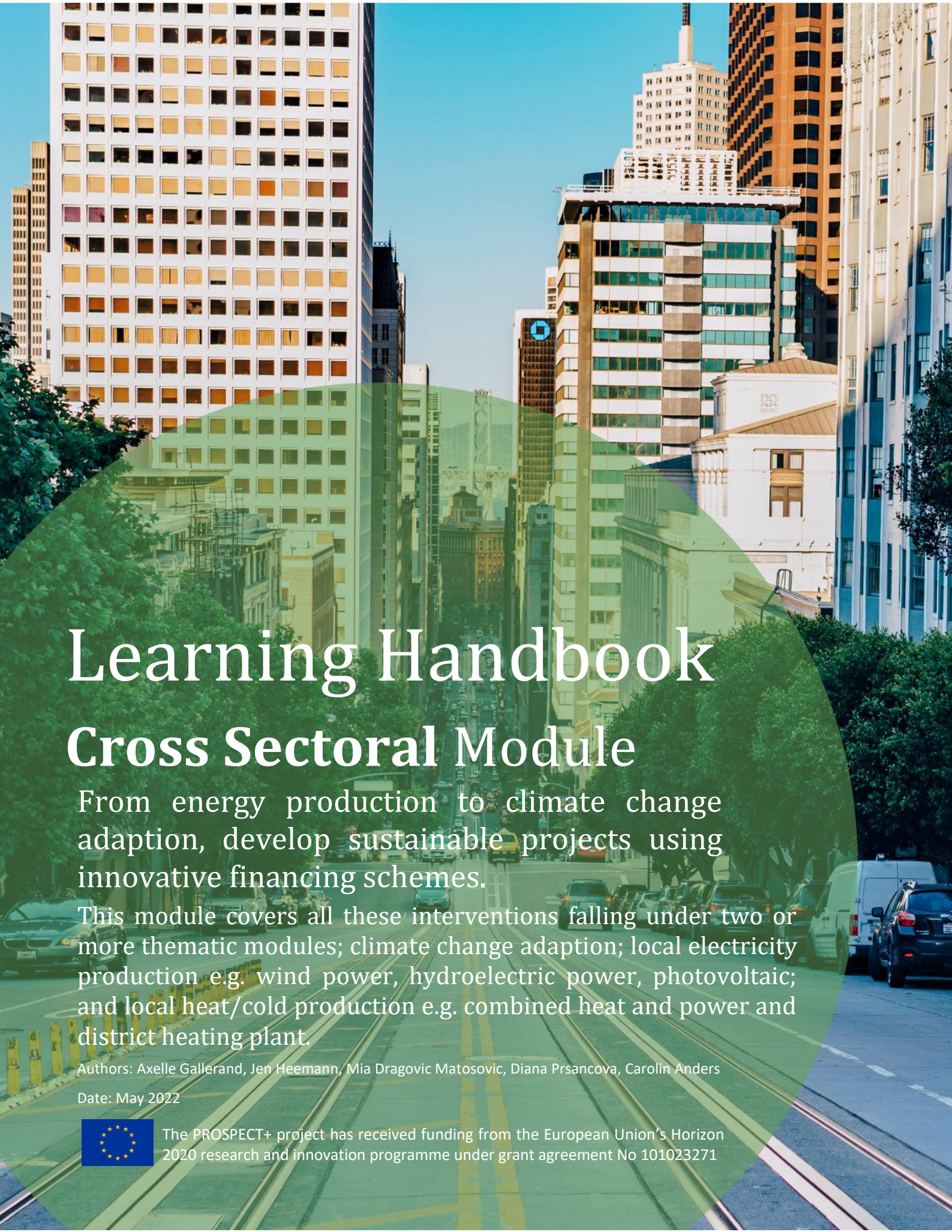
PROSPECT+



Learning Handbook

Cross Sectoral Module

From energy production to climate change adaption, develop sustainable projects using innovative financing schemes.

This module covers all these interventions falling under two or more thematic modules; climate change adaption; local electricity production e.g. wind power, hydroelectric power, photovoltaic; and local heat/cold production e.g. combined heat and power and district heating plant.

Authors: Axelle Gallerand, Jen Heemann, Mia Dragovic Matosovic, Diana Prsancova, Carolin Anders

Date: May 2022

The PROSPECT+ project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023271

Contents

List of Abbreviations

CBS	Climate Bonds Standards
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EIB	European Investment Bank
ESCO	Energy Service Company
EU	European Union
EPC	Energy Performance Contracting
ESG	Environmental, Social, Governance
GBP	Green Bonds Principle
HLEF	High Level Expert Group
LEs	Large Enterprises

Tables

Figures

Module Description

The module on cross-sectoral covers all those interventions falling under two or more thematic areas; climate change adaptation; local electricity production (e.g., wind power, hydroelectric power, photovoltaic); and local heat/cold production (e.g., combined heat and power and district heating plant).

Module Objectives

Mentee

At the end of this module, mentees can achieve the following learning objectives:

- Understand the innovative financing schemes relevant under cross-sectoral
- Recognise the barriers, incentives, advantages, and disadvantages of the innovative financing schemes
- Examine which sustainable energy and climate action projects can be financed by innovative schemes
- Analyse the success factors and lessons learnt from successful projects financed by innovative schemes

Mentor

At the end of this module, mentors can achieve the following learning objectives:

- Share knowledge on the topic of innovative financing schemes that are relevant under the cross-sectoral module
- Share a practical experience in implementing sustainable energy and climate action projects and support others in overcoming barriers
- Showcase sustainable energy and climate action projects financed using innovative financing schemes
- Learn from other cities and regions about what projects they want to implement and which innovative financing schemes they want to apply

Common Barriers

Energy efficiency projects in cross-sectoral, for example, those related to climate change adaptation or the production of renewable energy, can be quite broad. This may include local electricity and heat/cold production to satisfy consumption needs, as well as those interventions falling under two or more thematic areas. As a consequence, investments in cross-sectoral activities may carry higher complexity than in other specific areas.

According to the International Energy Agency (IEA) and Asian Development Bank (Copenhagen Centre on Energy Efficiency, 2015), the main barriers to energy efficiency in cross-sectoral are:

- Higher upfront cost investments
- Principal agent issues
- Lack of information among investors
- Energy-efficient products are still unfamiliar
- Risk exposure
- Discount rate problems
- External benefits are hard to quantify
- Lack of technical capacity to carry out projects
- Lack of experience in energy efficiency technologies

These barriers can hinder any intentions at end-use energy conservation in cross-sectoral. Energy policies need to be brought together to overcome all of these obstacles. Therefore, governments play a pivotal role in creating the framework specifically for energy efficiency in cross-sectoral. Governments can help trigger energy efficiency investment and expedite implementation through national energy efficiency strategies. Once implemented, it is important to monitor, enforce and evaluate such strategies to recognise gaps and reach targets (IEA, 2018).

Wohlfarth et al. (2018) identified several problems and the influencing factors for industries regarding cross-sectional energy-efficiency measures and proposed approaches to solve the issues, as follows:

Table 1: Approaches to respond to individual problems of companies regarding energy efficiency

Problem area for energy efficiency measures	Influencing factors and indicators	Proposed approach
Lack of information/doubts in benefits of measures	Hesitation to invest/implement despite the availability of profitable measures, avoidance of changes	Models of pioneer companies, information on implementation process (beyond the recommendation of measures)
Energy efficiency measures have low priority, lack of time, expertise and resources	The process of searching, getting informed and implementing is too effortful, transaction costs are too high, people in charge are overstrained	Offer one-stop-solutions for companies to outsource the process
Profitable measures are neglected due to financial issues	Inappropriate payback periods are applied, non-financial benefits are disregarded, decisions about expenses cannot be made autonomous, no possibilities for financing	Reasons should be differentiated. Depending on them: Incentivize consideration of longer payback periods, demonstrate multiple benefits, implement low-level-measures which can get approval faster, provide funds or loans
Heterogeneity between companies within one sector, no general recommendations	More influencing factors on implementation o measures than sector or companies' size	Promote individual audits; esp. for small and medium-sized enterprises (SMEs): develop a self-assessment tool for recommendations on measures fitting to company-type
Motivational barriers	Predominantly in large enterprises (LEs) implementation is stated difficult despite the availability of profitable measures	Measures should directly affect as few employees as possible, shift decision criteria from financial aspects to effort, support implementation process

Typical Projects

Typical projects under cross-sectoral can range from awareness-raising to solar thermal water storage. Below are the typical projects under cross-sectoral, including a description of their features: from CO2 saving potentials to estimated costs for municipality and target groups and key actors. You can find more concrete examples of Cross Sectoral replicable practices on PROSPECT+'s website (https://h2020prospect.eu/replicable-practices/cross-sectoral)

Table 2: Example of projects under cross-sectoral

Action	CO2-saving potential	Estimated costs for the municipality	Cost-benefit ratio	Implementation time	Target group	Key actors
Solar thermal water storage	High	High	Medium	Years	Municipality, economy, citizens	Municipality, economy, citizens
Alternative energy sources- lake water and wastewater	High	High	Medium	1-3 years	Municipality, economy, citizens	Municipality, economy, citizens
District heating/cooling network	High	High	Medium	1-3 years	Municipality, economy, citizens	Municipality, economy, citizens
Support local battery storage	High	High	High	Month to years	Households, municipality, electricity supplier	Households, municipality, electricity supplier
Awareness-raising - photovoltaics	Medium to high	Medium to high	Medium	2 months to 1 year	Private owners	Municipality, energy experts, GIS experts
Photovoltaics grants and subsidies	High	Medium to high	Medium	1-3 years	Households, municipality, electricity supplier	Municipality, energy experts
Wind energy plants	High	High	Medium	1-3 years	Municipality, electricity supplier, citizens	Municipality, energy experts
Check for reservoirs	High	High	Medium	3-10 years	Municipality, hydroelectric supplier	Municipality, energy experts, civil engineer, GIS experts
Water powerplants - planning	Low	High	Medium	2 months to 1 year	Hydroelectric supplier	Municipality, energy experts, GIS experts, citizens, nature conservation authorities
Adaptation in waterpower supply	Indirect	High	High	Months-years	Municipality, energy supply companies, water administration	Municipality, energy supply companies, water administration
Repowering of existing plants	Low	High	Medium	2 months to 1 year	Hydroelectric supplier	Municipality, energy experts, GIS experts

Good Practices

The table below presents the relevant financing schemes and examples of good practices, including the city or region where the example is located, and the source(s) of funds.

Table 3: Good practices under cross-sectoral

Financing scheme	City/Region	Good Practice	Source of Funds
EPC	Province of Barcelona (ES)	The project focuses on renewable and energy efficiency. It has given support to 108 implemented projects, representing around EUR 96 million of investment and a CO2 reduction of 21,600 t/year	Project development Assistance: ELENA EIB & Own Local budget (Barcelona Provincial Council)
Third-party financing of an ESCO and EPC	Piedmont Region (IT)	The project targets public buildings combined with public lighting. It has resulted in 11 municipalities coordinating successful energy efficiency tenders, five municipalities entering a contract with an ESCO for the retrofitting of 18 buildings, 10 municipalities starting to replicate the initiative and an EPC for the replacement of 120 boilers in 118 buildings.	Project Development Assistance: IEE MLE & Private Sector Institutions and Investors (private ESCOs)
Green Bonds	Paris (FR)	The bond focuses on financing climate adaptation measures. Initially, the bond had applications from investors worth EUR 475 million to fund it. Now, more than 30 investors are involved.	Private Sector Institutions and Investors + Own Local budget.
Revolving Funds	Amsterdam (NL)	This fund has financed 29 projects for a total of EUR 14 million, including the largest solar panel installation in the Netherlands, and 'HR+' glass in social housing, the installation currently investing around EUR 80,000 per day.	Own local budget
Cooperatives	Eeklo, Asse & Beersel (BE)	These funds are geared toward local municipalities that have signed the Covenant of Mayors (CoM) but face difficulties in writing their Sustainable Energy Action Plans (SEAP). They use the revenues of wind projects in Eeklo, Asse and Beersel to pay the monthly wage of a SEAP expert who initiates renewable energy sources (RES and energy efficiency (EE) projects at the local level.	Private Sector Institutions and Investors (Individual funds)
Revolving Funds & Crowdfunding	Bristol City & wider sub-region (UK)	So far, 28,000 social housing units and over 200 private homes have benefited from energy retrofitting, and the city's renewable energy capacity has been improved, with measures such as solar panel installation.	Project development Assistance: ELENA EIB & Own Local budget & National and Subnational Governments & Citizens finance

Funding Sources

There are different options for financing cross-sectoral projects – from the city or municipality's own resources through direct budget allocation and via revolving funds to using grants from sub-national or European funds.

Table 4: Source of funds for cross-sectoral

No.	Source of funds	Description
1	Own funds	Funds drawn from the internal budget and resources
2	Local (City or Municipal) or regional budget	Funds are drawn from the budget of local or regional public authorities
3	National funds	Subsidies provided by national governmental bodies or funding through grants from national programmes
4	European funds	Grants and contracts from the European Commission from the Funding and Tenders portal.
5	Managed at the EU level	Funds that provide technical assistance and project development, usually for demonstration/pilot projects (e.g. European Innovation Partnership on Smart Cities and Communities, European Research Framework Programme, and Intelligent Energy Europe II Programme)
6	Managed at the national, regional, or local levels	Funding resources and technical assistance, such as the European Structural and Investment Funds, which are managed by national, regional, or local public authorities in partnership with the European Commission through operational programmes based on strategic goals or investment priorities
7	European banks	These include the European Investment Bank (EIB), the Council of Europe Development Bank (CEB), European Fund for Strategic Investments, Private Finance for Energy Efficiency, European Energy Efficiency Fund, and European Bank for Reconstruction and Development
8	Private funds	Financing is provided by private contractors, utilities, institutional investors, crowdfunding, and through energy cooperatives

Decision Tree

The decision tree represents a flow chart of the most appropriate financing mechanisms to address specific situations faced by municipalities in financing energy efficiency (EE) projects. The scheme is not binding as, in many cases, multiple mechanisms may be combined.

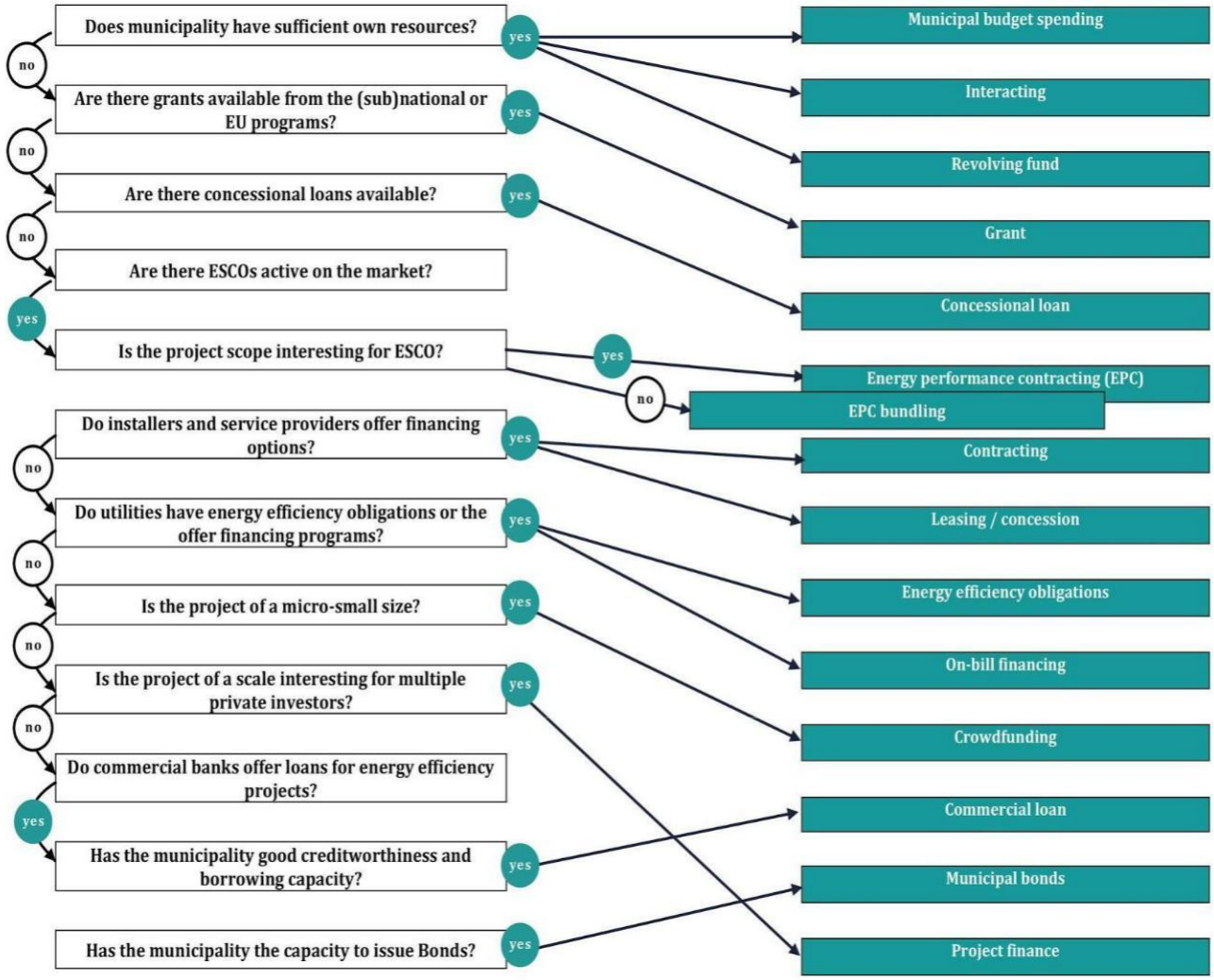
The first thing to address is whether the municipality has sufficient resources to fund the project(s) or not. If the municipality has sufficient financing for the project(s), it can allocate part of its budget for the project(s); by establishing a budget line item for a project and carrying out the mechanism of general budget financing. If the municipality does not have enough funds, it should seek any grants available from donors. If there are available grants, the municipality should apply for them. Often these grants do not cover the entire project cost as they represent a mechanism of partial budget financing. It is often possible that funds may also come from the national government; in this case, the municipality will capture a new budget for financing part of the project(s). If the fund does not come from the national government, it is possible to look for energy efficiency funds; this financing scheme is subject to EE fund eligibility criteria.

Besides these funds, commercial banks can also offer dedicated credit lines and/or risk-sharing programmes. To take advantage of these opportunities, the municipality must respond for its creditworthiness as well as it's collateral and borrowing capacity.

Other financing systems can be found in commercial or financial ESCOs; if there are ESCOs in the market the municipality should develop favourable EPCs by negotiating them with ESCOs. If the ESCO is not an option, leasing or vendor financing programmes can be searched. In such a case, when the eligibility criteria are satisfied, similarly to the commercial financing scheme, the municipality should negotiate the leasing or the vendor financing agreement. Finally, if the

municipality has the capacity to issue municipal bonds it should create a municipal bond programme by taking into account the transaction costs and market situations.

Select the relevant financing model for sustainable energy and climate action projects using a simple decision tree below:



Source: Novikova, et al., 2017

Figure 1: Decision Tree

Innovative Financing Schemes

Innovative financing schemes are non-traditional ways of raising funds and facilitating sustainable energy and climate investments for cities and regions by mixing different sources (own fund, public and private funds) or engaging different partners (e.g. citizens, private sector) aside from established financial institutions (e.g. banks). Below are the innovative financing schemes relevant to this module.

Table 5: Innovative financing schemes under cross-sectoral

Financial Schemes	Description
Energy Performance Contracting (EPC)	Energy Performance Contracting (EPC) is a method to implement energy efficiency projects, by which an ESCO (Energy Services Company) acts as a unique contractor and assures all of the steps of a project, from audit through installation up to operations and maintenance. The ESCO delivers a performance guarantee on the energy savings and takes responsibility for the end result. The EPC contract is the contractual agreement by which the output-drive results are agreed upon.
Third-party Financing	Refers solely to debt financing. The project financing comes from a third party, usually a financial institution or other investors, or the ESCO, which is not the user or customer.
Revolving Funds	A fund established to finance a continuing cycle of investments through initial amounts received from its shareholders, creditors or donors and later on through amounts received from reimbursements of provided funding or loans to projects. These recovered funds become available for further reinvestment in other projects under the similar scope (e.g. revolving funds for sustainable energy will use the loans recovered funds to finance new sustainable energy projects).
Guarantee Funds	Loan guarantees provide a buffer by first losses of non-payment. A mechanisms whereby public funding facilitates/triggers investments.
Soft Loans	Soft loan schemes are loans below-market rates and with longer payback periods. Soft loans may provide interest-free periods at the beginning of the loan. A mechanism whereby public funding facilitates/triggers investments.
Green Bonds	A functional debt instrument, like any other bond. It offers a fixed return and a promise to use the proceeds to finance or re-finance, in part or fully, new or existing sustainable projects. The bond issuer has to ensure that the proceeds are invested in green projects, such as renewable energy, energy efficiency, projects leading to reduced carbon emissions, etc.
Cooperative	A cooperative ("coop") is an autonomous association of persons who voluntarily cooperate for their mutual, social, economic, and cultural benefit. Cooperative raises equity capital through a large number of investors, including citizens, and obtain debt capital from a cooperative bank or subsidized loans.
Crowdfunding	A collective effort by people who network and pool their money together, usually via the internet, to invest in and support efforts initiated by other people or organisations

Overview of Financing Schemes in Cross-sectoral

Which financing schemes are more flexible and sustainable?

Two indicators are important to analyse when it comes to choosing the right financing scheme (Mango, 2010). The flexibility and continuity of a financing scheme should be identified before implementing the financing scheme. The indicator of flexibility is whether the financing scheme is more restricted or unrestricted in use. Grants from donor agencies are commonly more restricted due to the imposed terms and conditions. The funds that are raised through fundraising events, bank interest, and general donations tend to be more unrestricted in use. This type of fund is much more preferred as a part of a financing strategy because it is more autonomous, flexible, and secure. The indicator of continuity is whether the financing scheme remains available in the long run. It ensures more security to implement projects, especially in energy efficiency investments as they generally have a longer payback time. The following matrix shows the classification of financing schemes based on those two indicators.

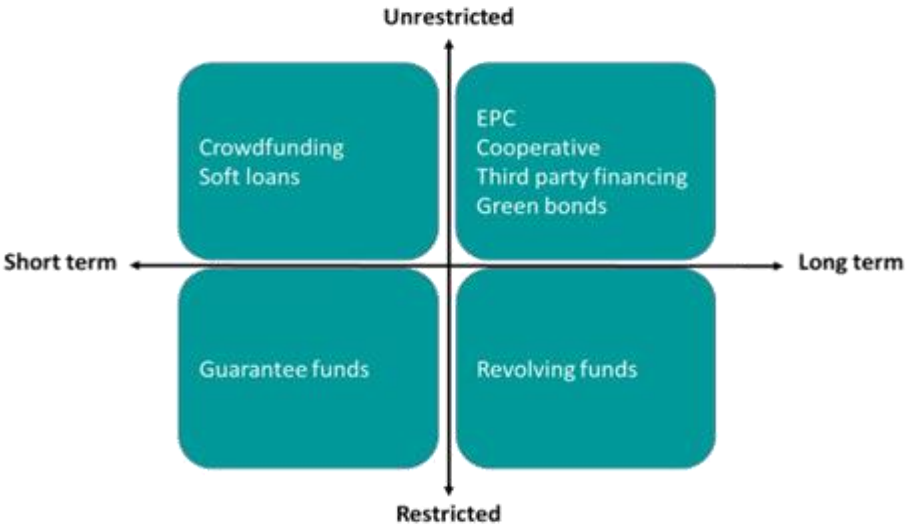


Figure 2: Financing Schemes Matrix of Flexibility and Continuity

In general, a mix of financing schemes is needed as most of these schemes are not a stand-alone financial solution. They need to be combined with other schemes to sufficiently support a project. However, based on Figure 1, it is recommended to have some of the funds from the financing schemes that fall in the top right quadrant. Funds that are less restricted and more sustainable in the future are more favourable.

