



Integrated Financial and Contracting Tools



Set of financial instruments integrated with Demand Side Management
D.T2.2.4

CE51 TOGETHER





INTERREG CENTRAL EUROPE 2014-2020

TOGETHER

TOwards a Goal of Efficiency THrough Energy Reduction

Set of financial instruments integrated with Demand Side
Management

D.T2.2.4



PP1 - Province of Treviso



PP4 - City of Zagreb



PP6 - Municipality of Paks



Executive summary

Successful energetic investments show that reliable energy planning provides the possibility for municipalities to base their investments on well-considered aspects, and avoid ad hoc decisions which might probably result in lower efficiency or even implementation problems. Energy strategies and action plans make a comprehensive assessment of opportunities and propose solutions to the energy supply of the municipality. They take into account the long-term development of the municipality in different areas and existing energy capacity. They are designed to enhance awareness and information of the consumers of energy and the preparation of measures in the field of energy efficiency and the introduction of new energy solutions. Based on the analysis of energy demand and supply they make it possible to maximize energy efficiency for all consumers (households, industry, trade, public buildings, etc.).

However, the lack of financial resources often hinders the implementation of the energy efficiency, renewable energy and awareness raising activities of these action plans. On the other hand, experiences of the TOGETHER partners show that this obstacles are often deriving from insufficient information on the available funds. The EU provides financial sources with even up to 85-100% support to:

- sharing experiences on successful developments,
- preparation of investment projects,
- research activities and testing new technologies,
- implementing the investments, installing devices.

The current tool intends to support municipalities in finding the most appropriate financial tool for their energy efficiency action in terms of project size, co-financing rate, eligible partners and focus of the development.

In the first part it describes the main aspects of energy refurbishment project, and presents the traditional method of financing energy refurbishment projects. From the 2nd chapter the tool introduces the currently available financial possibilities which are available for municipalities and some other kind of entities of the EU Member States. At the end of the 3rd chapter even some alternative financing schemes are indicated, which are scarcely known by most of the beneficiaries.

We hope that the current tool will reveal several financial possibilities for the Reader and assist in defining, planning and delivering the necessary energetic investment, which will contribute to the reduction of energy consumption and the related GHG emissions in the European Union.



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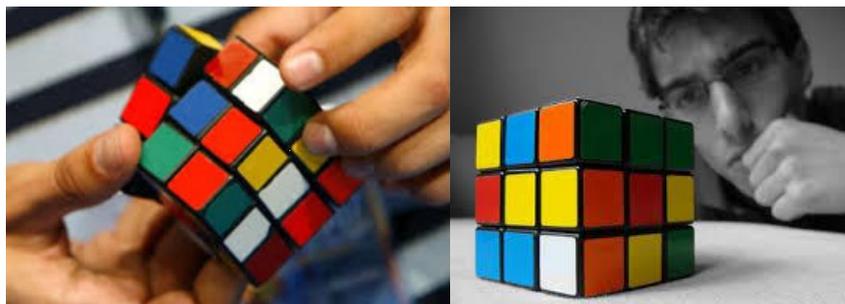
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1. Introduction

The Project TOGETHER offers a transnational capacity building platform, where partners with different levels of knowledge can strengthen their competences together, thus reducing their disparities and promoting actions on both the supply and demand side, in the context of planning EE in public buildings. The main goal of the project is improving energy efficiency and energy saving in public buildings by changing behaviour of building users and promoting energy efficiency measures.

This tool is contextualized within the framework of the second objective of the project TOGETHER: if the first project objective “To increase energy efficiency and secure investments thanks to improved multidisciplinary in-house staff skills and thanks to an Alliance system with more engaged and motivated buildings users” calls for the observation and learning of possible tools to be combined together for achieving energy efficiency in public buildings, and the second one “To produce and test the most appropriate combinations of technical, financial and Demand Side Management tools for the improvement of the energy performance of public infrastructures” calls for the practical and concrete implementation of the possible identified measures.



1.1. Project TOGETHER

The three main objectives of the project TOGETHER consist in:

1. Increasing public buildings energy efficiency and securing investments, through the improved multidisciplinary in-house staff capacity building of Public Administrations and the establishment of a system of alliances with more engaged and motivated building users;
2. Producing and pilot testing the most appropriate combinations of technical, financial and Demand Side Management tools for the improvement of the energy performance of public infrastructures, currently in the 8 regional Pilot Actions involving a total of 85 buildings;
3. Codifying the project outcomes into a comprehensive policy package for a large-scale implementation, bringing local buildings governance practices to the centre of ambitious energy saving policies.

In its inception, TOGETHER plans the organisation of an interdisciplinary “Training of Trainers” course for building owners, managers and public decision makers that integrates the traditional technical inputs on energy management and buildings retrofitting with targeted contributions from behavioural science, economics and psychology, aiming to engage the end users in the building energy performance goals.

The “Training of Trainers” course is completed by the provision of an Integrated Smart Toolkit, including:

1. Guidelines for implementing the innovative EPIC (Energy Performance Integrated Contract) scheme, combining technological devices and behavioural-based components;
2. A set of exemplary models of Energy Management Systems in schools, institutional and other type of buildings;
3. An innovative Building Alliance concept among building owners/managers/users who cooperate within a Negotiating Panel to achieve energy savings to be reinvested through a Reinvestment Action Plan.

Additionally, and by the project’s end, the Partners will jointly elaborate a Transnational Strategy and Mainstreaming Programme, including policy/strategic and operational recommendations for an appropriate follow-up and a sustainable take-up of the project outputs.

1.2. Purposes of the handbook

The current tool aims at introducing those financial equipment, which can be applied in order to finance the energy efficiency refurbishments and related behavioral influencing activities of the building users. Some of the listed financial tools are better known by the decision makers and technical experts of the municipalities, as they are widely communicated and applicants have wide experiences in applying for them. These tools are mostly the operational programmes of the given countries, financed by Structural Funds - mostly by the European Regional Development Fund. Other tools are not known or applicants are not interested in using them due to the lack of information - which on one hand hinders to fit the financial programmes to the planned investments, on the other hand the lack of routine and poor information makes these funds look risky for the applicants, and they don’t intend to waste their capacities into projects which have poor chance to be approved. The current tool intends to fill this gap and introduce all related programmes in details in order to make it possible for the users to evaluate, which programmes are adequate for their development, and above, how they can even cooperate with other applicants.

1.3. Usage of the handbook

The tool defines the measures that have to be taken into account during the preparation of energetic investments. It clarifies the applicable technologies and soft interventions of energy efficiency investments and presents the related financial sources by starting with the basics of EU financing tools to the details of alternative financial such as crowdfunding or green loans.

Local or regional municipalities are advised to use this tool during the elaboration of their energy strategies, Sustainable Energy and Climate Action Plans and even the feasibility and technical studies of the planned energetic investments. By analyzing the requirements and differences of the funds, the users will be able to decide on the best fitting funding source from the desired aspect of the investor - e.g. minimalized payback period, low risk or highest financing rate.



2. Energy refurbishment realization models

2.1. Energy refurbishment of public buildings

The total floor area of buildings is around 25 billion m² in EU, non-residential buildings represent more than ¼ of the total and are on average 55% more energy intensive than residential buildings (286kWh/m² compared to 185 kWh/m²)¹. In 2014, the building sector accounted for 40% of final energy consumption, which enthrones it as the largest end-use sector in the EU-28. In some Member States (MS) this share even exceeds 45%, as shown in Figure 1. Around 1/3 of the consumption in buildings is for non-residential, however in some countries such as Luxemburg, the Netherlands, Italy, Portugal non-residential consumption in buildings is higher than in other MS and represent around half of the total consumption of buildings.

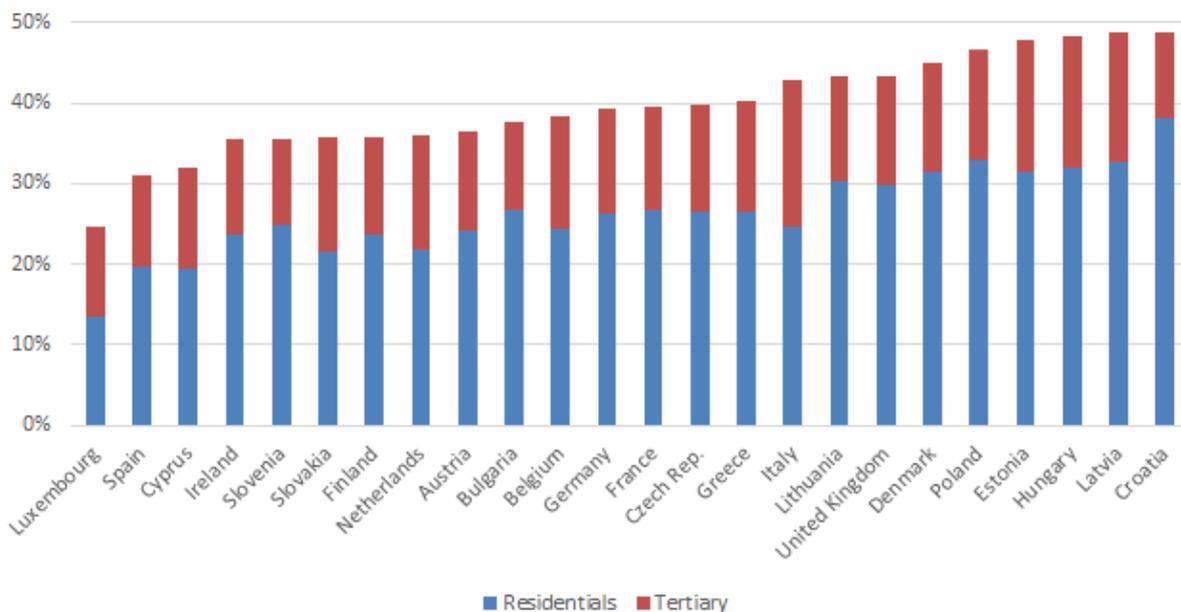


Figure 1: Share of buildings in final consumption (2014), source: ODYSSEE data base, Enerdata

Moreover, the buildings account for 36% of the EU’s CO₂ emissions and 55% of its electricity consumption. Therefore, the buildings play a key role in the EU’s energy and climate policy. As stated in the Energy Efficiency Directive, they are “...crucial to achieving the Union objective of reducing greenhouse gas emissions by 80-95 % by 2050 compared to 1990... The rate of building renovation needs to be increased, as the existing building stock represents the single biggest potential sector for energy savings”.

Buildings owned by public bodies account for a considerable share of the building stock and have high visibility in public life. Therefore, energy refurbishment of public buildings is aimed not only to reducing energy consumption, but also to provoke similar actions in other sectors and among other stakeholders as well. This “lead-by-example” role of the public sector in energy refurbishment of buildings and in energy

¹ ODYSSEE-MURE project: “Energy Efficiency Trends and Policies in the Household and Tertiary Sectors”, June 2015, available at: <http://www.odyssee-mure.eu/publications/br/energy-efficiency-trends-policies-buildings.pdf>

efficiency in general is emphasised in EU directives on energy efficiency (EED), energy performance of buildings (EPBD) and renewable energy sources (RES) directive.

Deep renovation (refurbishment) of existing buildings is needed to phase-out inefficient buildings from the EU building stock. It implies implementation of all cost-effective measures that will reduce both delivered and final energy consumption by a significant percentage as compared with pre-renovation levels, leading to a very high energy performance. Additional efforts for introducing renewables at the supply side will push renovation towards the nZEB standard. By stimulating deep renovation, a full economic potential for energy savings will be utilised, avoiding this way a lock-in-effect. However, the decision on the depth of renovation is governed by the investment costs and overall cost-effectiveness of the investment². Therefore, finding the right financing models, which are in the focus of the interest of this Guidebook, are of great importance.

2.1. Energy savings and other indirect benefits of energy refurbishment

The above presented data clearly show the significance of buildings in the overall EU's energy consumption. The benefits of energy refurbishment of buildings are multiple and they range from individual benefits at the building owner/user level to the while society/economy benefits.

The first, immediate benefit of energy refurbishment, are energy cost savings that result from the reduced consumption (for the same level of comfort). The level of cost savings depends on the level of energy savings and price of energy. While energy price varies depending on the energy carrier and the market, energy savings depend on the depth of renovation. There is still no universal definition of the deep renovation, but some efforts have been made in this field, which provide the idea on the expected level of savings³:

- Minor renovations: the implementation of 1 or 2 measures (e.g. a new boiler) resulting in a reduction in energy consumption up to 30% (with average costs of €60/m²).
- Moderate renovations: involving 3-5 improvements (e.g. insulation of relevant parts of the dwelling plus a new boiler) resulting in energy reductions in the range of 30%-60% (with average costs of €140/m²).
- Extensive renovations: in this approach, the renovation is viewed as a package of measures working together leading to an energy reduction of 60%-90% (with average costs of €330/m²)
- Almost Zero-Energy Building renovations: the replacement or upgrade of all elements which have a bearing on energy use, as well as the installation of renewable energy technologies in order to reduce energy consumption and carbon emission levels to close to zero (with average costs of €580/m²).

