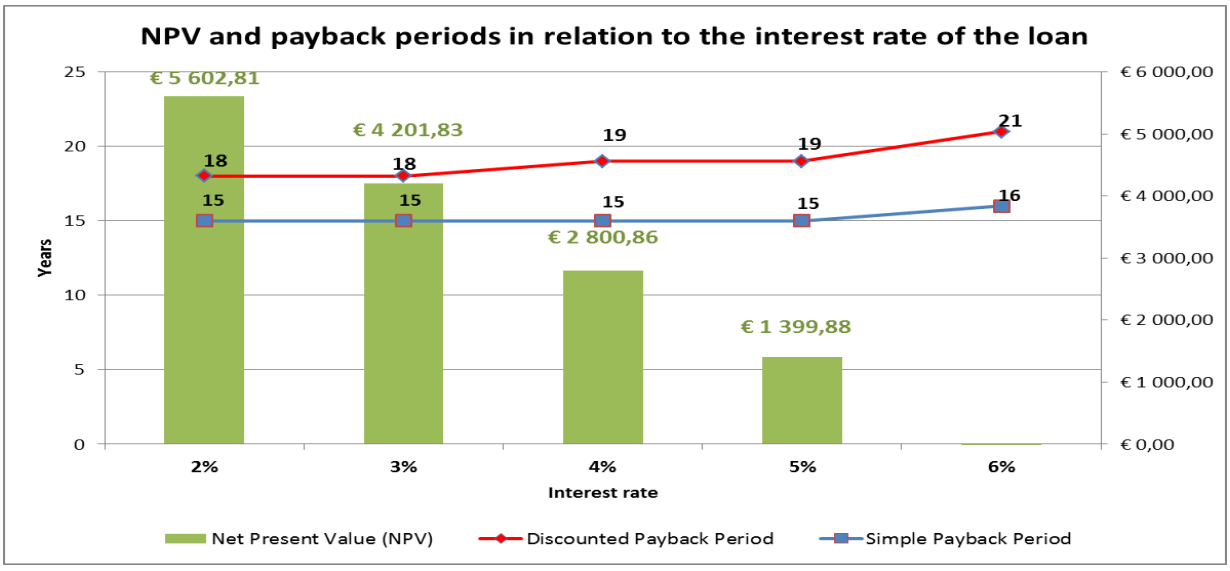
We can analyse this case further from other different perspectives. In the three following cases we will focus on the level of bank loan, level of subsidies and level of bank loan interest rate and how they particularly can change the profitability of the project.

Level of the loan can change the final evaluation of EE project profitability considerably which is reflected in the following graph *(loan interest rate is 6% for 5 years payoff period)*:



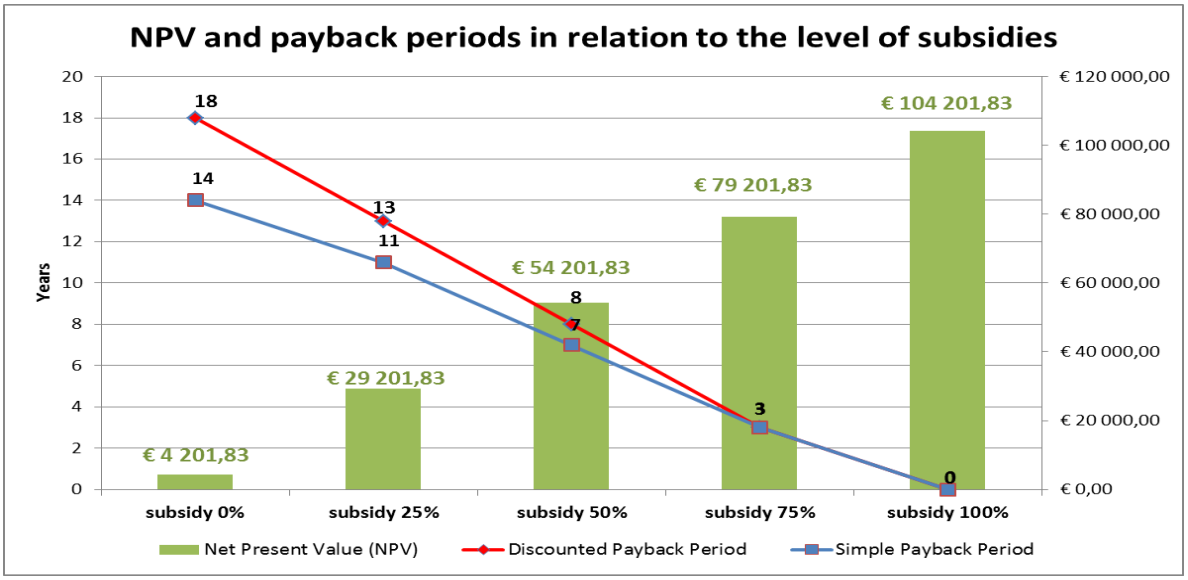
Picture 14 – effect of the level of bank loan on project profitability

However, with taking the loan we still need to consider carefully the interest rate offered as this feature should have a huge effect on our decisions as indicated in the following graph where we consider different levels of interest rate for 5 years loan payoff period:



Picture 15 – effect of the level of the interest rate on project profitability

Finally, we can analyse effect of different levels of subsidies on the EE project profitability*:



