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D6.7 - Financing Solutions for Cities and City Suppliers

WP6, Task 6.4

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17/11/2021	V1	R2M Solution	CAR, DEM	Cross-review of D6.7
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List of definitions, abbreviations and acronyms

Acronym	Description
BSTDB	Black Sea Trade and Development Bank
CF	Cohesion Fund
DG Clima	Directorate General for Climate Action
EAFRD	European Agricultural Fund for Rural Development
EBRD	European Bank for Reconstruction and Development
EE Quest	Energy Efficiency Quick Estimator
EEEF	European Energy Efficiency Fund
EFSI	European Fund for Strategic Investment
EIB	European Investment Bank
EIB-R	European Initiative for Building Renovation
EIP	European Innovation Partnership
EIP-SCC	European Innovation Partnership on Smart Cities and Communities
EMFF	European Maritime and Fisheries Fund
EPC	Energy Performance Contract
ERDF	European Regional Development Fund
ESCO	Energy Service Company
ESF	European Social Fund
ESIF	European Structural Investment Funds
GEFF	Green Economy Financing Facility
IFI	International financial institution
NGEU	Next Generation EU
PEB	Positive Energy Block
PED	Positive Energy District

PF4EE	Private Finance Instrument for Energy Efficiency
PPP	Public Private Partnership
SCC	Smart Cities and Communities
SEFF	Sustainable Energy Financing Facilities
SET Plan	Strategic Energy Technology Plan
SPV	Special Purpose Vehicle
WP	Work Package

Executive Summary

A **financial toolbox** is a set of pathways for replication of bankable MAKING-CITY solutions and reducing the financial risks to give confidence to investors for investing in large scale replication. There are two types of necessary investments for large-scale replication of MAKING-CITY results. The cities need capital to invest in new infrastructure by purchasing solutions from suppliers. The suppliers need to invest in product and service development as well as in competence and human resources. In this toolbox we address both types of investments by building and adapting the most suitable financing solutions.

Within this **financing solutions** deliverable we will adapt and implement a set of financial models for cities investing in large-scale replication. Furthermore, we will re-use current State of the Art financial toolbox and networks including: Financial instruments for large scale investments as Structural funds, EIB's and similar, Pension funds, Public Private Partnerships (PPP), innovative Public People Private Partnership (4P), city bonds, etc., as large-scale investments mapping of all structural investment funds in Europe.

The methodology used to develop the financial toolbox primarily focused on gathering data in order to identify financial models and investment strategies and map of financial providers. Due to the complexity of the project (level of innovation, number of partners, duration and covid-19 crisis), an adjustable approach mindset has been adopted, allowing to conduct different steps of the methodology in parallel, as follows:

- *Methodology to map financial models*
  - **STEP 1 Mapping the types of projects that cities/city suppliers are interested in**
  - **STEP 2 Partners invited to address existing financial models in their cities/countries**
  - **STEP 3 Filtering and categorisation of financial models based on project types, their scale and existing case studies**
- *Methodology to collect financial providers*
  - **STEP 4 Collection of financial providers suited for each financial model and development of a database**
  - **STEP 5 Partners invited to introduce financial providers active in their cities/countries**
  - **STEP 6 Refinement of database based on the introduced national/local providers**

Through interactions with city and city supplier partners that are delivering the innovations, a list of financial models is mapped and reported. Starting from step 1 – 3, different infrastructure, product and service development project types that cities and suppliers need capital to invest in them are identified. Later various investment strategies were mapped based on optimisation and effectiveness of their relevant models. Selection of effective models and filtering them accordingly is carried out based on the type, scale and case studies that could be associated to each one of them. The filtering process is critical in order to make replication of MAKING-CITY results profitable and attractive to public and private investors at international, national or local level.

Additionally, steps 4 – 6 embody a similar approach for collection of financial providers. Within these steps, a database consisting of a list of international, EU level, national and/or local providers is developed (see online database). In which contribution of consortium partners in the form of introducing national providers (i.e. commercial banks, investment funds, etc.) has complemented the initial version and supported us in the selection and refinement process of the most relevant ones.

The proposed "financial toolbox", described in chapter three of this deliverable and demonstrated in Figure 1, is envisioned to reinforce city municipalities and suppliers with bankable MAKING-CITY solutions through offering them a collection of active necessary funding programmes and financing sources both in the private and public domains.

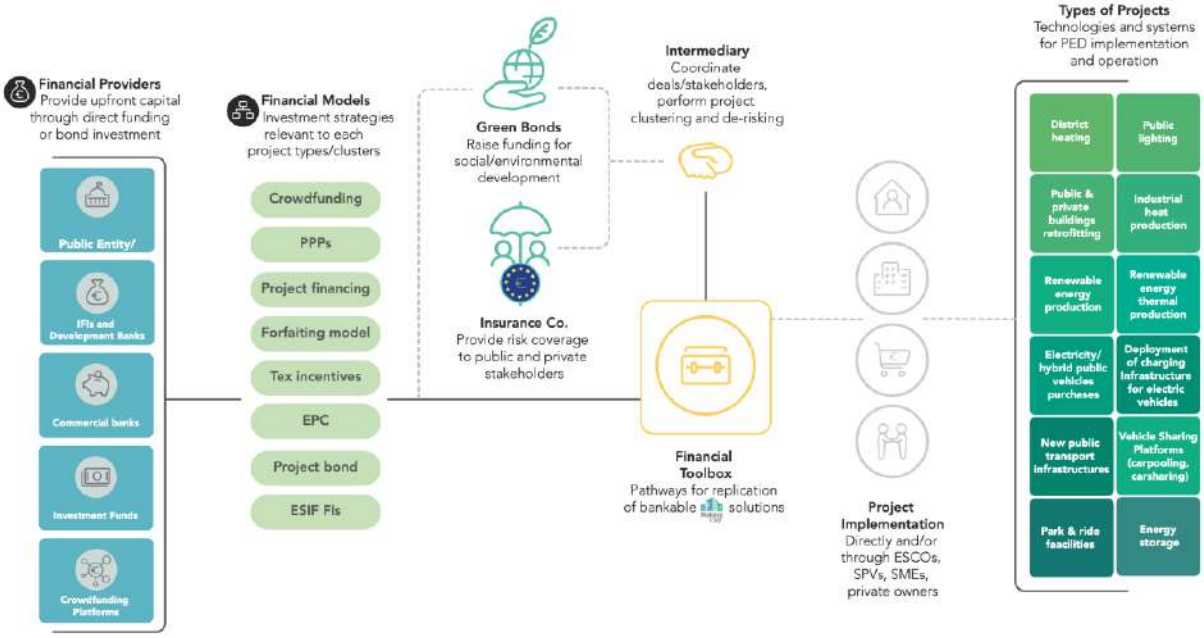


Figure 1 Proposed financial toolbox (Based on V. Cimini et al. 2019)

Through this toolbox, players active in each lighthouse and follower city engaged in the project, local, national and global stakeholders accompanied by some prospective players active in the EU level who share a common effort towards the energy transition in city districts, while considering sustainability aspects and their adaptation to different socio-economic contexts can be identified.

The toolbox supports cities and suppliers in establishing and elevating financial solutions to invest in energy transition facilities and services. Public entities establish regulations by planning and sharing investments which results in the increase of social responsibility for all the involved stakeholders.

Keywords

Financing Solutions, Replication, Bankable Solutions, Financial Toolbox, Business Model, Investment, Positive Energy District, Smart City

1 Introduction

1.1 About the MAKING-CITY project

1.1.1A H2020 project based on the PED concept

Launched in December 2018 and coordinated by the CARTIF Technology Centre, MAKING-CITY addresses and demonstrates advanced procedures and methodologies based on the Positive Energy District (PED) concept for 60 months.

A PED is defined as "a district with annual net zero energy import and net zero carbon emissions, working towards an annual local surplus production of renewable energy" in the European Strategic Energy Technology Plan (SET Plan). Derived from the Positive Energy Block (PEB) definition established by the European Innovation Partnership on Smart Cities and Communities (EIP-SCC), a PED is a delimited urban area composed of buildings with different typologies and public spaces where the total annual energy balance must be positive. Therefore, the district will have an extra energy production that can be shared with other urban zones. The total energy balance is the energy taken from outside the district minus the energy delivered inside the district. In line with the previous definitions, MAKING-CITY has adopted the following definition of a Positive Energy District: "A Positive Energy District is an urban area with clear boundaries, consisting of buildings of different typologies that actively manage the energy flow between them and the larger energy system to reach an annual positive energy balance". Error! Reference source not found.

Even if all energy carriers can be considered as potential energy inputs and/or outputs, only primary energy units make a suitable calculation of energy flows to establish the total energy balance. Finally, achieving PEDs means that the amount of energy delivered by the district must be higher than the amount of energy supplied from outside.

1.1.2Energy transition towards a City Vision 2050

For a successful PED implementation, the MAKING-CITY project is considering a series of key sectors and applications which will ensure a long-term vision for energy transition. A structural shift from a system mainly based on finite energy sources such as fossil fuels, towards a system using more renewable energy sources is considered as energy transition. This significant change also leads to a better management of energy demand in addition to an increase of energy efficiency.

Currently, city energy plans for energy transition are designed within a 2030 horizon, which can be considered as a mid-term strategy (part of the 2030 Climate & Energy Framework in Europe). Nevertheless, learning from the past to plan the future of cities for more than the next few years appears to be a real need. In MAKING-CITY, the City Vision 2050 is used as a longer timescale to address the urban energy system transformation towards low-carbon cities, bringing appropriate energy planning tools as well as reconsidering municipal organisation (creation of City Planning Offices for instance).

The implementation and/or replication of the PED concept developed by the MAKING-CITY partners include the following applications, besides the social innovation and citizen engagement activities organised in the cities:

- Initiate retrofitting buildings to maximise infrastructure performance;
- Increase renewable sources to produce self-sufficient green energy,
- Design, adapt and upgrade heating and cooling systems,

- Deploy storage & transfer systems to anticipate energy demand peaks,
- Set up public charging stations to boost electric mobility.

They are applied in two Lighthouse cities, Groningen (NL) and Oulu (FI), and 6 Follower cities, Bassano Del Grappa (IT), Kadikoy (TR), Leon (ES), Lublin (PL), Trenčín (SK) and Vidin (BG).

The technologies selected in the project are mature or already on the market.

1.2 Purpose of this report and target group

The present deliverable is the project's final financing solutions report and is due for M36, November 2021.

It aims at delivering a financial toolbox and investment strategies that support public procurement programs based on bundled replication programs and it consist of a mapping of financial providers for cities and suppliers focused on MAKING-CITY countries: Bulgaria, Finland, Italy, Netherlands, Poland, Slovakia, Spain and Turkey. In addition, financial providers from other countries may be considered if discovered to be relevant.

In the first phase, activities focus on identifying and mapping financial models have been carried out. Furthermore, in the second phase list of providers is collected and a database has been developed.

The target group of this public deliverable includes:

- MAKING-CITY partners, especially those involved in investment strategies/financial models, and more generally in replication activities,
- Other Smart Cities and Communities (SCC) projects,
- Every stakeholder interested in business model concepts applied to districts and cities.

1.3 Contributing partners

The main author of this deliverable is R2M Solution (WP6 leader).

R2M Solution contacted all project partners to collect exiting financial providers in their cities which can be found in the online database.

1.4 Relation to other activities in the project

The present deliverable D6.7 is part of the work package 6 (WP6) of the MAKING-CITY project "Exploitation and Business Models".

As depicted in Figure 2, WP6 is structured along two main workstreams:

- Business modelling workstream (left-hand side of Figure 2): the purpose of this workstream is to identify and develop business models adapted to the PED specific concept. Starting with the identification of stakeholders involved in PEDs and an analysis of their interactions (D6.1) Error! Reference source not found., a PED-readiness evaluation tool will be developed (D6.2) and used to conduct a market analysis (D6.3). A method for municipalities to adopt efficient innovation management practices and increase their PED-readiness levels will be proposed (D6.6), as well as a set of financing solutions for PEDs (D6.7). The outcomes of the workstream will be captured into a business model implementation handbook delivered at the end of the project in order to enable cities to successfully implement MAKING-CITY business models (D6.4).
- Exploitation workstream (right-hand side of Figure 2): the purpose of this workstream is to identify the project's exploitable results and in particular the KEY exploitable results; and for

each of them, develop an exploitable plan (D6.8 and D6.10), IP arrangements (D6.5) and a business plan (D6.9 and D6.11).

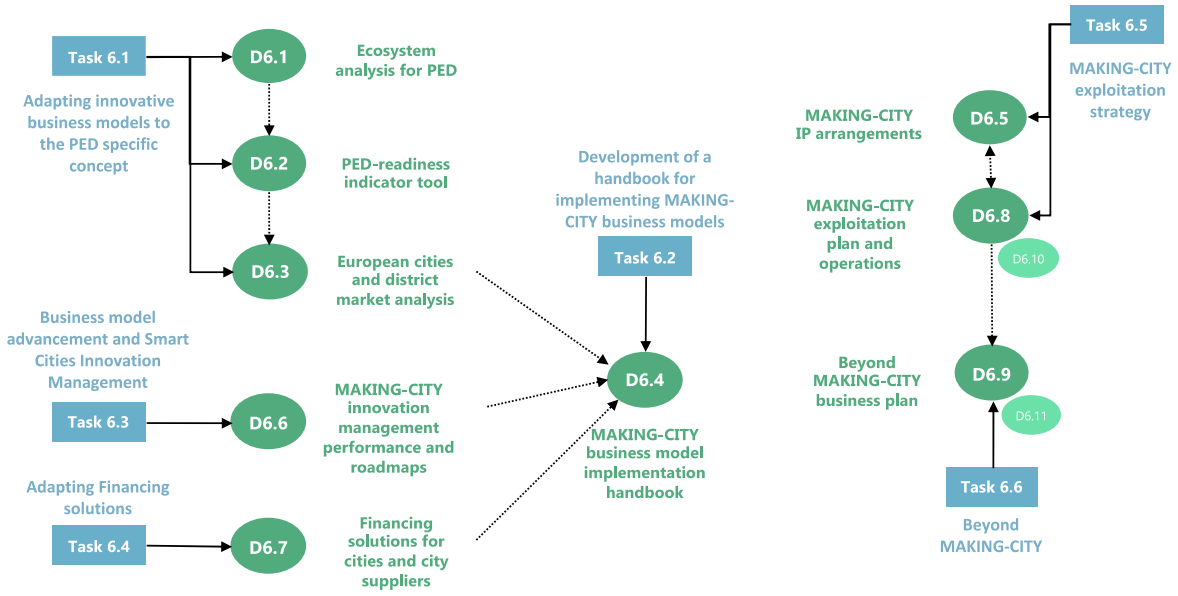


Figure 2. Detailed relations between WP6 tasks and deliverables

Given its cross-cutting nature, WP6 is linked to all other WPs in the project, as illustrated by Figure 3. WP6 intends to support and serve other WPs towards effective delivery and exploitation of the project's results.

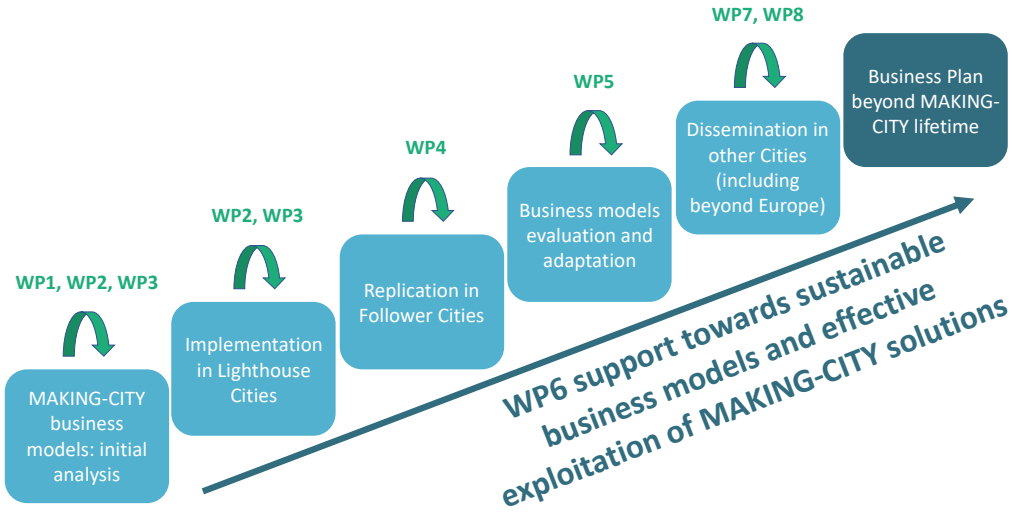


Figure 3. Activities in WP6 and links with other MAKING-CITY WPs

2 Methodology

The aim of Task 6.4 is to deliver a financial toolbox adapted for cities replication of MAKING-CITY solutions and investment strategies that support public procurement programs based on bundled replication programs. The general and cross-sectional methodology for this task includes two main areas.

- *Methodology to map financial models*
  - STEP 1 Mapping the types of projects that cities/city suppliers are interested in
  - STEP 2 Partners invited to address existing financial models in their cities/countries
  - STEP 3 Filtering and categorisation of financial models based on project types, their scale and existing case studies
- *Methodology to collect financial providers*
  - STEP 4 Collection of financial providers suited for each financial model and development of a database
  - STEP 5 Partners invited to introduce financial providers active in their cities/countries
  - STEP 6 Refinement of database based on the introduced national/local providers

The main activities on map and identification of the investment strategies/financial models and financial providers are carried out integrating the above two methodological approaches.

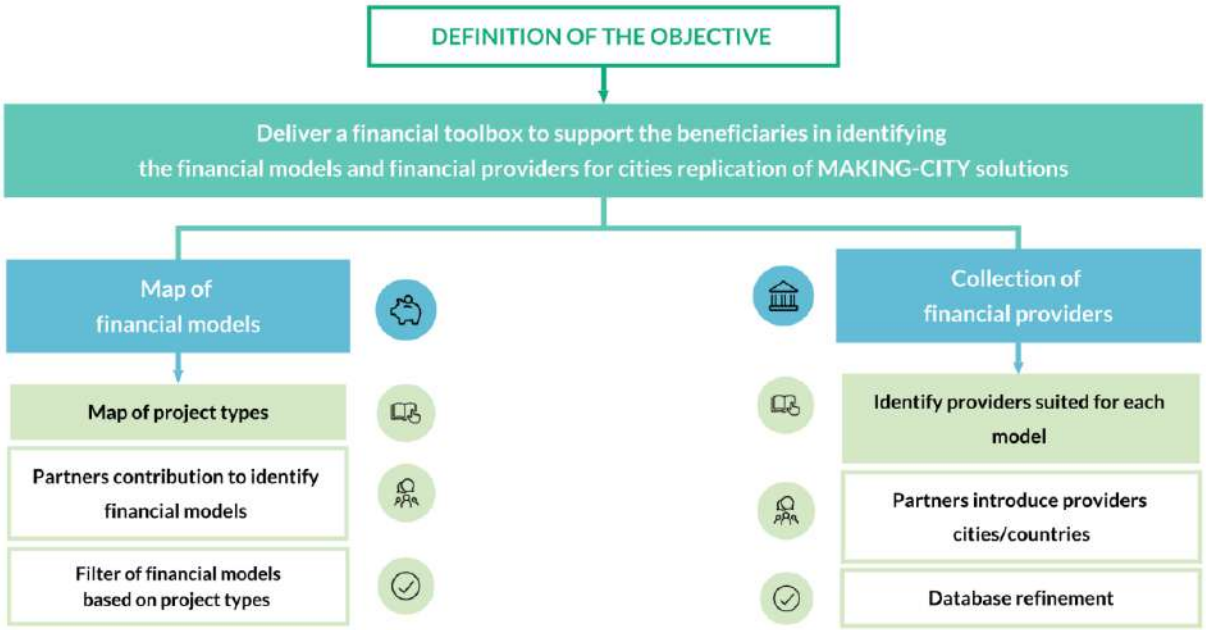


Figure 4. Methodology carried out

- Map/identification/characterisation of financial models:
  - By working team's experience on different projects in the field of energy transition and smart cities targeting at identification of inventive financing models and instruments.
  - Question to answer: what are the most common investment strategies/financing models in practice for cities replication of MAKING-CITY solutions? To what extent do these strategies support the replication solutions?