Crowdfunding and soft loans are quite flexible, however, they do not provide long-term financial means. Crowdfunding is especially meant for smaller projects within a short period. Guarantee funds can be versatile in terms of sectors that can be financed, like soft loans, but with complex bureaucracy, they are less attractive to potential customers. Revolving funds can be sustainable because the funds will be replenished after the loan repayments, especially if the funds are combined with other types of schemes, such as soft loans and guarantee funds. It will increase the capital of the funds and potentially be able to finance other similar projects. However, revolving funds are usually administered by the government, so they tend to have specific targets and projects that are eligible for the funds.

The financing schemes that fall in the top right quadrant of the matrix are green bonds, third party financing, cooperative, and EPC (Energy Performance Contracting). Green bonds have a high level of transferability, making them more adaptive in any situation and condition. They are typically intended for large-scale projects with long investment periods. Many investors are attracted to green bonds due to the fixed interest rate, so this type of scheme is considered more predictable and less risky. Third-party financing is very replicable and usually combined with EPC. They are more likely to serve the needs of the clients. Cooperative schemes, just like crowdfunding, obtain their funds from citizens and other investors. They are more autonomous in the form of organisational instruments, making them more flexible. They usually consist of different stakeholders that have the same aim of energy infrastructures decentralisation and taking part in the decision-making.

How to apply each financing scheme in general?

Energy Performance Contracting

What you need to know about energy performance contracting

What is energy performance contracting?

Energy performance contracting, or EPC, is an innovative financing scheme offered by energy service companies (ESCOs) to public building owners who need energy efficiency (EE) improvements but have limited financial means or technical capacities to implement such projects on their own. What makes EPC innovative is that an ESCO finances the project based on the guaranteed energy savings that will be generated in the future. In principle, the ESCO will only receive service fees – and get the return on investment – once the project delivers energy savings.

What are the characteristics of EPC?

In EPC, a public building owner and an ESCO engages in public-private cooperation – formalized by a contract. EPCs are usually long term with about a contract of 8 to 15 years. However, short-term contracts of 2-3 years are also possible for EE improvements that require low levels of investment. EE improvements can range from optimization of lighting, heating and ventilation to replacement or new installations of electrical devices up to deep renovation of building structures. EPC can be applied in public buildings whether existing or new as long as they have energy-saving potential. In EPC, the pooling of buildings is recommended to generate additional cost reductions and create economies of scale.

The difference between an EPC contract and any other turnkey project is that the company offering ESCO is not done once the (re)construction is done but is rather still responsible for the performance of the building(s), the savings that will occur, and the monitoring and building maintenance for the duration of the project. This ensures that ESCO has a stake in the building achieving savings and that the most efficient solution is offered.

What is the typical content and structure of an EPC Contract?

The EPC contract between a public building owner and the ESCO has the following key elements as outlined in the Energy Performance Contracting Manual:

- The ESCO guarantees a certain amount of yearly savings (**guarantee of savings**) to be achieved throughout the duration of the contract
- The **volume of investment** to bring the guaranteed savings and a commitment by the client to pay the investment after its installation
- Clear **definition of a reference scenario** (baseline) of the future energy consumption;
- The obligation of the ESCO is to provide a **report on yearly savings evaluation** that documentsthe actual amount of achieved savings in the respective year
- Responsibility of the ESCO for the **design and implementation of the energy-saving measures** correctly
- The obligation of the client to provide pre-agreed **conditions for the implementation** of theenergy-saving measures
- The planned **duration of installation** of the investment
- **Ownership transfer** of the installed energy-saving technologies to the client
- **Means of payment** for the services and savings
- Declaration of the **purpose of operation of the facility** on which the contract covers
- **Length of the contract**
- **Method of recalculation** of the guaranteed savings in case any of the input parameters differs from the presumptions defined in the reference (baseline) energy consumption scenario
- **Final report** – before the end of the paying-off period the ESCO hands over to the client the final report including the total amount of cost savings, guaranteed savings, given reduction in the price and bonuses calculated for the entire paying-off period, etc.

What is the role of the ESCO?

An ESCO usually operates as a commercial entity regardless if it is owned by a public entity e.g. public utility company. It also serves as a general contractor that provides the energy services required and offers a service package for the public building owner. ESCOs can provide the whole range of necessary energy services – from planning, management, implementation, and monitoring of energy management services and technical improvements. The ESCO shoulders the associated economic, technical, and administrative risks in carrying out the EE improvements. This, of course, depends on the investment size and contract duration. The main economic risk for ESCOs is not meeting the guaranteed energy savings which means reductions in EPC service fees.

What is the role of the public building owner?

Public building owners, with the support of local facilitators, can design and plan an EPC project. Public building owners generally have low-to-medium economic risk levels. However, it should be noted that an EPC contract is usually contracted in energy (e.g. amount of kWh save due to the agreed baseline), not actual energy costs. This means that if either building usage levels or the energy prices change, this is a risk for the building owner. Energy savings still keep occurring, but the monetary savings are not evident. On the other hand, should an ESCO fail to provide its services, or should the calculated energy savings be lower than predicted, a public building owner can withhold payments and penalties can be set. Even if the ESCO has designed and planned the EPC project and installed and operated equipment and technical facilities, the public building owner retains full ownership of the public building. As the ESCO is asked to ensure the quality of the technical facilities from installation until the operation, such as repairing damages, the public building owner should grant ESCO staff unconditional access.

What are local facilitators and their roles?

Local facilitators can be local or regional energy agencies, engineering offices, legal advisers, architects, and economics. Facilitators should be knowledgeable and experienced in EPC concepts and business models, techniques and economics of EE in buildings, and public procedures and codes of conduct. Commercial facilitators can be contracted. However, standard service procurement procedures should be followed. Local energy agencies may be involved without tendering if financed by the membership fees of municipalities. Facilitators can assist in the preparation of EPC contracts, and in managing EPC tender procedures and contract negotiations.

What other financing sources can be used?

In most EPC projects, the ESCO is mainly the investor and financer. Other financing sources are usually not necessary for EPC projects that require low investments. However, in big projects, such as the deep renovation of public buildings, the owner may share investment costs, avail of subsidies, or makes use of other financing sources. These include subsidies, such as feed-in tariffs for power generated from renewables or in combined heat and power plans, on specific technical measures and subsidies on interest rates paid by the ESCO which reduce financing costs. Find out more under "*How can EPC be combined with other financing sources*?"

How can energy savings be guaranteed?

First, the ESCO and public building owners set the baseline energy consumption of the building before EPC. This can be based on the energy consumption costs before EPC (the reference year), such as, for example, the energy cost paid by a public building owner at a specific time of the reference year (e.g. € 100 on December 31, 2016). Some EPC contracts are agreed in energy units instead of monetary ones. These can be adjusted based on factors, such as the occurrence of extreme climatic conditions or time and intensity of occupancy. Since the baseline energy consumption is determined in the contract as a fixed rate, any increase in energy prices does not significantly impact the EPC contract.

Using the baseline energy consumption, the ESCO can calculate and guarantee an annual energy cost savings to the public building owner throughout the contract period. Both ESCO and the public building owner will establish how to evaluate and verify the energy savings that will be generated after the EE project is implemented. The ESCO ensures that the energy savings will be achieved, while the public building owner guarantees the payment of EPC service fees to ESCO.

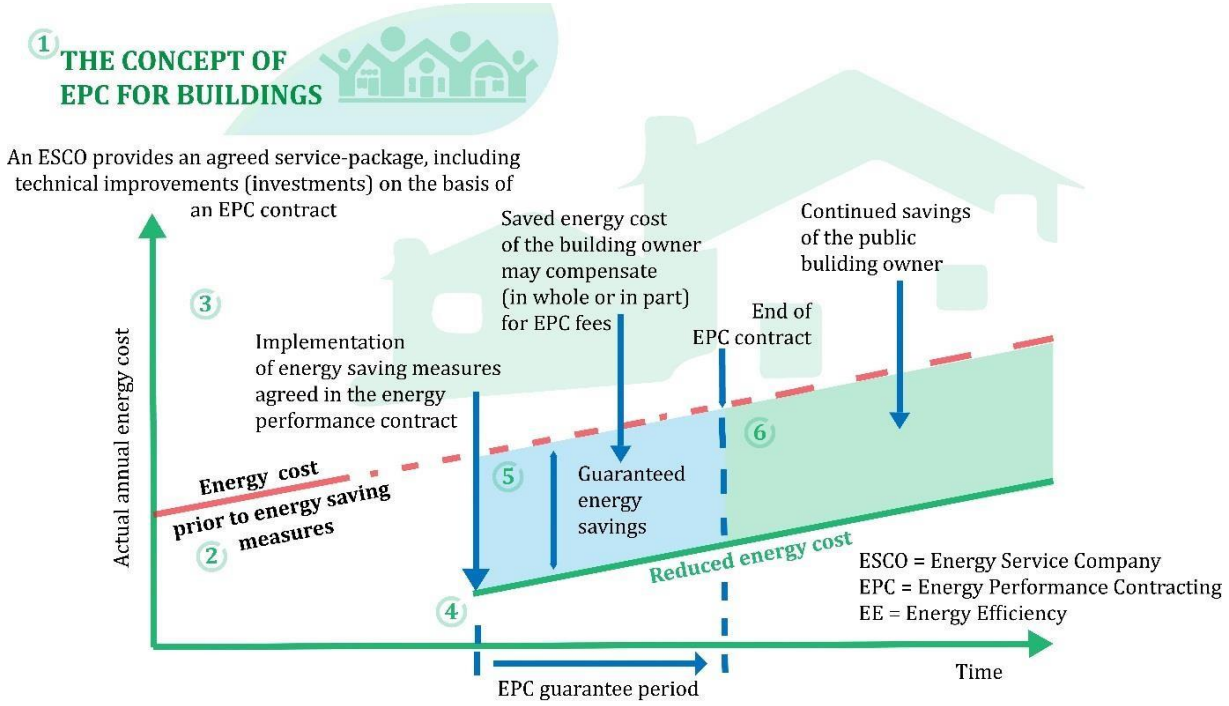
The ESCO provides energy reports and energy savings records. The ESCO should also be transparent in the adjustments of technical parameters, such as in the use and conditions of the building or the installation and removal of energy devices. Usually, the ESCO conducts periodic metering of consumption using automated systems or by remote access and control.

How is the EPC service fee calculated?

A fixed proportion of the guaranteed savings will be the EPC service fee which the ESCO gets from the public building owner to attain a profit margin and maintain the installations. The remaining proportion can be kept by the public building owner, or shared among the two parties, depending on the mutual agreement. In EPC, the yearly EPC service fee remains constant throughout the contract. The EPC contract is not affected by rising energy prices although this canbe reflected in the energy bills.

The service fees for EPC are calculated to ensure repayment of all costs of the ESCO as well as the expected return of investment. However, the fees should not go beyond the value of the guaranteed savings in the baseline year. The payment can be received either partially or in whole, depending on the agreement. Likewise, the payment scheme can be arranged.

1. EPC is a contractual agreement between an ESCO and a public building owner
2. The Baseline energy consumption of the public building is set during the reference year
3. Energy-saving measures, including installations of technical facilities, are implemented
4. Once the energy-saving measures are completed, the EPC guarantee period starts
5. Saved energy costs of the building owner may be used in whole or in part for EPC service fees
6. When the EPC contract ends, the continued savings are retained by the public building owner



Source: GIZ in EnPC – INTRANS (2015)

Figure 2: EPC: In Summary

What are the advantages of EPC?

- The investment risks are transferred from the public building owner to the ESCO
- Usually no investment or up-front capital required from the business owner
- ESCO provides the required energy services which the public building owner benefits from
- ESCO guarantees EE improvements which serve as the basis for their payments
- Maintenance costs are transferred from the building owner to ESCO during the contract duration
- The value and productivity of public buildings are optimized through ESCO's professional services

What are the common incentives for EPC?

The development of EPC is facilitated by the following:

- EPC guidelines, tools and sample contracts are available in the country (or under preparation)
- National or regional databases of ESCOs and facilitators
- National and regional competence centres promoting EPC
- Promotion of inter-municipal cooperation and/or poling of public buildings in EPC projects
- Trade associations of ESCOs promoting EPC as a business model
- Regional and local energy agencies and/or associations of local authorities promoting and facilitating EPC

Political and legal incentives

- High political commitment to EE and economical energy savings at the national level
- National EE law and supporting laws promoting EE in public buildings
- EE objectives and standards for public buildings stipulated in national policies and programmes
- Promotion of EPC as an innovative EE service in regional and national programmes and policies

Economic

- The expectation of increasing energy prices
- Energy-saving insurances for new ESCO
- Higher market value and increasing comfort level of renovated buildings
- Feed-in tariffs for renewable energies

Financial

- Limited municipal budgets increase the interest in EPC as a financing model
- Subsidies for municipal EE programmes and projects (planning and implementation
- Tax incentives

What are the common barriers to EPC?

Political and legal

- Procurement rules and procedures for public authorities (complex tendering procedures)
- Restrictive regulations concerning financing cooperation of public authorities with the private sector
- Little interest in EPC as a financing tool among municipal decision-makers
- Requirements concerning the comparison of EPC and building owners' investment

Administrative

- Lack of understanding of the EPC concept among municipal decision-makers and initiatives
- Lack of qualified and motivated personnel in some public administrations or public services
- Non-transparent, lengthy, or complex decision-making processes in municipalities
- Competition between investments in EE and investments in other public services
- Distributed responsibility for buildings, energy bills, maintenance and operation of facilities in municipal administrations
- Lack of finance and/or personal capacities for project preparation, tendering, contract negotiation

Economic

- Risk of incorrect calculation of baseline consumption
- Decreasing energy prices for fossil fuels
- Feasibility of EPC only for bigger buildings
- Long payback time

Financial

- High cost of loans
- High planning and bidding cost
- Limited access of ESCOs to bank loans

Technical

- Lack of experience in the calculation of baseline consumption
- Lack of attractive best-practice examples in the country
- Lack of know-how and experience among local public utilities
- Lack of calculation tools and sample contracts
- Lack of qualified local facilitators promoting EPC projects
- Lack of local ESCOs offering EPC services

Other barriers

- The bad reputation of EPC among public administrations and decision-makers
- High barriers to the market entrance of new ESCos
- Poor image of ESCOs among public administrations and decision-makers
- Lack of information on EPC in public buildings

Are there guidelines for managing EPC projects?

The EPC Code of Conduct promotes a professional and transparent approach to managing EPC projects. There are nine (9) guiding principles:

1. The EPC provider delivers economically efficient savings
2. The EPC provider takes over the performance risks
3. Savings are guaranteed by the EPC provider and determined by M&V
4. The EPC provider supports long term use of energy management
5. The relationship between the EPC provider and the client is long-term, fair and transparent
6. All steps in the process of the EPC project are conducted lawfully and with integrity
7. The EPC provider supports the client in the financing of the EPC project
8. The EPC provider ensures qualified staff for EPC project implementation
9. The EPC provider focuses on high-quality and care in all phases of project implementation

Learn more about the EPC Management from Fedarene's Good practice in EPC assessment, certification, and use - Fedarene (https://fedarene.org/good-practice-in-epc-assessment-certification-and-use/)

What are the business models for EPC?

There are three business models for EPC. The major differences lie in the scope of planned investment, targets for guaranteed energy savings, and contract duration. These business models may have overlaps as projects may mix different features. Below we bring an overview of EPC models of different scopes, straightforwardly named "basic", "light" and "plus".

EPC Basic

EPC Basic is the most common EPC business model that aims to facilitate investments in fast-paying EE improvements or those that can generate a high energy savings effect.

Table 5: Features of EPC Basic Business Model

Features	Description
State of building and planned investment:	The building still serves its purpose and there are plans for the building to be used for a prolonged future period (at least as long as the EPC contract is in force), but the energy systems installed and used in the building are outdated and inefficient. Energy rehabilitation of the building is planned.
Energy savings guaranteed:	Typically, 20-60% compared to the baseline
Investor:	ESCO or building owner (making use of subsidies, if available)
Financing:	ESCOs own equity, loans, subsidies, financial contributions from the building owner
Contract duration accepted in the market:	5-15 years

Box 1: Case Study Example for EPC Basic Business Model

Case study: Oberndorf, Germany

EPC business mode: EPC Basic

Basic description: A pool of seven municipal buildings

Total bid price: 2.521 Million Euro

Guaranteed savings: 0.216 Million Euro (i.e. ~ 64%) less energy cost per yearContracting

period: 11 years and 8 months

What were the contracted measures?

- Establishment of a building management system
- Different renovation measures per building, including e.g.:
- Replacement/renovation of HVAC units (central heating / cogeneration / biomass)
- Rehabilitation of lighting systems in a sports hall
- Replacement of thermostats in a conference building
- Insulation of the upper ceiling in a school

Source: Kea in EnPC – INTRANS

EPC Light

In this business model, the ESCO is contracted to optimize technical facilities to facilitate EE. However, EE improvements are realized with little to no investment in technical facilities.

Table 6: Features of the EPC Light Business Model

Features	Description
State of building and planned investment:	All public buildings with energy savings potentials
Energy savings guaranteed:	Typically 10-20% compared to the baseline
Investor:	ESCO (usually only minor equipment)
Financing:	ESCO bears only the staff cost
Contract duration accepted in the market:	2-3 years

EPC Plus

Under EPC Plus, the ESCO's services extend to comprehensive structural measures. Here, the investment costs may be shared between the ESCO and the public building owner. Other financing sources can be explored.

Table 7: Features of EPC Plus Business Model

Features	Description
State of building and planned investment:	The building no longer serves its (current or future) purpose. Building and installed energysystems are outdated and/or dysfunctional. Deep renovation/rehabilitation is more economic than constructing a new building. Deep renovation is planned.
Energy savingsguaranteed:	Ideally >70% compared to baseline
Investor:	ESCO or building owner share the investment cost (both making use of subsidies, if available)
Financing:	ESCOs own equity, loans, subsidies, financial contributions from the building owner
Contract durationaccepted in the market:	10-20 years

Box 2: Case Study Example for EPC Plus Business Model

Case study: Hanzehal ZutphenEPC

Business model: EPC Plus

Basic description: large sports and events facility buildings

Contract duration: ~11 years

Total bid price: App. 500,000 EUR of which 210,000 EUR for energy saving measures (paid back from energy savings).

Initial energy costs (baseline): 65,000 EUR/y

Guaranteed savings: 19,000 EUR/y (i.e. 30% (gas) and 7% (electricity))

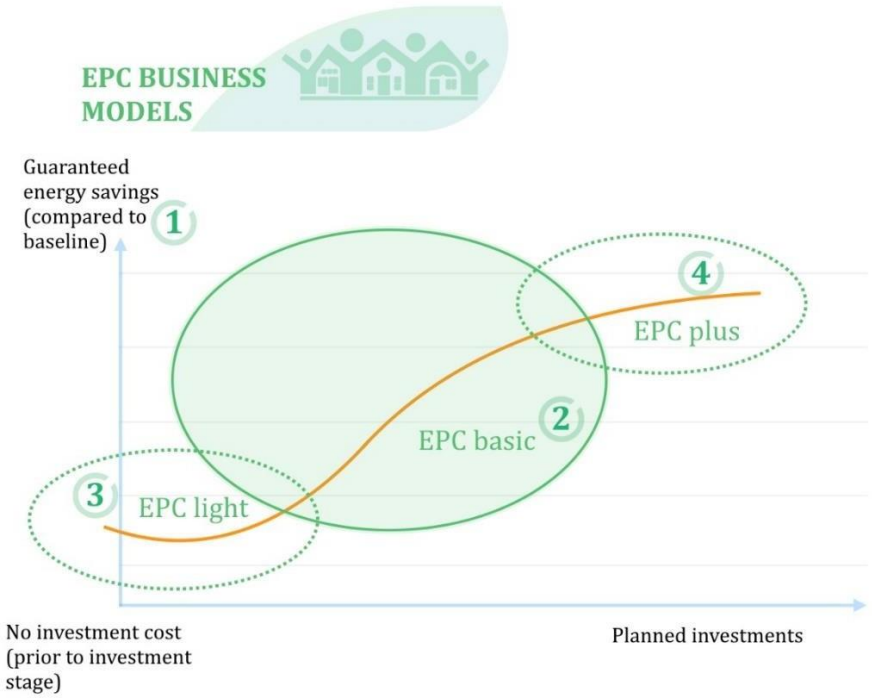
Reduction of CO2 emissions: 40 t/y (guaranteed)

Contracted measures:

- Roof renovation and insulation
- Wall insulation
- Solar PV / solar water heating
- Sensor lighting
- Building management system
- Contract-related figures:

Source: Transparense in EnPC – INTRANS

EPC plus projects are the most beneficial in terms of a high energy savings guarantee. However, for most public building owners, a starting point can be EPC basic or EPC light business models. Find out more about the business models and their corresponding features by looking at the Comparative Overview of EPC business models at EnPC - INTRANS.