Picture 16 – effect of the subsidies on the project profitability

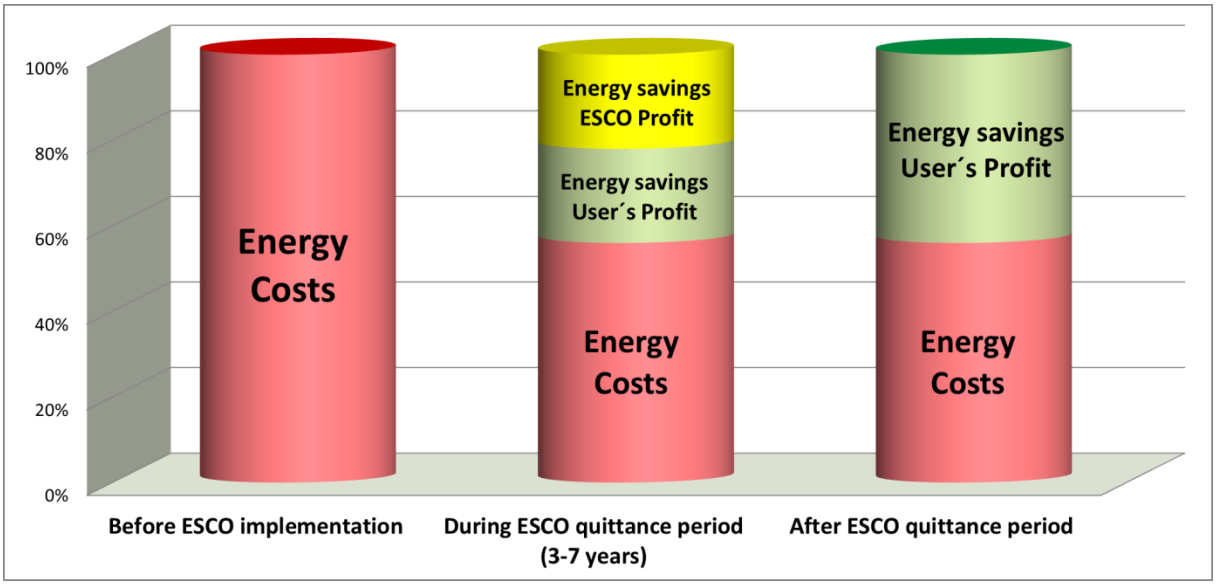
Apparently, with increasing the level of subsidies all the financial indicators improve dramatically in a positive way. This is bringing stability, certainty and profitability to investors; on the other hand, excessive and prevailing utilisation of state and European interventions in a long term period can bring unhealthy dependency on this kind of support as well as unnatural barriers for the development of the local market with alternative financing instruments which are closely analysed in the following chapters 3.3 – 3.8.

* *The NPV shows the same values for 100% self-financing (Picture 14) and 50% loan financing with loan interest rate 3% (Picture 15). The reason is the discount rate chosen for the calculation which is 3% as well. The difference between these two options is in the simple payback period, which is one year shorter when using just the self-financing without a loan.*

3.3 Energy Performance Contracting

The classic and commonly used method of financing an investment is that an investor engages his own financial resources or invests a loan of up to 70-80% of the investment's value in the bank for the project. It is also required that the investor has knowledge about what to do and how to achieve planned effects. But what can you do if the above conditions are not met, and there is an intention of an investment project that reduces the cost of energy supply of the facility? Well, the market has developed companies with technical and financial profile, willing to invest in projects reducing the consumption and energy costs of its user in exchange for a share in the profit (savings) created by this investment. The investing company is ESCO (Energy Saving Company or Energy Services Company), and the term third party refers to an external financial institution providing additional financial support to ESCO. This is where the name of this method comes from, i.e. third party funding (TPF).

ESCO investment and payback scheme



Picture 17 – ESCO principles

What has been written above is the idea of this system, but there have been many varieties of contracts concluded with ESCO. The basic division concerns the type of implementation of investment projects, among which we distinguish:

BOO (Build - Operate - Own)

There is permanent involvement of the ESCO from the investment phase to the permanent operation and possession of the completed investment (e.g. built facility or installed equipment), this system boils down to the purchase of a specific energy service by the investor, for example ensuring proper temperature in the room.

BOT (Build - Operate - Transfer)

After the construction of ESCO, the investment is used in the initial period of time and then it is transferred to the investor.

BOOT (Build - Own - Operate - Transfer)

Similar to BOT but the service life is extended, and it is the combination of the previous two variants (BOT and BOO).

Other keywords that often appear in this way of financing are:

Agreement on the energy effect (EPC, Energy Performance Contracting): is an agreement that guarantees the investor to achieve the savings declared by ESCO, these savings are allocated to the repayment of ESCO's investment costs (ESCO receives remuneration only after achieving savings calculated according to the agreed procedure).

First repayment (first out): EPC variant, where all savings are only allocated to the repayment of investments (shortening the repayment period to a minimum).

Sharing of savings (shared savings): EPC variant, where the investor partly participates in savings from the beginning (extension of the total repayment period, but the investor immediately notes the positive economic effect of the completed investment).