- Goal: to map and identify dominant investment strategies/financing model for each replicated solution and affiliating and selecting funding sources that are relevant to the project's solutions criteria and characteristics.

- Collect/identification/characterization of financial providers:
  - By developing a database and collect partners contribution and further analyse the results.
  - Question to answer: who are the entities that offer funding sources for replicating MAKING-CITY solutions? How are they relevant and what are their characteristics?

2.1 Desk research & analysis: Definition of funding sources available in Europe

In order to perform the mapping process for the existing funding sources and financial providers in the EU, a generic desk analysis on the definition and clustering followed by development of a database is executed.

Initiating with a standard data collection activity, the conducted tasks are categorised as below.

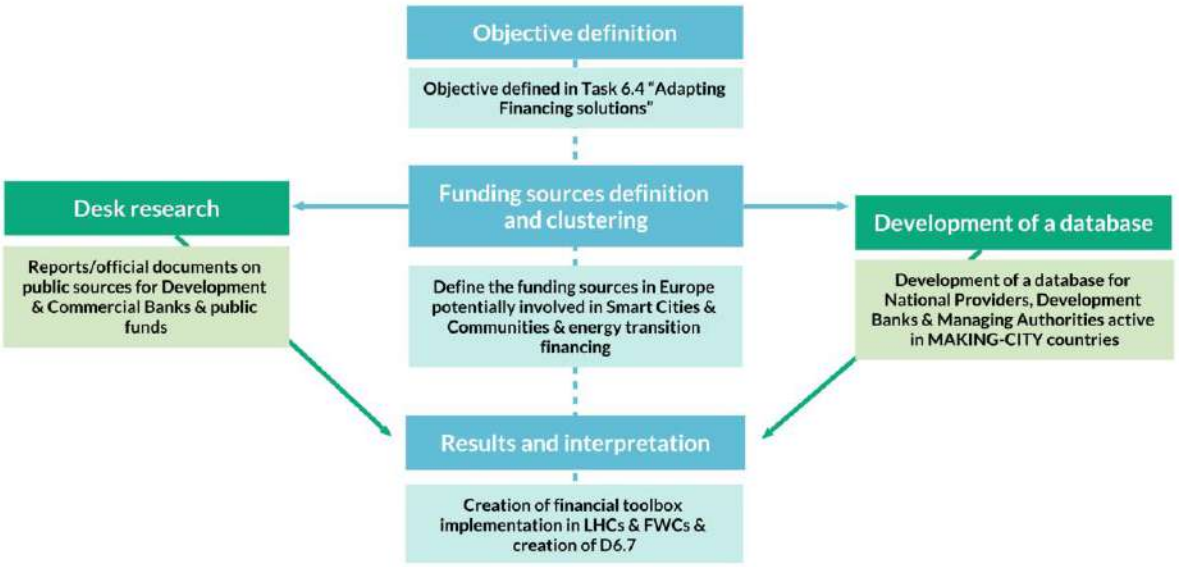


Figure 5. Data collection tasks and descriptions

The identification of the funding sources available in Europe and clustering them is executed based on the providing bodies. Furthermore, the identification procedure is operated based on desk research and general rationale of distribution of this funding sources across Europe, recognition and classification of the providers by tracking the funding sources.

The general methodology carried out to identify and cluster funding sources is illustrated below.

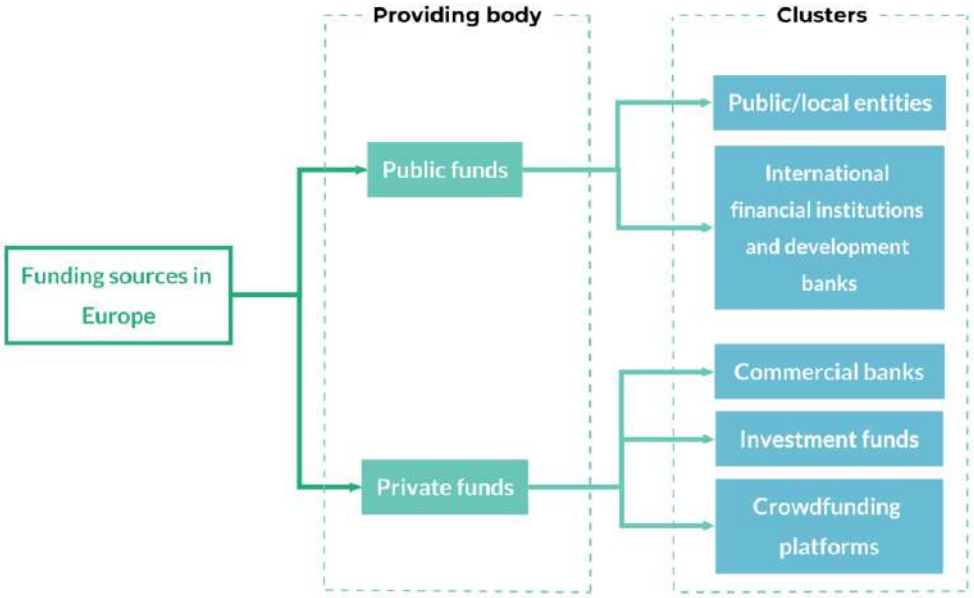


Figure 6. Identify and cluster of funding sources in Europe (Based on M. La Russa et al. 2020)

2.2 Desk research & analysis: Clustering of funding sources available in Europe

To map the existing funding sources in Europe for replication of bankable MAKING-CITY solutions, actions which address both types of investments by building and adapting the most suitable financing solutions are executed. These actions not only reduce the financial risks, but also encourage the investors in investing in such large-scale replication projects.

- The cities need capital to invest in new infrastructure by purchasing solutions from the city suppliers.
- The city suppliers need to invest in product and service development as well as in competence and human resources

Aiming to define and cluster the funding sources, identification, refining and selection of the providers are the next steps. Primarily the financial provider sectors with interest in Smart Cities and Communities (SCC) projects, Positive Energy District (PED) and Positive Energy Block (PEB) financing in both public and private bodies will be identified.

For the providers from public sector all the public funds that invest either independently or in collaboration with private sectors will be identified and clustered. Providing bodies from public sectors include public and local entities and funds provided by managing authorities. These funds are provided in the form of loans or contributions beyond any financial instruments. International financial institutions (IFI), development banks and commercial banks are other public sector providing bodies which concentrate on financing lines and instruments which are aligned with public resources in nature. The two clusters driven from private sector providing bodies, investment funds and crowdfunding platforms are exclusively providing from private resources independent from any public funds.

As seen in Figure 5, data collection tasks and descriptions, after the primary step of defining the objective, one of the steps that assists the process of defining and clustering the existing funding sources in Europe is the development of the database to select relevant financial providers. To cover

both public and private bodies, partners are contacted for contribution to refine the list of providers for focused desk research.

- Public and local funds by managing authorities, public funds within SCC projects are crucial in terms of both national and EU targets. These resources have the potential to motivate private bodies in investments. Such funds are divided into European, national and local levels. Within the bounds of data collection methodology to map public funds financial instruments, selected public providers are target of desk research.
- International financial institutions and promotional and national development banks, as one of the clusters under public funds, IFIs and development banks have contribution to sustainable economic development and operating collectively with the EU and national policies as part of their roadmap. Sustainable development growth of EU countries and addressing their financial tools to public and private entities are part of their objectives. The European Investment Bank (EIB) is among one of them which has its activities focused on energy efficiency related themes and it has been performing activities in cooperation with the European Commission on the same area. The corresponding data collection method from this financial instrument cluster is development of database and desk research on relevant case studies.
- Commercial banks, as entities which manage public platforms in place of national or local managing authorities, were target of desk analysis. Furthermore, financial instruments within the European Structural Investment Funds (ESIF), Green Economy Financing Facility (GEFF) and other products of Commercial Banks have been a target area for further analysis.
- Investment funds, this cluster's type varies and covers a wide range of funds. Private equity funds, real estate funds and infrastructure funds are among this category and each one's investment time horizon differs. Given, the infrastructure funds being more prevailing within energy transition projects with concept similar to MAKING-CITY, it is among the selected financial providers to be targeted for data collection through desk research and partners' contribution. As these types of funds are capital-intensive, they are usually supported by public sectors through public private partnerships (PPPs).
- Crowdfunding platforms, aiming at developing project funding through sources provided by the citizens, these platforms are designed to not only grant the providers with financial returns but also through the project's tangible results. This cluster will be targeted by desk research and partners' contribution.

Following defining and clustering of the funding sources, refining step intends to identify the most admissible and correlated financial provider within each cluster. In this regard, the table below aims at summarising the funding source platform which its data is collected and analysed.

Table 1. Summary of the sources for collected data (Based on M. La Russa et al. 2020)

Provider cluster	Funding source platform
Public/local entities	• EU official website • EU facsheets, publications, communication
Development banks	• Consortium members direct contacts • European Investment Bank • European Commission reports
Commercial banks	• European Investment Bank • European Bank for Reconstruction and Development (Intermediaries) • Green Economy Financing Facility (GEFF) • Fi-Compass platform
Investment funds	• InfraMation • Prequin • Consortium members direct contacts
Crowdfunding platforms	• Crowdfunding and the Energy Sector report • Citizenergy

The funding sources have been selected based on the following criteria:

- Country of operation: only EU-based providers with operation within the countries with MAKING-CITY project's lighthouse and following city will be selected.
- Target sector: only providers with operation on investment strategy focused on the energy sector within smart cities and communities, energy transition and sustainable economic development were selected.
- Energy transition and financial instrument: only financial instruments, models and strategies with focus on energy transition sector are selected.

Table 2. Selection factors for each funding source

Financial providers	Country of operation	Target sector	Energy transition/sustainable urbanisation related financial models
Public/local entities	○		
Development banks	○		
Commercial banks	○		○
Investment funds	○	○	
Crowdfunding platforms	○	○	

The process of collecting data through the analysing outcomes of the database is implemented upon applying these methods to public and local entities, investment funds, crowdfunding platforms, EU and national development banks. Once collected, desk analysis is executed in order to map the financial instruments offered by international financial institutions, development banks and public entities. This analysis along with desk research on relevant case studies on collection of information

3 Financial toolbox

3

Are you a city supplier active in one of the Making City lighthouse or follower cities?

- Do you need to invest in product/service development or human resouces?
- Which financial models cover the domain which you want to invest in?
- Find the suitable financial models depending on the project you want to invest in.

1

Which country are you operating in?

- Only EU-based providers
- Operation in the Making City countries
- The investment targets cover countries with a specific focus on Smart City projects (e.g. The Netherlands, Finland, France, Italy)

A Slovakian energy community active in areas of energy in built environment, green building design, energy efficiency and management, wants to deploy new energy concepts in the area of renewable energy electricity production and needs capital.

2

Are you a city/municipality?

- Do you need capital to invest in new infrastructure or renovate an existing one?
- Do you want to purchase solutions from suppliers active in relevant domains?
- Which financial models and providers are suited for your type of project?
- Find the suitable financial models depending on the project you need investment for.

A municipality in Poland, wants to invest in smart district lighting and is looking for secure investment.

Applicable Financial Models

Applicable Financial Models

- The main selected financial provider for the Polish municipality's smart district lighting project is through public entity/managing authority.
- The financial provider of Slovakian energy community's deployment of new energy concept project is crowdfunding platforms.

5 Associating the suitable financial provider(s) to each model involves 3 main steps

- **Provider cluster identification** within the sectors with interest in Smart Cities and Communities (SCC), Positive Energy District (PED) projects, financing in both public and private bodies
- **Provider refining** screening the most relevant provider in each category, collecting data from internal databases and high standing sources
- **Provider selection** according to the domain of the project

- Are you looking for a model based on direct lending and/or equity holding tools?
- Identify financial models best fitted for the category of the project you need investment for or want to invest in
- Eliminate financial models with irrelevant sizes
- Select the applicable financial models based on the provider which brings collective and individual benefits for your Smart City project

4 Are you looking for a financial model based on direct lending and/or equity holding tools?

- Public Private Partnership is the selected financial model by the Polish city municipality due to its relevant size.
- Crowdfunding is the Slovakian energy community's selected financial models.

Reference:
New Energy Solutions Optimized for Islands (NESOI). Deliverable 1.5, Mapping of Financial Instruments. (2020). Retrieved March 2021.

Visual reference:
Citron inforgraphics. (2021). Retrieved March 2021 from www.citron.io

A **financial toolbox** is a set of pathways for replication of bankable MAKING-CITY solutions and reducing the financial risks to give confidence to investors for investing in large scale replication. There are two types of necessary investments for large-scale replication of MAKING-CITY results. The cities need capital to invest in new infrastructure by purchasing solutions from suppliers. The suppliers need to invest in product and service development as well as in competence and human resources. In this toolbox we address both types of investments by building and adapting the most suitable financing solutions.

Through this toolbox a series of questions are asked in order to direct each energy transition project to the relevant provider:

4.1 Are you looking for a basic financial model?

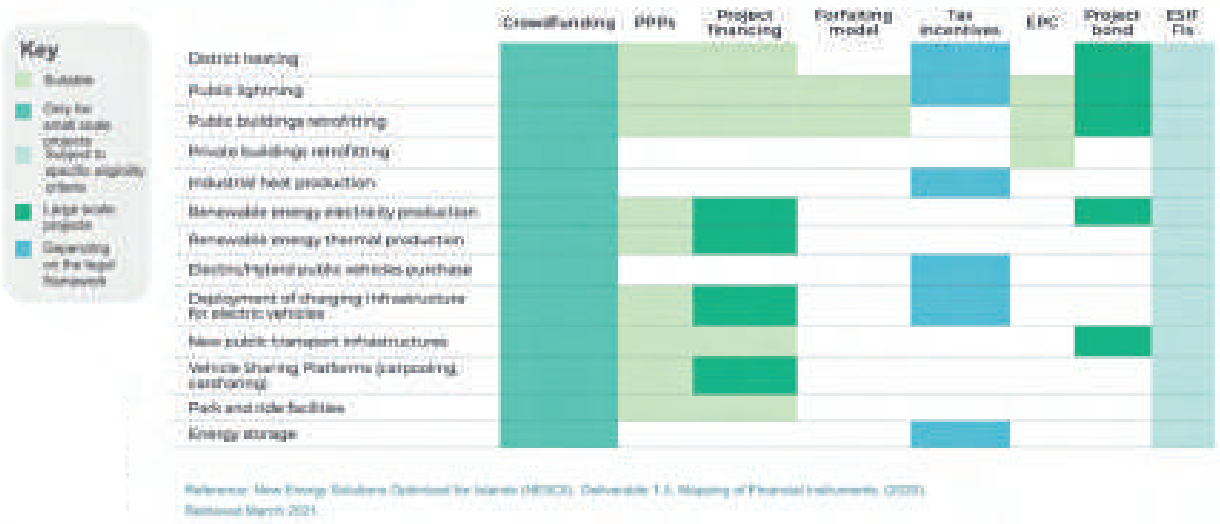
Are you looking for a model based on direct lending and/or equity holding tools?

Identify financial models best fitted for the category of the project you need investment for.

Eliminate financial models with irrelevant sizes.

Select the applicable financial models based on the provider which brings collective and individual benefits for your Smart City project.

4.2 Which financial models and providers are suited for your type of project? Find the suitable financial models depending on your project



5.1 Associating the suitable financial provider(s) to each model involves 3 main steps:

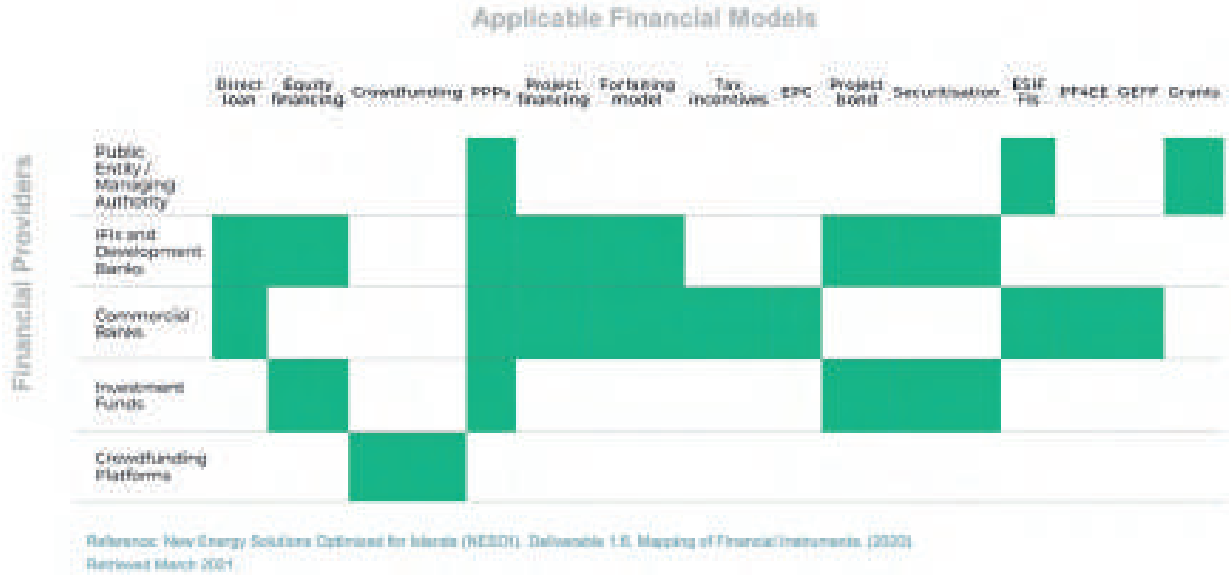
Provider cluster identification

Provider refining

Provider selection

within the sectors with interest in Smart Cities and Communities (SCC), Positive Energy District (PED) projects, financing in both public and private bodies	Provider selection according to the domain of the project	Provider selection according to the domain of the project

5.2 Select the applicable financial provider based on the model which brings collective and individual benefits for your Smart City project.