It is estimated that (deep) renovation of buildings could lead to a 75% reduction in final energy consumption at the EU level in 2050 (in comparison to 2010), while reductions in gas and oil consumption could be up to 95% and 97%, respectively⁴. Taking into account EU's high dependency on energy imports, with import dependency reaching 53.5% in 2014 according to Eurostat, it is obvious that renovation of the

² ODYSSEE-MURE project: "Policy Brief - Renovation of Buildings", February 2017, available at: <http://www.odyssee-mure.eu/publications/policy-brief/renovation-building.html>

³ DG for Internal Policies, Policy Department A: Economic and Scientific policy: "Boosting Building Renovation: What potential and value for Europe?", October 2016, available at: [http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL_STU\(2016\)587326_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL_STU(2016)587326_EN.pdf)

⁴ *Ibid.*

EU's existing building stock would reduce the energy imports, thus improving European energy security. Additionally, expenditure for energy imports, which were 2.5 times higher than the EU trade balance in 2013-2014 would be reduced and available for re-allocation to other purposes.

Energy savings are also translated into the environmental benefits, dominantly reduced CO₂ emissions arising from fossil fuel use. As already pointed, energy refurbishment of buildings can significantly contribute to the reduction of greenhouse gas emissions up to 90% by 2050 compared to 1990 level. However, not only emissions of greenhouse gases will be reduced, other pollutants emissions will decrease as well, leading to improved air quality and reduced related health issues.

Health issues are also tackled by the fact that energy refurbishment will improve indoor thermal quality and reduce problems like mould, humidity and drafts. Additionally, in residential sector, Europe is faced with rising fuel poverty, which is reflected in the fact that 11% of European population was unable to keep their homes warm in the winter. This is especially the case in the MSs with per capita GDP below the EU average. Therefore, reducing energy needs of buildings and consequently the energy bills of the households is essential for alleviating fuel poverty and achieving social and territorial cohesion at the EU level.

Apart from improved indoor thermal comfort, energy renovation will also bring economic benefits to the owner/user of the building. The most obvious are, of course, reduction of costs. However, there is more. First, the value of the property will increase. Some studies show that a property with energy performance rating A will achieve 11% higher price than a D rated property at the same location⁵. Secondly, when it comes to energy refurbishment of public buildings, public buildings, it will reduce government expenditures, which could be allocated for different purposes. Additionally, the pressure on the government budgets may also be reduced due to increased employment, which leads to less expenditures related to the unemployed support.

Namely, energy refurbishment of buildings will have also positive effects on the economy. Namely, the building sector is responsible for 7% of the EU GDP. It employs over 11 million people, whereas specialised construction activities that include renovation work and energy retrofits account for two thirds of overall employment in the sector. These activities are dominantly provided by SMEs. Therefore, stable demand for energy refurbishment induced by smart policies would trigger further development of building related SME sector, enhance the prominent role specialised activities already play in terms of value added and employment, contributing this way to overall EU's economic growth.⁶

Benefits from energy refurbishment are summarised in Figure 2.

⁵ *Ibid.*

⁶ Joint Research Centre (JRC): "Energy Renovation: The Trump Card for the New Start for Europe", 2015

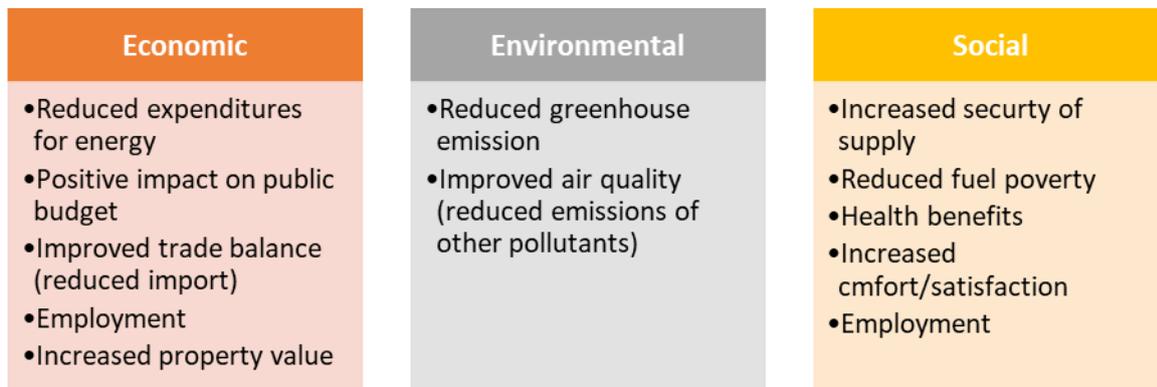


Figure 2: Overview of benefits from energy refurbishment of buildings

2.2. Traditional method of financing energy refurbishment projects

As any activity, energy refurbishment has its related costs, which vary according to the depth of the refurbishment, as briefly presented above. Therefore, any decision on energy refurbishment of a building must carefully evaluate these costs and ensure financing, in order to reap the above discussed benefits after the implementation.

Traditional financing of projects in cities and municipalities relies dominantly on the use of own budget or taking a commercial loan.

One of the financing challenges facing municipalities, more often for smaller municipalities rather than larger ones, is the insufficient revenue base with which to fund projects (not only EE projects, but also other development projects as well). An insufficient revenue base, which may be the result of a small number of tax-paying commercial businesses and/or high-income residents, can reduce the availability of adequate funds for capital investments. Municipalities depending on revenue transfers from regional or national governments often have limited revenue-raising powers. Such limitations imply that any decision to invest in an EE project either requires the municipality to reallocate funds or convince higher levels of government that the EE project is economically viable. This may often not be a simple task. Reliance on transfers from other levels of government also exposes municipalities to the risk that permitted levels and uses of funds may be affected by changes in national budgetary or political priorities. This introduces further uncertainties and makes commitment to multi-year programs of capital expenditures more difficult.⁷

When it comes to loans, i.e. borrowing, national governments often impose limits on borrowing by municipalities to prevent them getting into financial difficulties. These restrictions may take the form of limits on the use of loan funds and/or on the total amount that municipalities may borrow. In both cases, EE projects are likely to lose out, because they are not typical capital expenditure projects that can be readily assessed and approved by higher authorities. In addition, when debt ceilings are in place, EE projects, with relatively low public profiles, are likely to have a lower priority than other pressing or mandated needs.⁸

⁷ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: “CF4EE - Crowdfunding for Energy Efficiency”, October 2016, available at: <http://www.ieadsm.org/wp/files/2016-10-28-CF4EE-Feasibility-Study-final.pdf>

⁸ *Ibid.*

Obviously, cities and municipalities need to be aware of the sources of financing that are at their disposal for EE projects. Additionally, there is a need to move from these limiting traditional financing methods. Namely, not only that the use of these methods is hampered by the obstacles briefly discussed above, they are also combined with usually poor knowledge and capacities at the local level to prepare viable projects. Therefore, new financing models that can address both overarching barriers to wider implementation of EE projects at city/municipality level - lack of capacities and limited access to capital - should be sought for.

The information provided in this Guidebook on available sources and models of financing EE projects is aimed to assist cities/municipalities to find the one that suit their needs the best.



3. Financing opportunities

3.1. European Structural and Investment Funds

For the current programming period of the EU a single set of rules covering the EU’s five Structural and Investment Funds (the ESI Funds) has been defined. The purpose of these rules is to establish a clear link with the Europe 2020 strategy for generating smart, sustainable and inclusive growth in the EU, improve coordination, ensure consistent implementation and make access to the ESI Funds as straightforward as possible for those who may benefit from them.



Figure 3: ESI Funds contributing to Europe 2020 Strategy in all three areas

The 2014-2020 programming period brought forward a new legislative framework for these five Funds, which fall under the EU’s cohesion policy, the common agricultural policy and the common fisheries policy. These five ESI Funds are the following:

- the European Regional Development Fund (ERDF),
- the European Social Fund (ESF),
- the Cohesion Fund,
- the European Agricultural Fund for Rural Development (EAFRD),
- the European Maritime and Fisheries Fund (EMFF).

The funds finance remarkable part of the national operational programmes of the member states, and they are also accessible through transnational programmes. For energetic investments the most relevant sources are the ERDF, Cohesion Fund, and in terms of awareness raising and education the ESF.

3.1.1. ERDF

Its purpose is to contribute to reducing disparities between the levels of development of European regions or specific social groups. ERDF funds can be used by research centres, local and regional authorities, schools, corporations, training centres, government departments, small and medium-sized enterprises, universities and non-profit organisations. Besides them, funds are also available for public bodies, some organizations in the private sector (especially small and medium-sized enterprises), non-governmental organizations and voluntary organizations. The ERDF can contribute to the financing of the following:

- investments in infrastructure providing basic services to citizens in the areas of energy, environment, transport, and information and communication technologies;
- investments in social, health and educational infrastructure;
- development of endogenous potential by supporting regional and local development and research and innovation;
- technical assistance.

Beneficiaries: Local, regional and national authorities; Social, cultural and educational institutions; NGOs; SMEs and associations

Focus areas:

- RES, smart distributions systems and EE infrastructure
- Research, Innovation and ICT
- Competitiveness of SMEs
- Low carbon economy
- Climate change adaptation and risk management
- Environmental protection and resource efficiency
- Sustainable transport

3.1.2. Cohesion Fund

It provides financial contribution to projects in the fields of environment and trans-European networks in the area of transport infrastructure (TEN-T). Project funds of up to 80 - 85 % are aimed at Member States whose Gross National Income (GNI) is less than 90% of the EU average and who implement National Convergence Programmes of joining Economic and Monetary Union. Among other fields, the Cohesion Fund can contribute to the financing of the following:

- environmental infrastructure and adoption of EU environmental standards,
- energy efficiency and renewable energy use.

In The EU member state countries several operational programmes (OPs) are financed by these two funds. Part of the calls of these OPs are providing support for energy investments at municipalities (like Territorial and Settlement Development OP in Hungary).

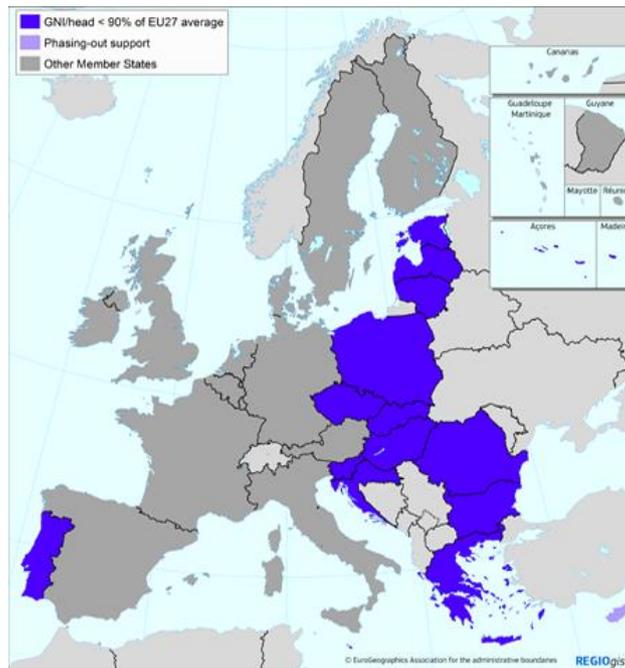


Figure 4: Cohesion Fund eligibility 2014-2020

Beneficiaries: Local and regional authorities

Focus areas:

- Energy: use of renewable sources and efficiency
- Low carbon economy
- Climate change adaptation and risk prevention and management
- Environment protection and resource efficiency
- Sustainable transport
- Institutional capacity

Types of funding:

- Grants
- Financial instruments: guarantees, loans, (quasi-) equity participation and other risk-bearing mechanisms, possibly with technical assistance support
- Indirect funding (e.g. loans, risk capital and seed funding)

3.1.3. ESF

The ESF is Europe's main instrument for supporting jobs, helping people get better jobs and ensuring fairer job opportunities for all EU citizens. In terms of energy management development the fund supports educational and awareness raising activities e.g. on renewables or energy efficiency investments.

Beneficiaries:

- Local, regional and national authorities
- Workers and employers org.
- NGOs
- Companies

Focus areas:

- Sustainability, quality and mobility of labour
- Social inclusion, combating poverty and discrimination
- Education
- Institutional capacity

There is a great variety in the nature, size and aims of ESF projects, and they address a wide variety of target groups. There are projects aimed at education systems, teachers and schoolchildren; at young and older job-seekers; and at potential entrepreneurs from all backgrounds.

3.2. European Funding Programmes

Over 76% of the EU budget is managed in partnership with national and regional authorities through a system of "shared management", largely through the above mentioned 5 big funds - the Structural & Investment Funds. In this chapter we introduce the most relevant programmes which are supported by ESIF and can be applied for energy or environment related investments.

3.2.1. Urban Innovative Actions

Approximately 359 million people - 72% of the total EU population - live in cities, towns and suburbs. Urban areas face multiple and interconnected challenges related to employment, migration, demography, water and soil pollution... But, they are also engines of new ideas and solutions, dynamic places where changes happen on a larger scale and at a fast pace. To answer the increasingly complex challenges they face, urban authorities need to go beyond traditional policies and services - they need to be bold and innovative.

