



**Final
Report**

Pilot Financing Campaigns

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1. INTRODUCTION

The overall objective of the E-FIX project is to prepare the European market – with a focus on countries of various EU enlargement rounds, as well as markets of countries, which have recently reached EU association status – for the intensified usage of innovative financing mechanisms in the energy sector in order to facilitate the increase of investments in energy projects and services.

In order to meet the overall objective of the project and demonstrate the applicability of innovative financing mechanisms for energy investments, 6 Pilot Financing Campaigns (PFCs) were implemented in the partner countries. With the goal to integrate those mechanisms in the market of the partner countries as replicable solutions, applicability was demonstrated with focus on one specific innovative financing mechanism, responding to territorial energy financing and implementation barriers, in the field of Energy Performance Contracting (EPC), crowdfunding or leasing models.

This report represents an overview of implemented pilot financing campaigns, their results and measured impact, but also serves as an overview of the whole process related to the mentioned activity. In this regard, the content of the report consists of general introduction of the project, key performance indicators, piloting process overview (establishment of implementation groups, Bilateral Master Classes, planning and preparation of PFCs, pipeline and monitoring process, organization of stakeholder events), development and implementation of PFCs by country and conclusion.

Since PFCs were individually defined by the project partners according to identified barriers and opportunities in their countries, lessons learned from the pilot campaigns, barriers encountered and mitigation measures carried out represent one of the crucial parts of this report and direction on how to implement future innovative financing and energy related projects.



2. KEY PERFORMANCE INDICATORS

The viability and replicability of innovative energy financing mechanisms within E-FIX project was demonstrated through implementation of 6 Pilot Financing Campaigns. The expected cumulative investments made by European stakeholders in sustainable energy were set to 48 m€, while the planned investment volume initiated during E-FIX project was set to 21,75 m€. In order to provide security of the investment, strict quality criteria for both investors and project developers were implemented, as well as financing standard for national and transnational EE financing.

Energy related impacts which were expected during the project period were 19.2 GWh/year for energy savings triggered by the project within its duration and 5.5 GWh/year for renewable energy production triggered by the project within its duration.

It is important to mention that these numbers are proposed indicators after the approved Amendment by the EASME and project extension of 4 months. Former numbers for planned investment volume initiated during E-FIX project were 8.5 m€, for energy savings 19.0 GWh/year and renewable energy production 1.6 GWh/year. So, as can be seen, the prolongation of the contract was justified through a new, ambitious, set of key performance indicators.

The summary of all project indicators are given in the table below.

Table 1. E-FIX key performance indicators

Country	Types of pilot projects	Financial model (ESC/EPC, CF, Leasing)	Investment size within project duration (m€)	Investment size beyond project (m€)	Primary energy savings (GWh/a)	RES production (GWh/a)
Austria	2-3 projects focused on innovation energy products and services, as well as small-scale PV installations	CF	0,75	5	7	0,02
Armenia	Leasing model focusing on leasing of fuel-efficient heavy machinery, in particular for SMEs	Leasing	1,65	10	2,5	-
Croatia	3-5 local EE and RES energy projects	CF/ESC	0,25	1,5	2	0,7
Czech Republic	2-3 projects focused on EE in buildings and new technologies (PV/battery)	CF	0,1	1,5	0,1	0,02
Georgia	Leasing model for EE equipment in the building sector and SMEs/private sector clients, as well as small to medium sized RES projects	Leasing	5	25	6	0,9
Poland	At least 1 project in building sector	EPC	14	5	1,6	3,9
Total			21,75	48	19,2	5,5



3. PILOTING PROCESS OVERVIEW

As the name says for itself, WP4 Piloting - Implementation and monitoring of pilot financing campaigns in the partner countries according to identified potentials and national requirements, focuses on transforming the theoretical findings of the project into practical E-FIX results. WP Leader was in charge of shaping piloting process, defining effective monitoring parameters and according success indicators, set up and moderation of peer-review process, while the whole partnership was in charge of conduction of bilateral Master Classes, organization and facilitation of Pilot Financing Campaigns and contribution to steering of pilot financing campaigns by peer-review process and participation in at least one study visit.

The tasks included in the WP were as follows:

- T4.1 Establishment of implementation groups consisting of stakeholders and PPs
- T4.2 Planning and preparation of Pilot Financing Campaigns, definition of objectives and success indicators
- T4.3 Hold Bilateral Master Classes facilitating knowledge transfer within the partnership for the design of the Pilot Financing Campaigns
- T4.4 Project pipeline for continuous implementation to be administrated by the Energy Finance Competence Centres
- T4.5 Implementation of Pilot Financing Campaigns
- T4.6 Continuous monitoring and peer-review
- T4.7 Organize stakeholder event to promote results of Pilot Financing Campaigns

All the tasks and related activities are described in the following chapters.

3.1. Implementation groups

In order to achieve the objective of application of innovative financing mechanisms and energy projects, it was important to form a respective implementation group which will be capable of implementing energy projects and later serve as a good practice example for other project developers. During the first months of the project, it became clear that the group would become a lively entity and gather different levels of engagement- stakeholders, advisory board, E-FIX Ambassadors and project developers.