The most common two variants of contracts are the energy service of the recipient (BOO) and the investment in energy saving (BOT + EPC). In summary, compared to other financing methods, the third party financing method provides the following basic benefits:

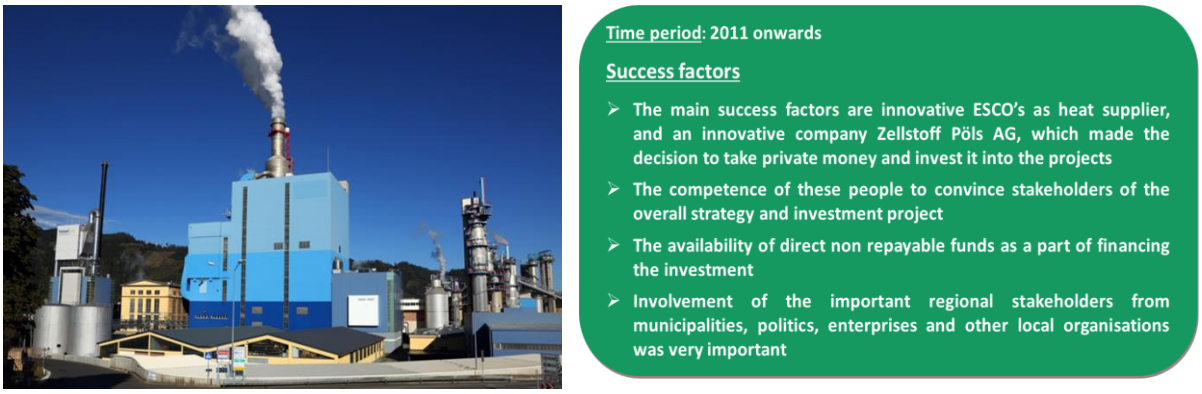
- The investment is carried out without the client's financial commitment
- The ESCO has full responsibility for implementing the project and obtaining results
- All technical services and financing of investments are carried out by one entity
- It is not required for the energy recipient to have a special technical knowledge
- An additional package of services for the recipient: training, extended service and maintenance [2] [3] [4] [5]

As the example of successfully implemented ESCO approach the best practice from Judenburgin Austria was identified by BOOSTEE-CE consortium:

District heating grid based on waste heat from pulp & paper mill Zellstoff Pöls AG

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 allows for 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.



Picture 18 – ESCO Best Practice from Judenburg

Best practice Factsheet #9 to this project is available on the BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency and involves comprehensive information on the measures of the action, partners' involvement, financial details etc.

3.4 Citizen cooperatives

Energy cooperatives refer to a business model where citizens jointly own and participate in renewable energy (RES) or energy efficiency (EE) projects. In energy cooperatives citizens are involved in both the decision making and financial & economical participation. All citizens are eligible to participate. [9]

Active customers might be individual citizens, households, non-commercial organisations, public entities and SME's that not only consume energy, but also actively participate in the energy market, either individually or collectively, including through an 'energy community'. Active participation in the market may consist in producing renewable energy, enhancing energy efficiency and/or energy system management and grid integration of fluctuating renewable energy sources through demand side response, aggregation, storage, etc. Active customers should get easy access to the grid and to energy markets at favourable conditions.

Citizen cooperatives do not necessarily need to have the legal statute of a cooperative, but rather distinguish themselves by the way they do business. They typically respect 7 principles that have been outlined by the International Cooperative Alliance: [26]

- Voluntary and Open Membership
- Democratic Member Control
- Economic Participation through Direct Ownership
- Autonomy and Independence
- Education, Training and Information
- Cooperation among Cooperatives
- Concern for Community

All citizens should be eligible to join. After purchasing a cooperative share and becoming a member or co-owner of local RES and EE projects, members share in the profits and often are given the opportunity to buy the electricity at a favourable price. In addition, members can actively participate in the cooperative: they can decide in what and where the cooperative should invest, and are consulted when setting the energy price.

As the example of successfully implemented citizen cooperative the best practice from Judenburg, Austria was identified by BOOSTEE-CE consortium:

PV installations as a sale & lease back model in Judenburg, Austria

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 innovative part is that the citizens of the city and customers of the Stadtwerke can participate in this model in a public private partnership model called SALE & LEASE BACK, this means people can buy from 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 significantly more compared to a bank account, without any risks.

Investment costs	700.000 EUR
Lifetime (service life)	30 years
Annual operational costs (incl. repairs, maintenance and other specific costs)	1% of the investment costs
Annual revenues from feed-in-tarrifs	App. 92.000 EUR

Success factors

- Available feed-in tariffs by the green electricity law
- Innovative PPP model based on SALE and LEASE BACK
- Trust into a strong public owned ESCO Stadtwerke for a long term partnership

Picture 19 – PV citizen cooperative in Judenburg

Best practice Factsheet #10 to this project is available on BOOSTEE-CE OnePlace platform, in the section Financing Energy Efficiency and involves comprehensive information on the measures of the action, key results, financial details etc.

3.5 Crowdfunding

According to the European Commission, crowdfunding has the potential to be a key source of financing for SMEs over the long term.[28]

Crowdfunding is a relatively young form of financing – especially for not-for-profit projects – that has a potential to be developing fast in Europe. Among the benefits belong for example the facts the project owners have greater control and financial risk is spread among a larger number of people, there are also some drawbacks which may include a high cost of capital, occasional displays of a 'herd mentality', capable of depriving potentially worthier projects of adequate funding and risks for investors from incompetence or fraud on the part of the project owners.