Urban Innovative Actions (UIA) provides urban areas throughout Europe with resources to test new and unproven solutions to address urban challenges. Based on article 8 of ERDF, the Initiative has a total ERDF budget of EUR 372 million for 2014-2020.

Beneficiaries: Local authorities from a population of at least 50,000 inhabitants or an association/groupings of local authorities if the total sums up to 50,000 (can be cross-border, but territorial contiguity is strongly recommended).

Focus areas:

- Integration of Migrants and refugees
- Jobs and skills in the local economy
- Energy transition
- Urban poverty
- Climate adaptation, circular economy, housing, urban mobility, green procurement, digital transition, air quality and nature-based solutions

Until the middle of 2017, 2 calls have been announced. The different calls might differ regarding the announced areas.

Maximum 5.000.000 EUR can be applied, and only a few projects are granted in every call. The maximum intensity of the subsidy is 80%.

Evaluation: The Permanent Secretariat checks whether the applications comply with the eligibility and admissibility criteria listed in the UIA Terms of Reference. In second step a strategic assessment is carried out according to 4 weighted criteria: Innovativeness (40%), Partnership (15%), Measurability of results (15%), Transferability (10%)

Calls can be reached at: <http://www.uia-initiative.eu/en/call-proposals>

3.2.2. CIVITAS Activity Fund

CIVITAS is a network of cities for cities dedicated to cleaner, better transport in Europe and beyond. Since it was launched by the European Commission in 2002, the CIVITAS Initiative has tested and implemented over 800 measures and urban transport solutions as part of demonstration projects in more than 80 Living Lab cities Europe-wide.

The programme offers practitioners opportunities to see innovative transport solutions being developed and deployed first-hand, and learn from peers and experts working in the field. CIVITAS nurtures political commitment, new marketable solutions, and offers funding and knowledge exchange with a view to creating growth and better connected, more sustainable transport modes.

It works on 10 thematic areas, related to sustainable transport mobility covering:

- Car-Independent Lifestyles
- Clean Fuels & Vehicles
- Collective Passenger Transport
- Demand Management Strategies
- Integrated Planning
- Mobility Management
- Public Involvement
- Safety & Security
- Transport Telematics
- Urban Freight Logistics

The CIVITAS Activity Fund is a programme that supports the take-up of sustainable urban mobility measures in Europe by providing financial assistance for specific activities of the CIVNETS

Beneficiaries: Local authorities, Organizations such as transport operators, SMEs, universities, NGOs

Average co-financing in the past period was 75%. Applications for amounts ranging between €10 -11,000 are recommended per organisation. However, one may apply for lower or higher sums depending on their foreseen activities. The CIVINET activities fund comprises a sum of €30,000 for the establishment of 2-3 new networks.

The programme supports workshops, study tours, awards, dissemination and communication, staff exchange, trainings, evaluation and feasibility studies, systematic transfer of measures from a pioneer city to a take-up city. Only activities proposed by organizations wishing to establish new CIVITAS networks can be funded.

Calls can be reached at: <http://civitas.eu/civinet-activity-fund>

3.2.3. URBACT III

For more than ten years, the URBACT programme has been the European Territorial Cooperation programme aiming to foster sustainable integrated urban development in cities across Europe. It is an instrument of the Cohesion Policy, co-financed by the European Regional Development Fund, the 28 Member States, Norway & Switzerland.

URBACT's mission is to enable cities to work together and develop integrated solutions to common urban challenges, by networking, learning from one another's experiences, drawing lessons and identifying good practices to improve urban policies.

Main objectives:

1. Capacity for Policy Delivery: To improve the capacity of cities to manage sustainable urban policies and practices in an integrated and participative way.
2. Policy Design: To improve the design of sustainable urban policies and practices in cities.
3. Policy Implementation: To improve the implementation of integrated and sustainable urban strategies and actions in cities.
4. Building and Sharing Knowledge: To ensure that practitioners and decision makers at all levels have access to knowledge and share know-how on all aspects of sustainable urban development in order to improve urban development policies.

To reach these objectives, URBACT III develops three types of interventions:

- transnational exchange,
- capacity-building,
- capitalisation & dissemination.

URBACT uses resources and know-how to strengthen the capacity of cities to deliver integrated urban strategy and actions on the thematic according to their challenges. The main target participants include practitioners, city managers, elected representatives and stakeholders from other public agencies, the private sector and civil society.

Box 1 - RESILIENT EUROPE (URBACT III, City of Rotterdam)

Cities are where the majority of the population lives, where innovation takes place and where the bulk of economic value is created. The future is hopeful and economists applaud the agglomerative effects of the city: proximity, diversity and density are considered keys to economic success. However, these are the same qualities that make cities vulnerable to the impacts of shocks and chronic stresses. In cities where stresses accumulate or sudden shocks occur, the result can be social breakdown, physical collapse or economic deprivation.

In this reality, cities are not the solution but epicentres of the problem. In order for cities to live up to expectations, cities need to be able to continue to function no matter what stresses or shocks the people living and working in cities encounter. In other words: cities need to be resilient. The policy challenge facing our cities therefore is to increase our city's resilience in order for its inhabitants to survive and thrive and for the city to successfully deliver on its potential for progress and in this way to contribute to transforming Europe into a smart, sustainable and inclusive society. We argue that it is the task of every city to lead the way in preparing their city to reorganize, adapt and regenerate urban structures and processes in the light of this resilience challenge without compromising the welfare and well-being of the citizens and the quality of social, ecological and economic services provided to them.
Budget: 704.436,00 EUR, EU cofinancing:523.630,20 EUR

Beneficiaries: Local authorities, Local agencies (city's stakeholders), NGOs

Focus areas are targeting integrated sustainable urban development regarding:

- Smart and inclusive growth
- Low-carbon economy
- Resource efficiency, environment protection
- Labour mobility, social inclusion, poverty reduction
- Policy design and implementation

Project sizes of different types of network: between €400,000 - €750,000. Period: between 6 and 24 months (in 2 phases).

More information on the calls: <http://urbact.eu/how-set-network>

3.2.4. Territorial Cooperation Programmes

European Territorial Cooperation is central to the construction of a common European space, and a cornerstone of European integration. It helps to ensure that borders are not barriers, bringing Europeans closer together, helping to solve common problems, facilitating the sharing of ideas and assets, and encouraging strategic work towards common goals.

To define the development priorities macro-regional strategies have been endorsed by the European Council, which may be supported by the European Structural and Investment Funds among others. They address common challenges faced by a defined geographical area relating to Member States and third countries located in the same geographical area.

Based on the strategies, cooperation programmes have been initiated. The relevant programmes for the TOGETHER countries are:

Danube Transnational Programme 2014-2020

The priorities of the Danube Transnational Programme are based on the specific characteristics and needs of the programme area which have been identified and agreed through an extensive programming and consultation process among the programme stakeholders and a wider ETC community.



Figure 5: Eligibility area of DTP

The projects supported by the Danube Transnational Programme (DTP) must form transnational partnerships to cooperate together in the following four thematic priorities and specific objectives:

Innovative and socially responsible Danube region

The Specific Objectives covered by Priority 1 are:

- Improve framework conditions for innovation
- Increase competences for business and social innovation

Environment and culture responsible Danube region

The Specific Objectives covered by Priority 2 are:

- Strengthen transnational water management and flood risk prevention
- Foster sustainable use of natural and cultural heritage and resources
- Foster the restoration and management of ecological corridors
- Improve preparedness for environmental risk management

- Better connected and energy responsible Danube region

The Specific Objectives covered by Priority 3 are:

- Support environmentally-friendly and safe transport systems and balanced accessibility of urban and rural areas
- Improve energy security and energy efficiency.

Well-governed Danube region

The Specific Objectives covered by Priority 4 are:

- Improve institutional capacities to tackle major societal challenges
- Support to the governance and implementation of the EUSDR.

Beneficiaries: Municipal institutions and administrative bodies; Social, cultural and educational institutions; NGOs; Companies, SMEs and associations

EU financing rate: 75-85%

More information on the calls: <http://www.interreg-danube.eu/calls/calls-for-proposals>

CENTRAL EUROPE 2020

CENTRAL EUROPE is a European Union funding programme that encourages transnational cooperation beyond borders in central Europe. With a budget of 246 million Euro from the European Regional Development Fund (ERDF), it supports partnerships made up of public and private institutions from nine countries: Austria, Croatia, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia and Slovenia.



Figure 6: Central Europe programme area

CENTRAL projects build regional capacities by involving and coordinating relevant players from all governance levels. Within the four priority axes, they realize outputs with a focus on policy-learning, pilot actions and pilot investments.

- Priority 1: Cooperating on innovation to make CENTRAL EUROPE more competitive
- Priority 2: Cooperating on low carbon strategies in CENTRAL EUROPE
- Priority 3: Cooperating on natural and cultural resources for sustainable growth in CENTRAL EUROPE
- Priority 4: Cooperating on transport to better connect CENTRAL EUROPE

Beneficiaries: Municipal institutions and administrative bodies; Social, cultural and educational institutions; NGOs; Companies, SMEs and associations

EU financing rate: 75-85%

More information on the calls: <http://www.interreg-central.eu/Content.Node/apply/home.html>

CROSS-BORDER COOPERATION PROGRAMMES

European Cross-Border cooperation, known as Interreg A, supports cooperation between NUTS III regions from at least two different Member States lying directly on the borders or adjacent to them. It aims to tackle common challenges identified jointly in the border regions and to exploit the untapped growth potential in border areas, while enhancing the cooperation process for the purposes of the overall harmonious development of the Union.

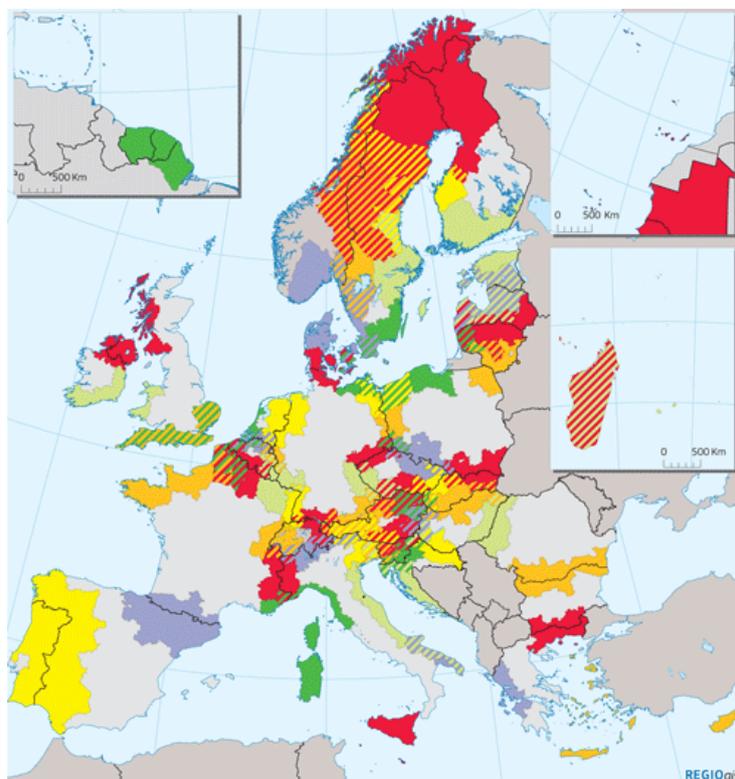


Figure 7: Cross-border cooperation programmes of 2014-2020

The following programmes are relevant for the TOGETHER countries:

- Interreg V-A - Austria-Czech Republic
- Interreg V-A - Austria-Hungary
- Interreg V-A - Czech Republic-Poland
- Interreg V-A - France-Italy (ALCOTRA)
- Interreg V-A - Germany (Mecklenburg-Vorpommern-Brandenburg) -Poland
- Interreg V-A - Germany-Saxony (Poland)
- Interreg V-A - Germany/Bayern-Czech Republic
- Interreg V-A - Germany/Brandenburg-Poland
- Interreg V-A - Germany/Sachsen-Czech Republic
- Interreg V-A - Greece-Italy
- Interreg V-A - Hungary-Croatia
- Interreg V-A - Italy-Austria
- Interreg V-A - Italy-Croatia
- Interreg V-A - Italy-France (Maritime)
- Interreg V-A - Italy-Malta
- Interreg V-A - Italy-Slovenia
- Interreg V-A - Italy-Switzerland
- Interreg V-A - Lithuania-Poland
- Interreg V-A - Poland-Denmark-Germany-Lithuania-Sweden (South Baltic)
- Interreg V-A - Poland-Slovakia
- Interreg V-A - Romania-Hungary
- Interreg V-A - Slovakia-Austria
- Interreg V-A - Slovakia-Czech Republic
- Interreg V-A - Slovakia-Hungary
- Interreg V-A - Slovenia-Austria
- Interreg V-A - Slovenia-Croatia
- Interreg V-A - Slovenia-Hungary

Beneficiaries: Municipal institutions and administrative bodies; Social, cultural and educational institutions; NGOs; Companies, SMEs, research centers, Higher Education institutions and associations

Focus areas:

- Research & innovation
- ICT
- Competiveness of SMEs
- Low carbon economy
- Climate change adaptation and risk management
- Environmental protection
- Resource efficiency and transport
- Institutional capacity of public authorities and quality employment

The EU financing differs from programme to programme. The projects can usually focus on promotion of sustainable employment, efficient use of natural resources, circular economy, innovation (ICT and social), infrastructure, urban-rural links, labor mobility, joint training, entrepreneurship, social inclusion, community, culture, fight against poverty and discrimination.