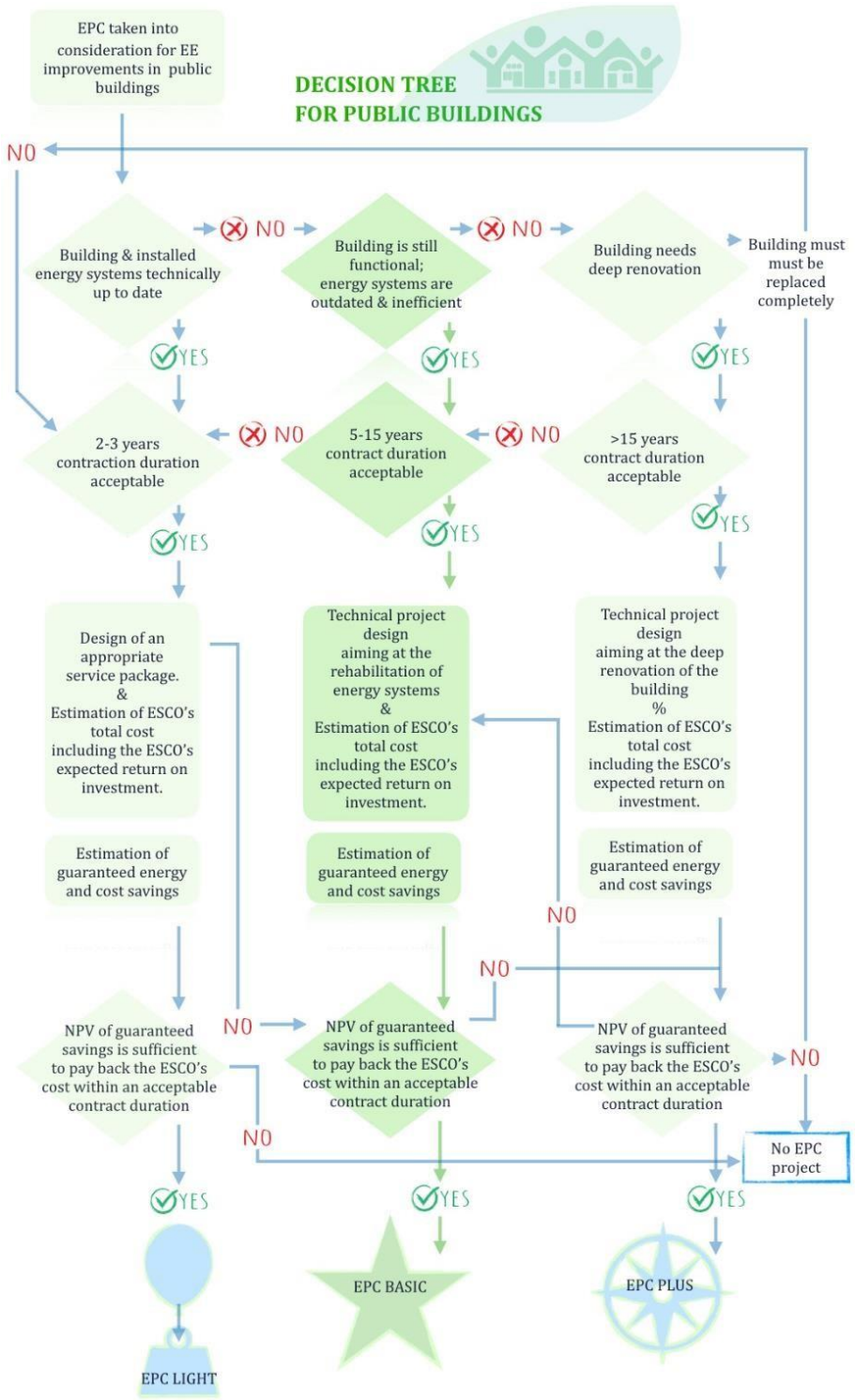


Source: EnPC – INTRANS (2015)

Figure 3: EPC Business Models

How can building owners decide which business model touse?

Use this decision tree to select the appropriate business model for public buildings in your city. Find out which EPC business model that you can use based on your context.



Source: EnPC – INTRANS (2015)

***Figure 4**: Decision tree*

Note: The net present value (NPV) of guaranteed savings is very important to identify the complete cost that may be financed by the ESCO. The investment volume and services depend on the guaranteed energy savings and the contract duration. Learn more about the variations on EPC business models that have been applied in Europe and its framework conditions in the toolbox.

What are the key lessons learnt from EPC projects?

Contract and finance

- Available subsidies and grants should be used and included in the financial concept for an EPC project
- Bundling of buildings in one EPC helps in decreasing transaction costs and creating economies of scale
- EPC may also include solutions to non-energy problems in the buildings (e.g. fire protection) in the same contract
- Besides the energy and maintenance savings, EPC plus can integrate non-energy related savings (health and safety requirements, comfort improvements, increased building value and others)
- A neutral and qualified third party acting as an arbitrator should be nominated in the contract and its decisions acknowledged in advances as binding by both parties
- Financing options for EPC projects
    - Very good experience exists with financing by EE Funds
    - Additional financing by the building owner can be helpful for the financing of the EPC
    - Insurances for the calculation of savings are an appropriate instrument to mitigate the risks for ESCOs, in particular for new un-experienced ESCOs

Facilitator

- Most the public building owners rely on proficient facilitators in
    - Project planning and preparation
    - Investigation and activation of potential grants and subsidies from local, regional, national, and EU sources
    - Compilation of tender documents and assistance with the tendering process
    - Tender evaluation and contract negotiations
    - Quality control of provided installations and services
    - Measurement and verification of achieved savings
    - Checks and approvals of EPC's bills
    - Verification of possible financing instruments (soft loans, instruments and grants)
- The capacity development of local facilitators is, therefore, a priority for the development oflocal capacities for EPC in public buildings

ESCOs

- For new ESCOs access to the EPC market relates to high economic and administrative barriers
    - Economic and technical risks are rated high by most of the interested companies

- New ESCOs usually must provide additional bank guarantees or insurance which increases the cost

Process

- Monitoring and verification of guaranteed savings are often complex and may lead todebates between the ESCO and the building owner
- Adjustments may be required regularly, depending on, for example:
  - Weather conditions
  - Changes in consumer behaviour
  - Type, intensity, and frequency of building use
  - Installation of additional, or removal of old consumer device
  - Replacement of old consumer devices with new, more energy-efficient devices
  - Changes in building structure (additional renovations) and installed facilities
- Simplified measurement and verification methods as well as key performance indicators, if agreed upon by both parties in advance, may help to reduce both complexities of calculations, and reasons for debate

Source: EnPC – INTRANS (2015)

Guarantee Funds

What you need to know about guarantee funds

What are guarantee funds?

One of the most commonly used financing tools to facilitate private investments in energy efficiency projects are guarantee funds. Guarantee funds enable the engagement of financial institutions and allow sharing of credit risk or distribution of loss in energy efficiency investments. Guarantee funds are a way of transferring credit risk from a creditor to another entity (guarantor) that is capable and ready to deal with part of the risk and/or cover the loss (ESMAP, 2014).

To illustrate, loans are provided to the debtor (or borrower) by a commercial lender (or financier). However, should the loans default or if the debtor fails to meet the conditions of the loan and is unable to pay the lender, another entity – the guarantor - absorbs the credit risk and/or covers the loss. Guarantee funds are different from debt financing as in the latter, direct loans, including the interest charged, are paid back over time by the debtor. However, debt financing, such as soft loans, and guarantee funds can complement each other.

Guarantee funds, along with first-loss facilities, are classified under risk-sharing facilities which cover the risk in case of payment default and if necessary, offer additional funding. The first loss can be absorbed by a guarantor, lowering the risk, so banks and equity investors are more willing to invest (Energy Efficiency Financial Institutions Group or EEFIG, 2014). Guarantee funds are also known as credit and/or risk guarantees and sometimes guarantee payments or programmes.

Why are guarantee funds important?

As commercial lenders may perceive it risky to invest in energy efficiency projects for reasons, such as long payback periods or high perceived risk exposure, the use of guarantee funds may address the wariness of investors, enable them to accept the risk of debt lending, and improve their confidence in investing. However, to facilitate private sector investments, guarantee funds sponsored by public authorities should address commercial and non-commercial (e.g. financial stability, policy changes) risks. Guarantee funds are a signal to financial institutions that projects, such as in energy efficiency, are worth lending to not just for commercial but also for social reasons (Association of Conservation of Energy or ACE, 2013).

Guarantees provided by public authorities, such as Estonia's KredEx and German KfW, can create a 'breathing space' which, according to the ACE (2013), is a condition in which energy efficiency investments have an opportunity to demonstrate good performance so that they seem promising and a guarantee is no longer necessary. Successful guarantee schemes for energy efficiency investments can then increase bank involvement in financing (Makinson, 2006).

However, according to the Association of Conservation of Energy, a consideration in assessing whether guarantee funds are a success is the extent to which these guarantee funds remain necessary. Investors, in the long run, may no longer find the need for guarantee funds should energy efficiency projects become more familiar, credible, and mainstream. The current economic condition, the increased reluctance to give on loans across all sectors, and the less fruitful investments may be the reasons public sector guarantee funds are still essential in Estonia and Germany (ACE, 2013). Guarantee funds are then meant as temporary interventions by the public sector to enable private investments and gain the trust of commercial lenders (FEDARENE, 2015).

For which energy projects can guarantee funds be used?

Guarantee funds are intended for large infrastructure projects. However, these have wider applications (United Nations Environment Programme, 2004). Risk-sharing facilities, such as guarantee funds, have been used in energy efficiency projects in public and private buildings whether these are commercial buildings, public rental and private rental buildings, and owner-occupied housing (EEFIG, 2014). In Bulgaria, the Energy Efficiency and Renewable Sources Fund (EERSF), which include guarantee funds, can be used for energy efficiency enhancements by municipalities, corporations, and private individuals in industrial processes, renewable energy sources (RES) projects targeting end-user consumption, retrofitting of building, improvements of heat sources and distribution systems, and street lighting. Having supported many projects in various sectors including the private buildings sector, guarantee funds have proved themselves as a versatile financing mechanism.

However, guarantee funds are not meant as stand-alone solutions and are not applicable for all market situations (Makinson, 2006). Based on reported experiences, young firms in energy efficiency, especially energy service companies or ESCOs, typically need guarantee funds in addition to public support instruments for debt financing, to secure the capital needed (Makinson, 2006). In general, all types of risk-sharing facilities, like guarantee funds, can be combined with

dedicated credit lines or soft loans (EEFIG, 2014). For example, KredEx's energy efficiencyschemes for the residential sector in Estonia are supported by loans, grants, and guarantees (ACE, 2013). According to the Conservation of Energy, this combination of different funding sources, such as in Estonia, and their accompanying interest rate and duration of the loan are more encouraging than market loans.

Are there different types of guarantee funds?

There are different types of guarantee funds available: public guarantee schemes, corporate guarantee schemes, international schemes, and mutual guarantee schemes. Public guarantee schemes are usually established by public policies, involve state subsidies, and are managed by private organisations or administrative government units (OECD, 2008). In case of loan default, the guarantees are paid from the government budget. An advantage of public guarantees is that this has higher credibility in the banking sector (OECD, 2008).

On the other hand, corporate guarantee schemes are funded by the private sector, such as banks, and are managed by corporate leaders. International schemes are usually provided through bilateral or multilateral agreements between governments or non-government organisations. Oftentimes, however, these international schemes incorporate guarantee funds and technical assistance to firms (OECD, 2008). Mutual guarantee schemes, which are also known as mutual guarantee associations, societies, or funds, are formed by private, independent organisations. Funded by membership fees and sometimes from government support, these are managed by borrowers who have limited access to bank loans.

According to FEDARENE, The Revolving Retrofit Guarantee Fund is an example of the credit risk guarantee approach. "Guarantee mechanisms aim at engaging financial institutions by supporting and sharing the credit risk of the energy efficiency investments. The guarantee makes financiers accept the risk for debt lending and act as a catalyst to scale up private investment in energy efficiency. However it is important to understand that guarantee mechanisms are an essential complement to other financing approaches, in order to fill the financial gaps encountered by early stage energy efficiency projects21. Guarantee funds may be used as a temporary public sector intervention in order to demonstrate to the financiers that loans are being repaid successfully, thus on the long run gaining their trust. Such instruments are urgently needed in developing countries, where the guarantees must cover a very large amount of the loan, sometimes up to 150% (as opposed to most energy efficiency guarantee programmes in Europe that typically provide 50% guarantee)."(https://fedarene.org/publication/brochure-on-innovative-financing-schemes-in-local-and-regional-energy-efficiency-policies/)

How are these public guarantee funds structured?

In Bulgaria, partial credit guarantees and portfolio guarantees are offered to private individuals, companies, or municipalities. Under partial guarantees, there are two options: 80% on a pari passu basis or 50% on a first loss basis after the bank creditor. Individual or per project guarantee commitments is up to BGN 800, 000 (EERSF, 2018).

Portfolio guarantees are classified into two: the ESCO portfolio guarantee which is designed to attract

more ESCO companies and make them comfortable guaranteeing the risk of project beneficiaries and the residential portfolio guarantee which is meant to kick start the market of EE investmentsin the residential sector by providing market products that overcome the lack of legislation the country (EERSF, 2018).

ESCO portfolio guarantees

ESCOs commonly depend on debt financing to fund a project. Consequently, they also rely on the client's payment to pay back their own debt. If the client fails to pay in time, it will cause a delay in ESCO's debt service performance. EERSF offers ESCO portfolio guarantee to cover such issues in the cash flow of the ESCO and absorb some of the risk of the ESCO. The following provides further detail:

- EERSF signs a framework agreement with the ESCO to issue a portfolio guarantee for a preapproved portfolio of projects;

- The ESCO wins a tender for an energy efficiency project;

- EERSF approves the project and adds it to the portfolio of approved projects;

- EERSF guarantees that it will cover up to 5% (the percentage is negotiable) of the defaults of the delayed payments of this portfolio;

- With this guarantee, the ESCO gets better interest rates on its debt with commercial banks and has a piece of mind that there is 5% failsafe trigger that will prevent cash flow disruptions and will reduce the risk of the clients.

The 5% of the investment can cover the delayed payments made by the client because generally the amount of the client's payment per month is much lower. Cases of delayed payments are more likely to happen and EERSF can act as a financial buffer to assume the risks. Besides, such product gives a great advantage to EERSF's own funds. For example, EERSF provides a guarantee of BGN 500 000 to aid a portfolio of investments worth BGN 10 million.

Source: EERSF

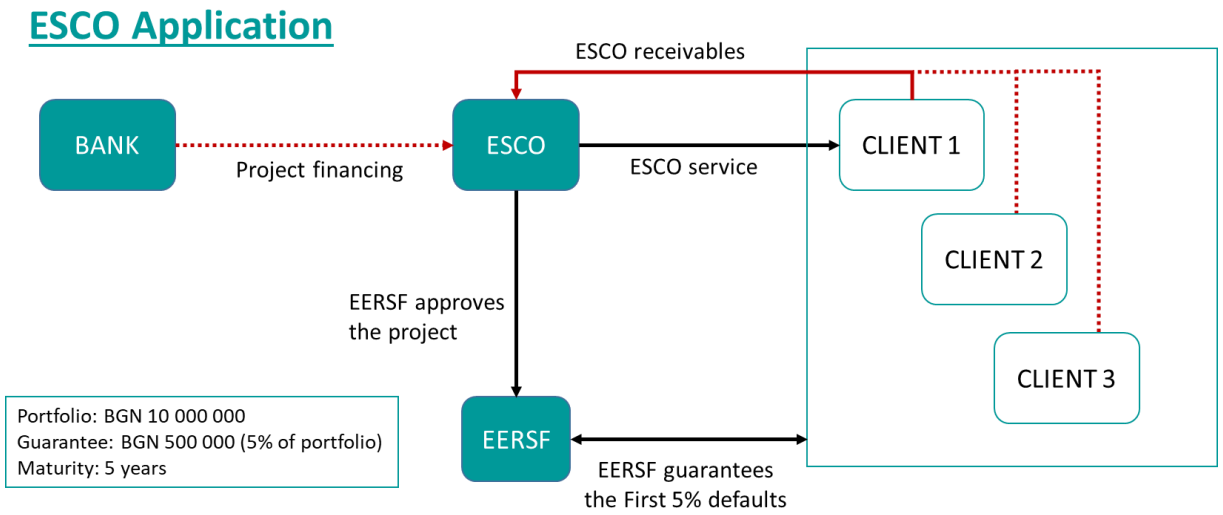


Figure 3: ESCO Portfolio Guarantees. Source: EERSF

Residential portfolio guarantees

EERSF offers the residents in a building to invest in an energy efficiency project and find a first class company to execute it. The project gets a bank loan, but each household in the building will be responsible to pay back the loan according to their own built-up area. This concept is known as residential portfolio guarantee.

The first 5% of defaults within this block (or portfolio of blocks) will be assumed by EERSF. Default is simply when the customer fails to repay the loan. The default rates are commonly up to 3%, so the guarantee from EERSF is enough to assume the entire risk of the commercial bank. Together in a partnership, EERSF and commercial banks are developing this guarantee product. EERSF acts as an intermediary between the commercial banks and the residents to run an energy efficiency project, as there are no household associations in Bulgaria coupled with inadequate energy performance regulations.

Source: EERSF

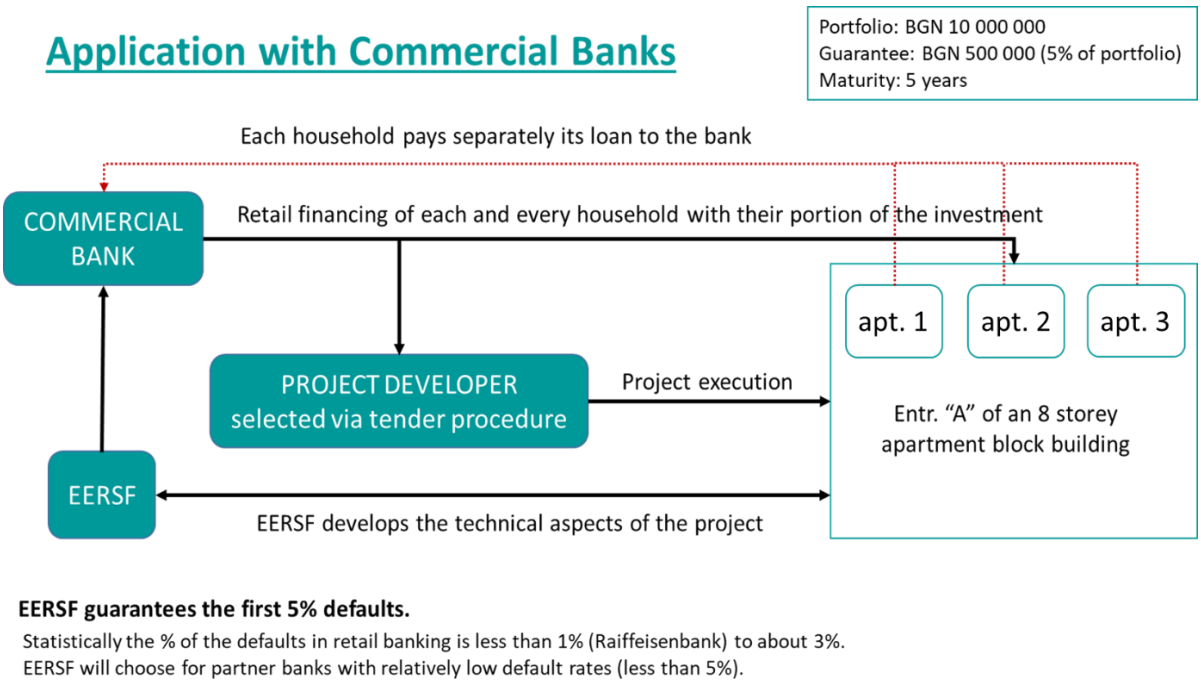


Figure 4: Residential Portfolio Guarantees. Source: EERSF

Other guarantee fund structures in general, especially for small enterprises, can be found in this thesis (https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1003&context=arch_crp_theses) along with the tools for choosing the right guarantee fund structure that will best fit a certain situation.

How do guarantee funds work exactly?

Guarantee funds have a covered and uncovered part of the loan. The covered part of the loan is allocated to the guarantor while the uncovered part of the loan is allocated to the lender (ESMAP, 2014).

Guarantee funds may cover all risks no matter the cause. However, a partial risk guarantee may only cover losses in certain cases. Guarantees usually do not cover all risks to encourage the lenders to investigate their customer's creditworthiness. Guarantees may provide access to bank loans for energy efficiency projects (ESMAP, 2014).

The debt recovery process starts once there is a loan default. The loan can be recovered from a guarantee fund which can allow for up to the maximum amount it contains (FEDARENE, 2015). Further, when this guaranteed scheme is incorporated with a preferable loan mechanism, the loan would be more likely accessible at reduced prices as the guarantee lowers the creditor's risk. In Europe, according to Makinson (2006), most guarantee funds for energy efficiency investment typically provide 50% guarantees.

How can guarantee funds be priced?

It is very important to address correct pricing for guarantee funds. The price should be low enough, so the borrowers can easily access the guarantee funds, yet high enough to make the banks realize afterwards that using a guarantee is unnecessary as the energy efficiency projects are promising. In fact, guarantee funds are overpriced. Without these considerations on the cost of guarantee funds, banks will rely heavily on guarantee funds and it will be hard to abolish (Makinson, 2006).

What are the advantages of guarantee funds?

Guarantee funds enable leveraging of public funds and ease the perception of risk among commercial lenders for energy efficiency projects (ESMAP, 2014). Furthermore, these funds reduce the risks for financial institutions, such as banks, and enable them to lend greater amounts and provide extra leverage for private sector funds (EEFIG, 2014). Also, according to EEFIG (2014), risk-sharing facilities, like guarantee funds, can be a temporary medium to help finance energy efficiency projects until they are recognised to have better credit performance, therefore loans for energy efficiency projects are more widely available later on. If the customers can succeed in paying back the loan with the support of public sector guarantees, the banks will consider energy efficiency as a real bargain on their lists (Makinson, 2006).

What are the limitations of guarantee funds?

Fedarene identified the main barriers and limitations of guarantee funds in their Brochure on Innovative Financing Schemes (2025):

- Moral hazard if all risks are removed.
- Extensive and complex handling of risk-sharing facilities.
- In case of replication, it is essential to understand that the ability to attract investment will
- depend on the financial climate of each country and of the availability of other schemes.
- It is difficult to gauge in advance what the take up might be – even with the best market
- research, things can change, or small details can affect results. For this reason it is crucial
- to design an approach that can flex as you learn more, and to build in a system to accept
- and respond to feedback from homeowners, advisers and installers.

What are the market conditions required for guarantee funds?

The market conditions necessary for guarantee funds include good banking partners willing to lend/assume risks; municipalities must be marginally creditworthy and willing to borrow; municipalities able to retain energy cost savings and pay for energy based on consumption; and reasonable, competitive lending rates (ESMAP, 2014). According to Makinson (2006), a few times,

guarantees are not befitting to be applied when the banks have insufficient liquidity, such as local banks where the Bulgarian BEERECL programme is partnered with to provide debt financing. In other cases, when the problem lies in other factors, such as unwillingness to take risks, it should be considered to use guarantees under a public financing scheme.

How can guarantee funds be rolled out at a larger scale?

According to EEFIG (2014), these are the necessary conditions to roll out guarantee funds at a larger scale:

- A template approach to execution of risk-sharing facilities using ESIF 2014-2020
- Consensus view as to at what stage and for what market segments this Financial Instrument is most useful and pressure by EU public financial institutions to develop faster in those identified segments and the Member States
- A greater degree of collaboration/ resource commitment to the design and implementation of these instruments by private and public sector Financial Institutions
- Further consideration of the role public guarantees might play in support of the energy efficiency services markets

According to FEDARENE (2015), it is essential to create a flexible approach that can be adaptable as time passes considering the uncertainties in the future. It is also important to maintain communication with homeowners, advisers, and installers through a good feedback system. Further, according to FEDARENE (2015), the financial conditions and the availability of other financing schemes in each country should be taken into account when drawing the attention of potential investors.

Mobilising commercial finance that is supported by the public sector can be a great tool for energy efficiency projects to access capital more easily and generate positive cash flow and cash position for ESCO. The lower the risk for the end-user, the more likely the project is considered a success. Therefore, risk-sharing facilities, like guarantees, can encourage private sectors to invest in energy efficiency as guarantees assume some of the risks, reducing the risk for the end-user (Makinson, 2006).

Who can lead and provide guarantee funds?

Public-sector funding with the aim of supporting wider private investments can lead to a risk-sharing facility (EEFIG, 2014). For energy efficiency projects in cities and municipalities, loan guarantees are usually provided by donors, while there are cases that these have been provided by or together with local – or even higher levels – of government to cover part of the loss (ESMAP, 2014). For example, KredEx had a total of €66.3 million in financial inputs and leveraged funding. These funding came from the Council of Europe Development Bank (CEB) and European Union (EU) structural funds which provided €49 million while the Estonian government offered €17.3 million.