Reference: New Energy Solutions Optimised for Islands (NESOI). Deliverable 1.6. Mapping of Financial Instruments. (2020). Retrieved March 2021

The proposed "financial toolbox", described in this chapter, is envisioned to reinforce city municipalities and suppliers with bankable MAKING-CITY solutions through offering them a collection of active necessary funding programmes and financing sources both in the private and public domains.

Regarding the financial providers, the type of relevant provider for each project varies in different countries depending on the financing tools that each MAKING-CITY has access to. As an example, Norway grants as a strong financing tool that covers energy related projects in Europe, is only available for some Eastern European countries; therefore, some of the MAKING-CITY follower cities are expected to benefit from such. While financial models such as crowdfunding platforms can be expected to fill the gap for wealthier nations, as citizen driven contributions are higher in those countries.

Although public authorities have a leading role in investment plans within energy transition projects, the proposed financial toolbox intends to empower Public Private Partnerships (PPP) as a tool to implement public driven policies in order to supply public energy services. Furthermore, this toolbox aims to clarify the role of various involved stakeholders such as: Policy makers and public authorities, Energy projects executing companies and ESCOs, Private investors (commercial banks, insurance institutions, etc.) and the citizens, within the functioning scheme of each model.

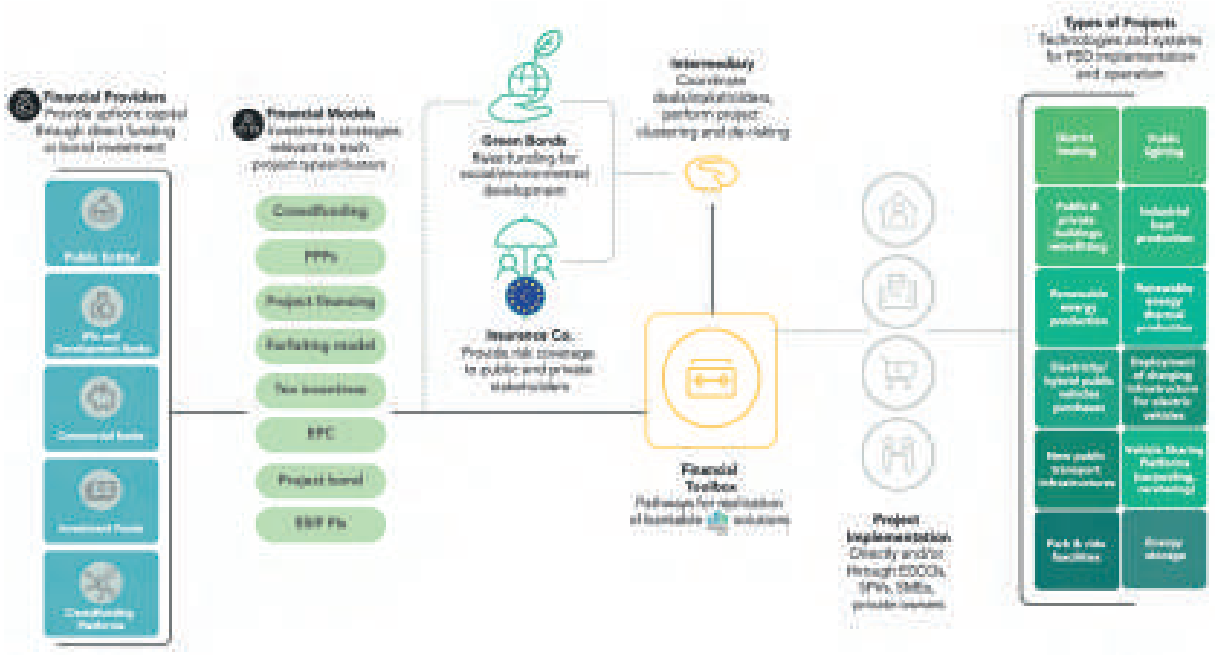


Figure 8 Proposed financial toolbox and relevant stakeholders for implementation of PED (Based on V. Cimini et al. 2019)

Commonly, the terms PPP, Private investment and Crowd funding are used interchangeably by different entities and stakeholders in this context. It is important to note however, that they each of them have a different outlook on the characteristics on those models. One of the features of the toolbox is to highlight how in smart cities public authorities involve private investors through different means such as citizens engagement. Public authority provides the private investor with the chance to invest in standard infrastructure development. Hence, the investments are considered with a joint concept as the public authority entity supports the investment and the private investor carries out the foreseen business.[1]

Moreover, the toolbox foresees the role of intermediary/investment advisors as influencers on the functioning level of financial models. Such specialists who aim to coordinate and support the stakeholders to plan financial investments are key actors for the promotion of financial products services. Evidence for in support of the role of intermediary advisors, was found during an interview carried out with EnerSaveCapital an advisor acting as an intermediary entity that supports different stakeholders/firms' development in the energy savings related projects by providing advice, private equities and securitisation services.[2]

Each of these points make an important contribution to our understanding of the toolbox that targets the application of innovative investment processes with non-conventional financing instruments that could be used by suppliers and local governments to invest in MAKING-CITY solutions and future energy transition investment projects.

[1] V. Cimini, F. Giglio, G. Carbonari. (2019). City ExChange Deliverable 2.4 – "Report on Bankability of the Demonstrated Innovations". City ExChange Project.

[2] https://enersavecap.com/

The toolbox highlights the development of smart city and sustainable urbanisation projects, not only on the planning side but also in regard to the identification of the most suitable funding sources for planned investments.

3.1 Financial models

There are various financial models with diverse features available to support energy transition projects, structured to support specific project types and clusters. Each financial model is classified by two basic tools of direct lending and equity holding. In this chapter we primarily will introduce the characteristics of each tool such as the applicability and key points, main features, definition, functioning scheme, national case studies and the relevant providers involved in within each model. Furthermore, we present the various systems to integrate each of them that results in the development of each model. The combined models contain different smaller entities that can be adapted and applied to various socio-economic circumstances depending on the project type in each context.[3]

Although energy transition and sustainable projects result in major benefits for both the individual and the community, the search for the primary funding can be a major obstacle in achieving those benefits. Hence, finding suitable funding sources in energy infrastructure facilities and services requires an important contribution of both public authorities and social duty of other involved actors.

Presently, there is a limited amount of data concerning the financial models that have the potential to be utilised by energy transition project promoters. Thus, the following chapter intends to deliver a comprehensive prospect of available possibilities in order to support further decision-making processes on funding sustainable urbanisation and energy transition projects.

3.1.1 Basic financial tools

3.1.1.1 Direct Loan

Regardless of scale, credits and loans are among the famous modes of financing an energy transition project. Such forms are available to cities and suppliers depending on the balance sheet (capitalisation and level of indebtedness) of the recipient company. Despite Banking lending being accessible to both private companies and public promoters, it is restricted to some extent for public entities due to regulations that limit the scope that a public body can be financed by banks and requires them to respect strict balance restriction when it comes to indebtedness. Furthermore, projects implemented by newer companies, despite their growth potential might not be eligible for this form of lending as they hold a smaller credit history. Such is due to this factor along with current level of solvency being important parameters for eligibility of being receivers of lending in the eyes of the banks regardless of expected cash flows and future growth of the developed project.

An equally significant aspect of this form of financing is how some banks offer special loans targeting energy related projects such as: energy efficiency loan, loans for the use of renewable energy sources, etc.

[3] M. La Russa, A. Martinez, A. Montanelli, E. Palmarin, S. Dourlens-Quaranta. (2020). NESOI Deliverable 1.5 – "Mapping of Financial Instruments". NESOI Project.

Direct financing has larger impacts in areas where the upfront costs are higher such as deep renovation projects. Commercial banks' direct loans for energy renovations, which are often unfamiliar with such investments, are seen as high-risk. As a result, the conditions may not be competitive, or credits may be rationed for projects.

Direct loans provided by International Financial Institutions, National Development Banks or Commercial Banks with specific programs, on the other hand, might have a lower interest rate than a conventional loan. Also, the repayment period is roughly equal to the return period calculated based on expected energy savings.

Overall, banking lending is a practicable way for private companies holding a solid credit history with business lines that are already established looking for finance for their projects. Projects should also consider that, banking funds in general can be utilised to partially fund them, with having grants or subsidies as other funding modes.

4 FINANCIAL MODELS

Direct Loan

APPLICABILITY & KEY POINTS

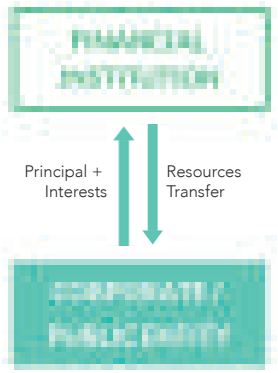
- Quick and easy financial model to implement
- Suitable for sound and solid companies
- Suitable for mature business lines
- No key competences required to implement
- Availability of specific credit lines for energy efficiency investments

MAIN FEATURES

- **MATURE BUSINESSES** — Good opportunity for private companies with solid credit history and mature business line
- **ENERGY PROJECTS** — Some banks offer specific loans to energy projects
- **UPFRONT COSTS** — Effective in cases where there are high upfront costs
- **LESS COMPETITION** — Commercial banks direct loans are perceived as high-risk investments and this reduces competition
- **LOWER INSTEREST** — Direct loans with specific programmes may have lower interest rate than conventional loans
- **GRANTS & SUBSIDIES** — Banking funding is used to finance a portion of the project and are complemented with grants and subsidies

DESCRIPTION	One the most well-known forms of financing for small- and large-scale projects	Access for private companies and public promoters	Less opportunity for public entities due to strict balance restrictions	Projects by newer companies have limited access to banking-lending due to less credit history

FUNCTIONING SCHEME



CASE STUDY

In early 2021, the Bankia loan was decided to be used to fund energy efficient programs largely sponsored by Spanish homeowner associations. The approximate proposed EIB finance for this direct loan is equal to EUR 5 million and the total cost is approximately EUR 40 million.

This activity aims to benefit the environment by assisting programs that decrease energy demand and aid in the mitigation of climate change. Specific projects to be funded are modest in scale and are intended to have few negative environmental consequences. An environmental impact assessment (EIA), as defined by the EIA Directive 2011/92/EU, is usually not necessarily due to the size, location, and existence of the sub-projects.

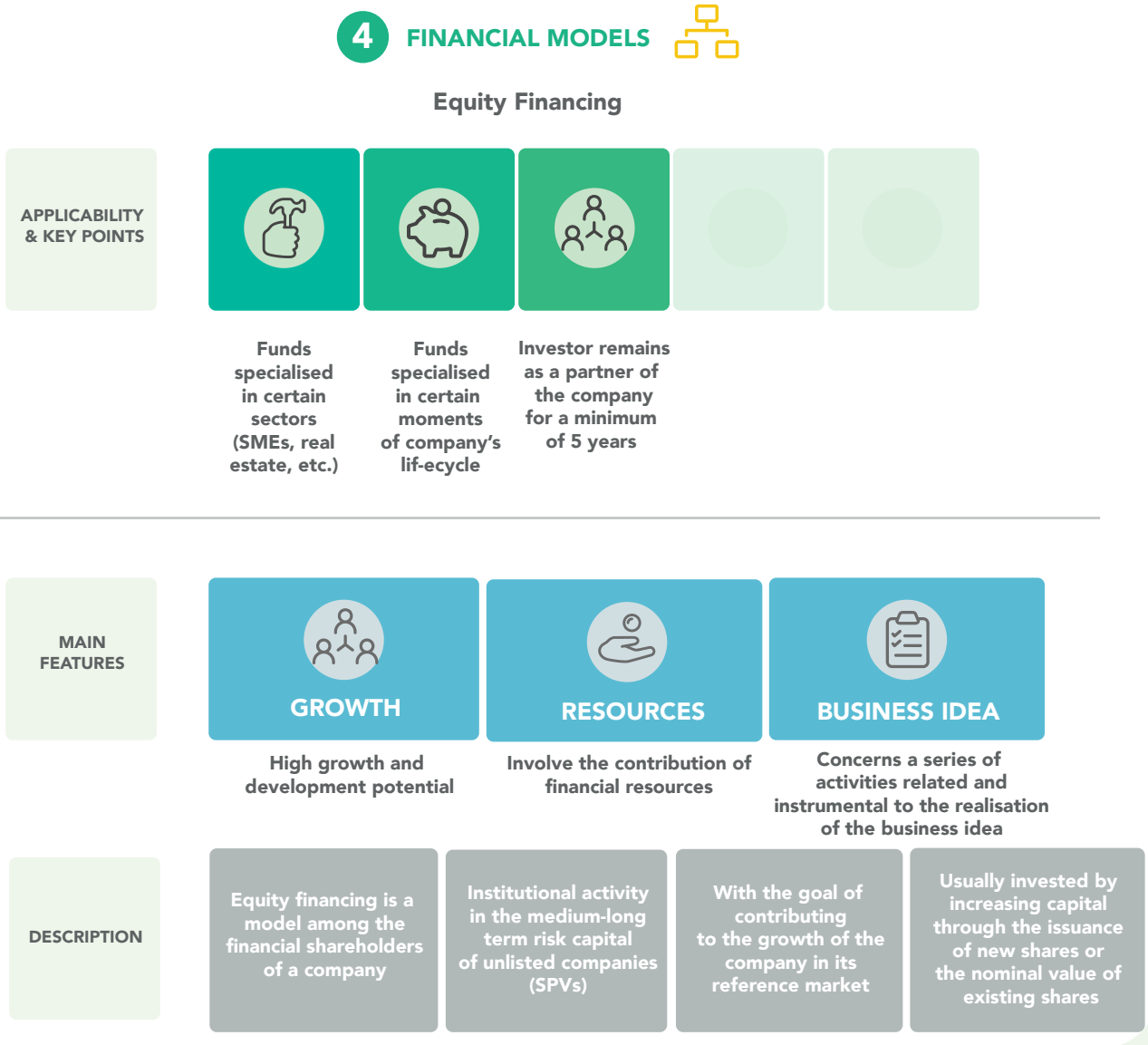
The Bank assessed the Financial Intermediary's capacity and processes for ensuring individual scheme conformity with national and European environmental and biodiversity legislation, as well as its ability to promote the Bank's Voluntary Disclosure Policy, which seeks to make environmentally related knowledge more accessible to the public.

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL	IFIs and Development Banks	Commercial banks		
	• International financial institutions • National and local promotion banks • Development banks	In energy sector, the most relevant instrum-ents available by commercial banks are: • PF4EE – Private Finance for Energy Efficiency • GEFF – Green Energy Financing Facility		

3.1.1.2 Equity Financing

Investment funds are one of the companies' financial shareholders that engage in medium-long term institutional risk capital investing in unlisted companies (also as SPVs) with high growth and promising development possibility (high grow companies), with the goal of contributing to the company's growth in its reference market and monetising the investment at the end of the set duration. Investment funds often participate in infrastructure projects by raising finance through the issue of new shares or increasing the nominal value of existing shares.

Typically, the investor stays on as a partner in the company for at least five years in order to extract the value required to achieve a specific target return, which varies based on the underlying asset. The investment fund activity, on the other hand, does not only entail the commitment of financial resources; it also entails a series of actions that are connected to and necessary for the execution of the business idea. Therefore, some funds focus on specific industries (SMEs, real estate, energy infrastructure, and so on) or stages of a company's life cycle (start-up, distressed, expansion, etc.).



FUNCTIONING SCHEME

CASE STUDY

brownfields

Brownfields 3 is an urban infrastructure fund that focuses on the cleanup and redevelopment of environmentally contaminated areas since 2017. The overall EIB commitment is equal to EUR 40m and the project is focused on Remediation and redevelopment of environmentally impaired sites sector in France, Belgium, Luxembourg, Spain and Poland.

The Fund buys former residential, tertiary, and business buildings, handle asbestos removal, renovation, and remediation, and develops a redevelopment plan in partnership with local authorities. Housing (including affordable housing) is a common theme in these projects, but they will also include tertiary, commercial, and industrial developments. The Fund will mostly invest in ventures in France and the Benelux region, as well as Spain and Poland. By investing in subsequent co-development on the cleaned sites, the Fund will contribute up to 50% of its money. Institutional investors such as the French Caisse des Dépôts and the European Investment Bank contributed EUR 250 million to the campaign. The Fund has a ten-year tenure and a five-year funding duration, as well as EFSI insurance. Brownfields Gestion is among companies that have a long track record in this area.

TYPES OF PROJECTS

District heating	Public lighting	Public buildings retrofitting	Renewable energy electricity production	Renewable energy thermal production	Deployment of charging Infrastructure for electric vehicles
New public transport infrastructures	Vehicle Sharing Platforms (carpooling, carsharing)	Park and ride facilities			

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL	IFIs and Development Banks	Investment Funds		
	• **International financial institutions,** • **National and local promotion banks** • **Development banks**	Investment funds differ in the function of time & expectations: • **Private Equity Funds:** with a short to medium investment time horizon • **Real Estate Funds:** with medium-long investment time horizon • **Infrastructure Funds:** yield stability and long-term time horizon		

3.1.2 Other financial models for MAKING-CITY actions

3.1.2.1 Crowdfunding

Crowdfunding is a method of raising money from a numerous individual investors using online platforms in order to support certain initiatives. There are other forms of crowdsourcing; however, we will only discuss equity and lending crowdfunding.

Crowdfunding may play an important role at the outset of the life cycle of a sustainable energy project, especially in environments where stakeholders are the beneficiaries or concerned groups concerned with environmental preservation and sustainability such as city districts.

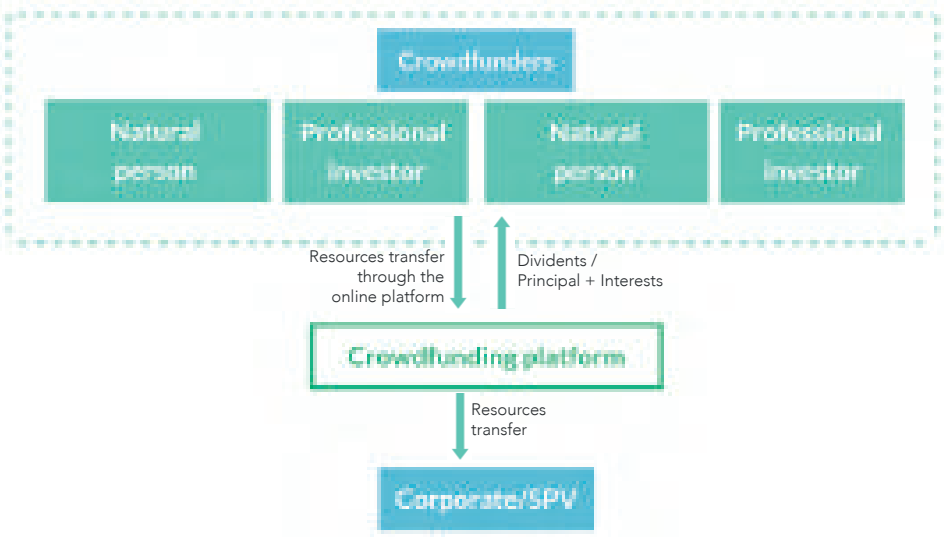
Crowdfunding may also play an important part in the establishment of energy communities, which are groupings of people, retailers, and other businesses that bond together to build systems to create and share energy from renewable sources. Energy communities are categorised as the next phase in the development of positive energy districts, zero-miles energy and smart grids.