The European Commission and the European Parliament have taken an active interest in this form of financing. As a result, the Commission conducted a study on the state of the European crowdfunding market. It found that, while crowdfunding is developing fast, it is still concentrated in a few countries (the United Kingdom, France, Germany, Italy and the Netherlands), which have introduced tailored domestic regimes, and that it remains, for the time being, a national phenomenon with limited cross-border activity. The study therefore concluded that for the

moment there is no strong case for EU-level policy intervention. Nonetheless, given the encouraging trends and the potential of crowdfunding to become a key source of financing for SMEs over the long term, the Commission noted that it will maintain regular dialogue with European supervisory authorities, Member States and the crowdfunding sector to monitor and review its development. [28]

Crowdfunding can be defined as an open call for 'the collecting of resources (funds, money, tangible goods, time) from the population at large through an Internet platform. In return for their contributions, the crowd can receive a number of tangibles or intangibles, which depend on the type of crowdfunding'. It generally takes place on crowdfunding platforms, that is, internet-based platforms that link fundraisers to funders. Crowdfunding campaigns can raise funds for not-for-profit and for-profit projects or organisations.

Commonly used classification distinguishes between four categories of campaigns:

- donation-based - contributors don´t receive any reward for their contributions
- reward-based - people receive goods or services in exchange for their contributions
- lending-based - contributors receive interest payments in exchange for financing a project with an associated rate of return and maturity date
- equity-based - contributors receive shares in the venture, in exchange for their contributions.

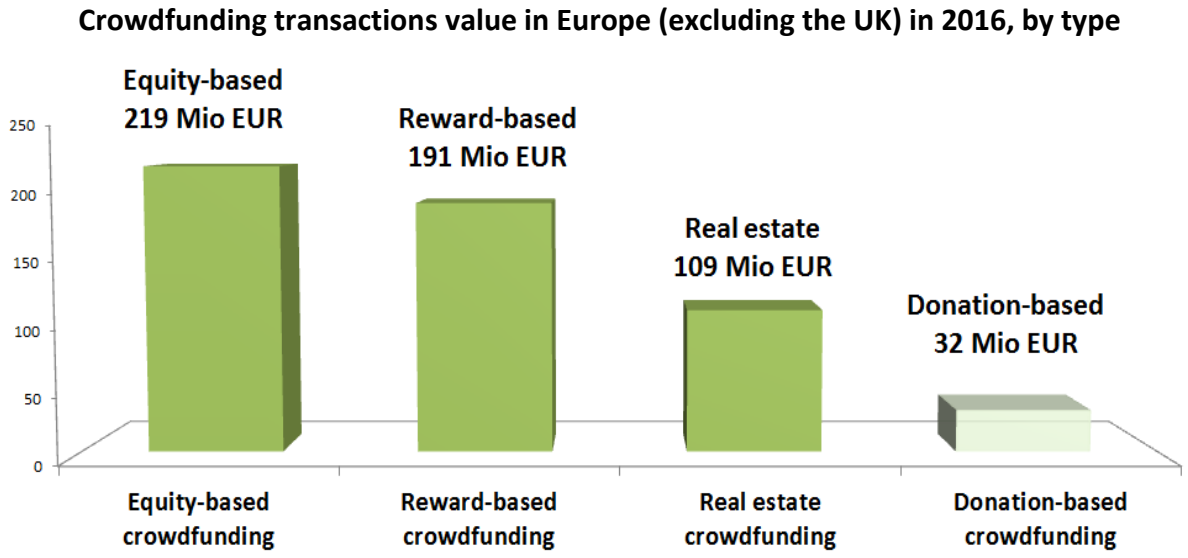
The International Organization of Securities Commissions (IOSCO) refers to the first two categories as 'crowd sponsoring' and the latter two as 'crowd investing'.

Unlike traditional financial intermediaries, crowdfunding platforms do not borrow, pool, or lend money on their own account. Instead, they focus on matching project owners and backers, providing information about the projects and advice (for instance, on how to reduce investment risks).[29]

Crowdfunding platforms vs. citizen cooperatives

Basic difference between crowdfunding platforms and citizen cooperatives is in the structure. While crowdfunding platforms focussing on sustainable energy may have multiple different projects in different countries and may offer various types of participation (loan, donation, etc.), an energy cooperative is a single organisation typically raising money to fund its own projects.

Increasingly though, the lines are becoming blurred: cooperatives can make their own investment offers or can even make use of crowdfunding platforms to fund part of their goals. [9]



Picture 20 – Crowdfunding in Europe (source: www.statista.com)[8]

For a further comprehensive reading on crowdfunding see for example CF4EE - Crowdfunding for Energy Efficiency by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.[7]

3.6 Green municipal bonds

A green municipal bond is a fixed-income financial instrument for raising capital through the debt capital market. As with any other bond, the bond issuer raises a fixed amount of capital from investors over an established period of time (the "maturity"), repays the capital (the "principal") when the bond matures, and pays an agreed-upon amount of interest ("coupons") during that time. The key difference between a green bond and a regular bond is that the former is explicitly labelled as "green" by the issuer, and a commitment is made to use the proceeds of the green bond to exclusively finance or re-finance projects with an environmental benefit. Eligible projects include, but are not limited to, renewable energy, energy efficiency, sustainable waste management, sustainable land use, biodiversity conservation, clean transportation, clean water, and various climate adaptation projects.[31]

As the green municipal bond market grows, it is important that issuers understand the process of issuing green bonds before entering into a transaction. Generally speaking, issuing a green municipal bond involves five phases:[32]

- **Identifying qualifying green projects and assets.** Municipalities, city governments, and states should first define the kind of green projects they seek to support with green bonds, while clearly

stipulating that the proceeds from the green bond sale would be earmarked for green projects or assets.