In Bulgaria, the EERSF, which was established through the Energy Efficiency Act (EEA) by the Bulgarian Parliament in 2004, received initial capital from the Global Environmental Facility through the International Bank of Reconstruction and Development and the World Bank with $10 million, the Governments of Austria and Bulgaria with €1.5 million each, and private companies in Bulgaria (EERSF, 2018). EERSF serves multiple roles: as a lending institution, as a credit guarantee facility, and as a consulting company. It also offers technical and financial support, such as guarantees, for Bulgarian firms, municipalities and private individuals in energy efficiency project development. In 2013, the European Bank for Reconstruction and Development and the

The Bulgarian Ministry of Economy and Energy provided € 5M in grants to further finance partial credit guarantees for ESCO projects in public buildings (CITYnvest, 2015).

In Severn Wye, United Kingdom, **The Revolving Retrofit Guarantee Fund** was developed by the Hungarian consultancy Global Environmental Social Business (GESB). This finance mechanism makes loan finance more accessible by providing a low-cost guarantee. Severn Wye acknowledged the role of GESB to advance the loan financing in the UK by adjusting the approachof the Revolving Retrofit Guarantee Fund that was a success in Hungary (BUILD2LC Project, 2017). This involved developing a loan portfolio relevant to the housing stock and potential in the local area, establishing a guarantee fund and seeking investors to provide loans.

Severn Wye have been working with South Gloucestershire and Stroud District Councils to introduce loans to homeowners wanting to improve the energy efficiency of their homes. The loans are available for various energy efficiency improvements including renewable technologies and upgrading heating where suitable. Householders going through this scheme are also able to take advantage of any grants they may be eligible for through national schemes including the Energy Company Obligation funding or Green Deal. This scheme requires householders to use installers registered on the Link to Energy database.

Severn Wye and Global Environmental Social Business initially had to develop debt products adjusted to the housing units and to the possibility in the vicinity. Consequently, they also needed to attract investors to give on loans and seek a source of finance for the guarantee fund. There were several steps in the establishment of the pilot loan based on the project report (FEDARENE, 2015):

- **Collating and mapping local retrofit markets**: data on the housing stock and on the potential for measures in order to draw up the first portfolio of potential financiers.
- **Develop a draft prospectus**: including measures and estimates of costs and savings.
- **Identifying potential commercial partners**: GESB and Severn Wye compiled a list of potential commercial funders (banks) and spent several months contacting them to explain the programme (See “main barriers” Section below).
- **Establishing the Guarantee Fund**: four local authorities had supported the project from the start. Three of them agreed to put their own funds into a Guarantee Fund.
- **Establishing the loans pot**: identifying investors to provide loan capital proved unsuccessful. Therefore, a reduced pilot loan scheme was launched with funds from the two of the local authorities (South Gloucestershire and Stroud District Councils), and from supporting charities such as Sainsbury Family Charitable Trusts and Severn Wye’s own charity reserves.
- **Establishing legal agreements**: between the various parties involved.
- **Obtaining permissions, licences and verifying compliance with regulations**: financial service regulations for providing loans, consumer credit regulations for referring people for loans, and regulations regarding the correct presentation of informationon promotional materials.
- **Agreeing on loan product details and processes**: loan duration, interest rates, fees, household eligibility, credit and affordability checking, and a clear map of the customer journey.
- **Promotion and marketing**, promotional materials, referral networks and marketing plans

A new initiative beyond the scope of the Green Deal hardly attracted most of the large financial institutions to commit to at that moment during the phase of identifying potential commercial partners. The goal of the initiative was aligned with the three-year "Countdown to Low Carbon Homes" project, which was conducting a full pilot loan during the project. However, it was postponed until 2014 to launch the initiative due to the legal and financial hassles, not to mention the challenges faced when seeking finance. Hence, in case of replication, the financial conditions and the availability of other financing schemes in each country should be taken into account when drawing attention from potential investors.

Moreover, Severn Wye had never participated in a financial market until then. GESB offered a financial adviser and technical knowledge of establishing the Revolving Retrofit Guarantee Fund to support the project. Severn Wye benefitted from the GESB's assistance as it saved time and even reduced their risk. This calls for specialist advice about loan mechanisms when the energy agency or organisation is inexperienced in the financial market, like Severn Wye.

It is worth noting that in this case, the loan pilot was a part of the Countdown to Low Carbon Homes project. Hence, the legal advice and support were not necessary at first nor was it included in the budget.

As the "Countdown to Low Carbon Homes" project was completed, Severn Wye needed to check if the payment for the work was made. Any charges quoted to the client need to comply with specific regulations, in which the annual percentage rate of charge (APR) and referrals are specified. It is important to note that this challenge might be encountered by any energy companies who are willing to replicate this scheme, though it comes down to the availability of funds within the scope of work.

Source: FEDARENE

Other possible sources of funding for a guarantee scheme can be found in this manual of guarantee funds for small enterprises p.51.
(http://www.ilo.org/public/libdoc/ilo/2004/104B09_435_engl.pdf)

Who can apply for guarantee funds?

Guarantee funds can act as a means for end-users as well as energy service companies (ESCOs) to ease access to affordable debt financing (Makinson, 2006). In some cases, the customer can be the guarantor using the future savings on energy bills according to the project contract that can be paid monthly or quarterly within a few years. In this case, the customer must possess high creditworthiness and a strong balance sheet. The risk of this type of model comes from the failure of the energy efficiency projects resulting in the customer being unable to profit from energy savings. Therefore, Energy Performance Contracts (EPCs) act as a point of reference in energy efficiency projects, by which the ESCO plays a major role in the project, such as taking care of the operation and maintenance. Above all, the ESCO must guarantee savings from energy bills, so it reduces the customer's financial risk (Makinson, 2006).

Furthermore, in some circumstances, the ESCO assumes the risk and looks for the funding in this model. In order to arrange more equitable risk allocation between contractual parties (the ESCO and the client), EPCs are getting more adaptable, especially in advanced markets. Energy efficiency projects that are funded through a lending platform will mostly need a guarantor. If the

ESCO owns a solid balance sheet (backed by equity) and other businesses with solid income statements, the ESCO may be exempt from a guarantee scheme (Makinson, 2006).

In Severn Wye, the United Kingdom, from the loan pilot project started until April 2015, 151 clients in Stroud and 196 clients in South Gloucestershire were considering the loan. Unfortunately, only four loans have been processed further in South Gloucestershire and none in Stroud to date. The loan pilot projects are still in progress (FEDARENE, 2015).

How to apply for guarantee funds?

In Bulgaria, under the EERSF (2018), the procedures are as follows:

1. **Detailed Energy Audit**

A necessary condition for a successful application with the Energy Efficiency and Renewable Sources Fund is the presence of a detailed energy audit allowing for energy analysis and choice of energy-saving measures

2. **Principal Eligibility Criteria**

All energy efficiency projects approved and supported by the Bulgarian Energy Efficiency and Renewable Sources Fund (EERSF) should meet the following eligibilitycriteria:

- The project should involve the application of well-proven technology;
- The project cost should range between BGN 30 000 and BGN 3 000 000 although exceptions are possible if strongly justified;
- The equity contribution of the Project Developer should be at least 10%;
- The repayment period is up to 7 years.

3. **The Project Cycle**

- Project identification (Project Developer)
- Initial project screening (when necessary, EERSF/external consultancy company)
- Completion of Initial Project Proposal (IPP) (Project Developer)
- Submission of IPP and accompanying documents to EERSF (Project Developer)
- Assistance in IPP and accompanying documents completion and improvement (EERSF)
- Project appraisal and assessment (EERSF)
- The formal decision for approval of EERS financing (EERSF)
- Completion of negotiations for financing and disbursement of funds

Note: The normal time period for project appraisal is 6 weeks, provided that the Project Developer manages to submit well on time all necessary documents, accompanying the IPP.

When can guarantee funds be used?

When corporates or private individuals decide to invest in energy efficiency projects but want to keep financial stability with adequate income streams, they tend to turn to debt financing provided by commercial banks. However, small-medium enterprises (SMEs) and private

individuals (such as homeowners) with low to medium income are most likely unqualified to get a loan from commercial banks (Deelen & Molenaar, 2004). Commercial banks provide dedicated credit lines with risk-sharing programmes only if the potential borrower has good borrowing capacity, collateral, and creditworthiness (ESMAP, 2014).

Banks consider collateral important as it indicates the client's commitment to pay back the debt. Besides, collateral can help compensate for loan default through the sale of seized collateral. To determine how good a collateral is according to banks, ask the following questions (Deelen & Molenaar, 2004):

- Is the ownership easy to verify?
- Is it easily and cheaply seized?
- Is it irremovable?
- Is it inexpensive to convert it into cash or any other desirable asset?
- If it consists of movable assets, is it relatively cheap to store or manage?
- Does its value remain relatively stable over time?
- If it has a low monetary value, does it have a high and stable personal value to the borrower?

If all the answers to the questions are unequivocally "yes", then the collateral may be quite passable for a bank. However, SMEs and private individuals with low to medium income will often have a hard time giving "yes" answers to all questions, except the last one. When they are unable to provide adequate collateral, guarantee funds can be used. However, guarantee funds are not meant for weak entrepreneurs and banks that under perform. There are four Ps needed for successful guarantee schemes (Deelen & Molenaar, 2004):

1. Well-**p**repared entrepreneurs
2. Good **p**rojects
3. Good **p**erforming banks
4. **P**rofessional bank staff who conduct an evaluation of the borrower

What have guarantee funds achieved?

Since launching, the EERSD Bulgaria fund has provided energy efficiency loans to 212 projects in total, with a project investment value of over USD 57.7 million (BGN 95.2 million). The fund has provided partial credit guarantees to 33 projects, for total project investments of USD 14.7 million (BGN 24.2 million). Using only USD 15 million of capital, the fund has catalyzed more than USD 72 million in energy efficiency investment in Bulgaria.

As of the end of Q2 2020, the investments financed or guaranteed by EERSF contributed to annual savings of over130,000 MWh/year and 93,000 kt/year of CO2eq (https://econoler.com/en/projects/management-of-the-bulgarian-energy-efficiency-fund/)

What are some other guarantee funds set up in Europe?

KredEx

The Credit and Export Guarantee Fund KredEx was established in 2001 by the Estonian Ministry of Economic Affairs and Communication. KredEx aims to support the financing of corporates, reduce the debt risk related to export, and encourage new residential constructions and renovations that are based on energy efficiency in Estonia (BPIE, 2010). KredEx in partnership with most of the credit institutions in Estonia has arranged Housing Loan Guarantees. These guarantees allow certain eligible applicants to make a lower initial payment for buying new living properties or having existing ones renovated. These guarantees charge 3% of the guarantee amount to be paid once upfront. KredEx provides up to 24% of the value of the loan guarantee property, no more than €19,200.

The Housing Loan Guarantee is only for young families with a child of up to 15 years old, young professionals, and residents of restituted buildings. A young professional must be younger than 31 years old and has completed secondary or vocational secondary education, either employed or self-employed. A resident of restituted buildings is a person who has a tenancy agreement in a restituted building (returned to a former owner) as illegally expropriated property through ownership reform. This restitution is usually found in post-Soviet states.

There is another loan guarantee specifically for renovations called Apartment Building Loan Guarantee. The targets of this guarantee are apartments with low market prices and informal apartment communities so that the borrower is not an independent legal person. For this guarantee, KredEx offers up to 75% of the loan amount. However, they charge yearly around 1.2

– 1.7% of the guarantee balance. The participating banks in this mechanism are Danske Bank, SEB, Swedbank, Nordea, Krediidipank, and Versobank.

Two groups are well-suited for The Apartment Building Loan Guarantee. The first group is apartment buildings that have a higher risk evaluated by the bank, so it is difficult to finance renovation through a bank loan. High risk can be caused by a high share of borrowers, a high unit cost of investment per m^2 compared to the market rate or the location of the apartment building that is in a mono-functional settlement or a below-market-rate area. The second group consists of apartment buildings that need a guarantor to cover the risk in case of payment difficulties. The loan guarantee requires the apartment association or the communities of apartment owners to be creditworthy. If these apartment associations would like to carry out a major reconstruction, KredEx also offers Reconstruction Grant for such cases.

The offered financing schemes (grants, loans, and guarantees) are exclusively for apartment buildings that have at least 2 (or in some cases, 3) apartments. Any apartments that belong to this group and meet the above criteria are eligible for the offered financing schemes, except for the apartment loan scheme that requires apartments built before 1993.

Table 6: KredEx scheme costs and benefits

Financial inputs (and leveraged funding)	Financial returns (direct and indirect)	Take-up rate	Energy saving	CO2 impact (or greenhouse gas equivalent)
CEB loan and EU structural funds grant: €49 million; Estonian government: €17.3 million (2010-2011). Total: €66.3 million.	The small income from loan interest is returned to the revolving fund.	Since 2000, 21,979 households have used the housing guarantee. 9.2% of housing loans issued in Estonia in 2011 had a KredEx guarantee. Since 2004, there have been 583 apartment loan guarantees (3.4% of apartment buildings) There have been 391 apartment loans since 2009 (2.3% of apartment buildings). By 2011, there have been grants to 266 apartment buildings (1.6% of apartment buildings). Also 1,038 smaller audit grants.	Apartment loans' average predicted energy saving is 39.3%. Expected saving from apartment loans and apartment grants is 75 GWh per year, expected saving over 20 years is 1,500 GWh (KredEx data)	Expected savings translate into 0.077 Mt CO2per year.

Source: Association for the Conservation of Energy (2013)

More information on the schemes offered by KredEx apartments and buildings can be found on their website. (https://www.kredex.ee/en/energy-performance-existing-buildings)

FOGIME

The FOGIME was founded by the French development bank for SMEs (BDPME) and the French Agency for Environment and Energy Management (ADEME) in November 2000. It aims to be a loan guarantor for SMEs in energy sustainability investments. According to International Energy Agency (2012b), *"eligible investments include: high-performance production, use, recovery and energy storage equipment; energy efficient modifications of production processes and renewables".* FOGIME provides private sectors around 17.8 million euros in total to guarantee their loans up to 244 million euros. The SMEs that can benefit from this guarantee must have been established for more than 3 years with less than 500 m FF turnover and less than 500 staff headcounts. FOGIME can guarantee 70% of the loan in up to 15 years. This amount of loan guarantee is particularly higher than the average coverage rates for other SME projects insured by BDPME (IEA, 2012b).

Regional Investment and Guarantee Fund (Ile de France)

The Regional Guarantee Fund was set up in Centre Region, France via a partnership with OSEO, which is a public company that offers SMEs financing related to energy efficiency through credit and guarantee support. The Regional Guarantee Fund is also in support of very small enterprises (VSEs) that wish to undertake sustainable energy projects. The goal of the Regional Guarantee Fund is to assist VSEs and SMEs in their creation, growth, innovation, foreign investments and to provide new job opportunities. The Regional Guarantee Fund can guarantee 50% of the loan in cooperation with the local partner banks. As the local partner banks hand the guarantee application to OSEO directly, the beneficiaries do not need to take further action. The following figure depicts how the financing scheme is implemented.

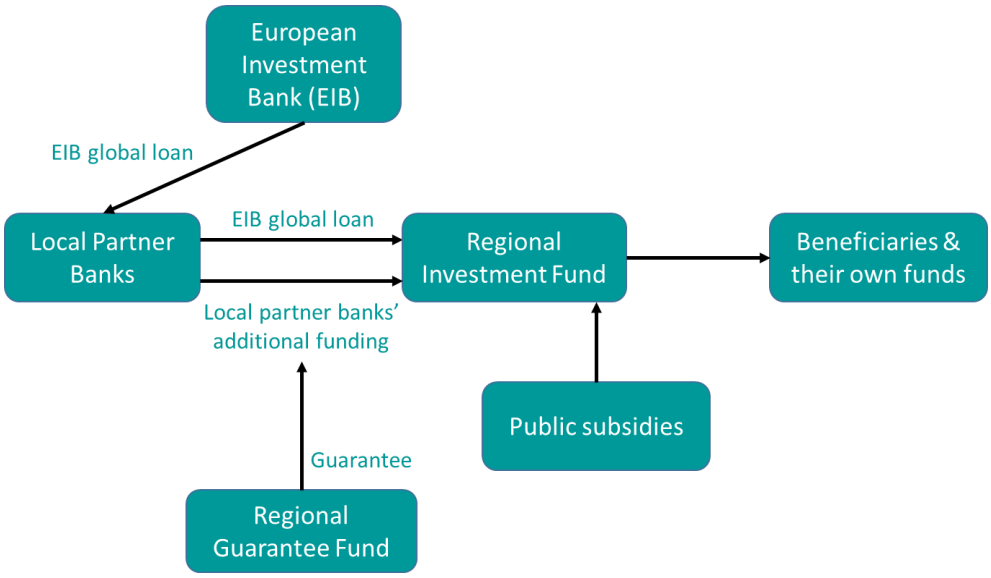


Figure 5: Business model of the Regional Guarantee Fund. Source: Energy Cities (2014)

What is the summary of guarantee funds?

Risk mitigation SMEs, such as loan guarantees, attract more private investments in energy efficiency as it can lower the risks for the lenders, so they are less reluctant to give on loan. A loan guarantee scheme cannot be a stand-alone financing. Dedicated credit lines like soft loans are good pairs for guarantee funds. The following table presents an overview of risk mitigation programmes, including guarantee funds based on EEFIG (2014).

Table 7: Risk-sharing facilities (Guarantee funds and First-loss Facilities - Supply Drivers)

Adapted for sectors:	Commercial	Public	Public rental housing	Private rental housing	Owner-occupied housing
	+		+	+	++
Led by:	Public sector funding with the aim of supporting wider private investments				
Advantages	○ Reduces the risks for banks and enables them to lend greater amounts ○ Anecdotal evidence suggests that energy efficiency loans experience "market standard" or better credit performance therefore risk-sharing facilities can be a transition phase until energy efficiency loans are mainstreamed ○ Provides extra leverage for private sector funds				
Weaknesses	○ Time to structure and negotiate ○ Moral hazard if substantially all risk is removed from bank lending ○ Know-how to implement at regional and local government levels				
Main obstacle/legal changes required	Often extensive and complex handling of risk-sharing facilities at the EU level ("red tape") especially for smaller financial intermediaries and first-time users				

Good practice examples	○ IFC's CEEF programme (Hungary, Czech Republic, Estonia, Latvia, Lithuania and Slovakia) ○ France's proposal to use the obligation from article 7 of EED to create a national guarantee fund for renovation loans ○ EERSF in Bulgaria ○ European Energy Efficiency Fund (EEEF)

What are the key lessons learnt from guarantee funds?

The guarantee scheme is not a new thing in Europe. However, Estonian's credit guarantee agency, KredEx, presents alternative schemes that include energy efficiency projects, which was uncommon at that time. KredEx serves as a guideline for best practices of guarantee schemes as it has gained credibility with commercial banks in a short time. KredEx also makes it less complicated to manage a loan programme, especially with the possibility of less administrative fees. It also offers more opportunities for smaller buildings and apartments, especially vulnerable groups like big families and residents in restituted buildings[1] (ACE, 2013).

However, there are several drawbacks of guarantee funds seen in the KredEx case study. The end-beneficiaries are still mindful of taking the loan guarantee. This is represented by the lower take-up rate than was hoped for. This might be due to additional required documents such as energy audit and building design documents. Another major drawback is that the complex reporting system makes it unattractive to beneficiaries. It can be quite cumbersome, as banks report to KredEx, and KredEx then reports to the Ministry and CEB (Council of Europe Development Bank), and then the Ministry must report to the EC (ACE, 2013).

The following lessons learnt are taken from the KredEx case study in Estonia based on the Association for the Conservation of Energy (2013).

- Preparation takes a long time – for Estonia, it was 2 years;
- A legal framework is needed to support measures; KredEx benefitted from a 2001 Government directive giving it a permit to grant state aid and a new law (Enterprise Support and State Guarantees for Loans Act, from 2003) meaning that KredEx's loan guarantees are counter-guaranteed by the State. Before that banks had no guarantee against the bankruptcy of KredEx.
- Combining different measures is beneficial
- An all-round approach - awareness raising, promotion, state and local support, legal and financial framework

Main lessons learnt from the "Countdown to Low Carbon Homes":

From the launch of the scheme to the end of April 2015, the loan was discussed with 151 clients in Stroud and 196 clients in South Gloucestershire. Four loans have gone ahead in South Gloucestershire and to date, unfortunately no loans have gone ahead in Stroud. The loan pilot projects are on-going.

Replication difficulties

[1] ACE (2013) explained that restituted buildings are "buildings that were confiscated under past regimes and then returned to previous owners. A tenant living in restituted premises is a person having a tenancy

At the identification stage of potential commercial partners, most of the large finance companies, including banks which were approached, were unwilling to commit to a new initiative outside the Green Deal at that time. Even though the aim was to run a full pilot loan during the three year "Countdown to Low Carbon Homes" project, the difficulties in raising funds and developing legal and financial processes delayed the launch until 2014. Therefore, in case of replication, it is essential to understand that the ability to attract investment will depend on the financial climate of each country and of the availability of other schemes.

Furthermore, working within a financial market has been a new area of development for Severn Wye. GESB provided expert advice on the financial aspects of the project and also information on setting up the Revolving Retrofit Guarantee Fund. Without this advice it would have taken longer and potentially posed a greater risk for Severn Wye. Therefore, if not an established provider of financial service (i.e. an energy advice organisation), specialist advice regarding loan schemes is needed.
It is important to pay attention to the context in which this financing scheme is implemented. In this case, the loan pilot was developed as part of the Countdown to Low Carbon Homes project and evolved as this project progressed. Therefore, the legal advice and support was not initially needed nor was it budgeted for.

When the "Countdown to Low Carbon Homes" project ended, Severn Wye had to ensure it received funding for the work on the project. Any charges made to the client need to conform to specific regulations, regulations that also prescribe how the annual percentage rate of charge (APR) is affected and how referrals are made. Therefore, depending on the funding availability of this area of work, energy agencies looking to replicate this scheme might also have this challenge.

Implementation barriers

The expertise to set up a loan agreement between Severn Wye and the other finance providers was one of the main barriers. This was in part because neither of the partners had experience in setting up legal agreements to facilitate this kind of working relationship.

Other barriers included:

- establishing the APR of the loan,
- setting up the client journey,
- ensuring the legal responsibilities through the Consumer Credit Act were met.

Becoming authorised under the Consumer Credit Act was indeed a significant task. The Consumer Credit Act regulates financial activity in the United Kingdom and as clients would be directed to organisations that could provide credit, a credit brokerage licence was required. Interpreting the regulations without any previous experience of working within this market was challenging and time consuming. Institutions that can provide the appropriate expertise are very costly.

Soft Loans

What you need to know about soft loans

What are soft loans?

A soft loan is a financing scheme for energy efficiency projects that allows the loan interest rate to be reduced below the market interest rate and may even provide zero-interest rates at the beginning of the loan agreement (ACE, 2013; EEFIG, 2014; FEDARENE, 2015). Soft loans may also grant concessions, such as longer repayment periods, with certain conditions to meet (EEFIG, 2014; FEDARENE, 2015). Soft loans are versatile in all types of buildings.

Soft loans are commonly offered by governments, both in the form of tenders and direct negotiations, to be more fitting to customers' needs, thus sometimes are called preferential loans or dedicated credit lines. With longer maturity provided by soft loans, homeowners who take theloan for energy efficient-renovation work in their homes can adjust the monthly instalments based on their financial conditions coupled with the savings on energy bills (Energy Cities, 2017a). A lot of public international financing institutions and national governments are trying out the loan programmes to trigger the market and close the lending gap left by the passive localand traditional banking sector actors (Makinson, 2006).