Every country, partner of the project, within WP1 organized a Stakeholder Forum (6 in total) with the goal of identification of joint deficits in the partner countries financing systems and on the development of first suggestions how innovative financing mechanisms could be used to bridge those gaps. As the result of the forum, implementation groups consisting of stakeholders and the project partners were identified (6 implementation groups in total).

Members of implementation groups were not only involved directly in the development of the PFCs, but also in training sessions, dissemination activities, PFCs planning process, Bilateral Master Classes, development of Action plan for roll-out of innovative financing mechanisms, all in order to gain a better perspective of the current energy market, possible barriers and ideas on how to overcome them.

On average, the meetings were held on a quarterly basis in order to have more regular and official exchange of information.



3.2. Bilateral Master Classes

Bilateral Master Classes represented key internal knowledge transfer activity organized on bilateral or trilateral level, in forms of expert workshops between implementing PPs and expert PPs for the respective piloted financing mechanism and a form of continuation of T2.3 Internal training (train the trainers). Also, they represented a way to close out the “knowledge gap” in pilot regions and increase capacity of 14 partner organizations.

The Classes were formed as advanced training sessions where support for the implementation of the PFCs and the roll-out of the selected financing mechanisms in partners countries were given, through findings, intervention logic and methods, as well as analysis of current gaps, barriers, opportunities and next steps. The meetings were attended also by stakeholders provided by each PP where they were active participants of group discussions and involved in summarizing the main conclusions of the meetings.

Some of the conclusions are given bellow, according to financing mechanism:

- Leasing
 - Lack of knowledge and capacity and strict collateral requirements from the local financing institutions;
 - High interest rates/short maturities;
 - Lack of vendors/suppliers of EE/RE equipment in Armenia;
 - Importance of providing energy project implementers and investors with an accurate assessment of the feasibility of the projects, addressing the common risks of the uncertainty of returns and perceived unfeasibility in order to get over the common barriers.
- EPC
 - Polish partners got broad knowledge in the field of EPC with main focus on current scale of EPC Croatian contracts, public incentives schemes for introducing EPC contracts, EPC contracts in EU co-financed projects (methods of calculation of grant intensity), portfolios of contractors, key selection criteria for contractors, statistical treatment, contract management issues;
 - As main problems, partners identified questionable legal framework, limited municipalities budgets for EPC projects, low price of electricity (for some types of EPC projects e.g. public lighting), scarce knowledge on ECSO/EPC, complicated technical solutions/distrust in technology, long payback period (for some types of EPC projects e.g. public lighting), easier solutions on the market, bad media image.
- Crowdfunding
 - There are a lot of concrete project ideas, now the challenge is to make them implementable in the respective real-life frameworks (national regulations, E-FIX aim & targets etc.);
 - There already are well established cooperation structures in all three participating countries HR, CZ and AT: E-FIX project partners and their local stakeholders are the main actors to bring these ideas into practice; local Ambassadors will then act as multipliers in order to spread out the innovative financing mechanisms and replicate project results;
 - Necessity of developing legal framework for implementation of crowdinvesting projects- especially for public institutions. Standardization and improvement of current platforms available in Croatia (payment security, specified roles of all parties involved in CF process...);
 - Increase of competitiveness of CF as a new and innovative financing mechanism, as well as monitoring performance of CF campaigns and transactions.

Master Classes were organized as a one or two-day workshops between June (M15) and July (M18) 2019 and detailed description of all sessions and conclusions can be found in deliverable D4.1 Report on Bilateral Master Classes.



3.3. Planning and preparation of Pilot Financing Campaigns

As one step to meet the overall objective of the project, specific objectives such as knowledge transfer between partners, increased competencies of the market actors, demonstration of the applicability of innovative financing mechanisms, triggering investments in sustainable energy projects and dissemination of results had to be implemented. The main output which would serve as a proof of the fulfillment of above-mentioned special objectives was the opportunity to test the E-FIX methodology and apply the developed financing mechanisms in their specific territorial context. In order to perform that, individual plans for the roll-out of pilot financing campaigns were developed.

The Plans were tailor made for each country participating in the project and included an overview market gaps for implementation of specific funding mechanisms, lessons learned from the bilateral master classes (BMCs) conducted with actors from more mature EU markets and finally: a list of potential projects which should trigger a wider market uptake of innovative financing mechanisms in the country and generate a pipeline of future documents. Being a living document, the Implementation plan also provided a monitoring template, description of peer review process, as well as PFCs replicability and future development.

6 individual plans were developed and can be found under deliverable D4.2 Individual plans for the roll-out of pilot financing campaigns incl. success criteria and monitoring values.