Similar to the process of re-financing, proceeds of a green bond can be applied to existing assets, such as public transportation assets. For instance, a municipality can issue a green municipal bond to refinance an existing metro rail line project and use the funds to repay or increase the existing financing for the rail line. Proceeds can also be allocated to upcoming capital investment, though investors generally prefer that the funds are used within a reasonable period in order to achieve green impact in a timely manner.

Guidance about qualifying projects and assets can be obtained from the Green Bond Principles,[44] which set out broad green asset categories, and the Climate Bond Standards Scheme,[45] which sets out more specific standards for what qualifies within these asset categories.

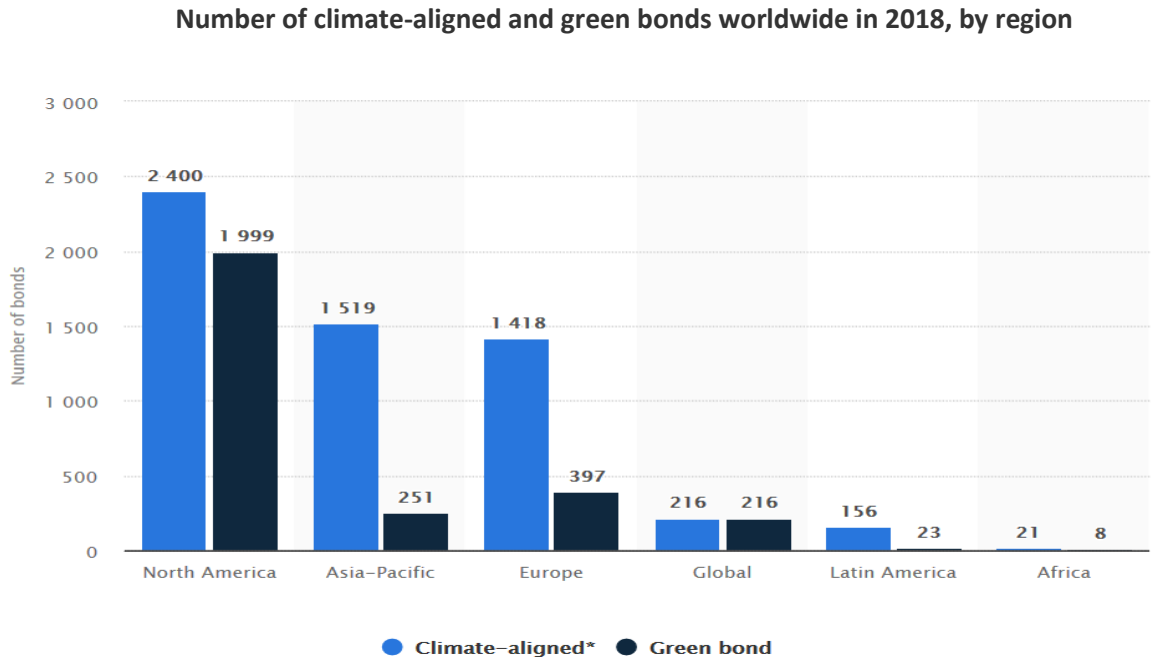
➔ **Arranging independent review.** Issuers of green municipal bonds should use independent review to further increase investor confidence in funded projects. Ultimately green investors want to make sure that their investment is being used to support genuinely green projects. Independent reviewers look at the green credibility of the proposed green municipal bond investments and the processes established for tracking funds and for reporting. Independent reviewers can also help identify green projects and assets, and help set up a green bond framework for the issuer. Different independent review options are available that vary in terms of their rigor and level of assurance. Issuers can engage a consultant with climate expertise to undertake second-party consultation on eligible green projects and choose whether to make the results of the consultation public. A more rigorous approach involves engaging an expert consultant or auditor to verify the criteria and processes in place for tracking proceeds, evaluating environmental outcomes, and preparing reports. The latter approach is generally conducted in line with professional standards such as the International Standard on Assurance Engagements 3000 (ISAE 3000) to ensure the integrity and independence of the review.[46]

➔ **Setting up tracking and reporting.** It is critically important that issuers of green municipal bonds always maintain full disclosure on the allocation of proceeds. A few key rules should be kept in mind:

1) Since the proceeds from green municipal bonds must be used only for specified projects, there should be systems in place to segregate green municipal bond proceeds and keep track of their use
2) Monitoring procedures must be set up to make sure proceeds are not placed in non-green investments throughout the life of the green bond.
3) The nominal value of the pool of assets or projects must stay equal to or greater than the amount of the bond. Municipal issuers should be tracking all this and also be able to show how they are tracking; transparency is essential.

- **Issuing the green bond.** As with any conventional bond, issuers of green municipal bonds will follow the usual steps. They should first seek required issuance approval from regulators. Second, working with an investment bank or advisor, they should structure the bond. Any sort of structure, from vanilla bonds to asset-backed securities, can be used as long as proceeds are allocated to green projects or assets. Finally, they should market and price the green municipal bond. It should be noted that creditworthiness is judged the same as for other bonds. Issuers should expect to get credit rated in the usual manner. Currently 82 per cent of the labelled green bond market is investment grade.