Soft loans alone are oftentimes not sufficient to finance energy efficiency projects. Grants and subsidies are complementary to attract more customers and make the projects even more cost-effective. These grants are usually designed for certain groups that are vulnerable or hard to approach and are most likely unable to access the loan scheme. This expresses the need for improvement in the energy efficiency market, which normally requires high investments (BPIE, 2010). It can trigger market development, especially for small energy efficiency companies and ESCOs in under-developed markets (ACE, 2013). In the US, it has been proven that soft loans have

helped many smaller residential and commercial energy efficiency projects to be carried out (Makinson, 2006).

Why are soft loans important?

Many countries give incentives to homeowners and enterprises who wish to conduct energy renovation work of buildings, such as subsidies from local to national governments and tax credits. Commercial banks provide consumer loans and mortgages. However, such financing schemes are mostly not adequate or suitable, especially for SMEs and homeowners with low to medium income. According to a CITYnvest study in 2015, energy renovation work is very expensive with the range of investment between €200 and €1200 per m^3. Therefore, existing financing schemesare often not sufficient to finance energy efficiency projects.

Subsidies, for example, are not designed to pay the whole investment costs. In most subsidy schemes related to renovation, most eligible measures must be able to demonstrate energy upgrades or savings. Quite a few subsidies can only be used for certain energy renovation works that are predefined. On top of that, these subsidies can only be reimbursed once the renovation work is finished and paid for. The initial costs are the most common obstacle for SMEs and homeowners with low to medium income.

Consumer loans are too pricey due to the high-interest rates and short maturity periods, in which the loan should be repaid within a short period of time. Whereas the payback from the energy renovation work takes up to 15 – 20 years and even more, especially the payback from deep renovation work.

Mortgages, however, are more attractive because they can secure long-term finance (20 – 30 years). The main issue here is that mortgages usually charge high admin fees. Moreover, when purchasing the property, the renovation work has to be planned in order to be taken into account in the mortgage.

When enterprises and homeowners conduct energy renovation work financed by a loan, they will pay less for their energy consumption, therefore they will be able to perform the debt service better. However, it is not acknowledged by financing institutions when they assess how creditworthy the potential customer is. They are unwilling to take on the risk of giving on loans to vulnerable groups, such as low and very low-income households and SMEs.

These issues can be overcome by soft loans (combined with other financing schemes). With soft loans, the vulnerable groups can access financing sources that fit their needs, investment capacity, and ability to perform debt service. Further, soft loans can help develop the local energy renovation market and provide new job opportunities. This is proven in the Picardie region (France) within 2007 – 2010, where the government made an investment in a soft loan scheme. With the investment of fewer than 9 million euros, the scheme ended up encouraging energy renovation work worth approximately 90 million euros and providing 330 jobs in the local building sector. The loan scheme was offered with zero interest rate coupled with grants and technical advice (Energy Cities, 2017a).

How do soft loans work exactly?

In the private residential sector, a soft loan acts as an incentive for homeowners. The idea is that homeowners who wish to conduct energy-efficient refurbishment work in their homes can finance the work through debt-financing with an interest rate below the market conditions. The following diagram simply displays how European Bank for Reconstruction and Development (EBRD) or other international financing institutions commonly offer a soft loan in an energy efficiency investment.

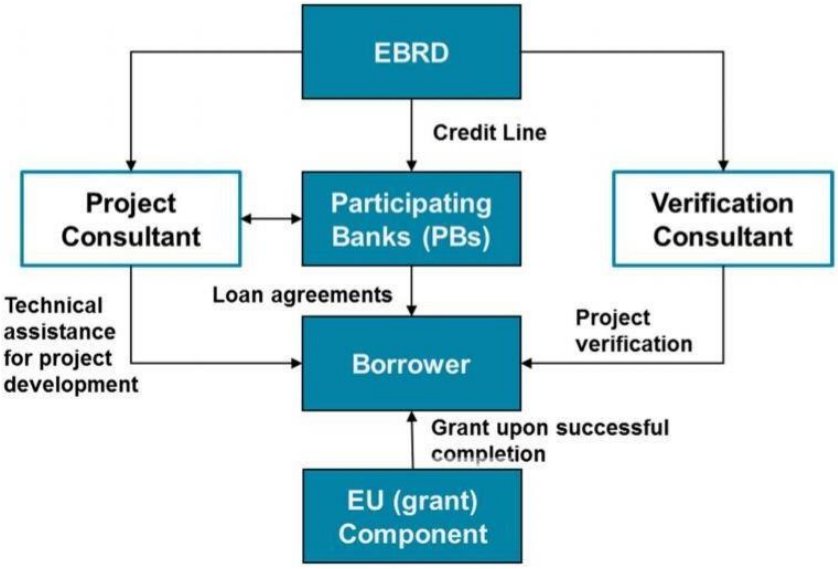


Figure 6: Typical soft loan provided by EBRD. Source: KANTOR Management Consultants Consortium, 2017.

In Frederikshavn, Denmark, and Bordeaux Metropole, France, soft loans are offered by banks. The banks evaluate the homeowner's creditworthiness to decide if the homeowner is qualified for the soft loan. The local government does not financially support the scheme, nor does it assume any risks. However, the local government successfully convinced the banks to form partnerships in the energy renovation of the city's residential buildings. It led to the development of a new product by the bank partners: soft loans. The banks' motivations include a new business area development, homeowners' passive capital mobilization, and an increase in banks' market value through their clients' properties.

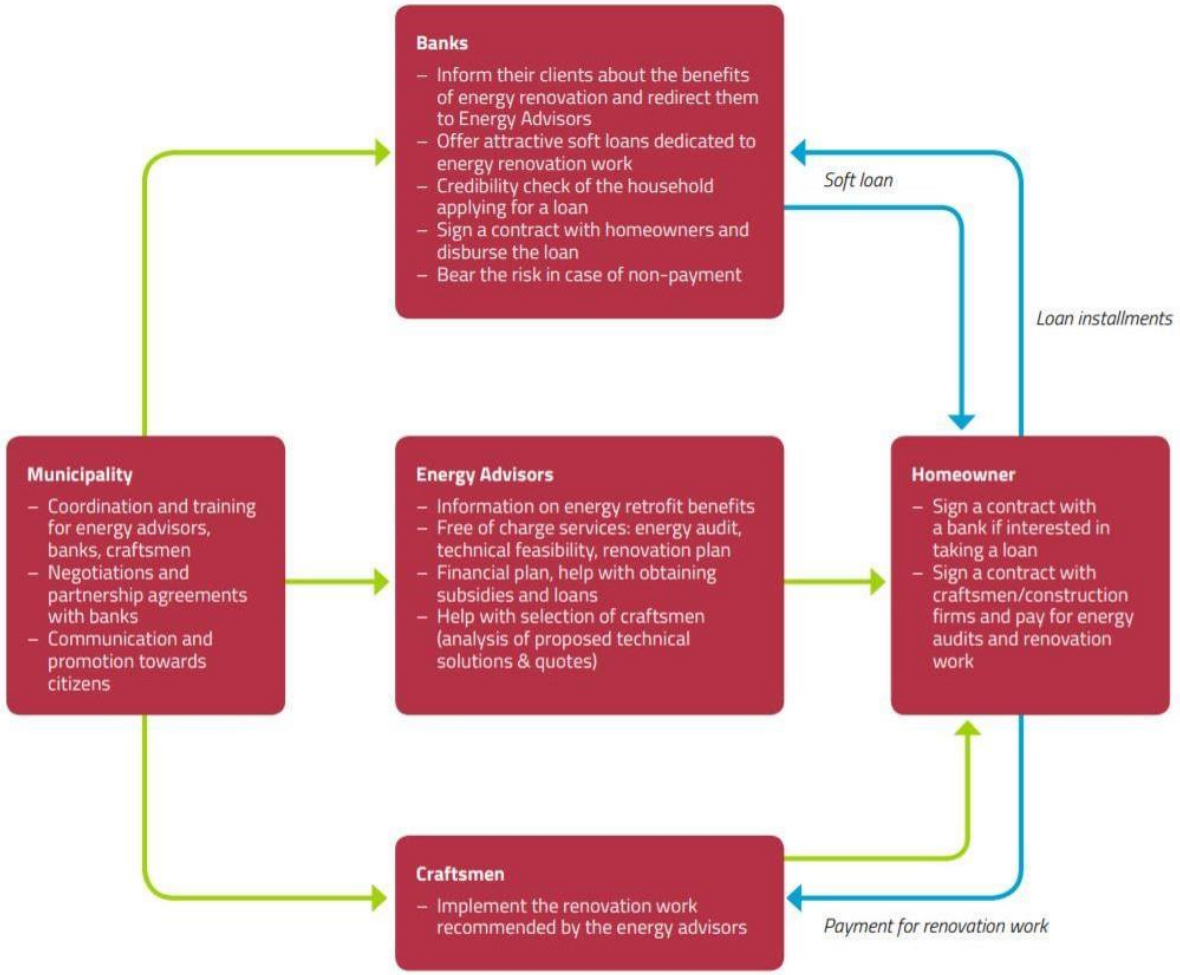


Figure 7: A business model of a soft loan scheme in Frederikshavn, Denmark. Source: Energy Cities, 2017a.

Soft loans are very adaptable to meet certain needs. There are several other business models ofsoft loan schemes that can be found in the Infinite Solutions Guidebook.

What are the advantages of soft loans?

According to BPIE (2010), EEFIG (2014), ESMAP (2014), and KFW (2011), the advantages of asoft loan scheme are as follows:

- Can be scalable
- Funds can revolve
- Usually offers longer duration than commercial loans
- Allows 1:1 refinance to commercial banks (Basel III compliant)
- Positive impact on public budgets due to leverage effects
- Address the higher investment cost by reducing interest rates and/or better loan terms
- Financial benefits give a signal to the market about desired improvements
- The leverage effect of public funds is usually between 4 and 10, which is higher than traditional grants

- Easy to roll out, however careful ex-ante analysis of supply and demand and legal/tax framework needed
- Standardised supply offering at the same time flexibility according to individual preferences (repayment, interest rate fixation, etc.)
- Can be used for ambitious renovation/refurbishing projects as well as for individual measures: large flexibility
- The use of cohesion funds for soft loans in housing is facilitated with the "renovation loan" (off-the-shelf instrument)
- Allows raising the ambition of the investment in terms of energy savings (e.g. by combining the loan with a grant component)

What are the weaknesses of soft loans?

According to BPIE (2010), EEFIG (2014), ESMAP (2014), and KFW (2011), the weaknesses of a soft loan scheme are as follow:

- Serves only creditworthy clients
- May be insufficient to attract investment
- Capacity/willingness of owners to take more debt (i.e. very country dependent)
- Risk aversion of banks (calling for guarantees from Governments)
- Often complicated, time-consuming and static application processes which act as a hurdle for projects
- Loans often require the additional implementation of costly non-energy related measures which change project characteristics
- Requires strong and willing bank partners to develop a project pipeline

What are the main barriers to soft loans?

According to EEFIG (2014), Energy Cities (2017), and FEDARENE (2015), the main barriers of a soft loan scheme are as follow:

- The energy refurbishment process is unclear (i.e. what measures can be taken, what these will cost, and whether or not the refurbishment will pay the investment back)
- Transaction costs to implement (technically) and manage long-term programmes within financing institutions
- Increased regulations/provisions for (promotional) banks hinder commitments of credit lines (EBA-supervisory, State-Aid rules, etc.)
- Specific procedures must be followed to select the partners (time-consuming, strictly supervised, etc.)
- Awareness of homeowners or corporates who are not convinced that investing in energy-saving measures is profitable
- Other households' or firms' investments take priority over energy efficiency investments

- Market actors (e.g. construction companies, craftsmen, real estate agencies, financing institutions, consultants, and energy auditors) are not coordinated and do not offer easy, global and guaranteed energy saving solutions

What are the market conditions required for soft loans?

The market conditions necessary for soft loans include good banking partners willing to lend/assume risks; potential clients must be marginally creditworthy and willing to borrow; clients able to retain energy cost savings and pay for energy based on consumption; reasonable, competitive lending rates; reasonable tenors and collateral requirements. Corporates or homeowners with weak and/or limited or no borrowing capacity are usually not eligible to take on soft loans (ESMAP, 2014).

The conditions below are examples of the existing standard market conditions set by banks for households wishing to take on a soft loan for energy refurbishment works in Frederikshavn, Denmark, as of November 2016.

Table 8: Loan conditions offered by partner banks to households in Frederikshavn

Bank	Loan conditions
COOP Bank	○ **Loan amount**: 10,000 DKK (€1,350) - 80,000 DKK (€10,000) ○ **Interest rate**: 0% ○ **Maturity**: max 5 years ○ **Grace period**: 0 month ○ Low-income homeowners are encouraged to implement energy renovation in several steps. Once the first measure is implemented and paid for through energy savings, the homeowner starts another measure. This model gradually improves the homeowner's creditworthiness as well as the value of the house.
Danske Bank	○ **Loan amount**: variable, the theoretical framework between 20,000 and 200,000 DKK (€2,700- €27,000), but in practice, and in most cases about 200,000 DKK (€27,000). ○ **Interest rate**: 5.5 % - 13.6 % or less (variable, depending on creditworthiness). The homeowner may choose a fixed rate for 10 years or a floating rate. ○ **Maturity**: An agreement between the bank and the customer. The loan can be redeemed at any time - maximum repayment period of 30 years. ○ **Grace period**: individual agreements but recommended time is less than 6 months.
Nykredit Bank	○ **Loan amount**: variable, typically between 50,000 and 300,000 DKK (€6,700-€40,300). ○ **Interest rate**: 3.3% - 10.0% (lowest interest rate for up to 60% of the house value, the highest rate for up to 100% of the house value) ○ **Grace period**: individual agreements but recommended time is less than 6 months.
Arbejdernes landsbank	○ **Loan amount**: two types of loan 1. Energy loan: up to 100,000 DKK (€13,500) with no requirement for a guarantee and 200,000 DKK (€27,000), with a requirement for a guarantee 2. Home loan: up to 250,000 DKK (€33,600). ○ **Interest rate**: 1. Energy loan: variable depending on creditworthiness. Typically 6.6 %, when a guarantee is required and 7.1% when a guarantee is not required. 2. Home loan: 4.7 % - 9.6 % (lowest interest rate for up to 60% of the house value, the highest rate for up to 100% of the house value) ○ **Maturity**: 1. Energy loan: up to 10 years 2. Home loan: up to 20 years ○ **Grace period**: up to 6 months.

How can soft loans be rolled out at a larger scale?

According to EEFIG (2015), these are the necessary conditions to roll out soft loans at a larger scale:

- Comprehensive framework, e. g. including energy audits and independent expert advice
- Large network of on-lending banks and equal conditions for all
- Long term horizon and stability
- A set of criteria that can easily be understood, processed and checked (MRV), possibly using software instruments.
- An effective information strategy directed towards the final beneficiaries.
- Greater involvement with Energy Performance Contract providers in selected subsectors.

Who can lead and provide soft loans?

The government financially supports a soft loan scheme to trigger capital investment, particularly to vulnerable groups in less-developed or high unemployment areas by promoting loans with below-market interest rates (CITYnvest, 2015). Soft loans are commonly a result of public-private partnerships where the government gives a financial aid to the bank, which leads to an attractive interest rate offered by the bank to its customers (ACE, 2013). National or international development banks (e.g. European Bank for Reconstruction and Development (EBRD) and EIB) commonly offer such dedicated credit lines and distribute them to designated markets through regional partner retail banks (Interreg, n.d.).

Who can apply for soft loans?

In the residential sector, soft loans may be accessed by individual residential or non-residential clients. A group of clients, such as an apartment community, may also be eligible to apply for soft loans (ACE, 2013; FEDARENE, 2015). Households with low to medium income who are often not eligible for commercial loans can access a soft loan financing scheme. Households, especially the elderly, with very low and irregular income may be offered soft loans under certain circumstances (e.g. social housing) and often combined with subsidies (Energy Cities, 2017a).

Soft loans for energy-efficient homes can be offered in the form of mortgages, called preferential mortgages. Existing mortgages can be extended on better terms to offer clients an opportunity to pay for energy efficiency improvements. Soft loans may seem to be an efficient financing schemefor energy refurbishment of buildings, however building owners need to obtain supplementary funds, not to mention additional debt financing. Many building owners are not willing or able to raise their debt ceiling for energy efficiency investments (ACE, 2013; FEDARENE, 2015).

The following table provides examples of the eligibility requirements for soft loans in the residential sector in several countries.

Table 9: Examples of eligibility criteria for soft loans in energy-efficient home investment. Source: EnergyCities, 2017.

City/Region	Type of housing	Type of households	Measures
Frederikshavn (DK)	○ All types of housing in private ownership (not only buildings constructed before 1970) in the municipal area	○ No specific conditions regarding the households' income	○ Insulation of the building envelope ○ Electricity and heating systems ○ Ventilation and heat recovery ○ Renewable energy production technologies ○ Control and monitoring of energy devices ○ Other renovation work not directly related to energy efficiency improvement
Bordeaux Metropole (FR)	○ All types of housing (single-family, apartments, condominiums) built before 1st January 1990 ○ The owner-occupied housing units are the main target, however, rented properties are also eligible	○ Households meeting the eligibility criteria of the national 0% Eco-loan ○ No specific conditions regarding the households' income	In the framework of the national 0%Eco-loan, at least two measures out of the list below must be implemented: ○ Thermal insulation of roofs, walls, doors and windows; ○ Installation, regulation or replacement of heating systems connected or not to energy-efficient ventilation systems or hot water production; and ○ Installation of hot water production equipment using renewable energy sources. All work has to be performed by certified professionals holding quality accreditation. Eligible costs also include energy audits, project management (e.g. architect fees), insurance, etc. In the context of the soft loans offered by partner banks: homeowners can only have one energy renovation measure carried out (e.g. window replacement).
Parma (IT)	○ Single-family housesand apartments ○ The housing unit has to be the owner's main residence	○ Parma inhabitants ○ Homeowners ○ Have to pass the banks' creditworthiness check	○ Thermal insulation of roofs, walls, glass walls, doors and windows ○ Installation, regulation or replacement of heating systems connected or not to energy-efficient ventilation systems or hot water production ○ Installation of renewable energy sources. All work must be performed by certified professionals able to deliver a declaration of conformity required bythe law. Only measures going beyond the national energy efficiency standards are eligible.

How to apply for soft loans?

According to Energy Cities (2017), the procedures for soft loans, in general, are as follows:

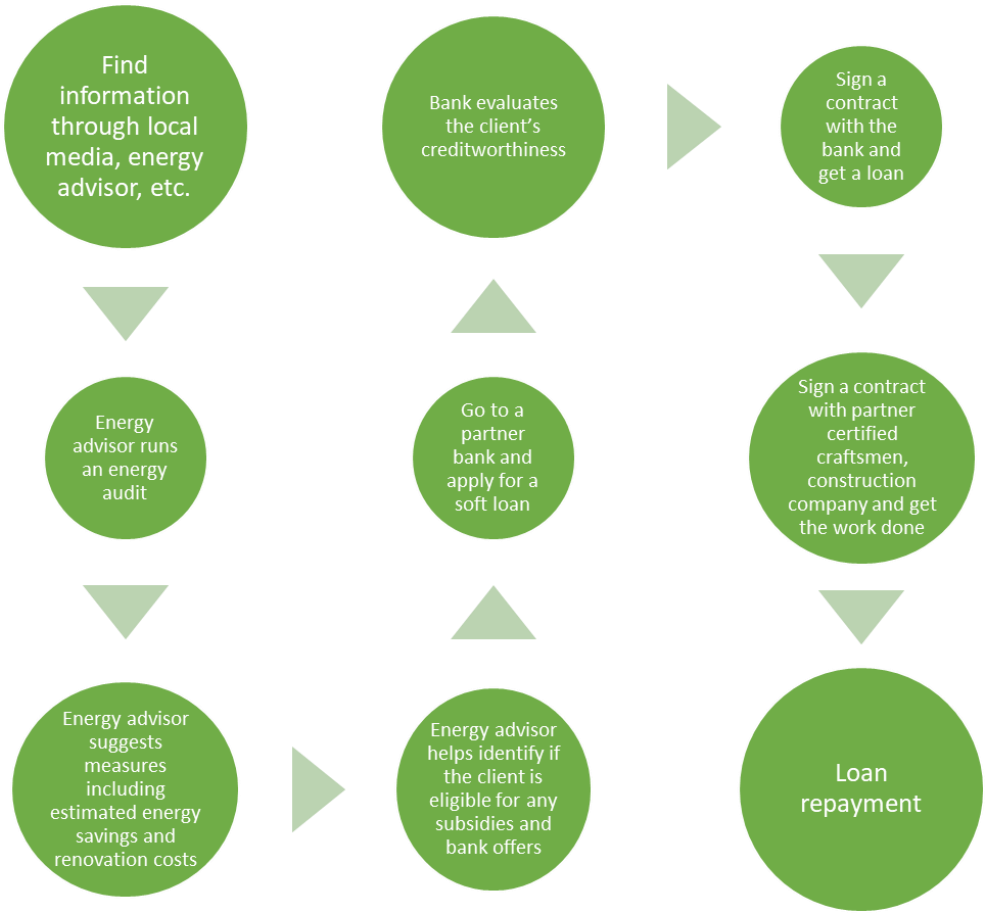


Figure 8: Step-by-step guide to a soft loan application process

Note: The procedures may vary in each city/region/country depending on the local initiative, policy, administrative culture, client's case, etc.

When can soft loans be used?

Just as guarantee funds, soft loans can be used only if the potential borrower has good borrowing capacity, collateral, and creditworthiness (ESMAP, 2014). When companies or private individuals decide to invest in energy renovation work but want to keep financial stability with adequate income streams, they tend to turn to debt financing provided by commercial banks. However, small-medium enterprises (SMEs) and private individuals (such as homeowners) with low to medium income are most likely unqualified to get a loan from commercial banks (Deelen & Molenaar, 2004). Soft loans can be the solution to trigger the energy efficiency market, so the high risk that commercial banks perceived is reduced due to the success rate of soft loans (Voïta et al., 2012).

What are other soft loans set up in Europe?

Soft loans alone are not sufficient for low to medium-income private individuals or companies to access in order to finance their energy efficiency investments that require high upfront costs. Therefore, soft loan initiatives are usually combined with other financing schemes, such as guarantee funds and revolving funds. **KredEx**, for example, provided not only loan guarantees but also revolving funds in the form of renovation soft loans. Supported by structural funds fromthe EU and extra credit lines from the Council of Europe Development Bank, KredEx offered soft loans at an average 4% fixed rate for 10 years to apartment communities. Other examples include **The Amsterdam Investment Fund** and **The Delft Energy Saving Fund** that combine revolving funds with soft loans. Through soft loans, The Amsterdam Investment Fund helped local enterprises, residents, housing associations, and community organisations in energy efficiency projects to reduce their carbon footprint and energy consumptions. The loan repayment is being revolved to invest in similar projects in the next 14 years. The Delft Energy Saving Fund has the same approach but focuses particularly on citizens and non-profit organisations. It offers preferential loans with an interest rate as low as 1.5% that is due in 10 years (FEDARENE, 2015).