More information on the calls can be found at the webpages of the programmes.

INTERREG MED PROGRAMME 2014-2020

Within this Programme project can be applied in Investment Priority 4.c „Supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including public buildings, and in the housing sector“.

Actions that can be supported are: Designing common approaches and strategies at transnational level, Pilot demonstrative cases, and Transfer, dissemination and capitalization activities.

The structure of the programme is the same as the Danube programme, more information can be found at: <https://interreg-med.eu/>

Interreg Europe (interregional programme)

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

It assists three types of beneficiaries:

- Public authorities - local, regional and national
- Managing authorities/intermediate bodies - in charge of the Investment for Growth and Jobs programmes or European Territorial Cooperation
- Agencies, research institutes, thematic and non-profit organisations - although not our main target group, these types of organisations can also work with Interreg Europe by first engaging with their local policymakers in order to identify options for collaboration with Interreg Europe

Organizations that work with Interreg Europe must also be based in one the 28 EU Member States, Switzerland or Norway.

Any actions developed with financial support from Interreg Europe must fall into one of the following four categories:

1. Research and innovation
2. SME competitiveness
3. Low-carbon economy
4. Environment and resource efficiency

Interreg Europe co-finances up to 85% of project activities that the project carries out in partnership with other policy organizations based in different countries in Europe. Through interregional cooperation projects, you and your partners must identify a common interest and then work together for 3-5 years. Initially, partners will share experience, ideas and know-how about how best to deal with the issue at hand. Each partner region must:

- Produce an action plan
- Set up a stakeholder group
- Participate in the Interreg Europe Policy Learning Platforms

After this stage, each partner must monitor progress of the implementation of their action plan and report to the lead partner. Pilot actions may be supported during this period.

More information on the calls: <https://www.interregeurope.eu/projects/apply-for-funding/>

3.2.5. Horizon 2020

HORIZON 2020 is the new EU Framework Programme for research and innovation. It is the financial instrument of the European Commission that runs from 2014 to 2020 with a €70.2 billion budget. The EU’s new programme for research and innovation is part of the drive to create new growth and jobs in Europe. The structure consists of three basic priorities:

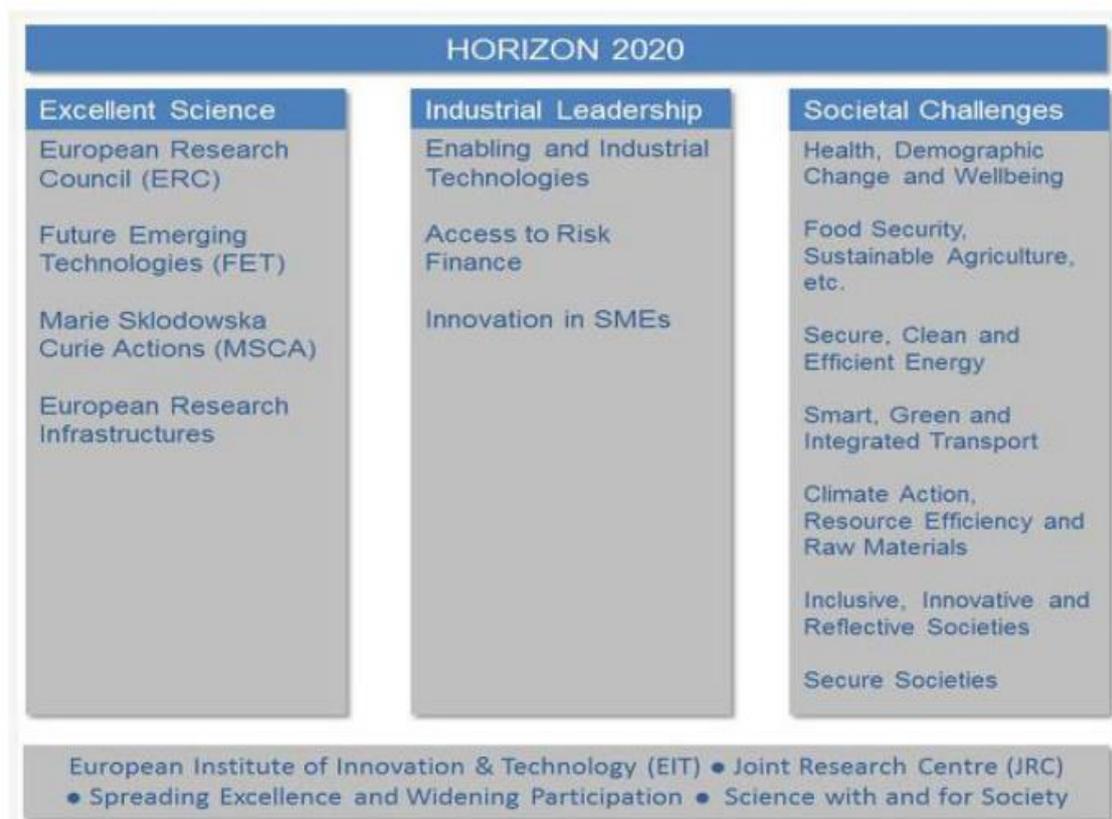


Figure 8: Strands of the Horizon 2020 Programme

The Horizon programme rather focuses on research and development of new products and processes instead of changing experiences and building networks like the territorial cooperation projects. Therefore, this very complex programme is advised for those entities, which operate in strong cooperation with higher education institutions or research facilities and intend to enter to the market with new technological solutions on the field of energy management.

Relevant calls of the different strands:

Secure, Clean and Efficient Energy		
	Energy Efficiency	Competitive Low-Carbon Energy
Calls for Proposals for local authorities	EE02, EE06, EE09, EE10, EE11, EE15, EE18, EE23, EE24, EE25	LCE21
Types of projects	EE02, EE06, EE09, EE11, EE15, EE18, EE23, EE24, EE25: Coordination & support actions EE19: Public procurement of innovative solutions	Coordination & support action

Smart Green and Integrated Transport	Cross-Cutting Activities
Mobility for Growth	Smart and Sustainable cities
MG4.4, MG4.5, MG5.3, MG6.1, MG6.2, MG6.3	SCC1, SCC2, SCC3
Research & Innovation actions: MG4.5, MG6.1 Coordination & support actions: MG4.4, MG5.3, MG6.3 Innovation action: MG6.2	SCC1, SCC2: Innovation Action SCC3: Research and Innovation action

Figure 9: Energy related Horizon 2020 calls

More information: <https://ec.europa.eu/programmes/horizon2020/>

3.3. Project Development Assistance

As underlined in the Investment Plan for Europe, there is continued need for building a solid and transparent pipeline of sustainable energy investment projects to help the EU unlock additional investments and in order to demonstrate their financial viability and attractiveness, in particular, to private investors. Whilst there is already a significant pipeline of large scale renewable energy projects, investors and lenders need to gain more confidence on investment projects related to energy efficiency which are still seen as risky and fragmented. EU added value can be obtained in particular where projects introduce innovation to the market regarding project aggregation and financing solutions minimizing transaction costs and engaging the private finance community as well as where projects demonstrably remove legal, administrative and other market barriers for mainstreaming large scale sustainable energy investment schemes.

Project Development Assistance programmes intend to unlock this potential by supporting applicants in covering the preparation costs of their investments.

3.3.1. ELENA EIB

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

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

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

On the field of Energy efficiency and distributed renewable energy, ELENA finances the following activities:

- Public and private buildings (including social housing), commercial and logistic properties and sites, and street and traffic lighting to support increased energy efficiency.
- Integration of renewable energy sources (RES) into the built environment - e.g. solar photovoltaic (PV) on roof tops, solar thermal collectors and biomass.
- Investments into renovating, extending or building new district heating/cooling networks, including networks based on combined heat and power (CHP), decentralised CHP systems.
- Local infrastructure including smart grids, information and communication technology.
- Infrastructure for energy efficiency, energy-efficient urban equipment and link with transport.

Beneficiaries: Local and regional authorities or other public bodies and a grouping of such bodies (legal entity with public service mission, controlled by a public authority and financed by more than 50% by public sources)

More information: <http://www.eib.org/products/advising/elena/index.htm>

3.3.2. ELENA KfW

The KfW-ELENA facility offers an approach in order to mobilize sustainable investments of small and medium sized municipalities and, where appropriate, Energy Service Companies (ESCOs).

KfW-ELENA consists of two elements:

- ELENA grant from the European Commission for Project Development Services.
- Global loans to local participating financial intermediaries (PFIs) in order to target smaller investments (volume up to EUR 50 million).

Eligible Participating Financial Intermediaries are banks operating in the eligible countries (EU member states, Norway, Iceland, Liechtenstein and Former Yugoslav Republic of Macedonia) motivated to expand their lending to municipalities for the financing of sustainable energy projects.

Eligible Final Beneficiaries for the ELENA grant are local or regional authorities and other public bodies within IEE participating countries including those under the Covenant of Mayors Initiative, or groupings of such bodies, mainly in the small and medium-sized range.

Participating Final beneficiaries apply to the ELENA grants directly via Partnering Financial Intermediaries (not direct via KfW). Application for ELENA grants is combined with application for financing of the Investment Project.

Currently KfW has signed agreements with BPCE in France, 'Erste Bank der österreichischen Sparkassen' in Austria, 'KommuneKredit' in Denmark, 'Cassa depositi e prestiti' in Italy and 'Bank Handlowy w Warszawie' in Poland. Since January 2016 no additional partner banks and countries can be included.

Focus areas:

- Energy efficiency in public / private buildings and street lighting
- Integrated renewable energy sources (RES)
- Energy efficiency and integrated RES in urban transport including freight logistics in urban areas
- Local infrastructures for energy efficiency
- Municipal waste-to-energy projects

More information: <https://www.kfw.de/KfW-Group/About-KfW/Auftrag/Sonderaufgaben/F%C3%B6rderkredite-EU/ELENA-%E2%80%93-European-Local-ENergy-Assistance/>

3.3.3. Horizon 2020 - Call EE22

Project Development Assistance (PDA) is provided to public and private project promoters such as public authorities or their groupings, public/private infrastructure operators and bodies, energy service companies, retail chains, estate managers and services/industry. The aim of the action is thus to build technical, economic and legal expertise needed for project development and leading to the launch of concrete investments.

The proposed investments will be launched before the end of the action which means that projects should result in signed contracts (or launched tendering procedures as appropriate) for sustainable energy investments to that effect, e.g. construction works, energy performance contracts, turnkey contracts.

The PDA focusses on the sectors of existing public and private buildings; street lighting; retrofitting of existing district heating/ cooling; energy efficiency in urban transport (such as transport fleets, the logistics chain, e-mobility, modal change and shift) in urban/sub-urban agglomerations and other densely populated areas and energy efficiency in industry and services.

Proposed actions are expected to demonstrate the impacts listed below (wherever possible, use quantified indicators and targets):

- Delivery of a series of sustainable energy investment projects and innovative financing solutions and/or schemes;
- Every million Euro of Horizon 2020 support should trigger investments worth at least EUR 15 million.
- Primary energy savings, renewable energy production and investments in sustainable energy triggered in the territory of participating parties by the project within its duration (respectively in GWh/year and million Euro of investments per million Euro of EU funding),
- Demonstration of innovative and replicable investment financing solutions, documenting feedback/uptake from potential replicators.

Proposals should have an exemplary/showcase dimension in their ambition to reduce energy consumption and/or in the size of the expected investments. This PDA facility focuses on small and medium-sized

energy investments of at least EUR 7.5 million to EUR 50 million, therefore it is complemented by the ELENA facility which provides project development assistance for larger scale investments.

More information on the calls:

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/ee-22-2016-2017.html>

3.3.4. JASPERS

JASPERS is a technical assistance partnership managed by the EIB and co-sponsored by the European Commission (DG Regional and Urban Policy) and the European Bank for Reconstruction and Development (EBRD). JASPERS is an important instrument of the EU Cohesion Policy.

Projects supported in the following sectors:

- Infrastructure: roads, rails, air and maritime transport
- Water and waste water
- Waste management
- Energy projects, incl. energy efficiency in buildings, district heating, RES production, CHP
- Urban Transport (also via the Connecting Europe Facility projects to 8 MS who requested it (BG, HR, EL, HU, MT, RO, SK, SI)).

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

Beneficiary countries: 19 EU Member States (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Spain and United Kingdom), and four Accession countries (the Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey). JASPERS' project preparation support may be made available to other EU countries benefitting from EU Structural and Cohesion Funds, if there is demand and resources made available.

Beneficiaries: Local, regional, national authorities or other entities with public interest.

JASPERS provides technical expertise for any stage of the project cycle from the early stages of project conception through to the final application for EU funding. Assistance may cover: Project review and recommendations; Horizontal tasks; Strategic support; Capacity building; Implementation support; Independent quality review.