- ***Reporting regularly.*** To maintain the status of a Green Muni Bond, the issuer must confirm at least each year that the funds are still properly allocated to green projects. Confirmation involves:
  - Public letter from the municipality auditor or a letter signed by an authorized officer of the municipality.
  - A brief report that sets out the ongoing use of the Green Muni Bond proceeds, highlighting the environmental impact to investors and other stakeholders. Reports should be publicly available, such as on the issuer's website. [32]



Picture 21 - climate-aligned and green bonds worldwide in 2018 (source: www.statista.com)

Further comprehensive reading on Green municipal bonds - How to Issue a Green Muni Bond: The Green Muni Bonds Playbook (n.p., City Green Bonds Coalition, 2015). [43]

3.7 On-bill financing

On-bill financing and on-bill repayment programs provide two options for property owners to pay for investments in clean energy upgrades through their utility. While electric utilities and natural gas companies typically run on-bill programs, there is an opportunity for state and local governments to capitalize on new on-bill loan funds and/or provide credit enhancement [47] for existing on-bill funds. Depending on the programs available in a given jurisdiction, some government entities may also be able to take advantage of on-bill programs to finance projects for their own facilities.

On-bill financing allows the utility to incur the cost of the clean energy upgrade, which is then repaid on the utility bill. **On-bill repayment** options require the customer to repay the investment through a charge on their monthly utility bill as well, but with this option, the upfront capital is provided by a third party, not the utility. Additionally, on-bill repayment allows for a streamlined process as utilities already have a billing relationship with their customers, as well as access to information about their energy usage patterns and payment history. In some on-bill repayment programs, the loan is transferable to the next owner of the home or building.[33]

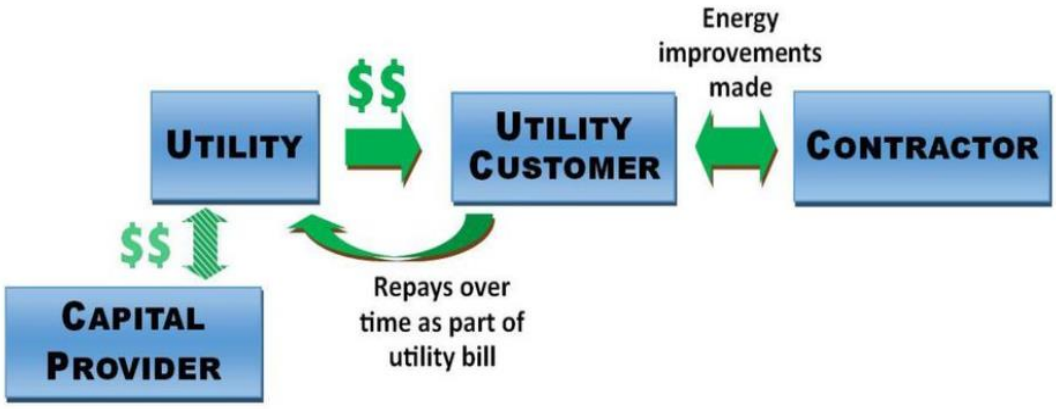
Advantages and disadvantages of on-bill financing

Advantages	Disadvantages
- Savings are paired directly with repayment on the same bill - Can be structured to meet the needs of different markets - Provides a secure revenue stream because failure to pay can be tied to disconnection - Can use past bill repayment as a proxy for credit	- Utilities are often reluctant to take on role of financing entity; potential exposure to consumer lending laws and alterations to billing systems are required - Can be complicated to set up - If transferability is not allowed, businesses or homeowners must pay off entire loan upon sale of property, which could result in not all of the energy savings being realized

Source: www.energy.gov [48]

As the successful example of on-bill financing the implementation of the UK Green Deal is often cited when loan facility that can last for 25 years and can be repaid on via a charge on an energy bill. It is a standardization of measures and loan contracts, which several UK local authorities set up in collaboration with private delivery partners.[34]

On-bill financing scheme



Picture 22 – on-bill financing (source: Environmental and Energy Study Institute) [35]

3.8 Revolving loan funds

Financial incentives such as grants, guarantees or soft loans for energy renovation could motivate homeowners to make the investment decision more easily.

Generally speaking, local and regional authorities in cooperation with financing institutions can offer to homeowners of private residential buildings other financial instruments like soft loans or loan guarantees.

- Soft loans are loans with interest rates below standard market conditions and longer payback periods, including eventually other advantages (e.g. grace period, lower administrative or insurance costs)
- Loan guarantees in a form of buffer by first losses of non-payment are incentives triggering investments in energy renovation.[9]

As a result, towns, cities, regions or provinces can decide to support energy efficiency in the form of so called "revolving loan funds" which may vary significantly regarding internal conditions of their utilisation, resources used or actions supported. There is probably not possible to indicate a universal scheme of these funds, therefore two options are introduced which were identified by BOOSTEE-CE consortium:

- ➔ Regional financing scheme including the support for individuals KAWKA - liquidation of the local heat source fired with solid fuel - the city of Jelenia Góra, Poland (KAWKA)
- ➔ Energy Fund - Multyscope Regional Fund of public financing in Emilia-Romagna, Italy

KAWKA (Poland)

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 this pollution and for which air protection programs have been developed.