Other soft loan mechanisms can also be combined with non-financial incentives such as technical support for the clients. This type of soft loan scheme is provided in several cities and regions in Europe including **Parma (Italy), Riga (Latvia) Frederikshavn (Denmark), Bordeaux Metropole (France), and Brussels Capital Region (Belgium)**. They collaborate with local banks and financing institutions to develop such soft loan schemes (Energy Cities, 2017a). A guidebook to soft loans and comparative analysis from Infinite Solutions provides further information related to those case studies.

Below are some initiatives that solely provide soft loans.

The Ecopack (Wallonia, Belgium)

A public interest body called SWCS (Société Wallonne du Crédit Socia) in Wallonia is in charge of this soft loan scheme. The loan is funded from a share capital with the regional government and the social housing association and also from the loan offered by CEB and commercial banks that are guaranteed by the regional government. Since May 2012, the Ecopack has provided loans with zero interest rates for home energy efficiency improvements. The amount of loan offered ranges from €2500 to €30000. As the energy renovation works are executed, the payments are made gradually and directly to the contractor or materials supplier. The clients then can pay back the loan for up to 12 years, depending on their total taxable income. Until 2015, over 8000 households were refurbished with the help of the Ecopack (FEDARENE, 2015).

Table 10: Requirements and main barriers of the Ecopack

Eligibility criteria of beneficiary	Conditions for energy renovation works	Main barriers
○ The loan's value must be set between €2 500 minimum and €30 000 maximum. ○ The building's initial construction permit must be dated before the 1st of December 1996. ○ The building must be sanitary. ○ The building must be on the territory of Wallonia. ○ The homeowner must not have their workplace in thatbuilding, unless it is permitted by the SWCS. ○ The loan applicant must be either the occupying homeowner or the tenant. ○ The applicant must already occupy the place before submitting the loan request. ○ The applicant's total taxable income must be evaluated within the acceptable scope (€18.700 - €93.000).	○ The enhancements covered by the loan must be comprised of at least 2 types of works (which constitutes a package of works called "bouquetde travaux"), of which at least one must improve the energy performance of the building. Other small works can therefore be included (e.g. adding a thermostat) but also works that could be disconnected from the energy efficiency goals (replacement of the sewage system, replacement of the floors, lining of the chimney system, etc.). ○ Works must be carried out by contractors authorized by the SWCS. ○ Works have to wait for the SWCS' approval. ○ A preliminary study of the home must be carried out in case of insulation of the walls or floors unless an energy audit was already made. ○ For the applicants with a total taxable income ofless than 18.700 € (cat. 1), thermal insulation of the roof is a package of works ("bouquet de travaux") on its own. ○ The adding of photovoltaic panels and micro-generation systems can be considered as part of the package of works, but benefits from a different financing instrument (certificates verts), and therefore is not covered by the Ecopack. ○ The works must be carried out within a 2 year period.	○ The wide accessibility to this loan had created a windfall effect, overloading the SWCS' capacity for processing demands and lengthening the whole procedure. ○ An instrument limited to homeowners that are able to take on additional debt. ○ No wide-scale scheme has proven effective on a wide national scale. ○ It remains questionable to what extent demand does not remain artificial when it is only created by the publicly incentivized loan.

Source: FEDARENE, 2015

Table 11: An overview of the works covered by the Ecopack

Energy performance works	Other types of works
○ Thermal insulation of roofs, walls, floors. ○ Replacing of window frames or of the glazing. ○ New ventilation systems. ○ Installation of natural gas condensing boilers. ○ Installation of heat pumps. ○ Installation of a biomass boiler. ○ Connection to a CHP network. ○ Carrying out energy audits	**Associated works (« travaux induits »):** ○ Replacingand repairing the roof. ○ Exterior walls skin. ○ Dress the interior walls. ○ Replacement of the sewage system. ○ Replacement of the floors. ○ The lining of the chimney system. **Small works contributing to energy savings:** ○ Adding a thermostat. ○ Isolation of heating pipes. ○ Thermographic audit. **Works targeting renewable energy generation** ○ *Covered by the Ecopack*: Solar thermal collectors for domestic hot water and/or heating. ○ *Not covered*: Photovoltaic panels and micro-generation systems.

Source: FEDARENE, 2015

More information can be found on: https://swcs.be/

Community Energy Loan Scheme in Kilkenny (Ireland)

This loan scheme is a product from St. Canice's Kilkenny Credit Union in a partnership with the Sustainable Energy Authority of Ireland (SEAI) and Carlow Kilkenny Energy Agency (CKEA). The loans provided a lower interest rate of 6.4% than the market rate with an opportunity to obtain a rebate of up to 30% of the related costs. The loans specified several energy renovation measuresthat would be funded including the upgrade of heating systems, high-efficiency boilers or stoves, the installation of attic or wall insulation, replacing windows or external doors, and solar panel installation.

The very first procedure of getting the loan is to submit the application form and CKEA will conduct a home energy audit for €100. This fee can be returned if the applicant does not meet the eligibility criteria. Once considered eligible to be the loan beneficiary and the energy audit is finished, St. Canice's Kilkenny Credit Union will contact the applicant to discuss it further (FEDARENE, 2015).

More information can be found on: http://www.stcanicescu.ie/community-energy-loan/

What is the summary of soft loans?

Soft loans are a financing scheme usually provided from public funding that reduces the interest rate below the market rate, so soft loans can be more accessible to those who wish to conduct energy efficiency buildings renovation, which usually requires a high upfront investment. The following table presents an overview of soft loan financing schemes based on EEFIG (2014).

Table 12: Soft loans (Supply Driver)

Adapted for sectors:	Commercial	Public	Public rental housing	Private rental housing	Owner-occupied housing
Led by:	Public sector funding is usually with private money levered and often deployed alongside a grant programme.				
Advantages	○ Easy to roll out, however careful ex-ante analysis of supply and demand and legal/tax framework needed ○ Standardised supply offering at the same time flexibility according to individualpreferences (repayment, interest rate fixation etc.) ○ The use of Cohesion funds for soft loans in housing is facilitated with the "renovationloan" (off-the-shelf instrument) ○ Allows 1:1 refinance to commercial banks (Basel III compliant) ○ Positive impact on public budgets due to leverage effects				
Weaknesses	○ Capacity/ willingness of owners to take more debt (i.e. very country dependent) ○ Risk aversion of banks (calling for guarantees from Governments) ○ The leverage effect of public funds is usually less than 10x and grants are often requiredalongside to improve energy efficiency ambition				
Main obstacle/legal changes required	○ Transaction costs to implement (technically) and manage long-term programmes within thefinancing institute ○ Increased focus on optimal rather than minimum energy efficiency standards				
Good practice examples	KfW, NRW.BANK, Kredex, EBRD Sustainable Finance Facilities (SEFF), etc.				

What are the key lessons learnt from soft loans?

Similar to guarantee funds, soft loans on energy efficiency alone are not able to cover the whole investments. Taken from the Bordeaux Metropole case study, one financing scheme will not be suitable for all types of households or buildings. For very low-income households or corporates, a soft loan scheme should be combined with a subsidy, third party investment and/or guarantee fund, as the soft loan scheme typically aims for low to medium-income target groups.

When signing a contract, it is hard to specify a fixed interest rate that is in favour of both parties (the financing institution and the client). This is due to the nature of interest rate uncertainty that is growing most of the time. As a result, soft loans could be unappealing for some types of groups, especially those with higher incomes.

If one of the eligibility requirements for getting a soft loan is the energy savings achieved or energy-efficient measures implemented, the loan provider will need to assure that, especially when the loan comes from public funding. Such monitoring may result in more intricate procedures and increased costs for the institution and the partners. Consequently, it will discourage the potential clients to get the soft loans (Energy Cities, 2017a).

Revolving Funds

What you need to know about revolving funds

What are revolving funds?

A revolving fund is a pool of capital replenished by the cost-savings from energy efficiency and renewable energy projects or by the interest paid by the sustainability measures financed by the fund. These cost-savings or interest revenues continuously finance new investments in similar projects, resulting in a sustainable funding cycle. Revolving funds can be a potential solution to deal with the long payback time of the projects. It may be more effective in the long term if coupled with other financing schemes, mostly soft loans (BPIE, 2010). It may also be a goodcomplementary to an ESCO (de T'Serclaes, 2007).

What are the types of revolving funds?

There are two types of revolving funds:

1. **External revolving fund**: it is often developed and managed by a selected fund manager (with its compensation tied to the fund's performance), or by a utility or specially created organisation. This type of revolving fund lends to multiple municipalities, which must repay the loan in an agreed date. It can form a partnership with service providers of energy efficiency or ESCOs to carry out the projects for the borrowers. It is very likely that the incentive payments should be made according to the energy savings achieved (ESMAP, 2014).

2. **Internal revolving fund**: it is a revolving fund developed by a single municipality of which the municipality funds the initial investment and may also take control (ESMAP, 2014). The structure of an internal revolving fund varies depending on the city's needs as well as local conditions. Other factors include *"mayoral powers, regulatory and legislative context, type and scale of infrastructure project, and the risk/reward profile of stakeholders"* (C40, 2016). The internal revolving funds need an initial capital contribution, which can come from the municipality's own budget, grants or loans from external sources and donors.

Why are revolving funds important?

Revolving loan funds commonly have certain targets and eligible types of groups determined, such as ESCOs or schools that wish to improve the energy efficiency of their building portfolio. Individual building owners mostly do not belong to the beneficiary group (National Renewable Energy Laboratory (NREL), 2011). Traditional investors are not used to energy efficiency projects and are unwilling to provide financing. Revolving loan funds help overcome this issue. For example, ESCOs cannot take on many big projects as they are short of necessary funding for upfront investment. Revolving loan funds can assist ESCOs in this regard by providing a more accessible pool of funds. This also applies to other segments of the building market, such as fairly large institutions and corporates (Becqué et al., 2016).

Revolving funds can also help prove that energy efficiency projects can be commercially feasible in the long run. This financing scheme helps the capacity development of service providers, such as energy auditors, craftsmen, construction companies, and ESCOs. Therefore, revolving funds can help encourage more commercial financing in the energy efficiency market (Limaye et al., 2014).

How do revolving funds work exactly?

Most revolving fund programmes offer loans with a specific maturity and determine what types of projects that can be funded (NREL, 2011). The funding sources of a revolving loan fund usuallycome from the government, which may be in the form of dedicated taxes on energy sources. The execution may be handled by partner banks, including the evaluation of loan applications, monitoring of loans and collection of loan repayments (Voïta et al., 2012). The money from loan repayment goes back to the revolving fund to make new loans for similar projects. The additional fees like the interest rates paid by the borrowers are mostly to cover programme administration cost, so the initial capital of the fund is not disturbed. Revolving funds are usually managed by government bodies or non-profit organisations with the aim of making positive changes within target beneficiaries (NREL, 2011). The following figure shows the cash flow in a revolving loan fund for energy efficiency (EE) or renewable energy (RE) projects.

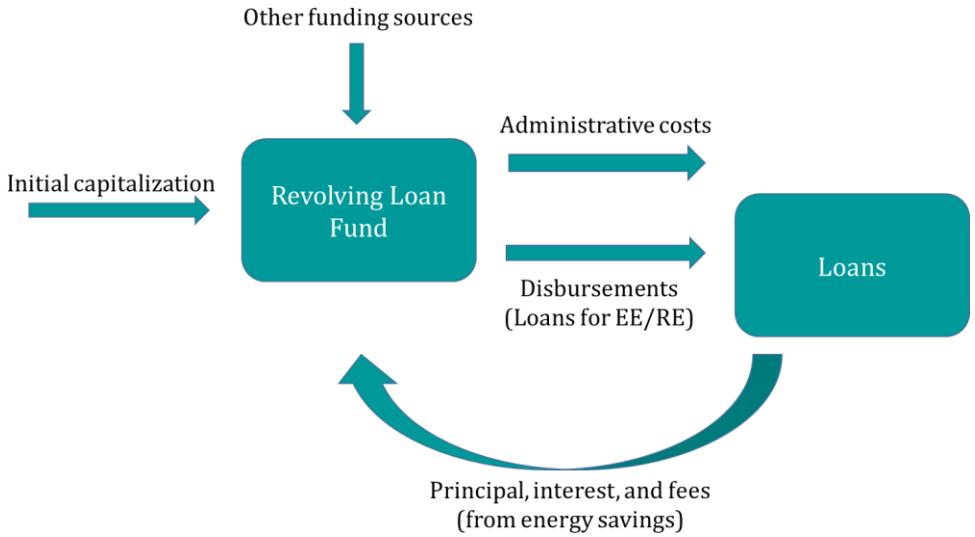


Figure 9: Cash flow of revolving loan fund. Source: NREL, 2011.

What are the advantages of revolving funds?

According to BPIE (2010), FEDARENE (2015), and de T'Serclaes (2007), the advantages of arevolving fund scheme are as follows:

- Enables recycling capital for future use.
- More efficient allocation of public funds.
- Allows long-term sustainability of public investment.
- A direct and clear impact on the financial barrier issue, which is lack of liquidity.
- Can help demonstrate the commercial viability of EE investments and provide credit histories, paving the way for future commercial financing.

What are the weaknesses of revolving funds?

According to BPIE (2010) and de T'Serclaes (2007), the weaknesses of a revolving fund scheme are as follow:

- Temporary impact on the financial barrier issue
- Does not contribute to long-term market transformation, unless it lasts for so long that sustained stable demand will have been created
- Does not call for any particular innovation from the market
- Limited budget to finance the measures
- The payback period limited to 15 years
- The setup and operation of a revolving fund can be administratively difficult, for example, it may be needed to apply significant effort in educating financial administrators on how to recognise savings

What are the main barriers to revolving funds?

According to FEDARENE (2015), the main barriers to a revolving fund scheme are as follow:

- Parallel negotiations with many different partners
- The economic situation in the country may change dramatically and therefore change thebehaviour of final beneficiaries
- The complex architecture of the fund: the preparation takes a very long time (and incurs considerable costs)
- Final beneficiaries, even with active awareness-raising measures, remain reluctant

How to identify appropriate measures to be financed through revolving funds?

The following steps can be undertaken to check whether a measure is appropriate to be financed through the revolving fund (Energy Cities, 2017b):

1. **Consult potential customers in charge of planning new construction, renovation, retrofits or maintenance about your scheme.** Ask about what is on their schedule. Try to steer their investment decisions towards energy efficiency beyond the current standard by offering additional Internal Contracting funding.
2. **Check whether the energy-saving measure will not be the subject of, or affected by,a more significant retrofit or new construction**, which could replace the whole installation before the investment of the measure is paid back.
3. **Examine the profitability of a project**, by determining:
    a. The economic parameters: the investment cost and the resulting expected financial savings calculated by multiplying the energy savings and the cost per energy unit.
    b. The payback time: the investment divided by the annual energy cost savings.
    c. The operational lifetime of a measure depends on the durability of its technical parts.

Only projects with feasible investment costs and payback times are suitable for funding via Internal Contracting. Therefore, consider the following:

Payback time < operational life of the measure = economically viable

Payback time > operational life of the measure = not viable

How to manage the investments of the revolving fund?

The initial monetary value of the fund is set up at the start of the scheme. New investments are financed by energy cost savings gained and paid back by the implemented measures previously invested by the fund.

In order to be able to finance several energy saving measures throughout the years using the initial monetary value of the revolving fund, a few aspects need to be considered:

1. **The fund cannot cope with investments of any size**. The cost of a single investment has to be lower than the fund's value.
2. **The total annual investment should be limited to only a share of the fund's value** since the fund is intended to pay for investments made in different years with paybacks also extending over several years.

The investment cost and payback period must be suited to the revolving loan fund in order to sustain the implementation. The longer the payback period, the lower the investment that can be funded annually, as it takes a longer time to replenish the fund. *"Increased investment costs can completely halt this business model*" (Energy Cities, 2017b).

Who can lead and provide revolving funds?

Public entities usually contribute to revolving funds by subsidizing interest rates or financing the main investment partially or fully (Voïta et al., 2012). Government can set up a revolving fund when the funds and expertise are sufficient. In some cases like Riga (Latvia), an energy agency can also establish this business model and coordinate all stakeholders on behalf of the city. Energy audits and energy retrofit works can be conducted by the energy agency within the framework of the energy refurbishment projects that is eligible for the revolving fund (Energy Cities, 2017a).

The primary issue in creating revolving funds is seeking the initial capital of the fund. The initial capital can be obtained from the government's own funds and budget, grants/loans from donors or other external funding sources. Revolving funds may be developed and administered by local, regional or even national governments. *"In such cases, the funds are often managed by competitively selected fund manager with its compensation tied to the fund's performance."* When revolving funds are established at a local level, they can encourage to recognise total costs and benefits of projects in the long run (Interreg, n.d.).

Who can apply for revolving funds?

According to Limaye et al. (2014), the eligibility requirements used to evaluate potential beneficiaries of revolving funds may include the following:

A. For debt financing:
   - The creditworthiness of the potential beneficiary
   - Existence of consumption-based payments for heating
   - Good energy bill payment discipline
   - The existing comfort level of at least 50 percent[3]
   - Building in reasonably sound structural shape
   - No current or imminent plans for closure/privatization
   - Ability to retain cost savings to allow loan repayments[4]
   - Potential use of commercially available technologies
   - Minimum and maximum loan amounts
   - Proper project preparation and documentation

B. For energy service agreements:
   - Availability of historical energy bill data
   - Consumption-based billing and good energy-bill payment discipline
   - Building in reasonably sound structural shape
   - No plans for closure or major changes planned in building operations
   - Willingness and ability to sign energy service agreements spanning multiple years
   - Willingness to work with the fund's payment security mechanism

The Bulgarian Energy Efficiency Fund (BEEF) is an example of a revolving fund initiative that is intended for energy efficiency investments. The beneficiary groups include industrial, commercial, and residential buildings. Below are the main eligibility criteria for getting the fund:

- The project should involve the application of well-proven technology
- The project cost should range between €15,000 and €1,500,000
- Minimum equity of 10%under co-financing and 25%for stand-alonefinancing
- The payback time of up to five years
- Required collateral: mortgage, pledges under Special Pledges Act, claims on accounts and commercial contracts, financial risk insurance, bank guarantees, etc.

[3] The "comfort level" in a building is defined as the ratio of the actual energy consumed for providing heating comfort to the amount of energy that would be needed to provide the desired or standard comfort level. If this ratio is small, it is unlikely that the EE project that will be designed to provide the desired comfort level can provide cost savings.

[4] Alternatively, the existence of a payment security mechanism that will assure loan repayment.

How to apply for revolving funds?

According to Energy Cities (2017), the procedures for revolving funds in the case of Riga (Latvia)are as follows:

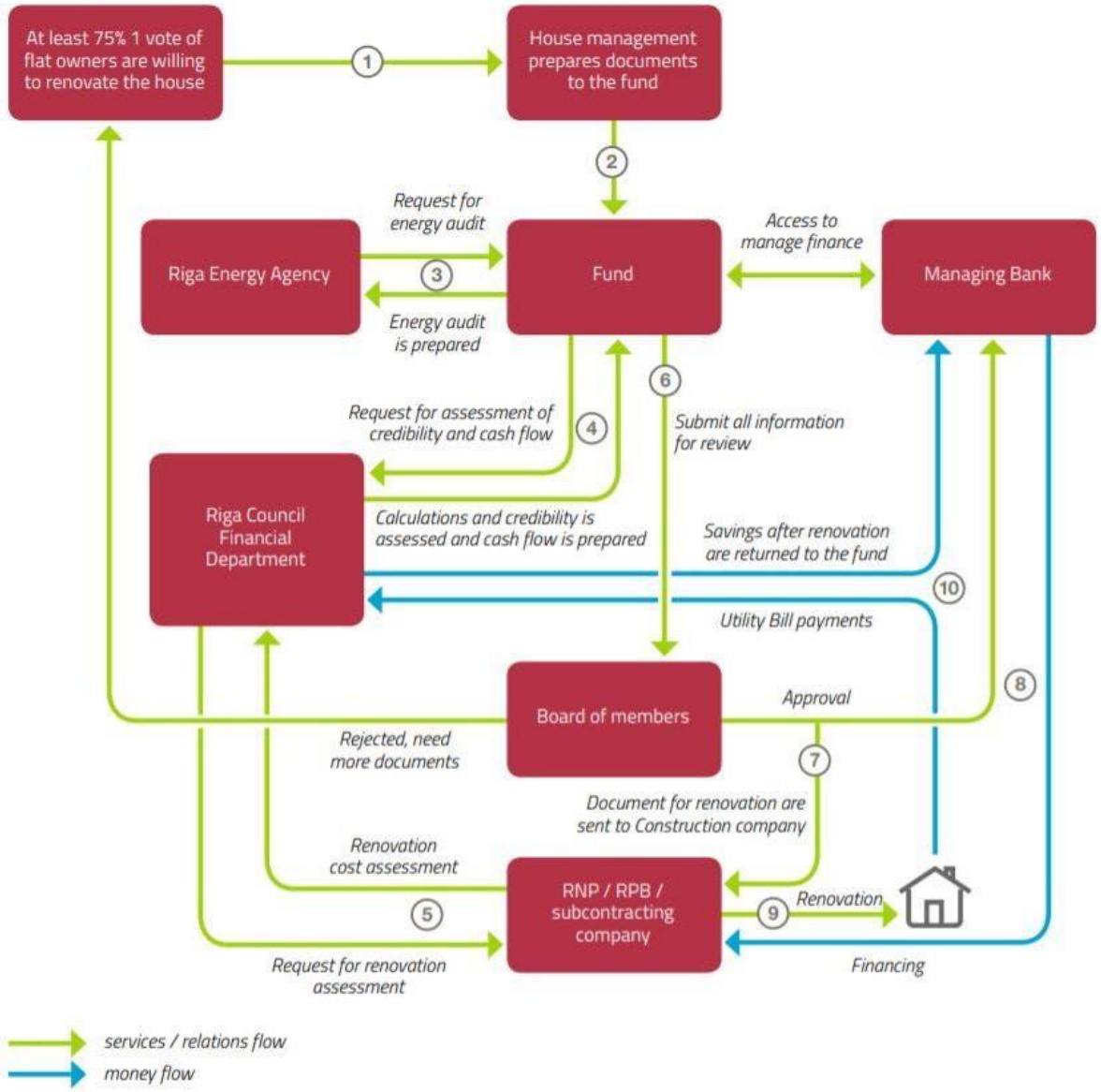


Figure 10: Business model of Riga Energy Agency's revolving fund

Table 13: Step-by-step guide to applying for revolving fund of Riga Energy Agency

Application	1. At least 75% + 1 vote (or 2/3) of flat owners are willing to renovate. 2. The House manager prepares the documents and applications that are submitted to the fund
Review process	3. Riga Energy Agency (REA) 3.1. The energy audit request is submitted 3.2. The energy audit is prepared and returned to the Fund 4. Riga Council/Financial Department 4.1. Request for assessment of creditworthiness and future cash flow 4.2. Calculations and creditworthiness are assessed and cash flow is prepared 5. Riga House Managers (RNP)/ Riga City Builder (RPB) 5.1. Request for renovation assessments 5.2. Renovation cost assessment provided
Process of approval	6. The fund gathers all information about the building and submits it to the Board of Members. 7. If the Board of Members approves the application, the documents approving the renovation are sent to a Construction company. 8. Managing Bank 8.1. Immediately after the application for renovation is approved, the request to provide financing is sent to a Managing Bank. 8.2. Financing is provided to a construction company.
Renovation and post-renovation	9. At this stage, a construction company is able to start the renovation. 10. Repayments 10.1. Once the renovation is completed, the building's energy consumption is reduced.Homeowners pay back the loan through the utility bills to the Riga Financial Department. 10.2. Savings after the renovation are then calculated and sent from the Financial Department to the Managing Bank.