ONE PROJECT	EQUITY	LENDING
Money is raised against a specific project	Equity crowdfunding: dividends generated are transferred to investors	Lending crowdfunding: lenders receive the repayment of the principal and a fixed interest rate (higher than the saving rates available to the lenders / lower than a traditional loan available to the borrower)

DESCRIPTION

A financing practice that involves collecting money from a large number of private investors	Funding a specific project through an online platform	Equity and lending crowdfunding are two of the main types that exist	

FUNCTIONING SCHEME



CASE STUDY

Soleil de Sainte-Sévère is a photovoltaic park project to be constructed on a former technical landfill centre for household waste.

This project, accessible only to the departments of Charente and Charente-Maritime, with an initial ceiling of € 2,000 per investor, in March 2021 reached 88% of its objective thanks to around 100 investors. This photovoltaic park is estimated to produce 6,122,000 kWh energy and supply 1,283 homes with electricity per year. By this 5 MW installed power construction and 13,500 photovoltaic modules, 490 tonnes of CO2 emissions are estimated to be reduced yearly.

The main financial model for this project is crowdfunding through Lumo France platform and so far 95 local investors (from Charente and Charente-Maritime territories) have contributed more than 120,000 Euros out of the overall goal of 150,000 Euros.

TYPES OF PROJECTS

- District heating
- Public lighting
- Public & private buildings retrofitting
- Industrial heat production
- Renewable energy electricity & thermal production
- Electricity/ hybrid public vehicles purchases
- Deployment of charging Infrastructure for electric vehicles
- New public transport infrastructures
- Vehicle Sharing Platforms (carpooling, carsharing)
- Park & ride faacilities
- Energy storage

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL

Crowdfunding Platforms

- Via **online platforms** with financial service (fintech), it develops community projects through capital provided by the citizens that will directly benefit from the financial return and its externalities
- Raises money for **small single projects** (less than € 1 million)
- **Communicates clearly the objectives**

3.1.2.2 Public Private Partnerships

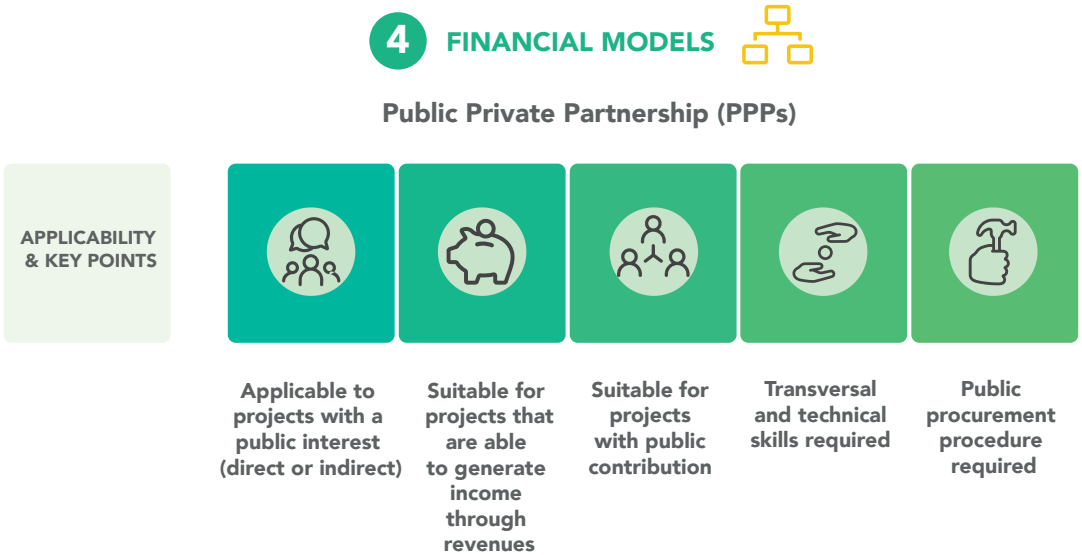
Public-private partnerships (PPPs) are a framework for public-private cooperation in the creation and/or management of public assets or works of public interest. The formation of an ad hoc firm, a Special Purpose Vehicle (SPV), whose shareholder composition might be made up of entirely private or mixed public/private operators, is how a Public-Private Partnership is accomplished.

One of the techniques that is used within PPP operations is project financing. This financial technique can be used in PPP operations to realise works in public infrastructure and public utilities by financing a particular economic unit through a process in which the lender considers the cash flow and project profits as a guarantee for debt repayment.

A public entity has entrusted the SPV with the construction and/or management of a work. The public body may offer a grant during the building phase or pay a fee during the management phase, depending on the uniqueness of the work to be done. The concession is for a medium-long period of time, after which the asset will be completely used by the public entity.

SPV is funded by project sponsors' resources, equity contributions, and bank financing for the construction of the work. The repayment of the loan, as well as the ultimate payment of dividends to the sponsors, begins with the project's kick off. Additionally, in most cases, a builder (EPC contractor) and a manager (O&M contractor) are hired to do the construction and management tasks.

As a result, the investment in the completion of the work is often recovered with proceeds from the sale of goods and/or services to end users (which might also correspond with the public contracting authority).



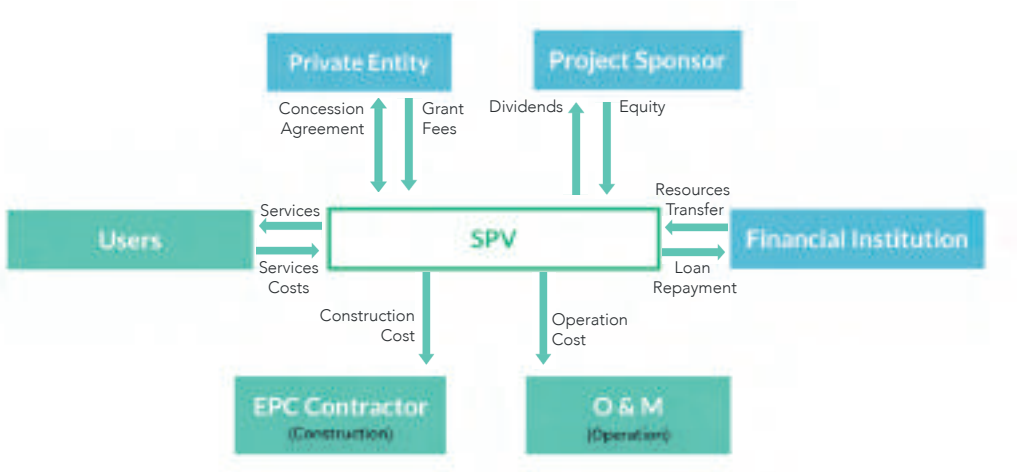
MAIN FEATURES

SPVs	LONG CONTRACTS	TRANSFER OF RISKS
Assignment of construction and management activities to a single entity (SPV)	Long term contracts, between the parties involved, even up to 20/30 years	Transfer of risks (partially) from the public and private operator

DESCRIPTION

Cooperation between the public and private sectors	For realisation and management of public works or works of public interest	Creation of a Special Purpose Vehicle (SPV), whose shareholder composition could be made by private or mixed public/private operators	The lender considers the cash flow and the project profits as a guarantee for debt repayment and assets economic unit as collateral

FUNCTIONING SCHEME



CASE STUDY

In 2017 the Blankenburg Connection PPP EUR1 billion project received investments through the Public Private Partnership financial model. This grand project aims to connect Rotterdam city to the Rotterdam port by the construction of a new road system. The project concentrates on the design, construction, funding and maintenance and is labelled as the largest PPP project initiated in the Netherlands by 2017. The Blankenburg Connection PPP was appointed to the BAAK consortium that includes three various ownership levels of Macquarie Capital (70% ownership of concessionaire), Ballast Nedam (15%) and DEME (15%) by the Netherland's Directorate-General for Public Works and Water Management, Rijkswaterstaat.

50% of the term load equivalent to EUR330 million of this construction project is funded by European Investment Bank (EIB) endorsed by the European Fund for Strategic Investments (EFSI). Furthermore, another EUR900 million was funded by groups of commercial floating rate lenders in particular The Korea Development Bank, Belfius, KfW, KBC, BNG and SMBC in addition to a fixed rate institutional lenders including Natixis, Samsung Life Insurance and MEAG.

This project is planned to be open to using by 2024, and it is aiming to supply a 4 kilometres long road system from the A15 and the A20 roads to the west of Rotterdam, a c.500m tunnel (Holland), a c.900m immersed tunnel (Maasdelta), two flyovers and the widening of the existing A20. Succeeding the five initial years, the maintenance of Blankenburg Connection PPP highways and tunnels will be provided by the consortium for 20 years.

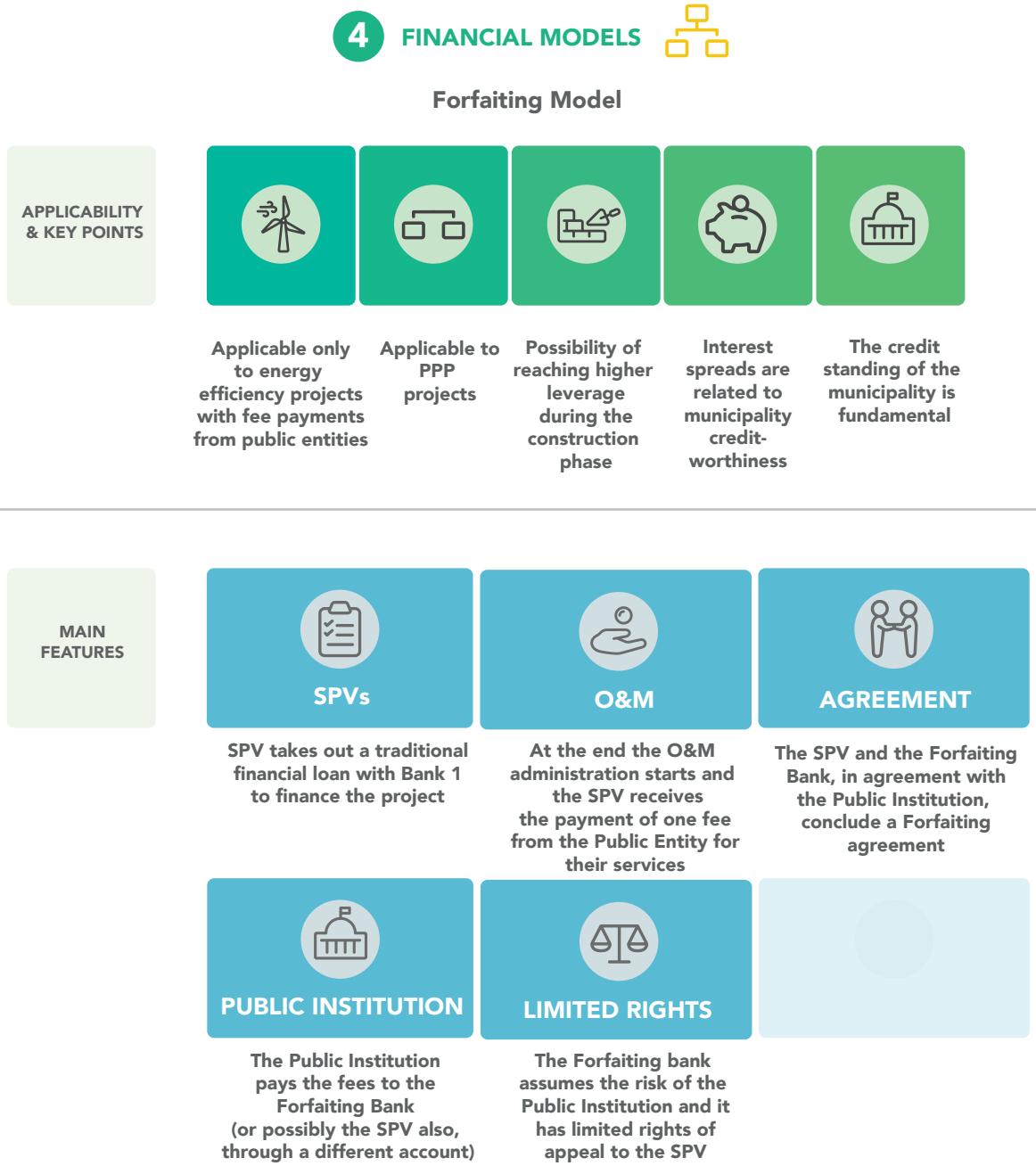
TYPES OF PROJECTS						
	District heating	Public lighting	Public buildings retrofitting	Renewable energy electricity production	Renewable energy thermal production	Deployment of charging Infrastructure for electric vehicles
	New public transport infrastructures	Vehicle Sharing Platforms (carpooling, carsharing)	Park and ride facilities			

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL	Public Entity/ Managing Authority	IFIs and Development Banks	Commercial banks	Investment Funds
	Public funds for energy efficiency at different levels: • **European, National and Regional/Local.** In particular European funds managed by: **o The EU directly or co-managed by Member States** **o European institutions (EIB)**	• **Internation financial instituitions,** • **National and local promotion banks** • **Development banks**	In the energy sector, the most relevant financial instruments that are available and managed by commercial banks are: • **PF4EE – Private Finance for Energy Efficiency** • **GEFF – Green Energy Financing Facility**	Investment funds differ in the function of time & expectations: • **Private Equity Funds:** with a short to medium investment time horizon • **Real Estate Funds:** with medium-long investment time horizon • **Infrastructure Funds:** yield stability and long-term time horizon

3.1.2.3 Forfaiting Model

The Forfaiting Model involves selling or transferring future fee receivables to a specialist operator (Forfaiting Bank). After discounting an interest rate, the Forfaiting Bank advances the value of the receivables to the Special Purpose Vehicle. Forfaiting activities are most commonly used in public-private partnerships (PPPs) where the public entity anticipates contractual and regular payments.

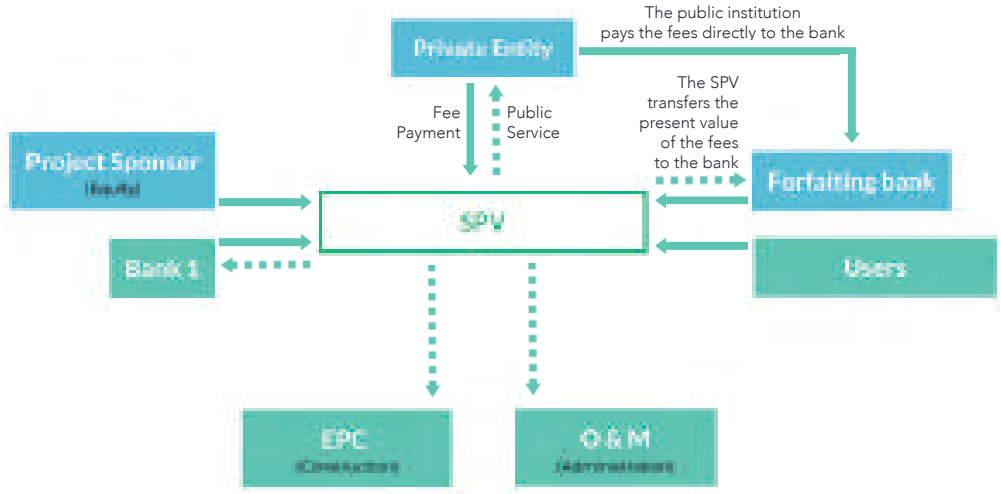
In the past few years, the forfaiting approach has been increasingly popular in EPCs for energy projects since it allows the SPV to get the required financial resources in advance and reduce its risks to the public entity.



DESCRIPTION

Consists of the sale or transfer of receivables	Deriving from future fees to a specialised operator (Forfaiting Bank)	Advances the value of the receivables to the SPV, after discounting an interest rate	Forfaiting operations are mainly applied to PPP structures where the Public Entity foresees contractual and predictable payments

FUNCTIONING SCHEME



CASE STUDY

In 2015, as a reply to 2012/27/UE directive from the European Parliament, Universidad Politécnica de Madrid (UPM) decided to enhance the quality of the heat and water supply systems across its campus. In this regard, UPM gathered several energy service companies (ESCOs) in order to introduce their proposals on this improvement project. The main objective of this initiative was to reduce the amount of CO2 emissions while transitioning to a greener fuel source. In August, Enertika (Ingeniería y Servicios de Eficiencia Energética S.L.), an engineering company with a special focus on energy generation, remote services on energy management and energy efficiency, took control of this project.

In this process, 63 gasoil boilers (consuming an average of 946,479 litres of gas oil yearly), were replaced by 66 natural gas boilers throughout the UPM campus. Later on in 2017, following the issuance of annual audits carbon and primary energy savings were recorded above 20% compared to its baseline.

The type of investment for this project is forfaiting loan and it will take 9 years to complete. In addition, the overall project size is equal to 2.8 million Euros and the European Energy Efficiency Fund (EEEF) investment size is 2.5 million Euros. Actual CO2 emission saving (p.a.) is estimated to be equal to 1,094. The energy savings based on thermal demand is 1,353,896 kWh/year equivalent to 13.15%, implying a reduction in the environmental impact of 730.25 tons of CO2 per year.

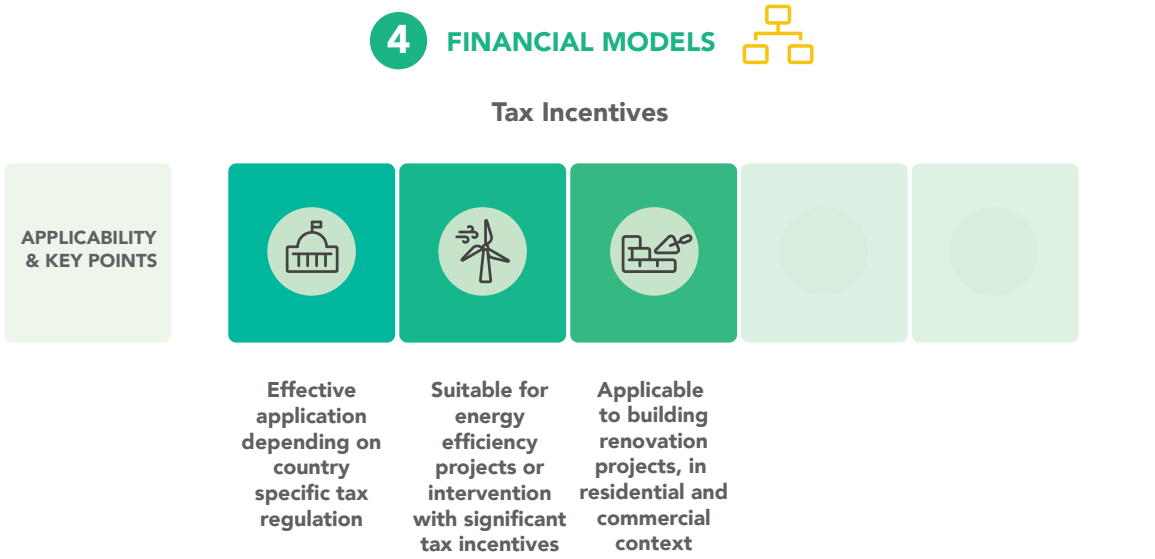
In 2018 14 grants we received from the FEDER fund through the Aid Program for the Energy Rehabilitation of Existing Buildings PAREER-CRECE of IDAE.