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-modernization in order to achieve savings in energy consumption and reduce heating costs.

It is the 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.

General scheme of KAWKA financing

Investment costs Jelenia Góra	**10.397.041 PLN = ca. 2.475.486 EUR**
- **Own sources** **- participation of program participants**	**3.269.342 PLN = cca. 778.415 EUR**
- **Subsidies** **- VFEPWM in Wrocław (15%)**	**1.425.550 PLN = cca. 339.416,67 EUR**
- NFEPWM (45%)	**4.276.650 PLN = cca. 1 425 500 PLN**
- **Loan - from VFEPWM in Wrocław (15%)**	**1.425.500 PLN = cca. 339.405 EUR**

Picture 23 - Regional financing scheme KAWKA

The whole description of this best practice is available on OnePlace Platform / EE Financing Module, the **Factsheet #8 - KAWKA - liquidation of the local heat source fired with solid fuel** - the city of Jelenia Góra – regional financing scheme including the support for individuals.

Multyscope Regional Fund of public financing (Italy)

This fund is a revolving fund of soft loan financing, privately-funded for the purpose of providing loans at a reduced rate. Beneficiaries are SMEs and large companies closely specified by the terms and conditions of the Fund.

Among eligible interventions to reduce the Energy consumption belong:

- 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

General scheme of the Multyscope Regional Fund financing in Emilia-Romagna

Investment costs	**13.460.000 EUR**
- **Own sources** - **Subsidies** **- Public** **- Private** - **Loans**	- **6.350.000 EUR** **7.110.000 EUR** -
Annual operational costs (salaries, repairs, maintenance and other specific costs)	**500.000 EUR**

Picture 24 - Multyscope Regional Fund scheme

The whole description of this best practice is available on OnePlace Platform / EE Financing Module, the **Factsheet #2 - Energy Fund - Multyscope Regional Fund** of public financing in Emilia-Romagna, Italy.

4. Indicative structure for EE financing roadmap

This part of the document suggests an indicative structure of the energy efficiency financing roadmap. The concrete EE financing roadmap of a particular municipality / region must always take into consideration a specific situation in the area, therefore following text should serve as a supporting tool for creating own EE financial roadmap rather than biding instructions.

The indicative structure bellow builds upon previous outputs and findings of BOOSTEE-CE project regarding energy efficiency financing, particularly on the State-of-the-art of financial strategies and schema identified by BOOSTEE-CE partners, Comparative analysis of financial schema, Best practices and investments return models as well as on findings included in previous chapters of this document.

The suggestion for the basic structure of EE financing roadmap is following:

- **Introduction & Internal and external conditions**
- **Strategic targets & Priority areas**
- **Action plan & Financing**
- **Organisational provisions, Monitoring & Evaluation**

4.1 Introduction & Internal and External Conditions

In this part the public body should outline the basic ambition of the EE financial roadmap, financial roadmap timeframe, what are the starting points and the legislative framework and what are related policies and strategies the financial roadmap is linked to, for example:

- Regional RIS
- Existing regional energy strategies and national energy strategies
- Regional development strategies
- Legislative demands related to energy safety and reliability of energy supply
- EU directives related to energy efficiency, buildings energy performance, RES, common energy markets etc.

Although a comprehensive SWOT analysis should be rather the part of a regional energy strategy than of the EE financial roadmap, some crucial findings on strengths, weaknesses, opportunities, threats, barriers and ways to overcome should be included even in the financial roadmap.

These might be structured according to various points of view, for example

- Technical and economical availability of primary energy sources
- Structure and efficiency of energy usage

- Level of local/regional energy management
- Maturity of EE financial market and availability of different sources of financing
- Economical features of the municipality/region, demography

More on this issue can be found in the SWOT analysis as the part of the BOOSTEE-CE Comparative analysis published on the BOOSTEE-CE OnePlace Platform.

4.2 Strategic Targets & Priority Areas

With the relation to the legislative and strategic framework and the SWOT analysis outlined in the previous section 4.1, each region / municipality should set strategic targets and priority areas to be pursued with regards to energy safety, competitiveness, economical, societal and environmental sustainability etc.

As an example of ***strategic targets*** following ones can be included (it is not an exhaustive list):

- Balanced local / regional energy mix
- Increasing of the energy efficiency in public buildings
- Infrastructure development (smart technologies)
- Support to research and development (involvement in international projects, further education…)
- Increasing the share of Renewable Energy Sources
- Increasing of energy safety and self-sufficiency (district heating systems, energy islands…)
- Improving the air quality

Upon the strategic targets the concrete ***priority areas*** should be identified in order to ensure meeting the strategic targets. Following ones might belong among them (it is not an exhaustive list):

- Support to energy management in the organisations of the region / municipality
  - Including organisation of bulk energy purchase, methodological supervision, introduction of ISO 50001 etc.
- Support to efficient energy usage in the region / municipality
  - Including construction of zero energy demand buildings, decreasing energy demand of existing building with implementing targeted investment measures, support to increasing of the energy efficiency of heating sources including utilisation of district heating systems etc.