3.4. Financial Institutions' Instruments

Generally the hierarchy for the most wanted type of funding is:

- Grants: direct funding from the EU for the beneficiary's project activities.
- **Investments through Financial Institutions** funding through debt (money is borrowed).
- Grants limited to the **technical assistance** that should trigger further investments. No money for project activities but only for project development (study), generally high leverage required on investments.

Grants for technical assistance.

Investments through Financial Institutions (b)

These include investments in local commercial banks, leasing companies and other selected financial institutions that either finance or are committed to financing projects of the Final Beneficiaries meeting the eligibility criteria of EEEF.

Selected partner financial institutions will receive debt instruments with a maturity of up to 15 years.

These instruments include:

- Senior debt
- Subordinated debt
- Guarantees

Specifications:

No equity investments in financial institutions.

Financial institutions onlend to the beneficiaries of the Fund meeting the eligibility criteria to finance energy efficiency and/or renewable energy projects

Source: EEEF - European Energy Efficiency Fund - <http://www.eeef.lu/eligible-investments.html>

Investments through Financial Institutions may be realised with the following four programmes:

- EFSI European Fund for Strategic Investments
- EIB Municipal Framework Loans
- Debt for Energy Efficiency - Projects (DEEP GREEN initiative) PF4EE Instrument
- EEEF

3.4.1. EFSI - EUROPEAN FUND FOR STRATEGIC INVESTMENTS

Beneficiaries

- Public sector
- Entities of all sizes, including utilities, special purpose vehicles or project companies, SMEs (up to 250 employees), midcaps (up to 3,000 employees)
- National promotional banks or others intermediate banks
- Funds and any other form of collective investment vehicles

Participating countries

EU-28 +AL, IS, IL, FYROM, ME, RS ,TR, NO, CH, KS

Major Focus areas

- (Digital) Infrastructure development in transport & energy
- Renewable energy
- Energy efficiency and energy interconnections
- Risk financing for SMEs and midcaps
- Education

- Heath
- Environment and natural resources

Project's average investment size

No restriction on the eligible project size.

Financing vehicle

A guarantee of €16 billion should cover first losses of higher-risk projects and an additional €5 billion allocation of EIB capital to co-invest.

Managing structure and Coordination

Existing EIB (European Investment Bank) Group structures.

Further information

http://www.eib.org/projects/cycle/applying_loan/index.htm

3.4.2. Municipal Loans

EIB MUNICIPAL FRAMEWORK LOANS

Beneficiaries

Local/regional authorities > 75,000 inhabitants

Participating countries

EU-28 & other countries (e.g. TR, ME, UA)

Major Focus areas

- Urban roads and public transport
- Water and sewerage
- Solid waste
- Education
- Health facilities
- Social housing
- Public buildings
- Energy (e.g. EE in public buildings)
- Cultural and sports facilities

Project's average investment size

< €50 million

Financing vehicle

Loan for a programme of investments (3-5 years), not completely prepared at the time of signing.

Managing structure and Coordination

EIB (European Investment Bank)

Further information

http://www.eib.org/projects/cycle/applying_loan/index.htm

3.4.3. Deep Green - PF4EE

DEBT FOR ENERGY EFFICIENCY - PROJECTS (DEEP GREEN INITIATIVE) PF4EE INSTRUMENT

Beneficiaries

- Pillar 1: Local/regional authorities and public bodies
- Pillar 2: Banks (Private Finance for Energy Efficiency, PF4EE)
- Pillar 3: ESCOs
- Pillar 4: Utilities

Participating countries

Currently only the PF4EE is operational and only in ES, CZ, and FR

Major Focus areas

- Public/private building stocks
- Public lighting, District heating and cooling networks,
- Urban transport (fleets, e-mobility, modal changes) in urban/sub-urban agglomerations
- Energy efficiency (investments in RES are eligible in combination with EE gains)

Project's average investment size

In the PF4EE (between local bank and e.g. local authority) : <€5 million

Financing vehicle

PF4EE supports local financial intermediaries via low-cost long term loans, credit risk protection and enhanced lending expertise for EE.

Managing structure and Coordination

- EIB
- DG CLIMA

Further information

<http://www.eib.org/products/blending/pf4ee/index.htm>

Application for local intermediaries:

http://www.eib.org/attachments/documents/pf4ee_request_for_proposals_en.pdf

3.4.4. NCF - Natural Capital Financing Facility

Beneficiaries

- Local and regional authorities
- Land owners and businesses
- NGOs
- Financial intermediaries (info)

Participating countries

EU28

Major Focus areas

- Nature and biodiversity (land, soil, water, waste, forestry, agriculture)
- Climate change adaptation

Project's average investment size

€ 5-15 million and max €1 million for technical assistance/capacity building

Financing vehicle

Debt, equity, intermediated and direct funding

Managing structure and Coordination

- EIB
- DG CLIMA

Further information

Application:

http://www.eib.org/projects/cycle/applying_loan/index.htm

Info leaflet:

http://ec.europa.eu/environment/life/funding/financial_instruments/documents/ncff_leaflet2_web.pdf

EIB Webpage:

<http://www.eib.org/products/blending/ncff/index.htm>

National contact points:

http://ec.europa.eu/environment/life/contact/nationalcontact/life_clima.htm

3.4.5. EEEF

Beneficiaries

- Local regional authorities;
- Public and private entities acting on their behalf (i.e. utilities, public transportation providers, social housing associations)

Participating countries

EU28

Major Focus areas

- Energy Efficiency
- Renewable energy
- Clean urban transport (all projects need to have a municipal commitment, such as in the Covenant of Mayors).

Project's average investment size

Between €5-25 million (smaller project size is possible, reviewed case by case)

Financing vehicle

Loans, guarantees (forfeiting structure) and equity.

Managing structure and Coordination

- EC
- EIB
- Cassa Depositi e Prestiti
- Deutsche Bank

Further information

Website:

<http://www.eeef.lu/home.html>

EEEF eligibility check:

<http://www.eeef.eu/eligibility-check.html>

3.5. Alternative financing schemes

3.5.1. Energy service / performance contracts (EPC) and the role of ESCO

The terms “energy services”⁹ and “energy service companies (ESCO)”¹⁰ are already well known and established in the energy efficiency field. They were defined already in the Energy Services Directive

⁹ ‘Energy service’: the physical benefit, utility or good derived from a combination of energy with energy efficient technology and/or with action, which may include the operations, maintenance and control necessary to deliver the service,

(2006/32/EC). There are many initiatives to promote ESCO model in the EU, due to its potential to remove several important barriers to energy efficiency in public sector - availability of up-front capital needed for EE investments and lack of technical knowledge and capacities to develop, implement and monitor EE projects. One of such EU funded projects is EnPC-Intrans, which deals with public sector and is excellent source of information. Therefore, the explanations provided hereafter are taken from that project.¹¹

ESCOs are companies that work on a basis of energy performance contracts (EPC). In an energy EPC arrangement, the ESCO is responsible for optimising building services systems and system operations in existing buildings across all branches of construction and maintenance. The main service provided by the ESCO is a guaranteed level of savings over a defined period of time.

Basic concept of EPC is shown in Figure 10.

Energy Performance Contracting (EnPC)

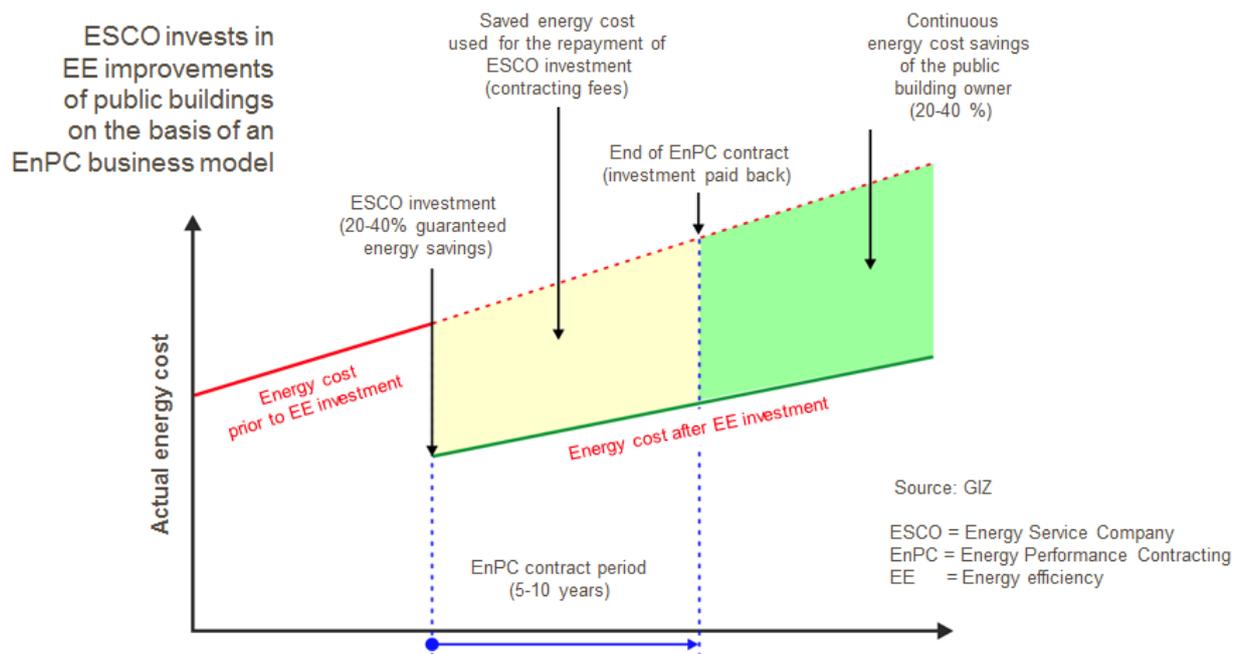


Figure 10: Basic concept of EPC and ESCO operation

Before a tender is made, an energy cost baseline is determined for the building (or building pool) or facility. This is usually based on the energy consumption of the calendar year prior to commencement of the EPC, which is often also compared to the two preceding years in order to eliminate extreme climatic

which is delivered on the basis of a contract and in normal circumstances has proven to lead to verifiable and measurable or estimable energy efficiency improvement and/or primary energy savings

¹⁰ 'Energy service company' (ESCO): a natural person or legal entity that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria

¹¹ The complete detailed explanation of EPC is taken from EnPC-INTRANS project: <http://www.enpc-intrans.eu/language/en/epc/basic-concept/>

influences, usage fluctuations, etc. The evaluated baseline data is climate adjusted on the basis of mild or hot days (annual degree days).

Proceeding from the energy cost baseline, the ESCO guarantees an annual energy cost savings (in EUR, calculated on a fixed price basis with the energy prices of the reference year) to the customer over the entire contract period. A fixed proportion of these guaranteed savings is set as the contracting fee, which the ESCO receives from the client to finance the investment, maintain the installations and attain a profit margin. Usually, the fee is set lower than the guaranteed saving in order for client to immediately benefit from savings.

In order to verify the annual energy savings, incurred energy consumption costs are converted into the reference year basis and then compared to the baseline during EPC bill audits. For the sake of ensuring this comparability, energy supply bills received by the client need to be adjusted for the following factors:

- deviations from the reference year in climatic conditions (annual degree days),
- changes in energy prices compared to the reference year (energy bills received by the customer must always be converted into the energy prices of the reference year),
- changes in building/facility usage compared to the reference year (insofar as these may cause energy consumption changes).

If the difference between the adjusted energy cost savings and the guaranteed cost savings is zero, the ESCO is exactly within the performance parameters of its contract. If the difference is greater than zero, contract over-performance sets in (savings are greater than guaranteed); in this case, the extra savings can be shared among the ESCO and the client. If the difference is negative, the ESCO has not achieved its savings goal and must reimburse the customer with the resulting difference (because, according to EPC, ESCO guarantees savings).

If energy prices rise, the energy cost savings of the customer increase (energy saved multiplied by energy price increases). This delivers additional budgetary benefit for the customer.

Contractually agreed one-off payments at the beginning (e.g. investment or building cost contributions) or at the end of the contract term (redemption sum) are also possible. With this solution, higher investment costs do not necessarily lead to higher contracting fees or longer contract durations.

Financing of EE project may or may not be ensured by ESCO¹². There are two basic cases:

1. Customer financings - this model is usually referred to as “guaranteed savings”. Here, an ESCO guarantees the outcome of investment in EE measures, but the customer (client) covers the whole investment and is responsible for accounting. This model is suitable if the customer has access to capital and if ESCO is a rather small company with limited balance sheet total.
2. ESCO financing - this model is usually referred to as “shared savings”. Here, ESCO provides the financing, and is thus also responsible for the accounting, for all necessary investment, normally by borrowing from a bank. The customer pays a fee to the ESCO for the services rendered and for investment payback. Under a shared savings EPC arrangement, the client participates in the energy cost savings from the start of the main performance obligation period. The level of a client’s share in cost savings must be stipulated in the contract. Typically, a client’s profit share is

¹² Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: “Assessing Framework Conditions for Energy Service Companies”, September 2012, available at: <https://www.giz.de/fachexpertise/downloads/giz2013-en-esco-guide.pdf>

between 10% and 20% of the savings achieved. Profit-sharing from the start results in shared savings EPC contracts having longer periods than a fixed-term arrangement, being that the annual contracting fee available to the ESCo for refinancing investment costs is lower. The benefit is that the customer's budgeted costs are directly reduced during the main performance obligation period of the savings guarantee agreement.