3.4. Pipeline and monitoring process

One of the courses of the projects planning and ways to assure future sustainability and replicability of the projects, was development of project pipeline of potential energy projects to be implemented after the project ended. In that regard, WP leader has developed dedicated template by partner country and according to finance mechanism they had focused on. The target of 48 m€ going beyond project duration was assured by setting of a list of potential projects prepared and reviewed by the partners and implemented with the support of Energy Financing Competence Centres in the regions. The pipeline table has been developed in Excel format and contains following information:

- Country
- Pilot project
- Type of project
- Financial model
- Total investment size (in €)
- Total energy related investment size (in €)
- Primary energy savings (GWh/a)
- RES production (GWh/a)
- Expected period of implementation
- Project status

Monitoring process is essential for success of the project and very important component of project implementation, especially within WP4 which is related to practical part of the project and implementation of PFCs. The whole process focused on three main tasks: definition of monitoring plan, reporting system and recommendations for improvement and future risk mitigation.

Within WP3, a Quality Criteria Catalogue was developed which focuses on alternative and innovative financing sources and financial feasibility of energy projects. Proposed quality criteria have been defined using three key parameters:

- relevance,
- effectiveness and efficiency,



- impact and sustainability.

These criteria were also used for preparation of the monitoring template. The monitoring process had been focused on project level, so the template is intended for monitoring of project by project, country by country. The evaluation tool contains a project description template structured along compulsory and additional optional information, containing general, technical and financial parameters but also environmental and social issues, creating a comprehensive ID form for analyzed energy projects.

The Continuous monitoring and peer-review was conducted in form of regular (monthly) MS Teams meetings between partners in order to monitor both the quality of pilot campaigns and its overall progress towards reaching energy and investment targets set by the project.

The final results of both implemented and pipeline projects are in detail described in Chapter 4.

3.5. Organization of stakeholder events

The final task of WP4, and a form of closure of the whole WP, is the organization of 6 stakeholder events to promote results of pilot financing campaigns. The events were intended for participants such as stakeholders, which could be potential implementers themselves and national/regional policymakers/public authorities, which could facilitate an even greater roll-out of the tested mechanisms. The initial plan was that these events should be organized in the form of study visits directly using a “show and tell”-approach, while other project partners and an international audience is also encouraged to take part in these events. Due to COVID19 crisis, this was changed and a series of online webinars was organized.

Some of the conclusions and main points are given bellow, according to financing mechanism and country specifics:

- Georgia/Armenia (Leasing model)
 - During piloting phase, together with their suppliers, partners gathered a lot of insights, since usually such equipment is harder to sell, because of higher prices and more expensive maintenance;
 - Very valuable experience in general which would contribute to creating success stories in this direction, gather practical knowledge, increase EE awareness, create more confidence even for suppliers, set EE definition criteria etc.
 - Separate product for such financing was created, meetings with different IFIs for credit lines to invest in EE leasing and plans to further develop the product were conducted;
 - Similarities were recognized in terms of economic sectors more suitable for EE investing, such as construction.
- Poland
 - further development of the market of innovative private financing is needed and necessary for the further progress of the energy sector in Poland, especially in the current situation of the changing perspective and Covid-19, and thus limited financing possibilities;
 - growing demand for the implementation of energy efficiency projects, rising energy prices increase the potential and willingness to implement projects in the EPC formula;
 - it is important to overcome mental barriers – as investors have at their disposal a number of grants available on the market, therefore, during the preparation of the project, it is crucial to encourage investors to implement projects using loans, and not wait for future possible EU financing;
 - the creation of a competence centre in Poland is needed and fills the gap that still exists on the energy financing market by creating a one-stop-shop, comprehensively dealing with the project from idea to implementation.



- Austria/Croatia/Czech Republic
 - Crowdfunding has huge potential in all three countries especially for smaller projects (5,000-10,000 EUR);
 - Only Austria has a legal framework for Crowdfunding, the Czech Republic and Croatia are still missing this;
 - The Corona crisis had a negative impact on the pilots but interest in crowdfunding should increase again;
 - The new EU crowdfunding regulation will have a great impact as it will make it possible to crowdfund across borders in the EU;
 - Campaigns need to have a strong local element and capture people's hearts.

Stakeholder events were organized as a one-day online workshops between May (M39) and June (M40) 2021 and detailed description of all events and conclusions can be found in deliverable D4.3 Report on Organization of Stakeholders events.



4. DEVELOPMENT AND IMPLEMENTATION OF PILOT FINANCING CAMPAIGNS

Pilot Financing Campaigns address specific financing gaps of each country/region, analyzed in detail in the beginning of the project within WP1, with the objective to demonstrate the practical application of innovative financing mechanisms. All activities conducted had the same final goal- trigger the implementation of an increased number of sustainable energy projects in the partner countries. As described in previous chapter, the whole process was detailed and extensive since PFCs, although limited in size and investment volume, present the implementation of the E-FIX methodology in a real-life environment.

In each of the partner countries actors from the different levels of financing sector (focused on the chosen financing mechanism) were part of the implementation, ensuring either a wider cooperation with actors or addressing target groups for energy project implementation in a more directed way.

The Campaigns were thoroughly monitored and peer reviewed using predefined success indicators and strict quality criteria, as well as mitigation measures which were additionally revised during the project period. Due to unexpected COVID-19 crisis and facing new challenges related pilot projects implementation, the project prolongation has been approved and new targets and key performance indicators have been set (already described in Chapter 2).

In the next subchapters detailed information on PFCs by pilot countries are given. The information consist of project pipeline description, implemented projects and description of the PFC outcomes and the process, barriers encountered and finally mitigation measures undertaken.