TYPES OF PROJECTS	Public lighting	Public buildings retrofitting
FINANCIAL PROVIDERS INVOLVED IN THIS MODEL	IFIs and Development Banks	Commercial banks
	• Internation financial instituitions, • National and local promotion banks • Development banks	In the energy sector, the most relevant financial instruments that are available and managed by commercial banks are: • PF4EE – Private Finance for Energy Efficiency • GEFF – Green Energy Financing Facility

3.1.2.4 Tax incentives

A tax deduction is an amount that may be deducted from a tax in order to lawfully lower the amount owed. Some jurisdictions provide tax breaks to those who make energy-saving investments. The most prevalent form of instrument is income tax credits or deductions. Deductions for new and innovative technology can be beneficial. These programs are commonly utilised to fund energy saving initiatives in both the industrial and real estate sectors.

The functioning model depicted could be implemented and is frequently used. In the financing model scheme, the contractor applies a discount to the invoice while the beneficiary of the works (corporation, limited liability company, or individual) transfers the tax incentives (in the form of a tax credit) to the contractor who does the work. In most cases, the incentive is collected from the beneficiary over a 5- to 10-year term.



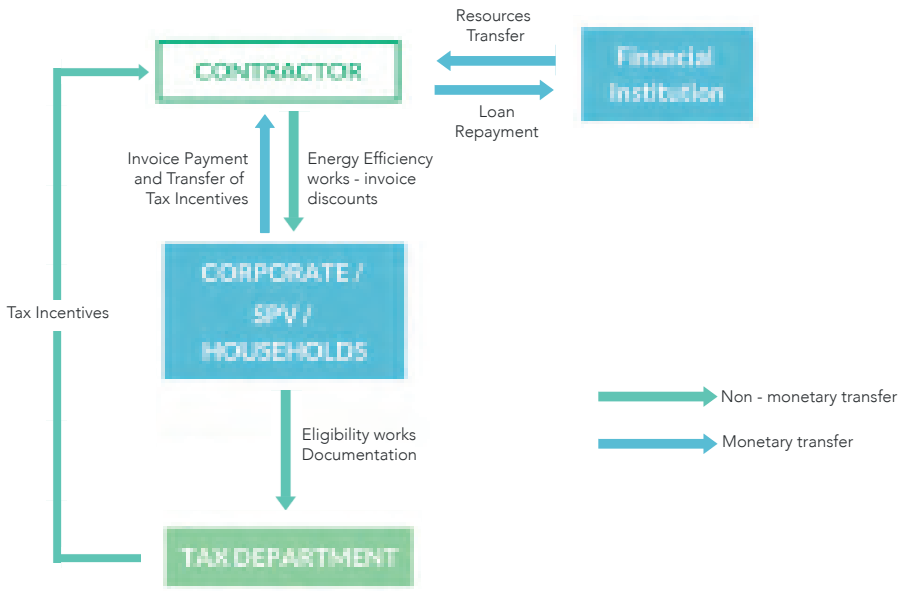
REIMBURSEMENT

The contractor receives the payment of the incentive directly from the tax department and reimburses the bank loan

DESCRIPTION

A sum that may be deducted from a tax in order to legitimately lower the amount owed	Some jurisdictions provide tax deduction for investments in energy efficiency	Income tax credits or deductions are the most common type of instrument	Tax deductions can have a positive impact on new, innovative technologies
It isgenerally used to support energy efficiency interventions both at industrial and real estate level	Usually a discount is applied on the invoice by the contractor	The beneficiary (SPV, corporate or household) needs to transfer the tax incentives to the contractor	The incentive is collected from the beneficiary in a period of 5 - 10 years

FUNCTIONING SCHEME



CASE STUDY

Based on to the Organization for Economic Cooperation and Development (OECD), 20 OECD member countries had implemented study tax credit measures in 2007, relative to just 12 countries in 1995.

The study tax credit (Crédit Impôt Recherche – CIR) is a reliable component of an ambitious company's financial strategy in France, and it is specifically well suited to the needs of SMEs. Companies can increase the level of their productivity by using this tax advantage to fund their R&D projects.

The Financial Law of 2008, which is align with the "Lisbon policy" (knowledge-based economy) and the "Barcelona objective," saw the French government implement a significant overhaul of the study tax credit (3 percent of total GDP dedicated to R&D).

TYPES OF PROJECTS

- District heating
- Public lighting
- Industrial heat production
- Electricity/ hybrid public vehicles purchases
- Deployment of charging Infrastructure for electric vehicles
- Energy storage

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL

Commercial banks

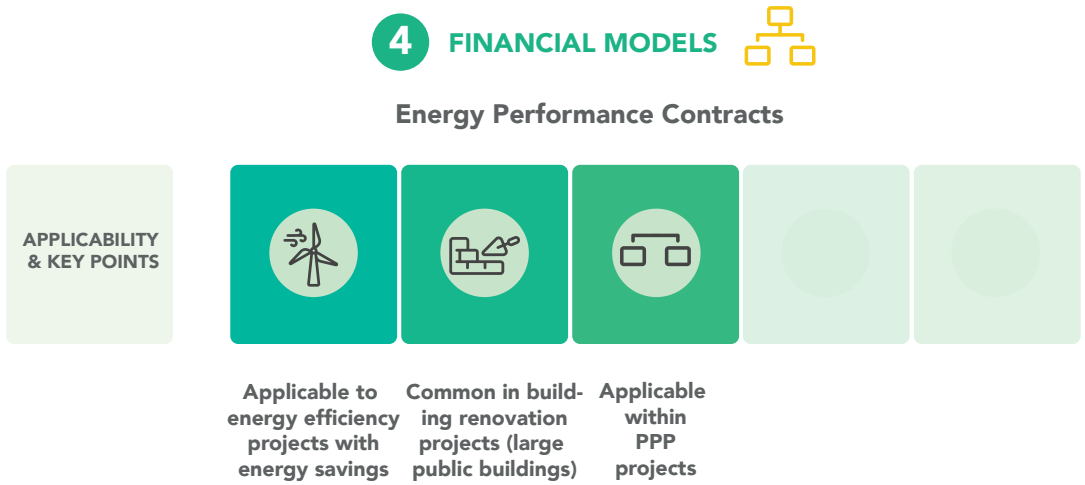
In the energy sector, the most relevant financial instruments that are available and managed by commercial banks are:
- **PF4EE – Private Finance for Energy Efficiency**
- **GEFF – Green Energy Financing Facility**

3.1.2.5 Energy Performance Contracts

The Energy Performance Contract (EPC) is a contract under which a supplier (specifically, an Energy Service Company – ESCO) delivers a package of services aimed at increasing the energy efficiency of the Beneficiary's real estate assets.

Savings in excess of the minimum guaranteed level may be split between the parties under the cost-sharing mechanism, but penalties will be levied on the ESCO if the minimum promised level is not met.

An ESCO company with advanced technical expertise is able to recommend the most profitable technologies to the client and also takes on all implementation and maintenance responsibilities to ensure the best results and highest energy savings. Hence, such an ESCO-based approach proves to be functional and impactful.

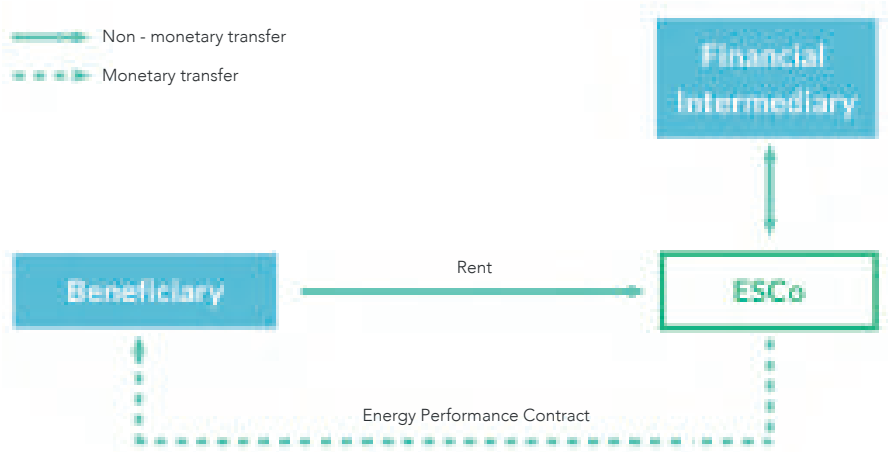


EXPENDITURE	ESCo & GRANTOR	PENALTIES
The rent paid also includes management & maintenance component linked to the historical expenditure	EPC contract not include the supply of the carrier. ESCo does not have conflict of interest with Grantor	There are penalties for any under performance

MANAGEMENT
ESCo takes charge of all activities on management and maintenance

DESCRIPTION		
The Energy Performance Contract (EPC) is a contract in which an Energy Service Company (ESCo) is the supplier	Providing a range of services aimed at improving the energy efficiency of real estate assets owned by the beneficiary	

FUNCTIONING SCHEME



CASE STUDY

In Vantaa, Finland an EPC project targeting 15 buildings with 83,000 m2 area has been implemented. The amount of financed investment was MEUR 1.5 (approximately EUR 200,000 annual savings) which categorises this project within the small to medium level. The Sustainable procurer prize was awarded to this project and the city of Vantaa in 2014, making it a replicable example for Finland and other EU states.

This project consists of two major financial models. Fees are applied on monthly basis as part of the guaranteed savings model framework. These fees are paid to the ESCOs with the aim of covering the investments with an estimated 2 to 5 years of payback duration. Furthermore, the ESCOs guarantee that the monthly fees are calculated smaller than the acquired savings during the same time period, to reduce the risks of the installed equipment.

On the other hand, loans are the more secure way of financing projects by the municipalities in the public sector, as the interest rates would be higher in comparison to the service providers. For the private sector, however, ESCOs cover risk and guarantees. For this particular project, the monthly charged fees are paid from energy costs budgets and the project is not benefiting from the Vantaa city's other investment budgets.

TYPES OF PROJECTS

- **Public lighting**
- **Public buildings retrofitting**
- **Private buidings retrofitting**

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL

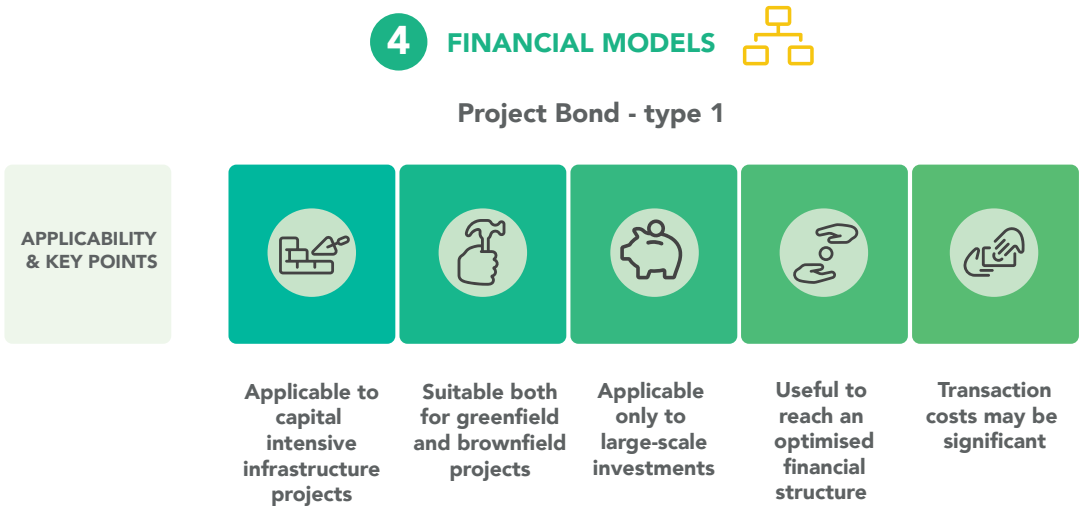
Commercial banks

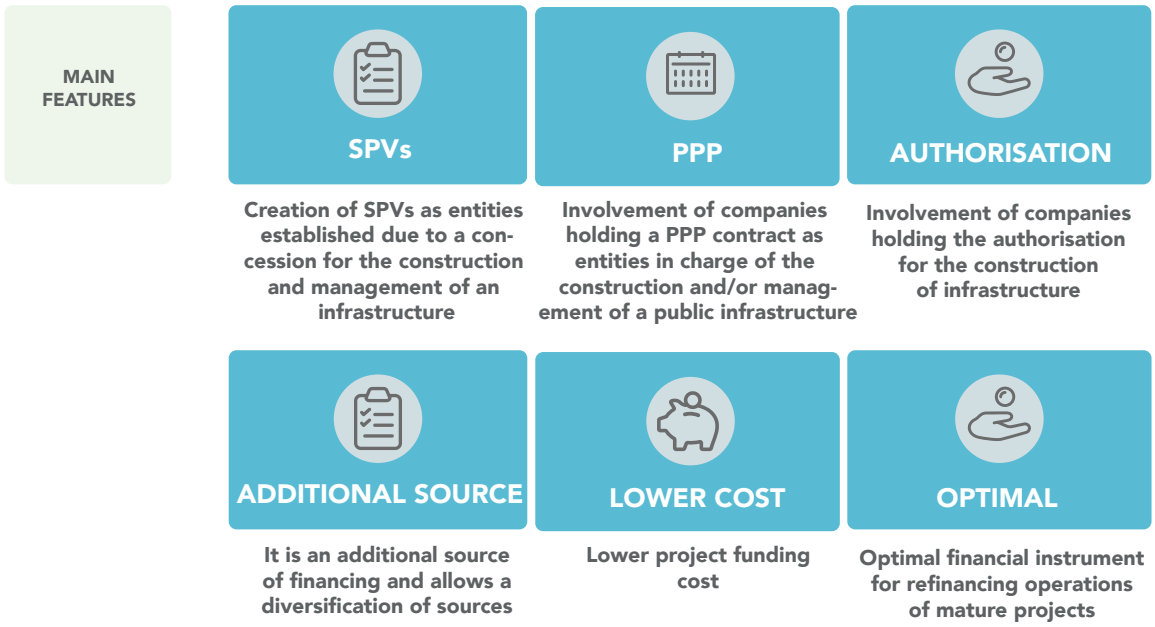
In the energy sector, the most relevant financial instruments that are available and managed by commercial banks are:

- **PF4EE – Private Finance for Energy Efficiency**
- **GEFF – Green Energy Financing Facility**

3.1.2.6 Project Bond type 1

The project bond is a financial instrument made up of bonds issued by companies to fund infrastructure projects. It may be classified into two categories: new works (greenfield) and works that have previously been financed (brownfield). Typically, this financial instrument is targeted at institutional investors, and repayment is contingent on the project's ability to generate financial flows.





COVENANTS

Better define the covenants related to the project

NEW PROJECTS

Finance new infrastructure projects and new public utility services

GREENFIELD PROJECT

Guarantees issued for a duration corresponding to the construction period of the project

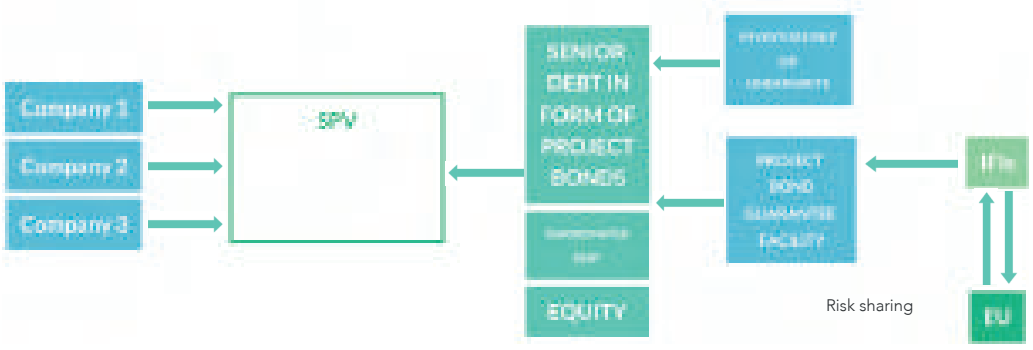
BROWNFIELD PROJECT

Guarantees can be lent in the period following the start of infrastructure management

DESCRIPTION

- Bonds issued by companies for the financing infrastructure projects
- Divided into Greenfield projects and Brownfield projects
- Addressed to institutional investments
- Repayment depends on the financial flows that the project ensures

FUNCTIONING SCHEME



CASE STUDY

The Glenmont wind farm is an example of a project being financed by Project Bond financial model. In this case study, the project bond is awarded to CEF 3 Wind Energy, a company controlled by Glennmont Partners and PGGM Vermogensbeheer with the aim of refinancing part of CEF 3 Wind Energy's wind farm, which is one of the Italy's largest wind portfolios (with an estimation of approximately 245 MW of installed capacity operating).

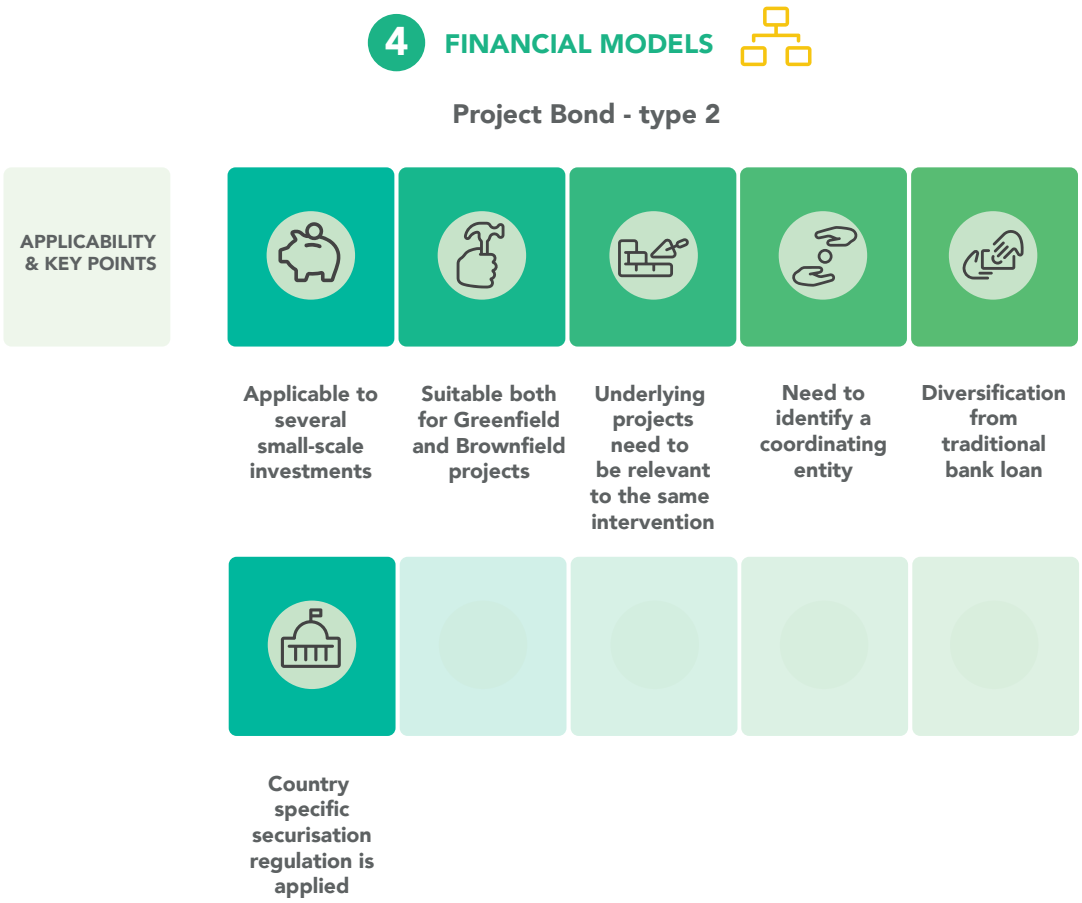
Within this project, Ashurst advised BNP Paribas Securities Services acts a as noteholders' representative, security agent, calculation and paying agent. Furthermore, the Glenmont wind farm marked the first project bond in the wind sector within Italy by 2018.