There are many examples of ESCO model implemented in the EU. Box 1 provides only one example of successful public sector EE projects implemented using ESCO model with EPC.

Box 2 - ESCO projects under Croatian Programme for energy Refurbishment of Public Buildings

Croatian Government adopted the above-mentioned programme in October 2013. The purpose of the programme is to reduce energy consumption in public buildings by 30-60%. The Programme is fully based on ESCO model. ESCOs provide 60% of the investment, while 40% is ensured from the Environmental Protection and Energy Efficiency Fund. In the period 2014-2016 21 EPC were signed, for 68 public buildings with total surface 225,000 m². Total value of EPCs is approx. 100 million €, while total energy savings are estimated to 70 GWh.

One of the flagship projects was energy refurbishment of Hospital Križine in the city of Split. Through deep, integral renovation of the building complex, which included also installation of RES systems (heat pump and solar heating) and introduction of Building Energy Management System, ESCO guaranteed savings of 7,9 GWh/y, which is 56% of baseline energy consumption. The investment costs were 12 million €, while EPC was signed for the duration of 15 years and with the annual EPC fee paid to ESCO of 0,66 million €.

More info can be found at: <http://www.enpc-intrans.eu/language/en/knowledge-centre/good-practices/>

3.5.2. Crowdfunding

Crowdfunding is the mobilization of funding for projects from a large number of investors ('the crowd') using internet based platforms and online processes. The size of the investment of an individual investor can range from very small (say €50) to large (several thousand Euros). Crowdfunding is generally divided into four different modalities:

Donations - the oldest form of crowdfunding, using the internet to fundraise for projects, causes, and organizations;

Rewards - in exchange for a contribution, the crowd investor receives a non - financial return, such as new music CD, the production of which was crowdfunded, or vouchers to make purchases in a specific shop;

Debt - the crowd investor provides a loan to a project or to another person (e.g. peer-to-peer lending) and expects in exchange interest payments and the return of the principal;

Equity - the crowd investor acquires a share in a company and expects dividends and/or a value increase in return. Here the crowd participates in upside and downside risks of the business.

For EE project debt and equity crowdfunding are of importance. Firstly, because energy efficiency projects are generally assumed to be cost - recovering and hence can offer a financial return to investors. Second, because debt and equity crowdfunding have a greater potential to scale up, and therefore are

more relevant when considering financing a growing pipeline of energy efficiency projects with costs often exceeding €100,000 and therefore typically beyond the scope of donations or reward crowdfunding.¹³

Typical crowdfunding process includes the phases as shown in the Figure 11.

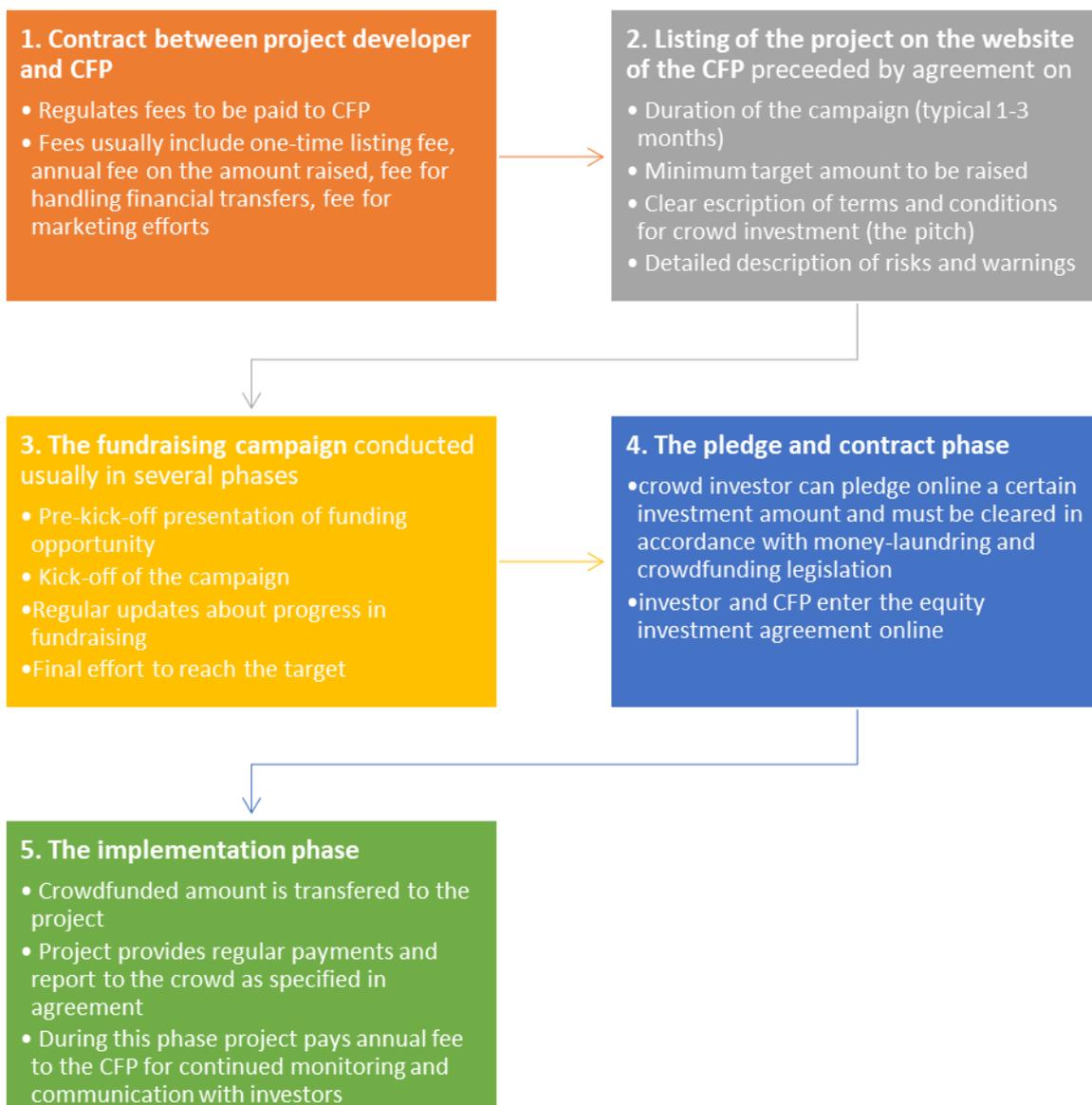


Figure 11: Typical crowdfunding process

Crowdfunding is still not widespread model for financing energy efficiency projects. There are many crowdfunding platforms (CFP) available in the field of clean energy (especially renewables, which appear

¹³ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: “CF4EE - Crowdfunding for Energy Efficiency”, October 2016, available at: <http://www.ieadsm.org/wp/files/2016-10-28-CF4EE-Feasibility-Study-final.pdf>

to be more attractive than EE projects)¹⁴, but very few of them in Europe are specialised solely for energy efficiency. Some of the pioneer CFPs are Bettervest or ECONEERS in Germany.

One recent example of CFP for energy efficiency is found in Croatia and is described in the box below.

Box 3 - Energy Efficiency Crowdfunding in Croatia - croenergy.eu

North-west Croatia Regional Energy Agency (REGEA) has been established in 2008 by Zagreb County, Karlovac County, Krapina-Zagorje County and City of Zagreb under the framework of the Intelligent Energy Europe programme. In 2015, REGEA started the unique CFP in Croatia - Croenergy.eu. The aim was to establish a platform that will be used for EE, RES and other green projects and to test this innovative way of financing in Croatia. The first crowdfunding campaign was launched under the name “You and me, for kindergarten in Pregrada”. It aimed at gathering 80,000 HRK for closing the financial construction of the project for thermal insulation of building envelope (walls and roof) of the kindergarten in town of Pregrada. The town ensured grants from Croatian Environmental Protection and Energy Efficiency Fund and from Ministry of Economy, however still 80,000 HRK were missing. The campaign was based on donations. Depending on the amount of donation, the crowd investors received symbolic gifts, like thank-you cards, T-shirt, name listed in the permanently displayed donors list at the kindergarten wall. Donations ranged from 10 to 2,000 HRK. The campaign was a remarkable success. It surpassed the targeted amount and eventually 97,092 HRK was gathered from 215 crowd investors. In April 2016 the energy refurbishment of Pregrada’s kindergarten was completed.

REGEA with its CFP Croenergy.eu has demonstrated that Crowdfunding for public EE projects is possible. Currently, two campaigns are undergoing at this platform, all directed to improvement of conditions in public schools.

More info can be found at: <http://croenergy.eu/>

3.5.3. Soft loans, guarantees

Soft loans are dedicated credit lines for EE measures extended to end users at preferential terms in terms of maturity and/or interest rates. Such credit lines are often provided by national or international development banks (such as European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD) and are further distributed to designated markets through regional partner retail banks.

Guarantees provide a means of transferring risk from a lender or financier to another entity that is better placed and willing either to manage or absorb the risk. For municipal EE projects, loan guarantees typically are provided by donors. However, in some cases, a municipality or a higher level of government may provide the guarantee. Credit and risk guarantees can be distinguished. Credit guarantees will cover the loss from a loan default regardless the reasons behind this loss. Risk guarantees will, on the other hand, cover only the loss caused by a specific risk. Guarantees usually cover less than 100% of the loss on default of the loan, making sure this way that entity taking the loan also takes over some part of the risk.

¹⁴ The map of CFPs for renewable energy can be found at: <http://www.recrowdfunding.eu/news-updates/2015/9/14/tracking-renewable-energy-crowdfunding>

Guarantees are, therefore, a risk sharing mechanism and as such may facilitate bank financing of city/municipal EE projects.¹⁵

Example of soft loans and guarantees offered for city/municipal EE projects is found in Bulgaria and is described in the box below.

Box 4 - Energy Efficiency Loans and Guarantees in Bulgaria

Bulgarian Energy Efficiency and Renewable Sources Fund (EERSF) was established pursuant to the Energy Efficiency Act, with intergovernmental agreements between the Global Environment Facility (through the World Bank), the Government of Austria and the Government of Bulgaria. It is the only institution in Bulgaria for financing energy efficiency investment projects.

EERSF offers loans to municipalities with interest rates 4-7% and maximal tenor up to 7 years. Minimal financial participation of the client in the proposed project should be at least 10%. There are no additional conditions on the loan and the monthly payment schedule is to be prepared in relation with beneficiaries' needs. Loan amount can be from 30,000 to 3,000,000 BGN. Until the end of 2015, EERSF has provided financing for 98 municipal EE projects, the total investment of which was 36.8 million BGN with the EERSF's share in loan of 24.1 million BGN.

EERSF offers also partial credit guarantees to share in the credit risk of EE finance transactions and to improve loan terms for project sponsors. The partial credit guarantees covered potential loan loss claims up to 80 percent of the outstanding loan principal (portfolio) of the financial institution, with guarantee fee 0.5-2.0% of the guarantee balance per year and individual guarantee commitments not exceeding 800,000 BGN.

More info can be found at: <http://www.bgeef.com/display.aspx?page=products>

3.5.4. Revolving funds

Revolving (loan) fund is defined as a fund set up for specified purposes with the proviso that repayments to the fund may be used again for these purposes. Revolving funds at a city/municipality level can be a sustainable solution for providing long-term financing of EE investments in public buildings and infrastructure. Under typical revolving EE funds, loans are provided to cities/municipalities to cover the initial investment costs of EE projects. The savings resulting from reduced energy consumption and improved EE are then used to repay the loan to the fund until the original investment is recovered, plus interest and any fees or service charges. The repayments can then be utilized to finance additional investments in EE, thereby leading to the revolving fund. Such funds can often offer lower cost financing with longer tenors and reduced security requirements than commercial loans, since both the borrower and lender are publicly owned. 16

¹⁵ IBRD & World Bank: „Financing Municipal Energy Efficiency Projects”, guidance note #2 developed under Energy Sector Management Assistance Program (ESMAP), July 2014

¹⁶ IBRD & World Bank: „Financing Municipal Energy Efficiency Projects”, guidance note #2 developed under Energy Sector Management Assistance Program (ESMAP), July 2014, available at: https://www.esmap.org/sites/esmap.org/files/DocumentLibrary/FINAL_MGN1-Municipal%20Financing_KS18-14_web.pdf

The main issue in establishing revolving funds is initial capital (seed) of the fund. Initial funding sources needed to establish such a revolving fund may include city's/municipality's own funds (from the budget), government allocations or grants/loans from donors or other external sources. Such funds may be established and managed by a single city/municipality, but often they are established also at regional or even national level offering financing to multiple cities/municipalities. In such cases, the funds are often managed by competitively selected fund manager with its compensation tied to the fund's performance. In case of revolving funds established at a single city/municipality level (internal), they can be excellent centres of expertise at a city/municipality level enabling long-term holistic approach considering total costs and benefits of projects.

The illustrative, simple presentation of a revolving fund structure and operation is shown in the Figure 12.