4.1. Armenia

4.1.1. Projects pipeline

ACBA Leasing has demonstrated significant growth in energy efficiency financing and developed robust EE pipeline despite significant headwinds caused by COVID-19 pandemic. EE financing will remain in ACBA Leasing's short- and long-term strategy considering the extensive knowledge and experience gained during the pilot phase. The piloting phase demonstrated that there is a significant potential for EE financing via leasing, especially in SME sector, which has limited access to traditional loan products.



Table 2. Project pipeline- Armenia

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Expected period of implementation
Leasing of Green house	EE	Leasing	259.050	Q2/2021
Leasing of Green house	EE	Leasing	309.301	Q2/2021
leasing of Regregrating equipment	EE	Leasing	398.096	Q3/2021
Leasing of Green house	EE	Leasing	197.452	Q2/2021
Fish processing quipment	EE	Leasing	333.526	Q3/2021
Leasing of Green house	EE	Leasing	210.498	Q3/2021
Leasing of construction equipment	EE	Leasing	122.395	Q2/2021
Leasing of electromobile to a transportation company	EE	Leasing	21.000	Q2-3/2021
Leasing of Green houses	EE	Leasing	4.407.152	Q3-4/2021
Leasing of EE equipment	EE/RE	Leasing	1.750.000	Q3/2021-Q2/2022
Leasing of EE equipment	EE	Leasing	5.000.000	Q3/2021-Q3/2022
Total			13.008.469	

4.1.2. Implemented Pilot Financing Campaigns

The pipeline of EE projects was built across different sectors of economy, including transportation, construction, agriculture, services, and manufacturing. In total 11 projects were financed under piloting phase, with the total investment size of EUR 2.9M, including contribution of EUR 1.6M from ACBA Leasing (financed amount). Energy saving for all mentioned projects financed is 5.75 GWh/a, which exceeds the target by 30%.

ACBA leasing has a team of professional leasing experts with strong track record in financing of renewable energy and energy efficiency projects in Armenia. The ACBA Leasing team sourced projects for PFC primarily through the own network (existing clients) and through the intermediary network (vendors) to develop a strong pipeline for the during implementation of the PFC. This network offers AL the exposure to a larger number of potential leasing opportunities. This access to the new market niche was further reinforced by the improved loan approval process, which included incorporation of the energy cost savings into free cash flow analysis and ability of the potential leases and end-users to meet lease service payments. These two elements combined with the experience of the dedicated team enabled ACBA Leasing to meet the targets of PFC despite the challenging environment.

The main focus of AL during implementation of PFC was on three different sectors: agribusiness (utilization of the state of art energy and resource technologies in the greenhouses), construction (energy efficient vehicles and machinery) and transport (fuel efficient transportation means, such buses and trucks). The sectoral focus was adopted considering the energy efficiency potential in the selected sectors, trends in the economy, including support programs from the Government and potential for the scalability of the selected technologies.

The largest project was the financing of a green house of roses a technically advanced plastic green house with total energy related investment amounting to EUR 2,160,121. The green house equipment was fully imported from a well known French producer. The green house is equipped with the most advanced irrigation/fertilization systems, with fully automated climate control, which allowed to achieve significant reduction in energy consumption (gas and electricity) in comparison to traditional greenhouses. In addition to the automated climate control the following EE technologies were utilized in the greenhouse: EE lighting, EE boilers, sunlight control.

The project was fully completed in December of 2020. Currently 18 different types of roses grow and are imported to different countries of Armenia, including Georgia and Russia. The project turned to be successful not only in terms of energy saving and efficiency but also has proved to be socially beneficial: 60 families of this specific rural



region, where the green house is situated are employed in the business and earn higher than the average salaries common in the region.

The success story has had its repercussions both for the demand side and to the financing consideration – there has been an increase in applications of greenhouse projects and ACBA leasing has around EUR 4,5 mln investment projects in the pipeline.

Table 3. Implemented projects- Armenia

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Total energy related investment size (EUR)	Primary energy savings (GWh/a)	RES production (GWh/a)
ACBA Leasing - Leasing of construction equipment	EE	Leasing	93.227	93.227	0,12	-
ACBA Leasing - Leasing of equipment to transportation company	EE	Leasing	18.648	18.648	0,11	-
ACBA Leasing - Leasing of construction equipment	EE	Leasing	83.201	83.201	0,10	-
ACBA Leasing - Leasing of bread producing equipment	EE	Leasing	47.381	47.381	0,09	-
ACBA Leasing - Leasing of construction equipment	EE	Leasing	121.006	121.006	0,17	-
ACBA Leasing - Leasing of construction equipment	EE	Leasing	57.358	57.358	0,54	-
ACBA Leasing - Leasing of construction equipment	EE	Leasing	310.848	310.848	0,35	-
ACBA Leasing - Leasing of truck	EE	Leasing	19.225	19.225	0,11	-
ACBA Leasing - Leasing of electromobile	EE	Leasing	21.397	21.397	0,07	-
ACBA Leasing - Leasing of equipment to construction	EE	Leasing	26.396	26.396	0,09	-
ACBA Leasing - Leasing of green house complex	EE	Leasing	2.160.121	2.160.121	4,00	-
Total			2.958.808	2.958.808	5,75	-