What are other revolving funds set up in Europe?

Lithuanian Energy Efficiency Housing Pilot Project - EEHPP

The EEHPP implemented a revolving fund scheme in 2001. One of the goals is to support energy efficiency projects in the residential sector. The scheme aims to encourage private initiatives to improve energy efficiency. It was financially supported by the Lithuanian government, the World Bank, the Danish Ministry of Housing and Urban Affairs and the Dutch Ministry of Economics. Within four months, over 200 households carried out energy efficiency works with the help of the EEHPP. The measures include new heat substations, window replacement, as well as roof and wall insulation (de T'Serclaes, 2007).

The European Dexia-Fondelec Energy Efficiency and Emissions Reduction Fund

This initiative ran from 2000 to 2010. The aim was to support companies and projects in energy efficiency investments, mainly in Central and Eastern Europe. The initiative acted as a trigger for energy refurbishment in the private sector. The funding sources come from Dexia-Public Finance International Bank, FondElec Group, and EBRD. The initiative became the first commercial investment vehicle that supports the carbon credits distribution to shareholders by investing in energy-saving projects (de T'Serclaes, 2007).

Energy Fund Den Haag - ED

This fund was established by the Municipality of The Hague in 2013. The funding sources came from the municipality's own fund, EFRD and Programme Authority "Opportunities for West". This fund focuses more on renewable energy and energy efficiency projects in the territory of The Hague. Through the fund, the municipality intends to attract more private funding to support both the funds and the projects. This fund also incorporates other schemes, such as soft loans and guarantee funds, as guarantee funds serve best with complementary financial instruments. The beneficiaries of this fund come from public and private sectors, including project developers, housing corporations, businesses, foundations and NGOs and public entities e.g. municipalities, local authorities. As of December 2014, the fund supported almost € 4 million for five projects, one of which was the installation of solar panels for a football club house (CITYnvest, 2015).

Bulgarian Energy Efficiency and Renewable Sources Fund - EERSF

The fund was set up in 2005 under a form of a public-private partnership. The initial capital was obtained from the Bulgarian and Austrian Governments, the Global Environment Fund (GEF) through the World Bank's International Bank of Reconstruction and Development (IBRD), and the private sector in Bulgaria. The fund does not only target the public sector, but also the private sector including Project developers, ESCOs, Project contractors, housing corporations and businesses. The aim is to create a sustainable market-based capacity for developing and financing commercial energy efficiency projects in Bulgaria. The fund also helps prove that energy efficiency investments are profitable so the market in this sector can be more developed. The EERSF also provides technical support free of charge. Like most the guarantee fund initiatives, the EERSF includes other financial instruments, such as soft loans and guarantee funds. As of December 2014, the EERSF has funded 53 projects in the private sector for a total amount of 13.1 million BGN with a total project investment value of 18.6 million BGN (CITYnvest, 2015).

Romanian Energy Efficiency Fund - FREE

This fund, also called FREE (Fondul Român pentru Eficienţa Energiei), began to operate in June 2003 with an initial fund of US$10 million from GEF. The FREE allows corporates in the industrial sector and other energy consumers to carry out energy-efficient projects under commercial conditions. Within 5 years, 12 projects in the private sector have been accomplished. The projects included changing old energy generation equipment to a more energy-efficient one. Each project must profit at least 50% from energy savings to be eligible for the fund (Limaye et al., 2014).

What are the key lessons learnt from revolving funds?

As the loan payback time can take years, the fund will take a long time to replenish its capital. Therefore, a revolving fund needs one or more dependable funding sources to continue financing other projects (Limaye et al., 2014). Take an example from the Bulgarian revolving fund, BEEF. The government's support decreased gradually making the BEEF lack ownership at the end of the project. The government did not seek more funding sources for the BEEF to grow its initial capital (World Bank, 2010), making the BEEF unable to sustain itself longer.

Overall, to be more sustainable, revolving funds should be combined with other financial instruments. Various public financial incentives, such as tax credits, tariffs, depreciation, and

mandated audits, can increase the funds and develop the market. The funds should be able to offer interest rates below the market rate, like soft loans, and/or other incentives, like technical assistance, to appeal to potential clients (de T'Serclaes, 2007).

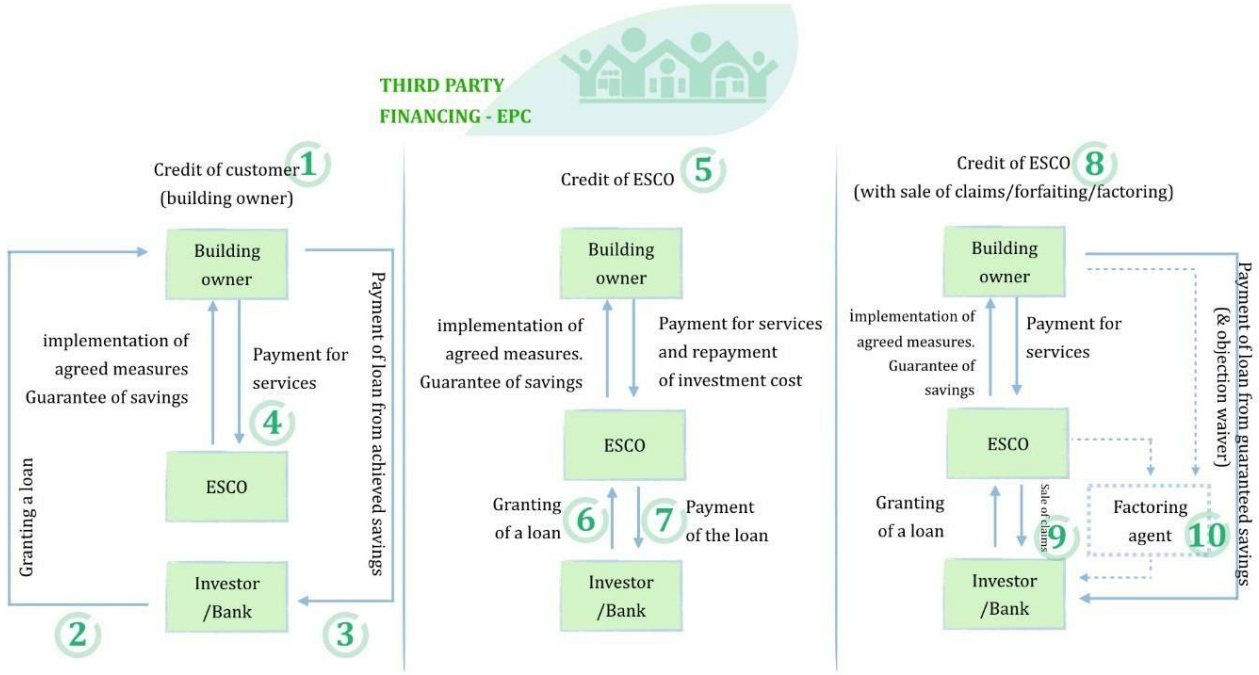
Toolbox and Materials

- Tools for choosing guarantee fund structures
- Materials on Energy Efficiency in Buildings
- Building (Energy Efficiency) Upgrade Value Calculator for Commercial Properties
- Comparative Study on Financing Schemes Used for Energy Efficiency in Buildings
- Guide to Financing the Energy Renovation of Residential Buildings through Soft Loans

BPIE: Financing Energy Efficiency in Buildings

Third Party Financing - EPC

In developed EPC markets, the most common financing model for EPC is third party financing. Third-party financing can be described as debt financing – wherein the building owner acquires financing resources from a third party, usually investors or banks, instead of getting these from the internal funds or the ESCOs. The ESCOs offer guaranteed savings to accommodate the repayment of the debt during the duration of the contract. These guaranteed energy savings offer positive project cash flow and minimize the risk of repayment to the bank. In this arrangement, the interest costs during the period of construction and installation are included in the project financing agreement.



Source: ENPC-Intrans (2016)

Figure 10: Third-Party Financing

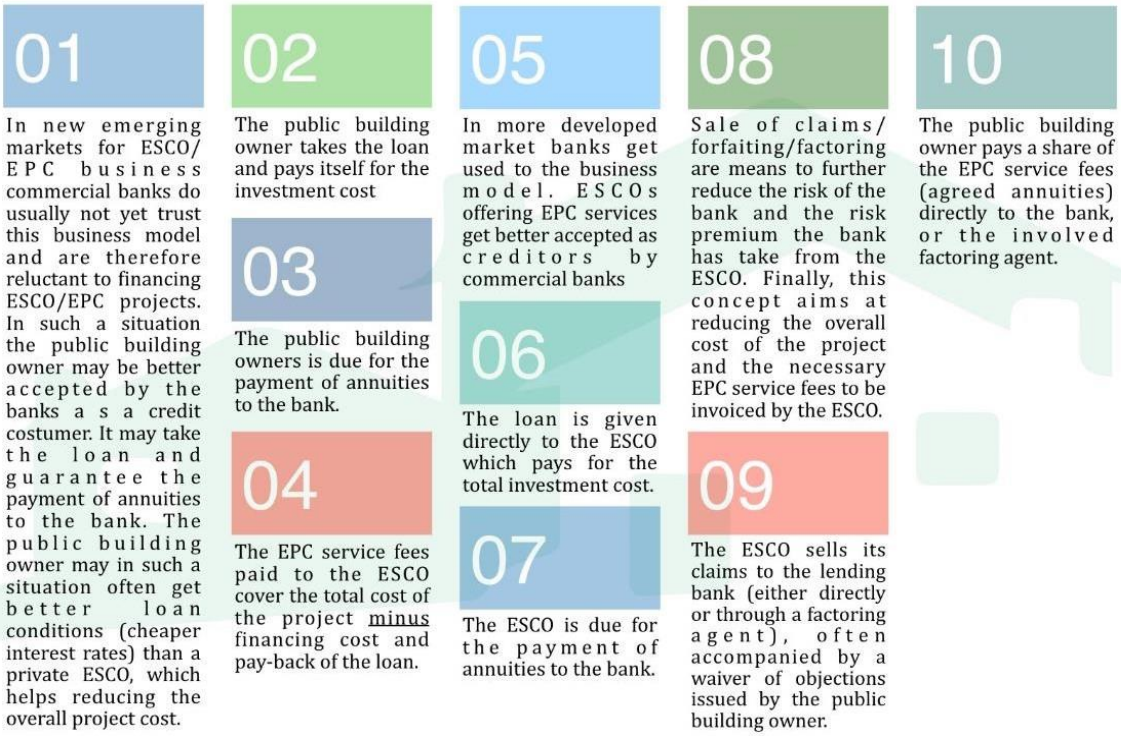


Figure 11: EPC process

Scheme: Third party financing – EPC

Location: Ljubljana, Slovenia Project:

Energetska Obnova Ljubljane (EOL)

Sources of funds: Project Development Assistance (ELENA) + Own Local budget

+Private Investments (bank consortium)

Results

With a total cost of EUR 1,498,400, 90% supplied by ELENA, this project mobilized investment of EUR 50,700,000. The replication potential is considered high, notably the use of ESCOs for energy efficiency and renewable energy products. The largest project of its kind in Slovenia, it may become the model for similar projects in the country. To achieve economies of scale, several tenders have been organised for groups of similar buildings, or buildings looking to implement the same green technologies. It has resulted in total energy savings of 79 GWh per year, achieving a 24,593 tons annual reduction of CO2.

References:

http://www.eib.org/attachments/documents/elena-completed-eol-en.pdf

http://www.transparense.eu/tmce/Gradiva/7-the_energy_retrofit_programme_by-_loose.pdf

Box 6: EPC in Ljubljana

Green Bonds

What you need to know about green bonds

Figure 2: Green Bonds in a Nutshell (Doris Kramer, 2018)

What is a green bond?

Green Bonds are bonds where proceeds are exclusively applied to finance or refinance, in part or completely, new or already existing green projects. In this module, we focus on green projects in

the sector of transport. These can be bicycle promotion, car sharing, or other projects presented in *Table 1: Examples of projects under transport.*

Who can issue a green bond?

Green bonds can be issued by:

- City governments
- Utilities: water, transport, energy, etc.
- Corporations that are developing, building or managing green assets for issuers
- States or development banks

What is the difference between a normal bond and a green bond?

As with any bond, green bonds are financial assets used for raising capital from investors through the debt capital market. During the "maturity" phase, the issuer - whether governments, corporations, banks, or individuals - raises a fixed amount of capital from investors; when the "principal" phase is reached, the issuers repay the capital with an agreed amount of interest called "coupons".

The difference between green bonds and other regular bonds is the term/label "green", which assures the bonds' proceeds will be exclusively used to finance or refinance "green" projects that result in environmental benefits (OECD, 2015).

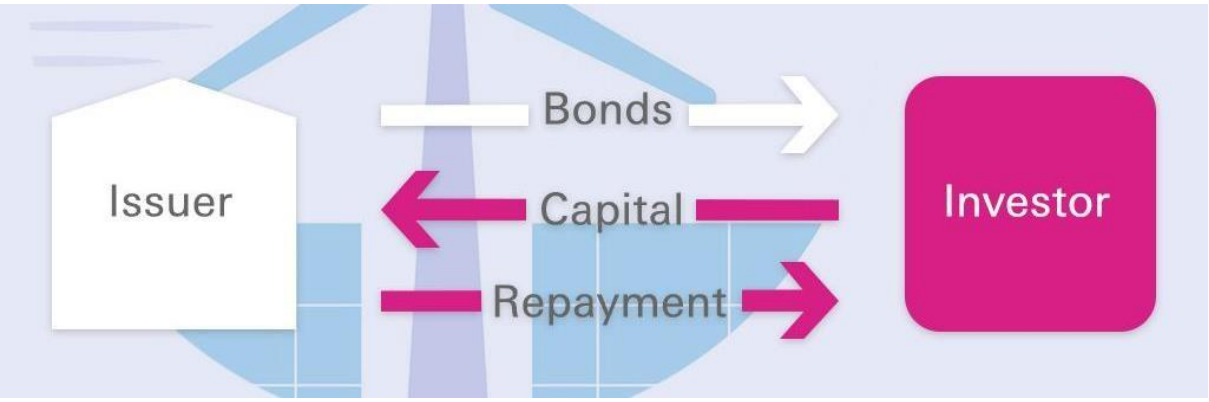


Figure 3: Issuer and Investor in the Green Bond market (Deutsche Bank, 2014)

Which are the existing standards for Green Bonds?

There are different standards the most renowned are The Green Bonds Principles (GBP) and the Climate Bonds Standards (CBS). Nowadays, all bonds labelled as green are aligned with the GBP (or GBP-based frameworks). The GBP is the "de facto" market standard for green bonds. The CBS,which integrates the GBP, are still relevant as they include *"more detailed sector specific eligibility criteria and have a certification mechanism."*(European Commission, 2016)

As an example, the city of Paris issued green bonds, declaring: "*The City of Paris is committed to the wellbeing of its population, sustainable development, and supporting the French economy. As part of this commitment, the City of Paris has elected to develop a Sustainability Bond Framework in accordance with the Green and Social Bond Principles 2017, for the future issuance of Climate and/or Sustainability Bonds*" (City of Paris Sustainability Bond Framework.)

Table 4: Types of Bonds (Adapted from Climate Bond Initiative, 2018)

Type	Proceeds Raised by Bond Sale	Debt Recourse	Example
General Obligation Bond	Earmarked for green projects	Full recourse to the issuer; therefore same credit rating applies as to the issuer's other bonds	As of 31 December 2016, European Investment Bank (EIB) remains the largest issuer of Green Bonds with over EUR 15bn raised across 11 currencies, of which the EUR equivalent of 3.8bn so far this year. The EIB provides the market with benchmark Green Bond issuances in EUR, USD and GBP, but has also issued CABs in SEK, CAD, ZAR, CHF, AUD, JPY, TRY and BRL (in synthetic format). EIB is increasing liquidity, size, and scale of Green Bond issuance, in addition to gradually building green reference yield curves. For more information, see: http://www.eib.org/
Revenue Bond	Earmarked for green projects	Revenue streams from the issuer, such as taxes or user fees, provide repayment ofthe bond	Iowa Finance Authority issued $321,5 million of State Revolving Fund revenue bonds in February 2015, with 1- to 2-year tenors, 1 to 5%coupon, rated AAA. The green bonds were backed by water-related fees and taxes. Proceeds were earmarked for water and wastewater projects.
Project Bond	Ring-fenced for the specific underlying green project(s)	Recourse is only to the project's assets and revenue.	No issuance seen in the market yet
Securitized Bond	Either (1) earmarked for green projects or (2) go directly into the underlying green projects.	Recourse is a group offinancial assets that have been grouped together as collateral.	Hawaii State Government issued $150 million, AAA-rated of green asset backed securities in November 2014. The securities were issued in two tranches: $50 million, 8 years, 1.467% coupon and $100 million, 17 year, 3.242% coupon. The bondswere backed by a Green Infrastructure Fee applied to the bills of the State Utility's electricity customers. Proceeds went to loans to install distributed solar panels, connectors, and storage
Municipal Bond	Either (1) earmarked for green projects or (2) go directly into the underlying green projects.	Recourse is a group offinancial assets that have been grouped together as collateral.	In 2013, Gothenburg issued its first green bonds for SEK 500 million. The city made a second foray into the green bonds market in 2014 with a SEK 1.8 billion issuance, the third issuance for SEK 1 billion in 2015, and a fourth issuance for SEK 1 billion in 2016. To date, the city has been able to raise a total of SEK 4.36 billion via the financial markets. Gothenburg's green bonds are the first financial product that allows mainstream investors (about 98% ofthe capital market) access to climate financing at no additional cost. (Gothemburg Green Bonds, Sweden)

The EU green bond market is generally well developed due to its well-established existing finance infrastructure; the active involvement of EU based organizations and political support. However, there are significant differences in the green bond market development across the EU Member States, caused mainly due to the differences in the national bond market development and policy frameworks. The EU green bond market is led by Multilateral Development Banks (such as EIB, EBRD), municipalities (e.g. Ile de-France, Gothenburg) and corporations (e.g. utilities and producers of green solutions) (European Commission, 2016)

In order to develop an overarching strategy in this area, the European Commission set up a High-Level Expert Group (HLEG) on sustainable finance at the end of 2016. The group was tasked to prepare a comprehensive blueprint for reforms along the entire investment chain.

Figure 4: Tasks of the technical expert group (European Commission, 2018)

Who are the actors involved?

The main actors in the market can be categorized as **issuers** (entities with green projects needing funding or refunding), **underwriters** (financial institutions arranging the issuance of the green bonds), **external reviewers** (verifying the "greenness" of the underlying projects) including rating agencies, intermediaries (such as stock exchanges), and **investors** (particularly those with a mandate to invest in green assets).

Issuers of green bonds may benefit from reputational gains and upgraded environmental risk management processes due to commitments to green disclosure. On the other hand, bond investors, especially long-term and responsible investors, are provided with an emerging class of green assets and more opportunities to actively engage with issuers on ESG (Environmental, Social, Governance) factors related to the financed projects (European Commission, 2016).

What are the roles of each actor?

Issuer: It is the main actor, the entity that decides to create the bond for financing green projects.

Underwriter: In support of the issuer, generally is a bank that provides the economic and environmental knowledge necessary to structure the Green bond and its framework

External Reviewers: An external actorprovides an independent assessment of the green bond framework created by the issuer and the underwriter.

What are the advantages for the issuer?

Local governments that set up a Green Bond normally mention the following advantages (OECD, 2017):

1. Demonstrating and implementing the issuer's approach to ESG issues
2. Improving diversification of a bond issuer's investor base, thereby expanding funding sources and potentially reducing exposure to bond demand fluctuations
3. Strong investor demand can lead to oversubscription and the potential to increase issuance size
4. Evidence of a greater proportion of "buy and hold" investors for green bonds which can lead to lower bond volatility in the secondary market
5. Reputational benefits (e.g marketing can highlight the issuer's green credentials and support for green investment)
6. Articulation and enhanced credibility of sustainability strategy (putting one's "money where their mouth is) leading to enhanced dialogue with investors
7. Access to "economies of scale" as the majority of issuance costs are in setting up the

processes Other less common advantages related to green bonds are:

1. Tracking of proceeds use and reporting leads to improved international governance structures, communication and knowledge sharing between the projects side and treasury side of the business (G20 Green Finance Study Group, 2016)
2. For municipalities, a tool to reach constituencies physically located close to the green project they intend to support and provide them with opportunities to invest in programmes that have a direct proximal impact (World Bank Group, 2015)

What are the common challenges?

Green Bonds are a recent financial instrument to support green investments and international organizations and banks are currently developing standards in order to regulate and stream the growth of this emerging market. Because of these, most of the current barriers to set up a Green Bond are based on the lack of knowledge of the green bond technical requirements and on the

impediments to access the green bond market. Here are the barriers adapted from the G20 Green Finance Study Group (2016):

Financial related barriers:

- Costs of Meeting Green Bond Requirements
- Difficulties for International Investors to Access Local Markets
- Lack of Domestic Green Investors

Knowledge related barriers:

- Lack of Awareness of the Benefits of Green Bonds
- Lack of Univocal International Guidelines and Standards
- Lack of Green Bond Ratings, Indices, and Listings
- Lack of Supply of Labelled Green Bonds

What are the prerequisites to set up Green Bonds?

The key factors that influence a city's Green Bond strategy are (Padraig Oliver & Climate Policy Initiative, 2016):

- National regulation dictates whether a city is legally able to issue its own bonds in domestic or international capital markets and currencies
- The size and risk profile of the green infrastructure investment indicates the likely investor segment to target
- The creditworthiness of a city's own balance sheet established either through a rating from an external credit rating agency or implicitly rated through external due diligence dictates its attractiveness to investors. Investment-grade credit ratings denote if the city has a low risk of default with typical thresholds at BBB- or Baa up to an AAA maximum rating.
- A city's level of engagement with or ownership of other organizations that have access to capital markets and may want to include city-based green projects in potential bond issuance, including:
    - City-based entities such as public utilities or agencies that city administrators exert a degree of control over
    - Public-private partnerships
    - Commercial banks or private sector companies with access to capital markets
    - National-level development agencies and banks
    - Multilateral or bilateral development agencies and banks

Some cities may have all these variables in place, while others can find limited options. You can easily check your options for developing a Green Bond strategy by using the decision tree below:

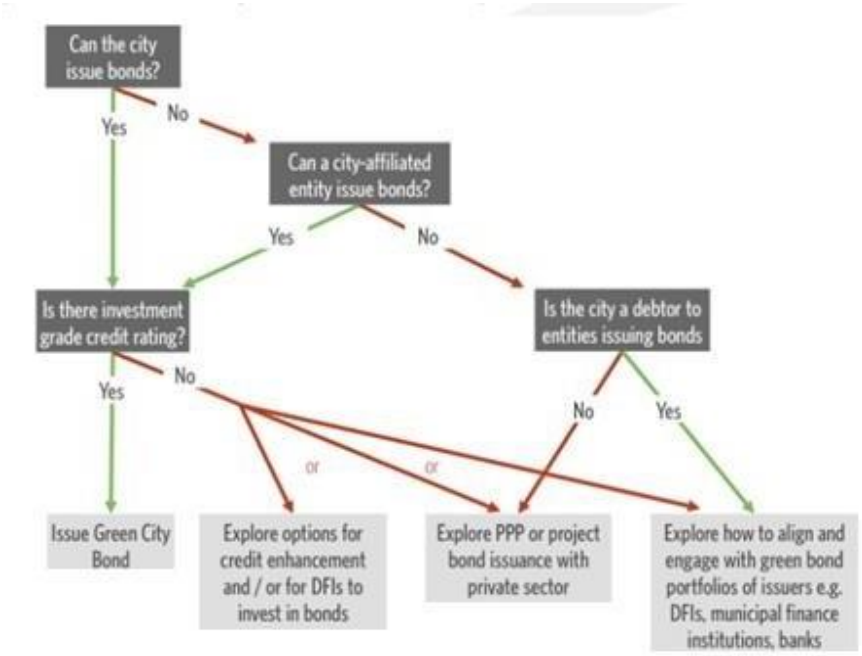


Figure 5: Decision Tree for Municipalities (Padraig Oliver & Climate Policy Initiative, 2016)

What are the steps for issuing Green Bonds?