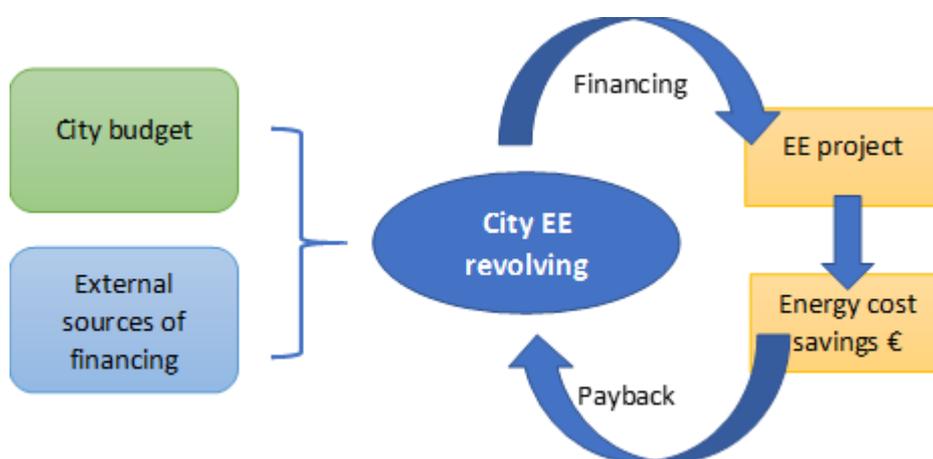


Figure 12: Illustration of Revolving Fund for energy efficiency projects in public sector¹⁷

Box 5 - Revolving EE fund in City of Koprivnica, Croatia

When it comes to energy efficiency and innovative financing solutions, city of Koprivnica is among the leading local and regional authorities in Croatia. Together with its strategic partner - Regional Energy Agency North (REA North) - it explored the opportunity to set up a local energy revolving fund that would finance its sustainable energy actions in the public sector. The Fund was established in late 2015 and became operational in 2016. The Fund will finance the implementation of energy efficiency projects that aim at greater reduction of energy use and significant financial savings resulting from lower energy bills and maintenance costs. The Fund is also expected to improve the way energy investments are planned, designed and implemented (e.g. preparation or procurement of energy related documentation), to speed up and simplify decision making about the investments and bring the financial benefits. The initial size of the fund - seed money - is 20,000 EUR but it will attract money from other sources as well. The simple scheme of the Fund is as shown in Figure 3.

More info can be found at: <http://www.energy-cities.eu/Koprivnica-Croatia>

¹⁷ Energy Cities: „Financing the energy renovation of public buildings through Internal Contracting”, guidebook prepared within Infinite Solutions Project, February 2017, available at: http://www.energy-cities.eu/IMG/pdf/guidebook_intracting_web.pdf

3.5.5. On bill financing

On-bill lending is a method of financing energy efficiency improvements that uses the utility bill as the repayment vehicle. The term on-bill financing has become an umbrella term for any financing program that includes charges on a utility bill¹⁸. However, there are several models that are successfully applied, dominantly in the USA, while the model is still not widespread in the EU.

The first model is actual on-bill financing (OBF). The main characteristic of this model is that utility is a lender. Ratepayer funds collected for energy efficiency programs are the most common funding source, but utility shareholder funds can also be used. OBF is the most commonly used on-bill model, probably because utilities can implement them entirely by themselves, with no costs associated with negotiating terms or recruiting third-party capital providers.

Second model is on-bill repayment, in which the capital provider is a third party, and the utility operates as a repayment conduit for that third-party capital provider. A utility may opt to use its own funds to offer administrative support or credit enhancements.

And third model is tariffed on-bill. In tariffed on-bill model EE upgrades are financed not through a loan, but rather through a utility offer that pays for upgrades under the terms of a new, additional tariff. This tariff includes a cost recovery charge on the bill that is less than the estimated savings. The on-bill charge is associated with the meter at the address of the property or facility where upgrades are installed, and the cost recovery charge is treated as equal to other utility charges on the bill. Because the cost recovery is tied to the property’s meter rather than the property owner, the tariffs remain in force regardless of a change in occupancy, whether that is due to a new tenant, a point of sale, or a foreclosure. New occupants are obligated to pay tariffed charges until utility cost recovery is complete.

Typical on-bill model structure is presented in Figure 13.



Figure 13: Typical on-bill model structure¹⁹

On-bill financing is the most utilised in the residential sector, where two the most known examples are Green Deal²⁰ in the UK and Pay As You Save (PAYS®)²¹ in the USA. Recently, utilities in the EU are

¹⁸ American Council for an Energy-Efficient Economy (ACEEE): „On-Bill Energy Efficiency”, available at: <http://aceee.org/sector/state-policy/toolkit/on-bill-financing>

¹⁹ Source: <https://betterbuildingsolutioncenter.energy.gov/financing-navigator/option/bill-financingrepayment>

starting their on-bill programmes as a part of energy efficiency obligation scheme imposed by article 7 of the EED. However, these programmes also focus on households or commercial sector consumers. Examples of on-bill financing for city/municipality EE projects in the EU were not found.

3.5.6. Green Municipal Bonds

Green bonds are bonds which are usually issued by private companies, local or regional authorities or international organisations for the development of projects with environmental benefits. In 2014, the market grew rapidly, with \$36.8 billion issued, triple 2013 levels, driven by interest from insurance and pension funds seeking to address their concerns about climate change. In 2015, \$41.8 billion of green bonds was issued, out of which more than \$5 billion were issued by cities, municipalities or provinces. While 46% of the proceeds from Green Bonds are used to support renewable energy, only 20% go into energy efficiency²². While development banks and corporations are the largest issuers of green bonds, the share of cities and municipalities in issuing green bonds is much lower, but it is continuously growing especially in 2014 and 2015. This rapidly growing market has the potential to help cities attract new investors and competitively priced capital to low-carbon and climate-resilient infrastructure investments.

The financial benefits of issuing green municipal bonds are access to low-cost debt capital markets and investor diversification, while issuing of bonds can also be used for marketing of climate change plans, increased collaboration between financial and environmental departments within city/municipality administration and raising citizens' awareness on environmental issues of a city/municipality.

In order to be successful and deliver desired targets, the process of issuing green bonds must be carefully structured and the following steps should be respected²³:

1. Identify qualifying green projects and assets - it is important that project that is to be financed by issuing of bonds is „green” (eligible projects under green/climate bonds are: green buildings, green infrastructure, clean transportation, industrial efficiency, agriculture, bioenergy and forestry, clean water and clean energy projects, waste management and methane reduction);
2. Arrange independent review - verification provides confidence of investors and confirms the quality of the project;
3. Set up tracking and reporting - to ensure all proceeds are applied to green projects, the sum of the cash on hand and amounts invested in assets or projects must not be less than the amount of the bond;
4. Issue your green city bond - the usual steps apply here, as for any other conventional bond;
5. Monitor use of proceeds and report annually - at least annually, issue a public report to confirm that the funds are still properly allocated to green projects.

²⁰ Within Green Deal scheme, utilities help households to improve household goods such as boilers and are reimbursed via the energy bill. More info can be found at: <https://www.gov.uk/green-deal-energy-saving-measures/overview>

²¹ The Pay As You Save® system enables building owners or tenants to purchase and install money-saving resource-efficient measures with no up-front payment and no debt obligation, but through tariff payments as long as they occupy the location where the measures are installed. The monthly charge is always lower than the measure's estimated savings and it remains on the bill for that location until all costs are recovered. More info can be found at: <http://eeivt.com/wordpress/>

²² Climate Bonds Initiative: „2015 Green Bond Market Roundup”, available at: <http://www.climatebonds.net/files/files/2015%20GB%20Market%20Roundup%2003A.pdf>

²³ Green City Bonds Coalition (Climate Bonds Initiative, C40, CDP, ICLEI and ICMIF): „How to issue a green city bond”, <https://www.climatebonds.net/files/files/How-to-Issue-Green-City-Bonds.pdf>

Box 6 - Green bonds of Île-de-France, City of Paris, France

French market of green bonds is very well developed. Green bonds are issued by companies but also by city administration. Île-de-France issued firstly its green bonds in April 2014. It raised 600 million €. Maturity of the bond is 12 years, with annual coupon 2.375%. The demand was very strong with 175 % oversubscribed. Socially Responsible Investment buyers dominated as they bought 84% of the issue.

More info can be found at: <http://www.paris-europlace.com/en/our-priorities/green-bonds>



4. Importance of financial instruments in Demand Side Management

4.1. Demand Side Management Concept

The term “Demand-side management” (DSM) has been initially coined to identify the complex of actions aiming at reducing peak electricity demand so that utilities can delay building further capacity. This has traditionally been applied to electricity loads but is also used for changes that can be made to demands for all types of energy.

DSM activities include as well the energy reduction programmes that is reducing demand through more efficient processes, buildings or equipment.

As examples of typical energy reduction measures, a series of “energy saving tips” that can be implemented for little or no investment, while others may require significant capital investment (e.g. measures to save electricity in lighting will normally require some investment but this need not be excessive and will typically allow paybacks under a year or so to be attained. Measures include changes in light bulbs, fittings and switches. In some cases, increased use of natural light can be achieved but may involve expensive building modifications).

Demand side means “services” that enable businesses and consumers to turn up, turn down or shift demand in real-time.

According to the IEA definition “Demand-Side Management refers to all changes that originate from the demand-side of the market in order to achieve large-scale energy efficiency improvements through deployment of improved technologies or changes in end-user behaviour and practices”

This category includes the Behavioural and Analytical demand-side management (DSM) concepts that are relatively new methods for discovering and promoting energy savings that have the potential to reduce the costs for energy consumption beyond what traditional DSM programmes have achieved. Both methods need energy metering, through automatic data acquisition systems, preferably web based (direct feedback system according to IEA definition included in the document “Achieving energy efficiency through behaviour change: what does it take?”). Software platforms might be useful for data post-processing.

- a. Behavioural DSM tends to focus on educating consumers and encouraging individual participation to achieve energy savings, whereas
- b. Analytical DSM finds opportunities for savings through equipment monitoring and data analytics.

The new availability of energy usage data and the creation of software platforms with data analytics have provided the basis for behavioural and analytical DSM.

4.2. Energy Management including no cost and low-cost measures

Energy management is strictly interlinked with the Demand Side management concept.

The aim of energy management is to lower energy costs and bring immediate benefits to an organization or enterprise. Energy management is the structured application of a range of management techniques that enables an organization to identify and implement measures for reducing energy consumption and costs.

Energy management activities typically cover energy purchasing, metering and billing, performance measurement, energy policy development, energy surveying and auditing, awareness-raising, training and education and as well capital investment management (including equipment procurement).

Energy management is a continuous process, with continuous monitoring of energy performance and always seeks to maintain and improve the efficient use of energy.

An important part of this job is the collection and analysis of data (see reference to the other integrated tools developed under the TOGETHER project related to the energy management in schools, in institutional buildings and other type of buildings).

Some measures to reduce energy consumption and improve energy efficiency can be considered as “no-cost and low-cost measures”.

Housekeeping and preventive maintenance are simple and cost-effective ways to reduce demand and have other benefits like process improvement.

Organizations should always consider implementing housekeeping measures as they can reduce energy demand in the short term, usually for very small capital investments and low installation costs.

A typical example is switching off unnecessary loads, such as lights—in unoccupied areas, and in areas where daylight provides adequate lighting (manually—light switches at strategic points can facilitate manual switching; or by automatic controls—motion detectors, time controls and photo sensors).

Energy efficiency can be obtained through an adequate and preventive maintenance programme as well. Preventive maintenance can take various forms (e.g. regular filter cleaning on air compressors, pumps, upstream of steam traps, in ventilation ducts, etc. as indicated in the Technical Training Material developed by the University of Maribor and in the integrated tool D.T2.2.2 Transnational Good Energy Governance Handbook).

On the other hands, there are measures requiring moderate or considerable levels of investment such as deep energy retrofitting and economic instruments play an important role in energy efficiency policy across all sectors. For the IEA the “Energy efficiency is the single most important option to reduce global energy use, and thereby vital in every climate and economic policy”.

4.3. The importance of financing the Demand Side Management and “Acceptance”

Moving to low-energy buildings is key to achieving significant reductions in energy demand in the future. However, due to the variety of market barriers and failures to implementing energy efficiency, economic instruments on their own are unlikely to maximise the potential of energy efficiency measures.

Other policies are needed and the Demand Side Management meant as analytic and behavioural DSM can be of support for energy savings and energy efficiency improvement in public buildings.

European Commission recommendation that priority should be given to use EPC for EE investments and to tackle non-cost and non-technological barriers, including attitude and behavioural barriers as the potential energy saving due to measures targeting behaviour is in the range of 5-20%.

Several EU programmes support projects aiming at increasing EE (e.g. 33 ETC 2007/2013) in public buildings, contributing to remove barriers that hamper the uptake of Energy Efficiency and stifle sustainable energy investment such as financial/legal/administrative framework, consumer behaviour, lack of appropriate knowledge and awareness about the benefits of Energy Efficiency measures.

But the financial and economic instruments that are available in the market interpret the investment meant as technological investment rather than non - technological investment.