4.1.3. Pilot Financing Campaigns outcomes

The primary outcomes of the Pilot Financing Campaign fall into four broad categories:

- **Awareness:** energy efficiency is increasingly being recognized by the local companies as one of the most effective tools for improving the operational efficiency of the businesses. However, there is a significant gap in knowledge and lack of experience in implementation of the energy efficiency projects, that hinder large-scale deployment of energy efficiency technologies and results in unforeseen transaction costs.
- **Access to finance:** the businesses have limited opportunities to finance the energy efficiency projects on-balance sheet. High collateral requirements, lack of project finance schemes and high pre-investment development and transaction costs are viewed as one of the main barriers to increasing investment and financing flows to energy efficiency projects.
- **Vendors:** suppliers of energy efficient equipment and technologies play major role in energy efficiency finance programs through provision of consulting services, vendor finance programs, support in monitoring of results etc
- **Cooperation:** the energy financing programs can be implemented via co-lending programs available in the country. For example, ACBA Leasing financed construction of the energy efficient greenhouse via state agricultural support program aimed to address the economic impact of COVID-19.

The implementation of the PFC revealed the following barriers and failures, which prevent deployment of EE technologies in Armenia:

- Information failure - lack of customer awareness and knowledge and a very high perceived risk of new more efficient technologies;
- Reluctance or impossibility for businesses to finance projects on-balance sheet. Typically the commercial EE equipment is acquired by the businesses with high leverage and limited opportunities for attracting new debt financing;
- Lack of knowledge in FIs on how to calculate free cash flow from savings and how to include them in the financial analysis of the project;



- High upfront development costs - EE projects are often not implemented because of high upfront costs, including design, engineering etc.

Therefore, the financial institutions should take a holistic approach in designing and implementation of energy efficiency financing programs. This smart approach, adopted by ACBA leasing during the piloting phase has demonstrated successful results and the Company intends to increase its EE portfolio and expand into other sectors of economy.



4.2. Austria

4.2.1. Projects pipeline

New crowdfunding platform launched for Austria – crowd17.at

To establish the Platform for the presentation and campaigning of crowdfunded/crowdfinanced pilot projects under E-FIX, the Austrian project partner CONDA launched a “white label” platform crowd17.at with the purpose to finance sustainable energy projects within E-FIX and beyond.

The decision to launch an individual platform was driven by the customer response received throughout the PFC setup and stakeholder consultations, as well as the fact that these potential customers were ready to display their finance request “crowd17”-platform, which helps to develop a sustainable crowd interested in supporting energy projects while focussing the sales on the new focus towards energy efficiency projects (and not purely on renewable energy developments).

The activities for the launch of the platform were:

- Technical Setup of crowdfunding & -investing platform -> STATUS: done
- Check and establishment of legal requirements in Austria -> STATUS: ongoing
- Development of branding and go-to-market strategy -> STATUS: done
- European trademark secured and domain registered -> STATUS: done
- Pre-launch of the platform done – URL: <https://crowd17.at> -> STATUS: done
- Based on the outcome and the economic impact of the COVID-19 pandemic, that there is a currently a low demand in Austria for crowdfunding for energy efficiency projects (only), the scope of the platform was set broader: “for energy efficiency and renewable energy projects” -> STATUS: done
- For the official launch of the platform, 3-4 projects are going to be set up: -> STATUS: ongoing
 - Crowdfunding (donation based) for a non-profit organization, using the funds for façade greening
 - Loan based crowdfunding for a public-private partnership energy project in an Austrian municipality
 - Equity based (name shares) for a renewable energy provider
- The platform is going to be launched during May 2021, several communication initiatives such as press releases, interviews, social media marketing and newsletters are planned, and pilot projects considered in the PFC assessment (see below) are being approached for consideration and promotion on the platform -> STATUS: ongoing
- Besides that, CONDA is approaching its existing investors base (35.000+) to scale the reach of crowd17 -> STATUS: ongoing



A. Supported projects on advance level

1. LED Street Lightning City TELFS, Tirol

Telfs is a market town in the district of Innsbruck-Land in the Austrian state of Tyrol, 27 kilometres (17 miles) west of Innsbruck. It is the third largest municipality in Tyrol with a population of 15.747 (01.01.2018). In his area, the market town own a lightning system organized in 53 zones having around 2.000 lightning points, over 80% of them being equipped with old technology modules consisting by gas discharge lamps. Consumption of the HGL – gas discharged lamps was 319.146 kWh in 2018.

As stakeholder of the project “LED Street Lightning City TELFS”, the market town of Telfs is planning to convert the existing street lighting systems to LED, looking to finance the project by a citizen participation model. Local authorities of Telfs named the project LEONARDO and decided to have: “Tyrol's first citizen participation street lighting system”.