The process has three (3) different phases: Pre Issuance, Issuance, and Post-Issuance, which are further explained below.

What is the Pre Issuance Phase (Phase I)?

It is the preparation for issuing the green bond. The first step is to **identify and qualify Green Projects and Assets**. Here the "greenness" of the issuing entity doesn't matter, it is all about the project or the specific physical asset. Therefore, if you are able to issue a regular municipal bond, you can also issue a green bond as long as there are green assets or projects (Green City Bonds, 2015).

Also, it is essential to set up an **independent review** who will help to identify green assets, protecting the issuer's reputation. In a further stage, the issuer needs to establish the right procedures for **tracking and reporting** the use of the proceeds. *"To ensure all proceeds are applied to green projects, the sum of the cash on hand and amounts invested in assets or projects must not be less than the amount of the bond."* (Green City Bonds, 2015)

In summary, the key steps of the Pre Issuance Phase are:

- Analysis of the green bond market, to check risks and opportunities given by the issuance of the bond. Capital and debt markets should be regulated and stable, in order to minimize the risks.
- Creation of a Green Bond Framework, to structure the bond and align it with international standards.

- Verification of the Green Bond Framework (and offer) by an independent institution, to assess the quality and coherence of the Framework.

What is the Market Analysis?

The market analysis supports the issuer to verify the existing conditions to access the green bond market. Through this preliminary analysis, the issuer can check how feasible and convenient it isto issue a green bond; for example, by checking opportunities and threats offered by the market.This phase is focused on three aspects:

- Analysis of Existing Assets
- Target Investors
- Assessment of Environmental Risks & Opportunities

While assessing risks and opportunities inherent to the business of the company, the issuer should give special attention to environmental aspects. *"This is because these issues will be subject to the analysis of potential investors."* (FEBRABAN & CEBDS, 2016)

What is the Green Bond Framework?

The Green Bond Framework is the core of the pre-issuance phase. In this document the issuer firstly provides an overview of its commitment to sustainability issues, generally through the support of a financing institution (i.e. bank) that acts as an "underwriter". Then there is a clear statement of how the bond will be aligned to the 4 Green Bond Principles, which are:

1. Use of Proceeds
2. Process for Project Evaluation and Selection
3. Management of Proceeds
4. Reporting

To have a practical example of what the framework is please check the link: FRAMEWORK FOR A TFL GREEN BOND - London Case Study, https://www.climatebonds.net/files/files/Case study - TfL final(1).pdf

What is External Review?

The issuer should use an external reviewer to confirm the alignment of their Green Bonds with the key features of the GBP. The external review can be performed through:

a) Consultant Review
b) Verification
c) Certification
d) Rating

The review may be partial or used only to cover certain critical aspects of the issuance phase. Although there is this chance it is suggested that the external review should be performed on the entire framework as well as it should be open to public consultation.

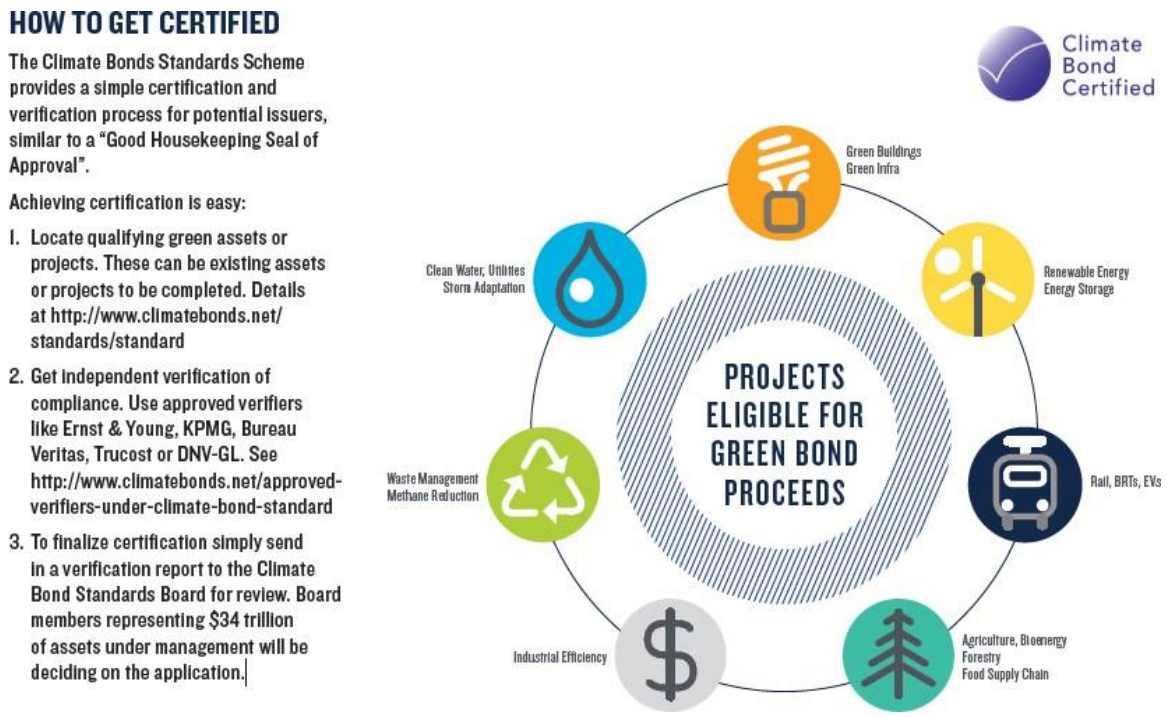


Figure 6: Example of Certification: Climate Bond Initiative (Green City Bonds, 2015)

What is the Issuance Phase (Phase II)?

The key steps of the Issuance phase are:

- Preparation of the offer:
  - The preparation of a Green Bond offer is very similar to that of a conventional bond, thus the issuance will follow the rules and procedures applicable to the type of bond chosen for the operation.
  - The preparation of the offer includes a series of documents to support the issuance (such as the issuance indenture, rating report, corporate documents of the issuance approval, and audited financial statements of the issuer), which may vary depending on the type of bond used.

- Structuring the offer:

When applicable, the issuer must choose the financial institution that will structure the bond offer

- Presentation of the offer to potential investors:

This happens through a series of presentations (roadshows) made with the support of theunderwriting bank.

- Offer distribution and allocation:

The Bond is placed on the Market, they can circulate among the major stock markets as the London Stock Exchange Market.

Actors Involved:

- Issuer
- Underwriting Bank structures the bond offer and can act as a sustainability consultant
- Investor

Interpreted from:

(FEBRABAN & CEBDS, 2016)

What is the Post Issuance Phase (Phase III)?

The key steps of the Post issuance phase are:

- **Monitoring and Reporting**, which consists of:
  - Annual Reports
  - List of the Projects to which Green Bond proceeds have been allocated
  - Brief description of the projects and the amount allocated
  - Expected impact of the project. Best Practice, Not mandatory
    - Transparency in communicating the expected impact
    - Monitor the achieved impact

- **Management of the Proceeds**, which implies:
  - Tracking of proceeds
  - Managing unallocated proceeds
  - Earmarking funds for Nominated Projects & Assets
  - Assessment of the process by a third party
  - Transparency

What are the monitoring and reporting activities?

It is important that the Issuer keeps up to date the information on the use of the proceeds, as previously mentioned. Therefore, an annual review should be provided for public view. The annual review should include a brief description of the projects and the amounts allocated, and their expected impact. The core aspect of this phase is transparency: the GBP recommends using qualitative performance indicators and, when possible, quantitative ones.

How are the proceeds managed?

Net proceeds coming from green bonds (or an equal amount to these net proceeds) need to be tracked by the issuer and *"attested to by the issuer in a formal internal process linked to the issuer's lending and investment operations for Green Projects. So long as the Green Bond is outstanding, the balance of the tracked proceeds should be periodically adjusted to match allocations to eligible Green Projects made during that period"* (ICMA, 2017).

The issuer should also inform investors about the types of temporary placement for the balance of unallocated proceeds.

Good Practices

The city of London wanted to enhance and provide a better and more sustainable transport service to the citizens. The expected increase in London's population pushed the municipality to consider an increase in the transport capacity of the city. In order to do that, the municipal authorities decided to align with the latest good practices.

Next to Paris, Gothenburg, Stockholm, and Orebro Kommun, London is a pioneering issuer of Green Bonds. This bond of GBP 400 million (approximately EUR 447 million) will fund low carbon transport projects from Transport for London's business plan until 2021.

London financed five eligible green project categories that could foster mobility in the city such as low carbon transport projects, station and line upgrades on rail and underground, low- emission hybrid buses, and cycling improvements.

Table 5: Good practices in transport

Financing Scheme	City/Region	Best Practice	Source of funds
Green Bonds	Greater London Authority (UK)	Transport for London (TfL) Green Bond	Private Sector, https://www.climatebonds.net/files/files/Case study - TfL final(1).pdf https://tfl.gov.uk/info-for/investors/borrowing-programme
Participatory Budget	Lisbon	Green PB, Lisbon	Public votes, https://cfl.southpole.com/solutions/lisbonGr
Investment package	Smart EU cities	BABLE solutions	Private, https://www.bable-smartcities.eu/home.html

Cooperatives

Cooperatives, also sometimes referred to as 'coop', have an established history. The following quote from the UN-Secretary General indicates that cooperatives have been established as a localised funding source:

> *"Cooperatives have long fostered inclusive and sustainable approaches to economic and social development at the local level. It is in keeping with this focus that cooperatives are expanding their development efforts creatively, into areas such as environmental sustainability and carbon neutrality, as communities around the world are struggling to adapt to climate change and strengthen their resilience against its impacts."*
>
> (United Nations Secretary-General Ban Ki-moon: *"Confronting Climate Change through CooperativeEnterprise"*, Message on the International Day of Cooperatives, 5 July 2008, 2020)

A cooperative is an autonomous association with voluntary membership that works together for their mutual social, economic and cultural benefit (Europe Cooperatives, 2015). A cooperative business model is usually established by a not-for-profit community organisation, where citizens invest through a cooperative body. Typically, the organisational structure of cooperatives is governed by a general assembly, a board of directors with a committee system, a set of officers, and hired managers or paid employees. A cooperative can simultaneously act as an association and as an enterprise. Internally, cooperatives operate as an association but towards the outside world, they act in a competitive and dynamic way like a business (Europe Cooperatives, 2015). Cooperatives are funded by the investments from the members, with or without external financial support (APEC, 2009). These members participate in decision-making processes as the cooperatives are managed collectively. This form of Citizen Financing seeks to address both members' and community needs. They raise financial support through collective membership fees rather than donations or external funding (Europe Cooperatives, 2015). The cooperative takes care of all administrative and operational functions, such as the installation, maintenance and safe operation of projects. It also manages the finance and payments between users, construction companies, and the cooperative (ADB, 2015). This autonomy of organisational arrangements means that the Cooperative has some flexibility. For example, there have been several cases where the mechanism has been used to fund local energy production. Both citizens and municipalities can purchase shares in the cooperative and so become members. They then have input and thus influence decisions such as investment action, product pricing etc. Furthermore, as well as being able to purchase shares, local authorities can also create political conditions and give support so that cooperatives can function (Covenant of Mayors for Climate & Energy EUROPE, 2019).

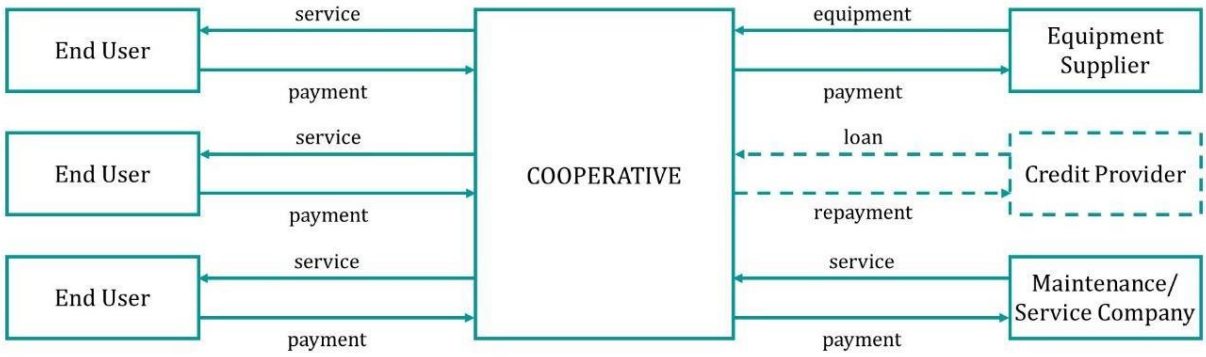
Organising Cooperatives

The business model of the project has to be feasible. This includes a skillful project leader, and the main authorisations to launch the project. Generally, the projects must fulfill the ethical expectations of the cooperative members. Moreover, the goal of a cooperative fund is to make sure that the governance within the projects will meet the ethical expectations of the participants and that it is transparent (REScoop, 2014). The goal is to assist the project leaders with the legal and economic aspects when required, but not to take control of the project.

To achieve this, they have a governance model where cooperative members contribute as a collectiveand the funds are not used for speculative purposes. Additionally, the project has to demonstrate thatit is both economically and technically viable as well as socially and environmentally beneficial. There often needs to be a charter signed by all of the cooperative members. Some initiatives may require portions

of the investment from local investors to ensure that there is local acceptance by the citizensin order to have a guarantee for the projects (REScoop, 2014).

As mentioned, cooperatives invest in long term visions. Therefore, a return on investments is mid- to-long term. This may mean that for a wind or solar energy project the return of investment is 5-7 years, and for Biomass is between 7-10 years (REScoop, 2014). These returns of investment are directed back into the cooperative, and as shown in Figure 4 they can be used for investments, payment of services or repayment of funds.



Main features of the cooperative business model

Source: Asian Development Bank, 2015

Cooperative

A cooperative business model is usually **established by a not-for-profit community organization.** It is **funded by member investments, with or without external financial support** (Asia-Pacific Economic Cooperation Energy Working Group, 2009). The **cooperative takes care of all administrative and operational functions,** such as the installation, maintenance and safe operation of projects. It also manages the finance and payments between users, construction companies, and the cooperative (Asian Development Bank, 2015).

Organising Crowdfunding

In general, the crowdfunding process can be observed through the following steps. Firstly, the project owner (or developer) creates a contract between themselves and the crowdfunding platform (it can be either an external or private platform). This contract is made to regulate fees and conditions of theservice. This can often include listing fees, which may be a one-off payment or an annual subscription.These contracts can include other financial service costs, for example, handling fees and marketing efforts. In addition to the financial arrangements, there are several other issues which need to be agreed upon which include the duration of the fundraising campaign; the minimum target amount that is intended to be raised; clear descriptions of terms and conditions (which includes the details ofthe project, legislation surrounding it and the risks and warnings). This may include the use of the 'All-Or-Nothing' approach. Which, if the funding target is not reached, then the amount invested is returned to each citizen that has contributed. Once these terms have been finalised then the project can be listed on crowdfunding platforms.

Next, the fundraising campaign runs through several stages, from pre-kick-off presentations to the crowd announcing the upcoming investment opportunity to the kick-off of the campaign, with continuous updates to potential investors about progress in fundraising and a final all-out effort to reach the target, or even better, overshoot it. The pledge and contract phases check the financial criteria of the initiative. Often the project initiative needs to be cleared in accordance with money laundering regulations and crowdfunding legislation, which is a service that is often provided by a bank or payment services provider. However, the regulations here are not standardised and this can vary greatly from country to country. Once cleared, the investor(s) and the crowdfunding platform (or in some cases the project itself), enter into investment agreements.

Not every project needs to use the same crowdfunding method. Literature has identified four main modes of crowdfunding, namely: *"donation-based, reward-based, loan-based, equity-based"* (Hasnam, 2019 p26). Hasnam (2019) gives definitions of each of these. Firstly, *donation-based* crowdfunding is where investors do not expect a return on investment. This can be seen as a charitable donation. Secondly, *reward-based* crowdfunding is where there are non-financial rewards for donating. These rewards in kind are acknowledgements of the contribution. Thirdly, *loan-based* crowdfunding is where an investor gives a loan to the project funders and the investment will be repaid. Finally, *equity-based* crowdfunding means that those who gave financial contributions are seen as stakeholders and so receive a share of the profits.

During the implementation phase, the total amount raised from the crowdfunding scheme is transferred to the project account. From the project account, regular payments are made for the project development and management activities. Project updates are shared with the investors on a regular basis through reports that are prepared in accordance with the signed project agreement. During the implementation phase, an annual fee is paid to the Certified Financial Planner (CFP) (here 1% p.a. on the original fundraised amount) for monitoring and continued investor communication (von Ritter & Bley, 2016).

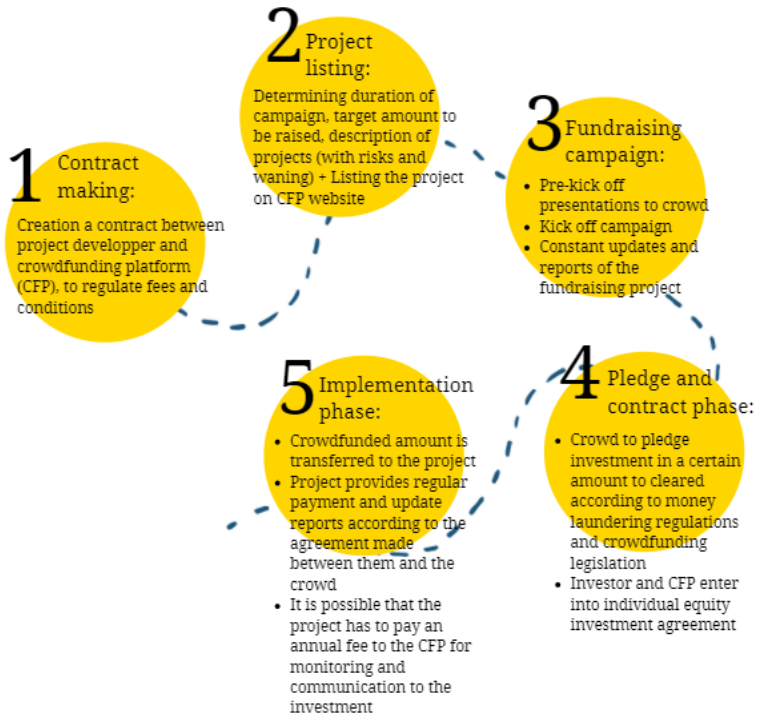


Figure 3. Step by step diagram of a crowdfunding financing schemeSource: von Ritter & Bley (2006)

What are the policy recommendations for improving cross-sectoral energy efficiency?

According to IEA (2011), the areas that need further development are as follows:

- Upgrade national energy efficiency strategies and action plans.
- Increase efforts in the financing, especially with the development of savings verification and

measurement protocols, and forming public-private partnerships.

- Expand efforts to stimulate risk-mitigation schemes, such as public-private partnerships.
- Increase quality and coverage of energy indicators.

References

Asian Development Bank. 2015. Business Models to Realize the Potential of Renewable Energy and Energy Efficiency in the Greater Mekong Subregion. [S.L.]: Asian Development Bank.

Asia-Pacific Economic Cooperation (APEC) Energy Working Group. 2009. Successful Business Models for New and Renewable Energy Technology Implementation in APEC. Final Report. http://www.egnret.ewg.apec.org/reports/Successful%20Business%20Models%20for%20New%20and%20Renewable%20Energy%20Technologies,%20Final%20Report,%20October%202009.pdf

Cochu, A., Glenting, C., Hogg, D., Georgiev, I., Skolina, J., Eisinger, F., Jespersen, M., Agster, R., Fawkes, S., Chowdhury, T. 2016. Study on the potential of green bond finance for resource-efficient investments. Luxembourg: Publications Office of the European Union. doi:10.2779/234777

Community Power. 2018. The Krk Island Energy Cooperative. Retrieved from: http://www.communitypower.eu/images/Giorgia/krk-Island-Energy-Cooperative.pdf

Copenhagen Centre on Energy Efficiency. 2015. Accelerating Energy Efficiency: Initiatives and Opportunities - Southeast Asia. Denmark: Copenhagen.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. 2016. CF4EE - Crowdfunding for Energy Efficiency: Can Debt or Equity Crowdfunding contribute to scaling up Energy Efficiency in Developing Countries? http://www.ieadsm.org/wp/files/2016-10-28-CF4EE-Feasibility-Study-final.pdf

Ernst & Young LLP. 2016. Green bonds: A fresh look at financing green projects. http://www.ey.com/Publication/vwLUAssets/Green_bonds-a-fresh-look-at-financing-green-projects/$FILE/EY-Green%20bonds-a-fresh-look-at-financing-green-projects.pdf

International Energy Agency (IEA). 2018. Retrieved from: https://www.iea.org/topics/energyefficiency/crosssectoral/

IEA. 2011. Implementing energy efficiency policy: Progress and challenges in IEA member countries. http://www.iea.org/publications/freepublications/publication/IEA_Scoreboard2011.pdf

Mango. 2010. Types of funding. https://www.mango.org.uk/Pool/G-Types-of-funding.pdf

REScoop. 2014. Handbook on Investment schemes for REScoop projects. https://uploads.strikinglycdn.com/files/7b5a2f25-445d-4cb3-924e-a2622749d3ed/Handbook%20on%20citizens%20RES%20investment%20schemes_version%204.pdf

Renewable Energy World. 2014. Top 5 Renewable Energy Crowdfunding Platforms. Retrieved from: https://www.renewableenergyworld.com/ugc/articles/2014/07/top-5-renewable-energy-crowdfunding-platforms.html

Topo, A., Moretta, S., Glorioso, C., and Panisini, A. 2014. Financial support mechanisms for distributed solar technologies and energy efficiency deployment in Mediterranean countries. MED DESIRE Project. MEDiterranean DEvelopment of Support schemes for solar Initiatives and Renewable Energies.

Trust EPC South. 2015. National Tertiary Sector Analysis: Fact sheets on best practice tertiary sector EE/RES applications. http://www.trustepc.eu/en/wp-content/uploads/sites/3/2015/11/151112_TRH_WP2_D2-1_Best-practice-factsheets.pdf

Wohlfarth, K., Eichhammer, W., Schlomann, B., & Worrell, E. 2018. Tailoring cross-sectional energy-efficiency measures to target groups in industry. Energy Efficiency, 11(5), 1265-1279. doi: 10.1007/s12053-018-9619-7

World Bank Group. 2014. Guidance note: Establishing and Operationalizing an Energy Efficiency Revolving Fund. https://openknowledge.worldbank.org/handle/10986/20043?locale-attribute=en

PROSPECT+

The PROSPECT+ project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023271