The overall financial model for this project consists of a project bond and bank loan of €190 million aggregated value (both senior secured). The €170 million unrated bond includes fixed rate tranche mentioned on the Italian ExtraMotpro segment with national and international institutional investors.

3.1.2.7 Project Bond type 2

Small-size bonds are a sort of project bond that is used to finance enterprises that are not publicly traded or listed on the stock exchange.

They are medium/long-term bonds or debt securities/instruments that are typically used for development plans, unusual investments, or refinancing in order to secure new loans without relying on bank credit. A succession of fragmented investments can be used to produce critical mass using the securitisation approach of a pool of securities.



MAIN FEATURES

INTEREST RATE

Recognised interest rate in periodic coupon form, and an expiration date

STOCK EXCHANGE

Issuer must not be listed on the stock exchange

SUBSCRIPTION

Subscription of small-sized bonds is reserved to professional investors

ADVISOR

A consultant intended to assist the company in the strategy, analysis of business plan, timing and methods of issuance

ARRANGER

Placement of securities on the market, identifying potential investors

RATING COMPANY

Verifying the issuer's solvency

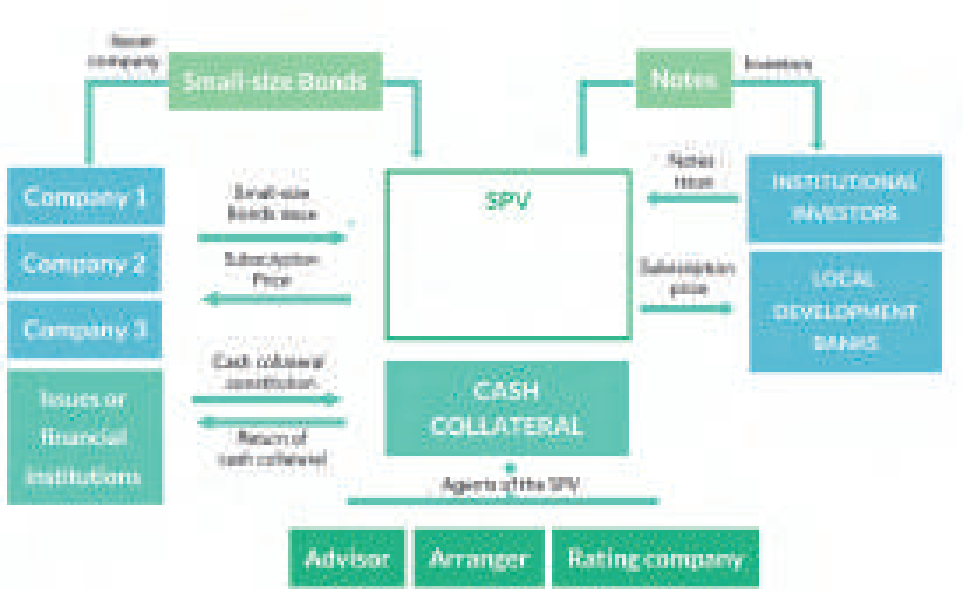
LOW COST

Low cost for issuing companies as ratings are assigned by specialised companies

DESCRIPTION

Specific to small-size bonds	Used for companies not listed on the stock exchange	Medium/long-term bonds or debt securities intended for development plans, extraordinary investments or refinancing	Obtaining new loans without resorting to bank credit

FUNCTIONING SCHEME



CASE STUDY

One of the examples of good practices to overcome climate change effects by funding projects focused on environmental causes, is Integrated Water Service project. Through 'Green Bonds' as one of the methods of catalysing private investment for climate innovation, The European Investment Bank (EIB) presented the 'Viveracqua hydrobond': an instrument bringing 300 million for 728 interventions for the Integrated Water Service in hundreds of municipalities in the Veneto Region, Italy.

By the same token, embers of the Viveracqua Consortium received EUR 145.8 million in long-term funding from the EIB in July 2014 to fund qualifying water and sanitation elements in their investment programs. Following the transaction's market adoption, the EIB has been asked to raise its contribution by up to EUR 76 million by offering new financing to additional members of the Viveracqua Consortium, with a total investment of EUR 221.8 million. Total infrastructure project costs are forecast to rise to a high of EUR 502 million. The new borrowers would use the activity rise, in conjunction with other sources of financing, to support capital projects in the Veneto region. Viveracqua Hydrobond also aspires to be a role model for small businesses working in the interconnected water market. The operation of Viveracqua Hydrobond 1 S.r.l includes the below phases:

1) Set up a securitization vehicle, such as Viveracqua Hydrobond 1 S.r.l in this case study
2) Small-size bond issue and SPV subscription (equal to €227 million)
3) Issue of securities by the SPV and subscription by investors: in this process, the SPV issued asset backed securities (ABS) in a sum equal to the total amount of small-size bonds subscribed; the funds raised from the issue of the securities were used to fund the purchase of the bonds.

The cash funds derived from the sale and remuneration of the notes by the issuers can be used to redeem the securities. Institutional buyers, including the European Investment Bank (EIB), Veneto Banca, Veneto Solidarity Fund, and BCC di Brendola, bought the SPV's shares. The refund of these securities is partly assured by a form of cash collateral issued by Veneto Sviluppo (the Veneto Region's finance company that works with businesses to help them grow), as well as a further guarantee provided by the issuer.

TYPES OF PROJECTS	District heating	Public lighting	Public buidings retrofitting	Renewable Energy Electricity Production	New Public Transport Infrastructures	

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL	IFIs and Development Banks	Investment Funds		
	• **Internation financial instituitions,** • **National and local promotion banks** • **Development banks**	Investment funds differ in the function of time & expectations: • **Private Equity Funds:** with a short to medium investment time horizon • **Real Estate Funds:** with medium-long investment time horizon • **Infrastructure Funds:** yield stability and long-term time horizon		

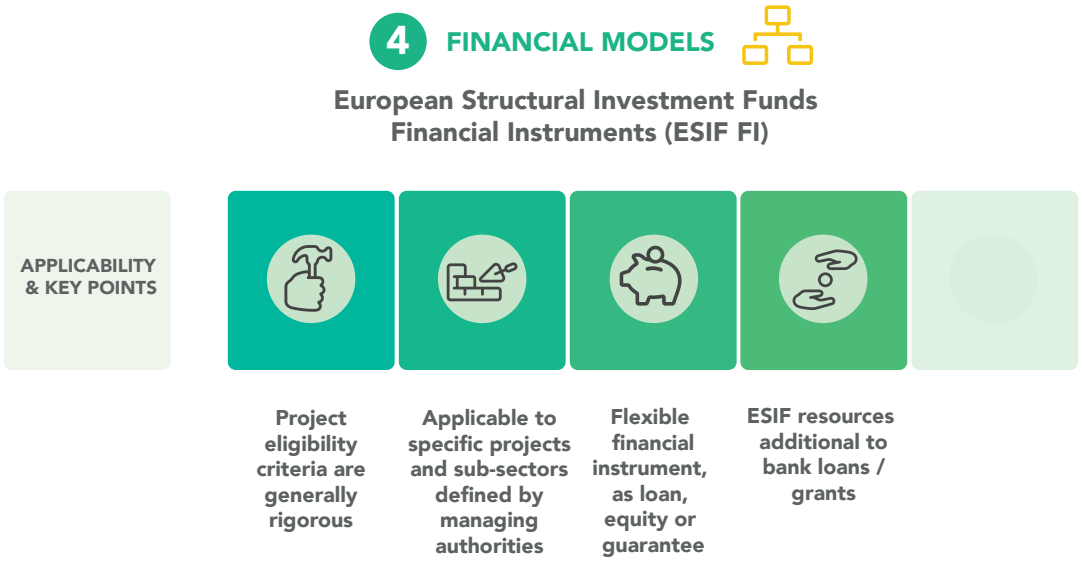
3.1.2.8 ESIF Financial Instruments

Regulation 1303/2013, which particularly regulates ESIF financial instruments under art. 37, governs ESIF (European Structural and Investment Funds). These appear to be an acceptable scheme in the setting of market failure: when there is a misalignment of demand and supply of financial resources, and particular types of investments in defined areas are deemed too risky or illiquid by traditional financial investors.

The ESIF has the ability to supply debt, equity, and quasi-equity instruments. Whatever tools they have available, their investment approach includes favourable terms for the final recipients: "patient" capital investments and financing - with a longer term than the market. They do not fund the entire project investment in order to attract additional investors or to be combined with public grants. As the Financial Intermediaries chosen to administer the financial instruments are skilled operators, the ESIF plan ensures efficiency and effectiveness.

National resources must be supplemented by ESIF resources, which necessitates significant upfront financing on the part of public authorities. ESIF Financial Instruments, on the other hand, provide benefits to both financial intermediaries and final recipients.

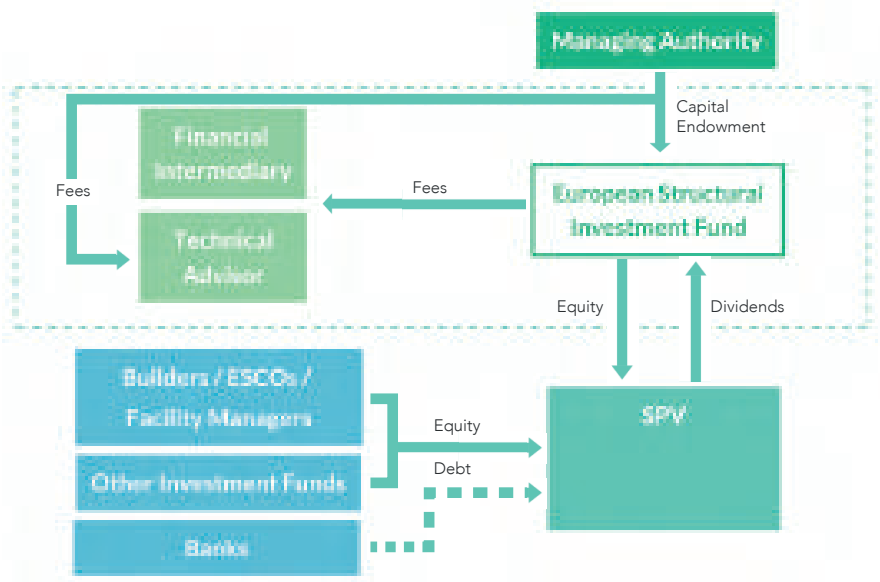
Given the market failure in which ESIF operates, financial intermediaries merely support operating risk, while credit risk is assumed by the Managing Authority. Blending is recommended for Final Recipients to attract additional funds for ESIF-funded initiatives: Final Recipients can merge ESIF resources with any grants or financial sources.



MAIN FEATURES	**PUBLIC AUTHORITY** European structural investment funds are revolving funds promoted by a public authority	**POLICY PROGRAMME** Managing authorities decide how to allocate ESIF resources within specific policy programme	**POST A TENDER** Managing authorities with the support of EIB, post a tender whose aim is to select financial intermediaries to manage the financial instrument
	RECIPIENTS Selected financial intermediaries allocate the funds to the final recipients in compliance with the investment strategy agreed with the managing authority		

DESCRIPTION	ESIF is an appropriate scheme in a context of market failure in conditions where there is no matching between demand and supply of financial resources	ESIF provides debt, equity instruments. It also provides investment strategies entailing favourable conditions for the final recipients	ESIF does not fund the overall project investment in order to attract other investors or to be blended with public grants	ESIF scheme assures efficiency as the financial intermediaries selected in charge of the financial instruments' management
	ESIF resources need to be complemented by national resources, which entails a substantial upfront capitalisation borne by public authorities	Financial intermediaries support only the operating risk, while credit risk is taken by the managing authority, given the market failure in which ESIF operate		

FUNCTIONING SCHEME



CASE STUDY

The European Structural and Investment Funds (ESIF) are the European Union's primary investment policy instrument, with a budget of EUR 454 billion for 2014-2020. The ESI Funds are made up of five different funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD), and the European Maritime and Fisheries Fund (EMFF) (EMFF).

Over the period 2014-2020, Italy has received EUR 42.77 billion from ESI Funds across 75 national and regional programs. With a national commitment of EUR 30.96 billion, Italy has a total budget of EUR 73.73 billion to spend in a variety of fields, including employment and development, science and innovation, environmental protection, and labor market participation.

Biogas Plant at IASI Agrizoo Farm project (total budget of EUR 602 512 and EU budget contribution of EAFRD: EUR 199 953) helped to fund the construction of a small biogas plant in the Basilicata region, which generates heat and electricity by fermenting livestock manure. Processing manure offers a way to diversify your profits by generating green clean energy. The project provided funding for a 130 KW plant that includes an electronically operated anaerobic digester system that generates biogas to fuel a heat/electric power generator. The surplus power is sold to the local utility provider, and the heat is used on the plant.

TYPES OF PROJECTS

District heating	Public lighting	Public & private buildings retrofitting	Industrial heat production	Renewable energy electricity & thermal production	Electricity/ hybrid public vehicles purchases
Deployment of charging Infrastructure for electric vehicles	New public transport infrastructures	Vehicle Sharing Platforms (carpooling, carsharing)	Park & ride faacilities	Energy storage	

FINANCIAL PROVIDERS INVOLVED IN THIS MODEL	Public Entity/ Managing Autority	Commercial banks		
	Public funds for energy efficiency at different levels: • **European, National and Regional/Local.** In particular European funds managed by: **o The EU directly or co-managed by Member States** **o European institutions (EIB)**	In the energy sector, the most relevant financial instruments that are available and managed by commercial banks are: • **PF4EE – Private Finance for Energy Efficiency** • **GEFF – Green Energy Financing Facility**		

3.2 Financial providers

Providers introduced in this deliverable consist of members of public resources, such as Regional and National Managing Authorities, International Financial Institutions (IFIs), Local Promotional Banks and Commercial Banks (limited to public-related Financial Instruments), and on the other hand, providers from the private resources, such as Investment Funds and Crowdfunding Platforms.

3.2.1 Public funds

In order to meet the EU's long-term and national goals, public investments in energy transition are critical. Despite the fact that pure public investment is insufficient to cover all of the necessary intervention, such funding is required to promote private investment in the industries concerned.

When compared to the demands, private investments are frequently insufficient. There might be a variety of causes for this. Energy-related projects are fraught with uncertainty, making them look extremely risky to investors. Uncertainty is mostly associated with the inability to make correct predictions about the learning curve, current financial data, realistic investment schemes, new technology dangers, and so on. This is especially true when it comes to early-stage interventions, such as the research and development and pilot stages of the technological innovation chain. These initiatives necessitate the use of public funds.

Furthermore, public funds can be used to attract additional private investment, increasing the visibility of the renewable energy sector. Because investors typically have few incentives to invest, due to the traditional energy costs being cheap, public involvement can encourage investors in new industries that would otherwise stay undiscovered.

Energy efficiency funds are offered at three levels: European, national, and regional/local. They can be:

- European funds managed by:
  - The EU directly or co-managed by Member States or regions
- National funds managed:
  - Directly
  - Thought national promotional banks

3.2.1.1 European financial resources

The European Union has always had a key role in the energy transition sector. This is confirmed not only by the regulatory framework developed especially in the most recent years (i.e. Clean Energy for all Europeans, European Green Deal), but also by the concrete effort in supporting investments. From the economic point of view, European resources are available in the forms of grants, loans and funding for technical assistance.

Funds cover both budget areas managed directly by the European Commission and those managed jointly with Member States, such as the European Structural and Investment Funds.

Over € 645 billion, or more than half of the EU budget, is distributed through five ESI funds:

1. European regional development fund (ERDF)[4]
2. European social fund (ESF)[5]
3. Cohesion fund (CF)[6]
4. European agricultural fund for rural development (EAFRD)[7]
5. European maritime and fisheries fund (EMFF)[8]

During the negotiation for the current 2021–2027 Long term EU budget and recovery package[9], Multiannual Financial Framework between the Commission, the European Parliament and the European Council, it was agreed to make at least 30% of EU expenditure towards climate-related projects in 2021-2027. This set the overall objective to earmark funds within different budget headings for climate-related measure, so that they should represent the 30% of the EU budget, three out of every ten euro spent, if taken together. This aim entails € 322 billion in resources, which is one and half times the amount of the preceding Multiannual Financial Framework (MFF) 2014-2020.

Investments in the energy transition are also supported by other MFF funds and programs under "Smart and inclusive growth" and "Sustainable growth: natural resources".

These include:

- Horizon Europe, the EU research and innovation programme;
- Connecting Europe Facility (CEF), which provides grants for transnational energy infrastructure projects;
- ITER contributions, to support the design and construction of a large-scale nuclear fusion reactor;
- LIFE program.

The European Green Deal is the key initiative that merges regulatory and budgetary measures to make Europe the world's first climate-neutral continent by 2050. To meet this goal, activities must be taken across the economy, including environmentally friendly technology and industries, cleaner private and public transportation, decarbonization of the energy sector, and energy efficiency improvements.

Following the Covid-19 outbreak, the EU committed to provide financial assistance to Member States' economic recovery by establishing a specific recovery fund. The recovery plan was published in May, and EU leaders agreed on the current long-term budget for the MFF 2021–2027 on July 21, 2020. The budget also includes a €750 billion recovery fund that will be returned over 30 years, in addition to the

EU's own resources. Loans of up to € 360 billion and grants of up to € 390 billion are possible with the funds.