The advantages of this project:

- ✓ The municipality of Telfs does not have to take out a new loan
- ✓ The possibility to involve the citizens in a project and give something back to them
- ✓ Due to the yearly cost saving by the LED technology the municipality can service the repayments to the citizens
- ✓ The creation of awareness about climate change and environmental protection
- ✓ The community as a pioneer and role model in this area
- ✓ After 8 years, the entire cost saving accrues to the municipality and relieves their budget
- ✓ A further step towards the target "TIROL 2050 - climate neutral" to be taken.

The model provides that citizens have the possibility to buy one “light share” for € 1.000 each. This corresponds to 2 lamp heads. For 8 years the citizens get then in each case € 140 paid out. At the end each " light share" owner receives per a yield of € 120 per share, which is higher than the return on a savings account.

The target of the project is the 800 lamps changeover from mercury vapour lamps (HQL) to LED technology, at a cost per light point of approx. € 375 and a total cost estimated by approx. € 300 000.

After the implementation of the project, the energy consumption of the new LED lamps will be ca. 84,200 kWh / year, achieving savings in amount of 235,000 kWh / year, resulting in 28% savings equivalent to € 32,895. Per year 63 to of CO₂ will be saved.

The municipality planned a budget per year of € 30,000 for energy efficiency measurements and considering this, an implementation period of 10 years will be necessary. Looking to reduce the necessary implementation of the project, local authorities were interested in finding new financing solutions and they started the consultation with ConPlusUltra and CONDA to support them in the elaboration of an innovative financing variant for the total amount of investment.

Using the evaluation tool developed in the E-FIX “Quality Criteria Assessment”, ConPlusUltra has evaluated the potential of the crowd investing mechanism as follows:

Quality Criteria for Financing EVALUATION RESULT 102 Calculation Matrix

Leasing	EPC	CF / CI
163	169	204

Looking to the evaluation results the recommended financing mechanism was crowdfunding.



In this respect ConPlusUltra supported with the following activities:

- Periodical meeting with the local authorities for financial analysis and identification of the best financial solution
- Presentation and know-how transfer to the local authorities of Crowd Investing methods and financing process
- Elaboration of a financing solution for the necessary investment using crowd investing
- In cooperation with the E-FIX project partner CONDA, a marketing plan, investing strategy and financial forecast were elaborated and offered to the city.
- Project Partner CONDA has offered their support to the municipality in the marketing campaign during the crowd investing process and also in the processing of the collection and payments of the investing subscriptions.

Finally, because of the Covid pandemic situation, the municipality of Telfs postponed the implementation of the project and the planned pilot financing campaign could not take place; depending on the evolution of the actual situation the project implementation could start the earliest in autumn 2021.

2. Energy efficiency projects in City of Litschau, Lower Austria

Litschau is municipality located in the Northern part of Lower Austria, about 5-10 km away from the Czech border. Not least because of the waters Herrensee and Schönauer Teich Litschau is a touristic place, especially in summer, which attracts families as vacation guests. The area of the municipality covers 81.08 square kilometers. 64.78% of the area is forested.

The municipality of Litschau was looking for energy optimization measures and they identified a list of possible future projects:

- Middle school renovation and extension into a school center
- New clubhouse of a marching band, Brand
- Small hydropower plant to supply electricity for the wastewater treatment plant
- Photovoltaic plant 1 MWp on a closed waste landfill

ConPlusUltra started to identify together with the local authority which projects could be financed with the goal of citizen involvement in the financing process.

In this consideration, ConPlusUltra provided analyses of the proposed projects offering the consideration of being involved in one of the E-FIX pilot financing campaigns. However, decision for implementing any of the mentioned projects was not taken by the local council until summer 2020 and after that principally any major community investment decisions were halted due to the pandemic. It is likely that at least some renovation activities will take place later in 2021, however beyond the possibility to be tested within the E-FIX pilot financing campaign.

B. Identified projects with implementation potential

1. Building renovation and Green Roof at Vienna International School, Vienna

Vienna International School (VIS) is a non-profit international school in Vienna, Austria. The school was built to accommodate the children of United Nations (UN) employees and diplomats when the UN decided to locate one of its offices in Vienna (at the Vienna International Centre), and it remains affiliated to the UN. About 50% of students are children of UN employees and receive education grants, while much of the remaining students are children mainly of embassy and other companies' staff. The school has an enrolment of 1400 students, from pre-primary to the twelfth grade.

The consideration of the stakeholder Vienna International School was to develop a project for the renovation of parts of the existing building on their campus, using state-of-the art concepts and technical solutions but also looking for an optimal financing solution. A first target of the project was the roof renovation and gymnasium/wardrobes refurbishment.



After a first discussion with the school management, ConPlusUltra presented them the E-FIX project and opportunities being offered in supporting a pilot financing campaign; it was agreed to pilot a donation-based crowdfunding scheme for energy efficiency based on the assessment of the key points of the investment project (scale, potential energy savings, investment costs, schedule). For more technical details of the necessary investments ConPlusUltra offered services to the stakeholder for an energy audit of the buildings and development of an innovative integrated solution for their initial project.

Amount of the necessary investment was estimated at ca. € 1,200,000.