For that reason it is difficult to “integrate” the already existing financial instruments with the Demand Side Management but it is more reasonable to think that new instruments are conceptualized to finance the investment in non-technological measures such as “social” investment educating and engaging the consumers which are - with reference to the public buildings - the building’s owners, managers and end-users.

A separate discussion can be done on the so called EPIC - Energy Performance Integrated Contract (developed as integrated tool by the TOGETHER project) whose aim is the creation, by integrating organizational and behavioural aspects in the existing EPC model, of an investment plan including all the aspects of energy efficiency: technological, organizational and behavioural interventions.

In order to detect the most fitting educational paths and measures for triggering the behavioural change, it is necessary to ‘provide insight into the drivers, barriers and needed influencing the energy behaviour’ (excerpt from IEA) and therefore the attitude to “accept”.

Policies, programmes and financial instruments should therefore increase the “Acceptance” factor in the formula provided by IEA “Result = Potential * Acceptance” that is explained in the deliverable D.T2.3.3 “DSM tool”. What the formula says is that potential per se is not the only issue. Another problem is how to get sufficient acceptance of energy efficiency measures by the building users.

Successful DSM programs therefore need to work on three distinct aspects: Promoting the Acceptance of proposed measures, Understanding the Potential of a large-scale DSM deployment and Monitoring the Results of behavioural change in terms of improved energy efficiency of buildings.

Wikipedia defines “Acceptance in human psychology is a person’s assent to the reality of a situation, recognizing a process or condition (often a negative or uncomfortable situation) without attempting to change it or protest it. The concept is close in meaning to acquiescence”.

Demand Side Management programmes typically include information and education initiatives that should support - in the entire building players’ chain to tackle the energy efficiency not only under the technology point of view and to accept that energy savings and energy efficiency improvement depend on the combined efforts of many individuals and therefore by the effort of the single player.

Well-motivated personnel are best able to develop and implement energy efficiency policies that are crucial for continued energy efficiency improvement in their organizations.

It is therefore necessary to raise awareness by campaigns informing the staff (from the top management to the last level) and all the building users of energy-consuming organizations about energy efficiency options and specific DSM techniques.

DSM programmes and policies can be promoted and implemented at different levels and local authorities and government agencies can make various policies and regulations, and provide subsidies for these programmes and stimulate the acceptance for introducing energy efficient lifestyle and rational energy management approaches to the energy efficiency.

Knowledge opportunities such as training paths (formal, informal, peer learning etc.) Are a crucial element for enabling the capacity of the public administration and generally said of the organizations to produce energy efficiency through energy reduction programmes that is reducing demand through more efficient processes, buildings, equipment and behaviour.

4.4. The model of change related to the acceptance

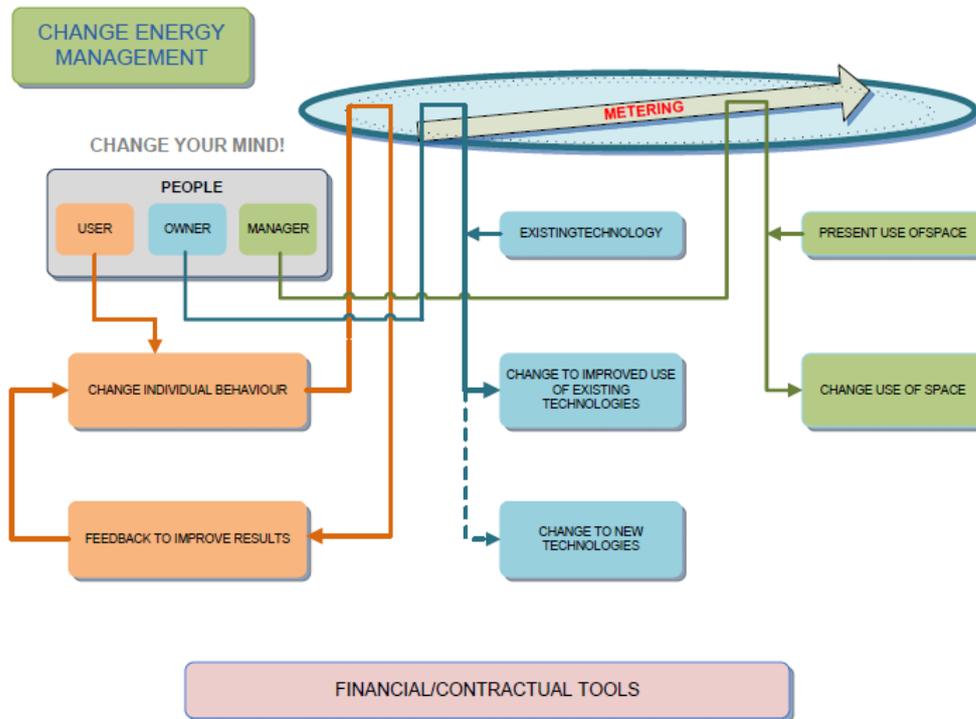


Figure 14: The model of change related to the acceptance

According to the TOGETHER holistic vision, policies should support measures for increasing uptake of measures influencing the energy behaviour of end users and promoting an energy efficient lifestyle.

We know the potential, but we need to improve, for example, business and behavioural models that provide end-users with better options to be efficient.

Models that can be applied by providers of energy services and also by policy makers who decide what measures should be supported and how to stimulate acceptance.

Another part of promoting acceptance, and thereby increasing uptake, is to provide insight into the drivers, barriers and needs influencing the energy behaviour of the end-user. IEA DSM combines the knowledge of social sciences and technology to promote an energy efficient lifestyle.



5. Conclusion

During the implementation of TOGETHER, it became clear that municipalities of different countries have different level of knowledge on the energy efficiency tools and the ways of their financing. While at some countries behavioural changes are a highlighted part of the energy development programmes, other countries rather focus solely on technical energy efficiency measures such as the improvement of the energy performance of the buildings by insulation, replacing doors and windows or renewal of the heating system.

The discussion on the predefined indicators of the introduced financial programmes often also gave some ideas how a simple energy efficiency programme could be made more complex by involving the stakeholders - by awareness raising activities, or even in a deeper way, by applying the living labs concept. And the involvement of the building users to the reduction of the energy consumption is the main goal of TOGETHER.

In the chapters above we have followed the evolution of the financing of energy efficiency actions from the traditional loans and own sources through different territorial cooperation and research projects to really innovative, alternative financing methods. Some of these methods even involve the users into the finances, like the crowdfunding methodology.

If the municipalities are aware of the above listed tools, they can implement a wider variety of investments and accompanying activities and also find co-operating partners from other regions, other countries.

It is obvious that understanding these tools, selecting the best fitting financial methodology and compiling a successful application needs deeper knowledge and remarkable expertise. Therefore in case of any needs for support, the TOGETHER partners are available for any municipalities of the CENTRAL area and beyond. You find our contacts at <http://www.interreg-central.eu/Content.Node/TOGETHER.html>.



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- EEA Achieving energy efficiency through behavioural change: what does it take?
- Other tools developed by the TOGETHER project that are D.T2.2.1 “EPIC -Energy Performance Integrated Contract”, D.T2.2.2 “Transnational Good Energy Governance Handbook” and D.T2.3.3 “DSM tools for the engagement of the building users”.

Pictures of graphical design

- <https://www.munters.com/es/Acerca-de-Munters/energy-efficiency/>
- https://www.munters.com/globalassets/images/about/electricity-plugged-to-the-globe_shutterstock_89738425-color-print_1200x600.jpg
- <https://carleton.ca/financialservices/>

<https://carleton.ca/financialservices/wp-content/uploads/fs-banner.jpg>



Glossary

Beneficiaries

Beneficiary means a public or private body responsible for initiating or both initiating and implementing operations (according to Article 2(10) of the CPR benefitting from programme funds).

Energy efficiency

Energy efficiency improvements refer to a reduction in the energy used for a given service (heating, lighting, etc.) or level of activity. The reduction in the energy consumption is usually associated with technological changes, but not always since it can also result from better organisation and management or improved economic conditions in the sector ("non-technical factors") (World Energy Council, 2008: Energy Efficiency Policies around the World: Review and Evaluation).

Energy planning

Energy planning at the territorial level provides a framework linked to policies and economic development which considers the specific local/regional patterns of energy needs and resources serving as a tool to mitigate climate change and enhancing sustainability.

Entrepreneurship

Entrepreneurship is to be understood as the mind set and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation (European Commission, 2003: Green Paper Entrepreneurship in Europe).

Environmental protection

Any activity that maintains the balance of the environment by preventing contamination and the deterioration of the natural resources, including activities such as: a) changes in the characteristics of goods and services, and changes in consumption patterns; b) changes in production techniques; c) waste treatment or disposal in separate environmental protection facilities; d) recycling; e) prevention of landscape degradation (IUCN, 2011: Definitions).

Governance

Governance refers to sustaining coordination and coherence among a wide variety of actors with different purposes and objectives (Pierre, 2000). Such actors may include political actors and institutions, interest groups, civil society, non-governmental and transnational organizations.

Innovation

Innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD, Oslo Manual, 2005: Guidelines for collecting and interpreting innovation data).

Innovation systems and actors

An innovation system is to be understood as "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1987)".

The actors of the innovation system include stakeholders from the research and business sector, policy makers and public authorities.

Integrated environmental management

Integrated environmental management means a comprehensive approach to natural resource planning and management that encompasses ecological, social, and economic objectives. It considers the interrelationships among different elements and incorporates concepts of carrying capacity, resilience and sustainability.

Macro-regional strategy

A macro-regional strategy means an integrated framework endorsed by the European Council, which may be supported by the ESI Funds among others, to address common challenges faced by a defined geographical area relating to Member States and third countries located in the same geographical area which thereby benefit from strengthened cooperation contributing to achievement of economic, social and territorial cohesion (according to Article 2(31) of the CPR).

Peripheral region/area

A peripheral region/area is to be understood as a marginalised or badly accessible territory. It has the opposite characteristics of a core region. A peripheral region has mostly rural characteristics with only few major centres of urbanisation. Most people work in primary activities, while job opportunities and wage levels tend to be lower than in core regions. Consequently those regions often suffer from out-migration.

Pilot action

A pilot action means the implementation of schemes of an experimental nature to test, evaluate and/or demonstrate its feasibility with the aim to capitalise on those results and transfer practices to other institutions and territories.

Public infrastructure

Public infrastructure comprises infrastructure that is owned by the public and/or is for public use, including public buildings.

Regional actors

Regional actors are all main stakeholders operating at regional level in a specific thematic field independently from their legal status, thus comprising the public as well as the private sector. These sectors include different types of entities such as public administrations, infrastructure providers and operators, interest groups, NGOs, research centres, education facilities, enterprises including SMEs etc.

Renewable energy sources

Renewable energy sources are a diverse group of technologies that capture their energy from existing flows of energy, from on-going natural processes, such as sunshine, wind, flowing water, biological processes, and geothermal heat flows.

Smart specialisation strategy

Smart specialisation strategy means the national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts; a smart specialisation strategy may take the form of, or be included in, a national or regional research and innovation (R&I) strategic policy framework (according to Article 2(3) of the CPR).

Sustainable development

Sustainable development means using natural resources in a way that avoids irreversible damage to ecosystem structure and function, the loss of irreplaceable features or a reduction in ecosystem resilience. Environmental interests must be considered alongside social and economic interests, so as to prevent the irreplaceable loss of natural features, function or processes and to ensure a long-term and dependable flow of benefits from the exploitation of renewable resources. Delivering such sustainable development will involve significant measures to recover ecosystem structure and function, where the flow of benefits is already reduced or impaired, or where ecosystem resilience is at risk (IUCN, 2011: Definitions).

Transnational

Transnational is understood as the integration of the following principles:

- to ensure joint project development, management, financing and implementation,
- to address topics of shared interest and common benefit,
- to develop transferable results which can be applied by various actors and territories.

Target groups

The target groups concern those individuals and/or organisations directly positively affected by the activities and results of operations. Not necessarily receiving a financial grant and even not directly involved in the operation, the target groups may exploit project outcomes for their own benefits.



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Abbreviations

CHP	-	Combined Heat and Power
CoM	-	Covenant of Mayors
DSM	-	Demand Side Management
EBRD	-	European Bank for Reconstruction and Development
EE	-	Energy Efficiency
EED	-	Energy Efficiency Directive
EEEF	-	European Energy Efficiency Fund
EFSI	-	European Fund for Strategic Investments
EIB	-	European Investment Bank
EnMS	-	Energy Management System
EPBD	-	Energy Performance of Buildings Directive
EPC	-	Energy Performance Contract
ESCO	-	Energy Saving/Service Company
ESF	-	European Social Fund
ESIF	-	European Structural and Investment Funds
EU	-	European Union
GDP	-	Gross Domestic Product
GHG	-	Greenhouse Gas
ICT	-	Information and Communication Technology
IEA	-	International Energy Agency
MS	-	Member State
NGO	-	Non-governmental organization
nZEB	-	Nearly Zero Energy Building
OP	-	Operational programme
PDA	-	Project Development Assistance
PF4EE	-	Private Finance for Energy Efficiency
PV	-	Photovoltaic
RES	-	Renewable energy sources
SME	-	Small and medium-sized enterprises
TEN	-	Trans-European Networks
UIA	-	Urban Innovative Actions