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[4] https://ec.europa.eu/regional_policy/en/funding/erdf/

[5] https://ec.europa.eu/esf/home.jsp?langId=en

[6] https://ec.europa.eu/regional_policy/en/funding/cohesion-fund/

[7] https//ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/rural- development

[8] https://ec.europa.eu/fisheries/cfp/emff/

[9] https://www.consilium.europa.eu/en/policies/the-eu-budget/long-term-eu-budget-2021-2027/#

The present EU financial framework intends to mobilize € 1 trillion in private and public investments by 2030. More than € 500 billion will be distributed directly from the EU budget, mostly as grants, representing more than half of the overall funding for initiatives under the European Green Deal. The remaining portion of the budget will be financed substantially in accordance with the EFSI program. It envisions guarantees under the 'InvestEU' project, in particular, to attract national public and private investments totaling more than € 280 billion. The EIB, in collaboration with national and international financial institutions, manages these EU resources in the form of loans, guarantees, and equity investments. Moreover, the Just Transition Mechanism provides targeted financial assistance to Member States in order to lower their economies' carbon intensity.

The Next Generation EU (NGEU) fund, often known as the Recovery Fund, is built on three pillars. It's important focusing on the first one for the purposes of this toolbox, which is dedicated to assisting Member States in their recovery from the pandemic crisis. The following programs are listed under the first pillar in further detail:

1. European Recovery and Resilience Facility
2. REACT-EU – Recovery assistance for cohesion and the territories of Europe
3. Rural Development
4. Just Transition Fund

The European Recovery and Resilience Facility is a critical instrument for assisting Member States in their recovery efforts. The EU's recovery strategy comprises the following elements:

- A large wave of building and infrastructure renovations, promoting a more circular economy and creating new employment locally;
- Developing renewable energy initiatives, with an emphasis on wind, solar, and hydrogen;
- Cleaner transportation and logistics initiatives, such as the installation of one million electric car charging stations, are being implemented to enhance rail travel and clean mobility.
- The Just Transition Fund will aid in reskilling, business assistance, and the creation of new economic prospects.

3.2.1.2 European financial resources jointly merged

As previously stated, the European Commission and Member States jointly manage some European funds. In more detail, the Multiannual Financial Framework 2021-2027 permits Member States to obtain funds to conduct initiatives in a variety of sectors.

For this purpose, EuroAccess[10], a free online search tool to support the use of existing funding opportunities can be used. This tool provide an overview of existing opportunities under the current programming period, in particular in terms of priority axis and investment priorities linked with energy transition in Member States with the purpose of improving economic, social and territorial cohesion in the European Union and its Macro-Regions.[11]

[10] https://www.euro-access.eu/

[11] https://ec.europa.eu/info/funding-tenders/find-funding/funding-management-mode_en

3.2.1.3 National resources

Energy transition financing is also one of the top objectives for individual Member States. Even though national public resources are insufficient to support the investments necessary to meet EU and national objectives, national public administrations account for a considerable portion of total financial flows to cover energy related projects in most European nations. They can invest directly in initiatives that green typical public sector interventions (e.g., EE in the transportation and construction sectors, assist the development of EE in industry, R&D for non-established, innovative RES and EE technologies) and/or attract additional funding sources.[12]

This section seeks to map out the national resources that are available. National public administrations, by definition, encompass national, municipal, and regional governments, as well as public agencies. Public direct investment, grants, and public-private partnerships are the most common mechanisms utilised. Furthermore, policy-based incentives, such as subsidies and tax incentives, can encourage private investment in certain industries, such as renewable energy.

In order to provide a preliminary framework of available funding opportunities, the analysis was focused on those Member States represented by the partners in MAKING-CITY consortium. As said, the following sections are only some of the potential financing schemes available to support project realisation in energy transition domain within MAKING-CITY timeframe: in-depth list can be seen in the online database collected by the support of partners with specific reference to national funding sources and case studies.

5 FINANCIAL PROVIDERS

[12] European Commission, Assessing the European clean energy finance landscape, with implications for improved macro-energy modelling - Deliverable D3 Study on the Macroeconomics of Energy and Climate Policies, 2017

Country	The Netherlands
Programme/Fund	Netherlands Enterprise Agency, ISDE
Type of provider	Country Specific Dutch State
Type of financing	Grant, Subsidised Loan
Beneficiary	SMEs, Public Administrations, ESCOs, Private Corporations, Housing Corporations, Home owners
Case study	ISDE offers the possibility of getting a certain amount of money for a specific renewable energy production/energy saving method. Example: €125 per installed kW peakpower (total 15-100kWp) using PV panels for SMEs/Public Administrations/Private Corporations/Housing Corporations or a €500 cashback for home owners who install a heat pump (terms and conditions apply)

Public Entity/ Managing Autority

CASE STUDY

Country	Spain
Programme/Fund	Programme 5: energy efficiency improvements in buildings
Type of provider	Public institution
Type of financing	National housing plan; subsidies, grants and loans. Some of them linked with regional grants.
Beneficiary	Individuals, Buildings and dwelling owners, public administrations, enterprises, ESCOs
Case study	Programa de fomento de la mejora de la eficiencia energética y la sostenibilidad en viviendas

Public Entity/ Managing Autority

CASE STUDY

Country	Poland
Programme/Fund	Ministry of Climate and Environment together with the National Fund for Environmental Protection and Water Management
Type of provider	Ministry, governmental institution
Type of financing	Subsidy
Beneficiary	For municipalities with up to 100,000 inhabitants up to 70% co-financing For municipalities with more than 100,000 inhabitants below 70% co-financing
Case study	Stop smog programme - Replacement or decommissioning of carbon-intensive heat sources with low-emission ones, thermomodernisation of single-family residential buildings, connection to district heating or gas networks

Country	Poland
Programme/Fund	National Fund for Environmental Protection National Fund for Environmental Protection and Water Management
Type of provider	Public institution, state legal person financing environmental protection and water management within the scope defined in the Act of 27 April 2001. Environmental Protection Law.
Type of financing	Subsidy in the form of a grant of up to 50% of the eligible costs of the micro-installation included in the project, not more than PLN 5,000 per project.
Beneficiary	Residents of single-family houses
Case study	The priority programme My Electricity is a unique instrument in Poland to date, dedicated to supporting the development of prosumer energy sector, and specifically to supporting the segment of micro photovoltaic (PV) installations. Implementation of the programme will be a strong impulse for further development of prosumer energy and will significantly contribute to the fulfilment of Poland's international commitments in the field of renewable energy development.

Country	Poland
Programme/Fund	Voivodeship Fund for Environmental Protection and Water Management in Lublin
Type of provider	Public instituition, state legal person financing environmental protection and water management within the scope defined in the Act of 27 April 2001. Environmental Protection Law
Type of financing	Support in the form of a low-interest investment loan at 2% per annum
Beneficiary	For SMEs, large, small and micro enterprises, cooperatives, housing associations

Public Entity/ Managing Autority

CASE STUDY

Country	Finland
Programme/Fund	Ministry of Environment
Type of provider	Public Entity (Managing Authority)
Type of financing	Grants
Beneficiary	Public organizations and non-profit organizations

Country	Finland
Programme/Fund	ELENA (EUROPEAN LOCAL ENERGY ASSISTANCE) managed by European Investment Bank (EIB)
Type of provider	Public Entity (Managing Authority)
Type of financing	Grants/loans
Beneficiary	Innovative investment projects

Public Entity/ Managing Autority

CASE STUDY

Country	Italy
Programme/Fund	Superbonus 110%
Type of provider	Tax agency of the Public Administration
Type of financing	Tax Deductions
Beneficiary	Citizens / Private Firms / Banks - Credit Agencies

Public Entity/ Managing Autority

CASE STUDY

Country	Bulgaria
Programme/Fund	National Housing Renovation Program
Type of provider	Public Entity (Managing Authority)
Type of financing	Grants
Beneficiary	Citizens / Private Firms / Banks - Credit Agencies

3.2.2 Development banks, International financial institutions, national and local promotional banks

Promotional and national development banks work to contribute to long-term economic growth in accordance with EU and national policy goals. As previously stated, we conducted a desk analysis on some of the banks based in EU Member States that includes MAKING-CITY lighthouse and/or follower cities to learn more about how promotional banks function. We were able to discover a common intervention pattern among all these entities and describe certain development lines and operational schemes as a result of this process. Below are three examples of such.

1. European Investment Bank (EIB)
2. European Bank for Reconstruction and Development (EBRD)
3. Black Sea Trade and Development Bank (BSTDB)

Such providers share the goal of enhancing countries' long-term development, and they provide services and financial tools to both private and governmental enterprises. They only work directly on large-scale projects (above 5 million Euros), but with the help of national commercial banks, they may also fund smaller initiatives. All promotional and development banks offer a wide range of financial services, including loans, equity, and guarantees, to support efforts in any area that contributes to a country's long-term growth and development.

Aside from standard financial facilities, development banks frequently collaborate with International Financial Institutions (IFIs), such as the European Investment Bank (EIB), in a variety of ways, such as creating particular investment platforms or acting as Fund Managers for ESI Funds.

3.2.2.1 European Investment bank

Since its founding in 1957, the European Investment Bank (EIB) has been investing in the energy industry as a publicly owned international financial organization whose shareholders are EU Member States. The Bank's energy lending has averaged around 12 to 14 billion Euros per year during the previous five years. The Bank's activities are divided into four categories:

1. Unlocking energy efficiency
2. Decarbonising energy supply
3. Supporting innovative technologies and new types of energy infrastructure
4. Securing the enabling infrastructure

For some years, the EIB has been highly engaged in energy efficiency, and it will develop a new European Initiative for Building Renovation (EIB-R) in collaboration with the European Commission to promote innovative approaches to attract capital for building rehabilitation. Moreover, the EIB will consider funding up to 7% of qualifying capital expenditures under this initiative as an exemption to its general rules.

The EIB offers both general loan products and finance for the energy sector. In the case of generic products aimed at the public sector, it covers up to half of the program's expenses, which typically begin at 100 million Euros. If the program also receives EU funding, the EIB and EU funding combined cannot exceed 70% of the overall project investment expenditures.

Some of the tools that the EIB uses to implement specialised products for the energy industry include:

1. EFSI (European Fund for Strategic Investment) lending
2. PF4EE (Private Finance Instrument for Energy Efficiency)
3. Marguerite Fund
4. NER 300

3.2.2.2 European Bank for Reconstruction and Development

The European Bank for Reconstruction and Development (EBRD) is owned by 70 countries across the five continents, as well as by the European Union and the European Investment Bank. Among EBRD shareholder countries, the EU Countries that are both an EBRD and a MAKING-CITY target are: Bulgaria, Finland, Italy, Poland, Spain, The Netherlands and Turkey.[13]

Energy is a significant intervention area for the EBRD, which aims to improve energy efficiency, accelerate the transition to a low-carbon energy sector, rethink energy systems to empower consumers, and develop new business models for both efficient energy supply and consumption. The Green Economy Transition (GET) method is the EBRD's strategy for assisting countries in developing low-carbon economies. Green investment, concessional financing, and innovative financial instruments are among the services provided by the EBRD, which works with bilateral and multilateral donors to offer funding at market rates and in accordance with good banking standards.

EBRD has so far sponsored 373 projects with a total investment of 16,7 million Euros. In fact, EBRD intervenes directly in large-scale initiatives ranging from 3 to 250 million Euros; smaller projects can be realised with EBRD contributions, but only with the help of commercial local banks with which the EBRD has cooperates. EBRD does not offer specific energy financing, however it offers a diverse range of financial instruments that may be used to support energy transition related projects. Furthermore, it is important to note that EBRD manages the Green Economy Financing Facility (GEFF) and the Sustainable Energy Financing Facilities (SEFFs) with the help of local banks.

[13] https://www.ebrd.com/shareholders-and-board-of-governors.html

Country	Bulgaria, Finland, Italy, Poland, Spain, The Netherlands, Turkey
Programme/Fund	EBRD Financial Facilities
Type of provider	Country specific, European Union and the European Investment Bank
Type of financing	Loan (amount: 3 - 250 million Euros), with repayment period up to 15 years
Interest rate	Fixed or floating, market rates: a margin is added on to the base rate (LIBOR) depending on Country risk and project-specific risk
Fees	Commitment fee, payable on the committed but undisbursed loan amount

Country	Bulgaria, Finland, Italy, Poland, Spain, The Netherlands, Turkey
Programme/Fund	EBRD Financial Facilities
Type of provider	Country specific, European Union and the European Investment Bank
Type of financing	Equity (Ticket size: 2 - 100 million Euros)
Type of shares	Ordinary/preference/redeemable preference shares
Duration	No long-term equity investment

3.2.2.3 Black Sea Trade and Development Bank (BSTDB)

Since 1999, the Black Sea Trade and Growth Bank (BSTDB) has supported economic development and regional cooperation in the Black Sea Region from which Turkey is the only MAKING-CITY member country.

BSTDB offers a variety of traditional financial services, including loans, equity, and guarantees. These funds are not limited to a single industry or sector, but can be used to fund energy and energy transition projects. Indeed, the BSTDB supports environmental and social sustainability in its Member States, for example, by tackling climate change and encouraging the use of natural resources in a sustainable manner. BSTDB has so far supported a number of renewable energy projects (PV, biogas and wind).

BSTDB, an international financial institution, engages with EU institutional entities. it has created a SME program in partnership with the EIB and co-financed various activities with the European Bank for Reconstruction and Development.

IFIs and Development Banks

CASE STUDY

Country	Poland
Programme/Fund	Bank Gospodarstwa Krajowego
Type of provider	State development bank
Type of financing	Thermo-modernisation bonus renovation premium compensation premium
Beneficiary	Investors

3.2.3 Commercial banks

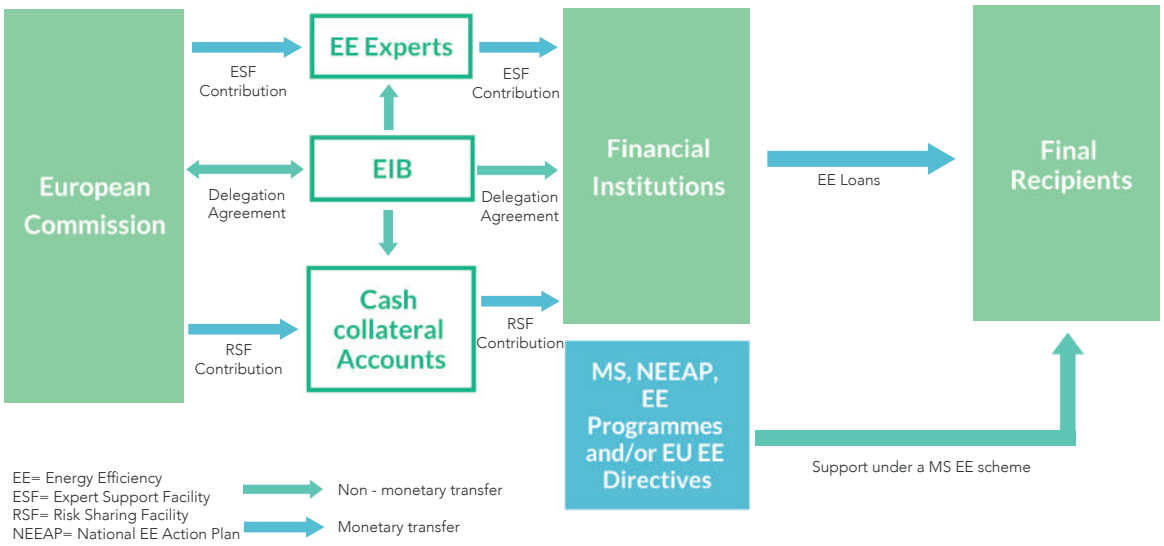
Commercial banks do not often provide products customized expressly for energy efficiency investments, although they do manage several public platforms on behalf of national or regional management authorities. Below, commercial banks were solely considered as managers of EU financial instruments. The management of public funds by private specialized professional entities ensures a high degree of spread of the EU financial measures.

The most relevant financial instruments accessible and managed by commercial banks in the energy sector are PF4EE – Private Finance for Energy Efficiency and GEFF – Green Energy Financing Facility.

3.2.3.1 Private Finance for Energy Efficiency

The Private Finance for Energy Efficiency (PF4EE) Instrument was agreed by the European Commission and the European Investment Bank the PF4EE Instrument is funded by the Directorate General for Climate Action ("DG Clima") under the Programme for Environment and Climate Action ("LIFE Programme"). It operates through private sector partner banks, which use the instrument to offer preferential energy efficiency financing in their national markets to sustain the implementation of National Energy Efficiency Action Plans. The PF4EE Instrument has two basic objectives:

1. Turning energy efficiency loans into a more sustainable activity inside European financial institutions by encouraging them to treat the energy efficiency industry as a separate market segment.
2. Increasing the amount of debt finance available for energy efficiency projects.



The PF4EE Instrument combines portfolio-based credit risk protection provided by cash collateral (the "Risk Sharing Facility") with long-term financing from the European Investment Bank (the "EIB Loan for Energy Efficiency"). Expert assistance services for Financial Intermediaries (the "Expert Support Facility") can be made available to help with the implementation of the PF4EE Instrument. The LIFE Programme has allocated 80 million euros to credit risk mitigation and professional support services. The EIB has agreed to leverage this amount, making a minimum of 480 million Euros in long-term financing available.

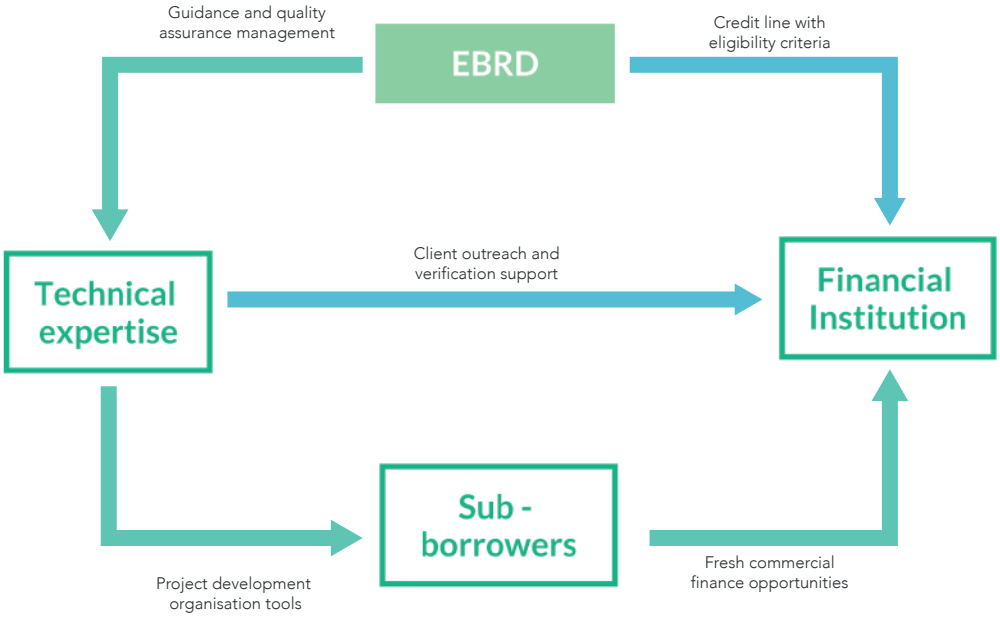
This instrument can finance energy efficiency projects with a very different size: both initiatives entailing an investment of 10 thousand Euros to initiatives requiring million Euro investments. Under this program, the EIB developed a new tool, the Energy Efficiency Quick Estimator (EEQuest), which estimates the savings potential for about 20 typical energy efficiency projects, such as replacing a boiler or adding LED lights and solar panels. This tool help banks appraise a project's design and energy savings, which usually takes a lot of work and expense for a lending bank.