- Support to renewable energy sources (RES) and non-conventional sources of energy
  - Searching for, support and implementation of concrete projects on RES utilisation and on-conventional and more effective sources of energy inside existing infrastructure
- Increasing safety and reliability of energy supply in the region / municipality
  - Including planning of more safety in electricity and heating supply, development of relevant IT systems or active involvement in official regional crisis management bodies
- Awareness raising
  - Including conferences, workshops and seminars promoting the EE financial roadmap as well as regional / local energy policy, educational campaigns, facilitation of cooperation between public and private sector etc.

4.3 Action plan & Financing

With the reference to priority areas identified in the previous chapter it is advisable to identify concrete energy efficiency activities and energy efficiency projects to be implemented according to the classification introduced in the Chapter 1.2a) of the BOOSTEE-CE comparative analysis:

- *EE services* are the core activities which must be continuously provided to fulfil regional / local energy efficiency strategic objectives including development and maintaining of energy management, energy efficiency advice services provided, training and educational activities in the field of energy efficiency monitoring of implementation of energy efficiency policy etc.
- *EE Projects* 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.

This can't be effectively done without analysing and revising the current regional / local situation as done by the BOOSTEE-CE partner in the Chapter 2.2 of the BOOSTEE-CE comparative analysis.

On the basis of the revision of the current situation it might come easier to establish the list of intended EE projects the region / municipality intends to implement and EE services it intends to provide as indicated by BOOSTEE-CE partners in the Chapter 2.4.4 of the BOOSTEE-CE comparative analysis.

Indicative costs calculation for the overall regional policy needs to be calculated in the terms of particular activities as indicated in the Chapter 2.2 of the BOOSTEE-CE comparative analysis as well as the overall sum as indicated in the Chapter 2.4.2 of the BOOSTEE-CE comparative analysis.

Setting a balanced funding mix is another step that should be done when developing EE financial roadmap and it is an issue all municipalities and regions are facing with a growing urgency. This may be viewed from different perspectives, for example:

- According to **levels of restriction and the continuity and security of funds**.
- According to **sources of financing**

Regarding the **level of restriction and security of funds** a helpful guide may be defining them as suggested in the Chapter 1.2b) and 1.3 of the BOOSTEE-CE comparative analysis and explore the findings of the BOOSTEE-CE consortium described in the Chapter 2.3 of the BOOSTEE-CE comparative analysis - while regions are relying almost entirely on programme funding, municipalities are utilizing mainly core financing or project funding. The mutual share of the core financing and project funding at particular municipalities varies a lot which is depending mainly on actual external sources of funding available and it definitely will vary from year to year.

Regarding the **sources of financing**, both regions and municipalities are encouraged to diversify the sources of financing so that they were not dependent mostly only on the conventional ways of financing as stated in the Chapter 3.2 of this document but increase their portfolio also in alternative ways of financing as indicated in Chapters 3.3 – 3.8 of this document, namely:

- Energy Performance Contracting
- Citizen Cooperatives
- Crowdfunding
- Green municipal bonds
- On-bill financing
- Revolving loan funds

4.4 Monitoring & Evaluation

In this section an organisational provision should be suggested on how, how often and by whom the monitoring and evaluation of the EE financing roadmap will be ensured, including the tools, staff personnel requirements and cost foreseen for monitoring and evaluation. Qualification and quantification of results of EE financing roadmap implementation should be enlisted as well. They might be economic, energy related, environmental, social etc.

➔ It is highly advisable to establish a set of concrete indicators against which the EE financial roadmap will be monitored and evaluated. The indicative list of such indicators was identified by the BOOSTEECEE consortium in the Chapter 2.4.6 of the BOOSTEE-CE comparative analysis.

5. Terms and definitions

Annual Energy Savings	Annual sum of money savings generated by the investment, for instance costs saved for heating
Annual Revenues	Annual sum of money generated by the investment, for instance electricity sales
Capital Costs	The sum of the different type of costs related to the considered investment
Depreciation	The monetary value of an asset decreases over time due to use, wear and tear or obsolescence. This decrease is measured as depreciation
Discount Rate	Rate used to discount future cash flows in order to obtain their present value. The rate generally viewed as being the most appropriate is an organisation´s weighed cost of capital Utilities normally use discount rates ranging from 3% to 18%, for public sector it is tenable to set this rate around the lower limit.
Discounted Payback Period	Based on the same rationale as Simple Payback Period; the difference is represented by the fact the net cash flows are discounted in order to account for the time value of money
IRR - Internal Rate Ratio	Rate of return used in capital budgeting to measure the profitability of investment. It represents the discount rate at which the NPV of an investments becomes zero. In other words – it is the interest rate which will make the total of the future cash flows exactly equal to the original investment.
NPV - Net present Value	Discounted cash flow reflecting the time value of money. It represents the sum of the present values of the individual cash flows of a project; its calculation depends on the selected discount rate as well as on the length of the calculation period; for this calculator the period of 20 years is chosen. The general rule for NPV is: NPV > 0 – project favourable for investment NPV < 0 – project not favourable for investment
Operational & Maintenance Costs	Annual operational costs including salaries, maintenance, fees, energy costs etc.
Simple Payback Period	The time in years for a project cumulative annual savings to equal its upfront costs
Weighed Cost of Capital	A company's weighted average cost of capital is the average interest rate it must pay to finance its assets, growth and working capital. It is also the minimum average rate of return it must earn on its current assets to satisfy its shareholders or owners, its investors, and its creditors.

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