The key figures of the proposed solution are:

- **Roof renovation.** Complete renovation of all of the 3,300 m² area. Using new insulation, the thermal losses of the roof are supposed to be reduced by 77% which corresponds to a cost reduction of 22,400 € per year. The saved heating energy represents 12% of the school's total heating demand.
- **Photovoltaic.** A PV system is planned with an output of 145.5 kWp at the time of installation. Based on the yield calculation made, the annual production is approx. 141,000 kWh. The system output of 145.5 kWp was selected so that approx. 93% of the system generation can be consumed directly at the site.
- **Green roof.** Urban green spaces are considered an appropriate way to reduce urban heat island effects and provide higher comfort (especially in summer periods) to the underneath student classes. Positive impacts by roof greening are also expected to avoid the heat up of the building areas and at the same time reduction of cooling demand.
- Due to the reduced temperature on the rooftop, caused by the green roof, the photovoltaic system generates 5% more electrical energy. This reduces the energy costs by another 250€ per year.
- **Renovation of changing rooms (gym)** The new changing rooms are planned with a floor heating-system to provide good comfort. In order to reduce the thermal losses towards the basement an insulation of 10 cm on the ceiling is highly recommended. This saves about 38,000 kWh/a of heat losses which corresponds to a cost reduction of 4,400 € per year.
- **Change window sealings** the existing windows were installed in 1984, therefore the sealings lost their flexibility after 35 years in use causing air leakage. These sealings should be changed with new ones to provide several advantages:
 - Higher comfort for pupils und staff due to the reduction of cold draft
 - Extension of the windows operating period, avoiding high costs for a complete window replacement in future
 - Reduction of heat losses through the window construction, causing reduced costs for heating of about 11 000 € per year.

In the analysis the most important issue was if the higher efficiency really can be payed for itself in energy cost savings, so that ConPlusUltra made a comprehensive calculation of consumption and benefits for the stakeholder.

Using the evaluation tool developed in the E-FIX "Quality Criteria Assessment", ConPlusUltra has evaluated the potential of the crowd investing mechanism comparing to Leasing and Energy Performance Contracting and the results recommended Crowd Investing as optimal financing solution.

Quality Criteria for Financing EVALUATION RESULT 117

Calculation Matrix

Leasing	EPC	CF / CI
169	181	223

In the consultation process ConPlusUltra has involved also CONDA and analyzed together benefits for crowd investing versus donation-based models, modalities of campaigning / and modalities for setting up of a donation platform.



Project Partner CONDA offered their support to VIS in the marketing campaign during the crowd investing process and also in the processing of the collection and payments of the investing subscriptions.

Basically for two reasons, 1st the change of the senior school management and main facility manager at the VIS with different investment priorities and 2nd the COVID pandemic led to the decision to postpone the implementation of the project, and the planned project supporting and monitoring by ConPlusUltra/CONDA took no longer place. It was envisaged to proceed with the discussions after a year, i.e. in autumn 2021.

2. Building renovation School in Strebersdorf, Vienna, Austria

During the pilot financing campaign, ConPlusUltra has contacted ELCOTRON ELCS GmbH, an electric services company based in Lilienfeld, Lower Austria, who was looking for an innovative financial solution for the implementation of an energy efficiency project combined with a photovoltaic system.

Stakeholder of the project is the School Association De La Salle – Strebersdorf in Vienna, Austria, who intends to refurbish the lighting system in the school buildings in their ownership. Elcotron is offering cross-process conceptual design and realization of energy projects and they developed a project consisting in the changeover of the existing lighting system with LED and at the same time to build a photovoltaic system on the roofs of the school.

The estimated amount of the investment was € 300,000 for the new LED system and € 350,000 for the photovoltaic plant.

The evaluation of the project using the developed tool in the project indicate crowdinvesting as the optimal financing solution for the implementation of the proposed project.

Quality Criteria for Financing EVALUATION RESULT 117

Calculation Matrix

Leasing	EPC	CF / CI
174	177	217

ConPlusUltra provided to Elcotron a comprehensive presentation of the crowd investing mechanism and process, elaborating also economic forecast and calculations using the key figures from the planned investment. A complementary assessment was provided by CONDA including a detailed offer for the support in the marketing campaign during the crowd investing process and also in the processing of the collection and payments of the investing subscriptions.

Another time further consultations and collaboration through the E-FIX project partners in this pilot phase had been stopped at the early stage because of the Covid pandemic situation. The School Association De La Salle – Strebersdorf didn't continue the planned investment and Elcotron didn't receive any order for the realization of the project.

3. Photovoltaic plant 1,000 kWp - DOKA / Umdasch Group

Doka is an international producer and supplier of formwork used in all fields of the construction sector. It is a branch of the Umdasch Group AG (JSC) based in Amstetten, Austria. Doka has a worldwide workforce of 7,400, with 160 branches in 70 countries.

A 1,000 kWp photovoltaic plant was planned by Doka to be build on the roof of their buildings in the factory in Amstetten. The consideration of the investment was that in the medium term the photovoltaic system will be extended up to 2,000 kWp.