3.2.3.2 Green Economy Financing Facility

The Green Economy Financing Facility (GEFF) is another programme among those supporting the energy transition projects. GEFF aids businesses and homeowners that want to invest in green technology. The European Bank for Rural Development (EBRD) manages the Facility and operates through a network of 140 financial institutions in 26 countries.

Furthermore, local financial institutions lend the funds which they have received from the EBRD to their clients, including small and medium-sized businesses, corporate and residential borrowers, and renewable energy project developers.

Local implementation teams allow for further outreach to customers in need of green technology solutions, while project development support aids in identifying suitable technologies and quantifying their advantages (climate mitigation, adaptation or other environmental benefits).



Bulgaria, Poland, Slovakia and Turkey are among the 29 countries addressed by the GEFF and are also MAKING-CITY members. Each of these countries are assigned to a certain facility. The GEFF is one of the Sustainable Energy Financing Facilities (SEFFs) operated by the European Bank for Reconstruction and Development (EBRD).

Commercial banks

CASE STUDY

Country	The Netherlands, Belgium, United Kingdom, Germany, Spain
Programme/Fund	Triodos Bank
Type of provider	Commercial Bank
Type of financing	Loans and other actives for supporting the implementation of sustainable and social awareness projects
Beneficiary	Individuals and companies
Case study	Advancement of public subsidies A partner from one of our projects (CITYFIED in this case) get financial support to start the construction works for the energy retrofitting meanwhile the prefinancing and EU payments became

Country	EU Countries
Programme/Fund	BNP Paribas Fortis
Type of provider	Country Specific Commercial Bank
Type of financing	Grant/Loans or equivalent
Beneficiary	Public administrations, workers' and employers' organisations, NGOs, charities and companies
Case Study	The Saint-Nazaire wind farm project , BNP Paribas & METRON , BNP Paribas Real Estate & Metal 57

Commercial banks

CASE STUDY

Country	Spain
Programme/Fund	Banco Santander
Type of provider	Country Specific Commercial Bank
Type of financing	Private Finance for Energy Efficiency (PF4EE)
Beneficiary	Private Corporations
Case study	EUR43000 investment in Gran Canaria to install a new chiller with a heat recovery system at IFA Continental Hotel. The intervention allowed annual energy savings in excess of 114.400 kWh, corresponding to annual cost savings of about EUR7000

Commercial banks

CASE STUDY

Country	Spain
Programme/Fund	Avanza Credit from Deutsche Bank
Type of provider	Commercial Bank
Type of financing	Loans for retrofitting project through the product called "Prestamo Huella 0"
Beneficiary	comunity owners or cities for district retrofittings

Commercial banks

CASE STUDY

Country	Turkey
Programme/Fund	Şekerbank
Type of provider	Commercial Bank
Type of financing	Subsidised Loan
Beneficiary	Private corporations, households

Country	Turkey
Programme/Fund	Garanti Bankası
Type of provider	Commercial Bank
Type of financing	Subsidised Loan
Beneficiary	Private corporations, households

Country	Turkey
Programme/Fund	Yapı Kredi Bankası
Type of provider	Commercial Bank
Type of financing	Subsidised Loan
Beneficiary	Private corporations, households

Country	Turkey
Programme/Fund	Türkiye İş Bankası
Type of provider	Commercial Bank
Type of financing	Subsidised Loan
Beneficiary	Private corporations, households

3.2.4 Investment funds

In terms of time and investor expectations, investment funds can be:

- Private Equity Funds: mostly invest in opportunities at the higher end of the risk/return profile, aiming for a quick way out, with a short to medium investing time horizon;
- Real Estate Funds: with medium-long investment duration time;
- Infrastructure Funds: yield stability and long-term time horizon.

The most common funds in the energy transition domain are infrastructure funds, which have an investment horizon that corresponds to the life of the infrastructure.

Commercial investment funds provide a diverse variety of project types with varying risk-return profiles. These are often capital-intensive investments that may be made under long-term agreements with public sector institutions through public-private partnerships (PPPs). Infrastructure funds are quite diverse in terms of project type, stage of development, and area.

The mapping and grouping of investment funds have been done based on their characteristics. Unlike banks, investors providing capital target companies with a high growth potential. Because of the unique characteristics of energy projects, private, governmental, and public-private investment funds are springing up across Europe. These funds are mostly interested in large-scale projects (above € 10 million) and brownfield initiatives. Projects needing such a large quantity of resources can be planned, for example, by combining various investments to be realized over a city district. Furthermore, certain investment areas, such as sustainable transportation and energy storage, are less focused than others.

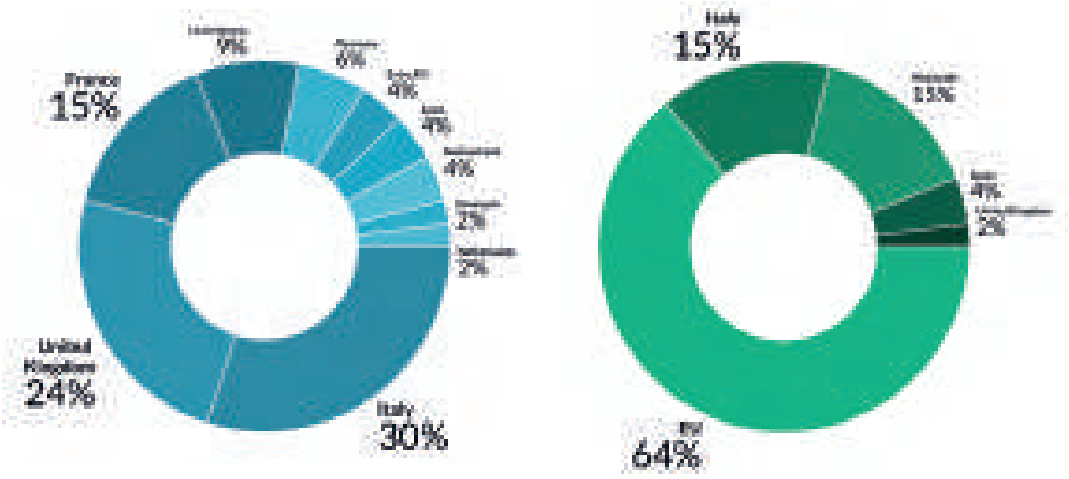
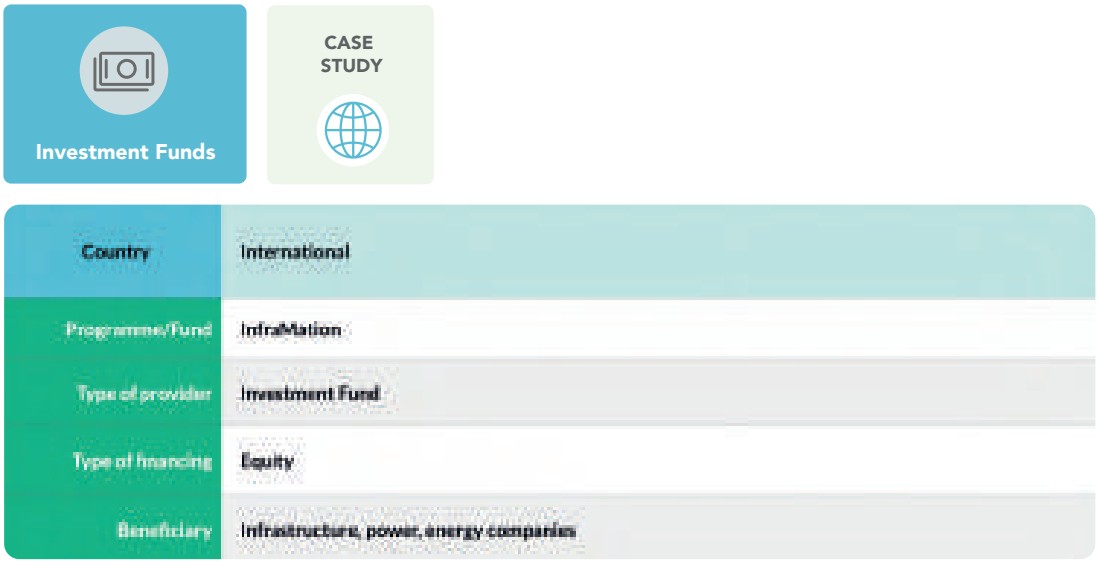


Figure 9 Investment Fund Location (left) and Investment Geographic target (right) (Based on M. La Russa et al. 2020)

Consequently, increasing capital with the help of investment funds can be a viable funding option for private promoters who are working on projects with significant development potential and require large amounts of capital (about € 10 million).



Investment Funds

CASE STUDY

Country	Spain
Programme/Fund	IVACE
Type of provider	Country Specific Investment fund
Type of financing	Grant/Loans or equivalent
Beneficiary	Firms with special domain on energy saving, Companies and entities of the Valencian Community
Case study	Aid for promotion of electrical self-consumption installation for companies and entities 2021

Country	Spain
Programme/Fund	EnerAgen: Official Gazette of the province of Burgos
Type of provider	Country Specific Investment fund
Type of financing	Grant/Loans or equivalent
Beneficiary	Firms with special domain on energy saving
Case study	"Your Burgos Origin and Destination Station" For installations of electric power in service stations in the province of Burgos located in municipalities with a lower population, to 20.000 inhabitants.

Investment Funds

CASE STUDY

Country	France
Programme/Fund	Economie d'Energie SAS and BNP Paribas
Type of provider	Country Specific Investment fund and Commercial Bank
Type of financing	Grant/Loans or equivalent
Beneficiary	Private clients looking for financial solutions for energy and renovation projects
Case Study	Mon Projet Renovation

3.2.5 Crowdfunding platforms

Crowdfunding is mainly done through online platforms that specialise in this type of financial service (fintech). The goal of crowdfunding is to establish community initiatives using capitals provided by residents who will benefit directly not only from the initiative's financial return, but also from its positive externalities.

Contrary to investment funds, crowdfunding platforms use a fund-raising logic that allows them to collect funds for single specific projects, hence allowing them to convey the goal of their investment to the citizens in a clear manner. Projects supported through crowdfunding are often small-scale due to their local nature: goals are typically less than € 1 million.

Citizens' direct engagement as consumers, but also as investors, is becoming more prevalent in the context of energy transition sustainable urbanisation. Such is conveyed in the expansion of energy cooperatives and participatory approaches for the development of renewable energy investments across Europe.

In this context, comparable concepts apply to the use of crowdfunding in the energy sector. Similar to energy cooperatives, crowdfunding platforms include citizens and stakeholders, allowing them to participate, contribute, and profit economically from investments in the energy industry.

In the energy sector, crowdfunders often invest in renewable energy projects such as solar, wind, and biomass. Solar photovoltaic projects are the most common among them, accounting for 70% of all projects funded. Energy crowdfunding, on the other hand, is showing a rising divergence in terms of technology in countries where it is more widely used. Correspondingly, projects in the fields of energy efficiency and biofuels are also on the rise.

More than 90% of active platforms are crowd investing in equity and loan mode (to invest and raise cash), while the rest offer projects based on rewards in donation or reward mode. The financial platforms provide ownership, loans, or community shares for initiatives outlined by the company.

When it comes to crowdfunding, there are two important elements to consider:

- Access to capital, as a new and alternative type of institutional finance for the financing of energy projects: preliminary research suggests that access to capital is faster and easier than other alternative forms of funding;
- The ability to involve local citizens and stakeholders: this allows on the one hand to expand the pool of potential investors, while increase the visibility of projects and, potentially, overcome any local opposition due to the implicit redistribution of resources on the territories through the recognition of economic returns to local investors.

Germany, the Netherlands, and France account for 55% of the crowdfunding platform. One of the distinctions of crowdfunding in comparison with investment funds is the maintenance of the local geographical relationship between the project and the financing community.

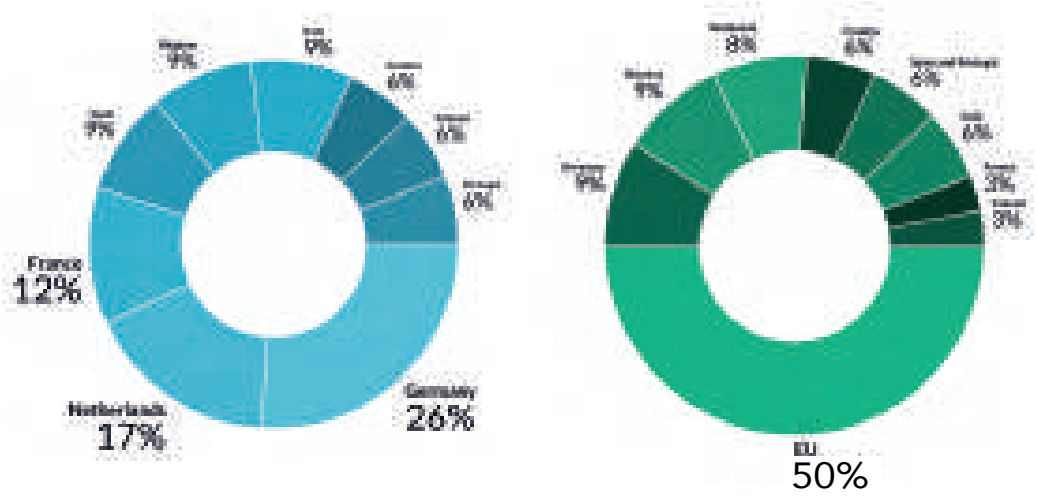


Figure 10 Investment Platform Location (left) and Investment Geographic target (right) (Based on M. La Russa et al. 2020)

Crowdfunding platforms provide a wider range of financing options than traditional investment funds. For instance, equity platforms (equity crowdfunding) and debt platforms (crowdlending) are among the instruments that can be utilised for a project. Other alternative instruments, such as subsidised equity and subordinated loans (both in the "other" category), are available on both platforms in addition to regular instruments.

The amount of equity that may be covered by an equity crowdfunding campaign varies, ranging from 30% to 100% depending on the project. Platform funding, in general, is extremely flexible and adapted to the specific demands of each project and its sponsors. Similarly, a crowdlending platform may provide bridge financing up to 100% of the whole project cost and thereafter maintain a funding level of roughly 30% of the total project cost.

Equity IRR rates on equity crowdfunding platforms typically vary from 5% to 10%. The platform can achieve a target return of up to 15% if it invests in innovative projects. The minimum investment for tickets is low, starting at approximately € 50,000. The average investment is less than € 500 thousand, while the highest investment is lower than € ten million.

Interest rates on crowdlending platforms are more aligned with one another, ranging from 4% to 7%. The minimum investment is € 100,000, with an average of €500,000. In terms of maximum amount of funding, as an example one platforms can provide up to € 8 million.[14]

The typical loan maturity is about 8 years, with certain platforms offering short-term financing (i.e. 1–2 years) and others offering longer-term finance (up to 15 years). In most cases, the collateral required is minimal; it may include guarantees from a potential holding company, asset pledges, subordination only after senior financing, and suretyship.

[14] M. La Russa, A. Martinez, A. Montanelli, E. Palmarin, S. Dourlens-Quaranta. (2020). NESOI Deliverable 1.5 –" Mapping of Financial Instruments". NESOI Project.

In terms of target beneficiaries, usually crowdfunding platforms finance single projects or portfolios of projects, as well as special purpose entities and small and medium-sized enterprises (SMEs).

However, because these platforms use a bottom-up approach, starting with the single project to be completed, the range of possible beneficiaries is wide, including public institutions, start-ups, and non-governmental organizations (NGOs). Large businesses are seldom funded for a variety of reasons, the most common of which being project size and the capacity to locate financial resources.

CASE STUDY

Country	EU countries
Programme/Fund	Citizenergy
Type of provider	Crowdfunding Platform
Type of financing	Equity and Lending crowdfunding
Beneficiary	Energy cooperatives (working on wind turbines, solar rooftops, biogas plants, etc.) covering small districts, entire cities, regions or on a national level
Case study	Soleil de Sainte-Sévère - France, a photovoltaic park project to be constructed on a former technical landfill center for household waste

4 Conclusion and next steps

The above easy-to-use models and providers have been developed based on the consortium's desk research and experiences in order to assist cities and city suppliers to self-evaluate their project and identify the relevant financial path, and eventually, financial sources.

The goal is to provide potential beneficiaries a roadmap that shows which financial models may be used to fund a project and, in turn, which financial providers can put the chosen model into action.

Furthermore, the outcome is aimed to be used as an input within deliverable 4.5, Financial plan of PED in follower cities (Bassano, Kadikoy, Leon, Vidin, Trenčin and Lublin) lead by Demir Enerji (25 - DEM) and due at month 42. This deliverable is about financial scheme-investment plan and discussed several financial resources that could be suitable to address a financial plan for a PED. The first business model is focused on the energy consumption reduction. Refurbishment actions are needed in this case and could be financed by means of well-known business models as energy service contracts, etc. in combination with subsidies from the municipality and other public administrations (regional, national...). After that, an intensive set of actions focused on on-site energy generation will be necessary. Sometimes, a suitable joint approach for district refurbishment and RES facilities improves the business case and makes this more attractive for private investments. Finally, it will be essential to strengthen those facilities that allow energy surpluses exchange as district heating, storage, etc.,

Consequently, once technologies selected for each follower city and assessed from a financial and economic point of view, appropriate financial instruments will be identified following the earlier proposed toolbox in chapter 3 of this deliverable. Below a summary of the reasoning of the approach used within this chapter is provided.

Crowdfunding is an appropriate model for initiatives in all energy sectors that are characterised by smaller cutbacks and have a strong local connotation.

PPPs may be a great way to fund projects that have a significant public benefit or if the beneficiary is a public institution. Cogeneration plants, for example, may only be funded through PPPs if they are built in public facilities such as hospitals, schools, public buildings, and local community district heating plants.

A public-private partnership (PPP) is a flexible funding strategy for infrastructure expenditures that may be constructed around a project.

Project financing is used to fund bigger, high-cost, long-term infrastructure and energy assets, notably large-scale renewable energy projects, and is typically fueled by non-utility sponsors such as independent project developers' "debt overhang."

EPC is a risk transfer mechanism for energy efficiency projects that allows the project developer to shift the risk of future energy savings to a third party (i.e. ESCO).

Project bonds can be used to fund capital-intensive infrastructure projects and large-scale investments in both greenfield and brownfield projects; however, project promoters should be aware that this financing option may come with high transaction fees.

ESIF financial instruments are appropriate for any initiatives that are unable to secure funding on private markets, such as innovative projects that financial markets are unable to assess or that are deemed too risky. They're ideal for financing small and medium-sized energy projects that require long-term loan repayment plans or patient equity investors.

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