ConPlusUltra discussed with the staff of the Doka company about possible financing solutions. The main goal was how to give the possibility for the employees to participate in the financing process of the investments in the renewable energy strategy of the company. Presentation of the crowd investing mechanism, economic simulation and benefits calculation was given by ConPlusUltra to the stakeholder. However, a final closure and agreement



could not be met. The conclusion was that the industrial company would not prefer for debt financing and would opt for a 100% equity based solution.

4. Energy concept for Sports Center in Municipality of Schlitters, Tyrol

Schlitters is a municipality in the Schwaz district in the Austrian state of Tyrol.

The local authorities offered ConPlusUltra to discuss the support for several municipal projects, one of them being a refurbishment of the existing Sports Center in Schlitters, focusing on combined energy efficiency and renewable energy measures, and interested to identify financing solutions by giving the possibility to citizens to participate as investors in the innovative climate action programmes of the municipality.

ConPlusUltra made analysis of the proposed project offering to the local authority's economic forecasts, benefits calculation and implementation solutions. However, the municipality did not take any decision to implement any of the proposed project.

5. Photovoltaic system and e-charging station City Arzl, Tyrol

Arzl is a cadastral municipality, a fraction (locality) and a statistical district in the northeast of Innsbruck. It has 3164 inhabitants (as of January 1, 2020), lies at 880 m above sea level and has an area of 29.37 km².

Discussed project was with a local planner that received the order from local authorities for designing a photovoltaic plant on the roof of the city hall building combined with an electric charging station. ConPlusUltra was looking to identify financing solutions by giving the possibility to citizens to participate as investors in the innovative climate action programmes of the municipality.

After presenting different innovative financing solutions, and ways of support by the E-FIX partnership a decision was finally taken to implement the project in a partnership with an ESCO company.

6. Renovation of middle school and indoor swimming pool Böhheimkirchen, Lower Austria

Böhheimkirchen is a market town in the Mostviertel region of Lower Austria with 5096 inhabitants (as of January 1, 2020).

The municipality of Böhheimkirchen, looking for energy optimization measures, has planned the renovation of the middle school and indoor swimming pool being in their ownership.

ConPlusUltra started to find out together with the local authorities how this project could be financed, in a combination with a standard bank loan and together with citizen financing.

In this consideration, ConPlusUltra made first assessments of the proposed project offering to the local authority's economic forecasts, a cost/benefit calculations and a first technical pre-feasibility. The investment was estimated at € 1,200,000. The municipality finally decided to go for a standard loan which in combination with regional grants would be the cheapest solution for them. However, the project had then to be postponed due to the COVID pandemic.

7. Energie Steiermark AG

Energie Steiermark, a regional utility in the Province of Styria, as a modern energy service provider has committed itself to actively shaping climate protection, digitisation and the turnaround in heating and mobility and building a block and a beacon project for enlarging the portfolio in the field of municipal services through a H2020 PDA application ("StEEria" – submitted in the September 2020 call). StEEria would support communities and municipalities willing to launch smaller to medium-sized integrated energy projects (energy efficiency and renewable energy investments) in their territories through the development of a "One-stop shop" for public sector projects that would also include the demonstration of applicability of innovative financing mechanisms for energy investments with the goal to integrate those mechanisms in the Styrian regional market.

The project has been positively evaluated in principle, however did not reach a funding contract due to large number of applications. The utility is in the process of evaluating other funding/financing options to nevertheless proceed with the one-stop-shop.

8. Green Roof and Façade - CAPE 10

The non-profit CAPE 10 Foundation aims to alleviate the suffering of people who are in need through no fault of their own, especially when they are in need due to illness. CAPE 10 has built a "house of the future and social



innovation” as a green building. A Green Roof and facade are likely to be financed via crowdfunding (donation based) up to a volume of € 50,000. The energy related benchmarks are still unclear as basic data has not been delivered by the client yet and so the project could not be considered under the PFC of E-FIX

9. farmNow – urban gardening in Vienna

farmNow is a project for the City of Vienna led by the R&D platform “grünstattgrau” (green instead of grey). Grünstattgrau is a holistic competence centre for greening buildings: it gives impetus and connects people, innovative products and projects, provides know-how and guides participative urban strategies to their implementation. It is planning to rollout an urban gardening project in the City of Vienna with support of the community as well as the city administration itself. Starting with a campaign together with the support of CONDA through E-FIX, several projects are planned to be realized with crowdfunding, yet the energetic benefits have to be individually assessed (e.g. in case connected to greening roofs and the consequential energetic impact on the building. Initial meetings have been organized, but due to the delays in timing could not be considered under the E-FIX pilot campaigns.

C. Projects not suitable for crowdfunding

The Austrian project partners have assessed further project opportunities but the result was that the analyzed projects were not suitable to be included in the E-FIX Pilot Financing Campaign.

1. Energy efficient motors for SME (cooperation with EE motor supplier)

ConPlusUltra discussed with the company MOLL motors the possibility to integrate innovative financing solution through crowdfunding/crowdinvesting mechanism for their services regarding motors refurbishment in partnership with their regular customers. The idea was not considered viable due to the high costs and missing interest among the motor companies clients.

2. Energy efficiency vouchers for hotels, Austria-wide

Research has been done by ConPlusUltra to elaborate a solution with interested energy consultants and service providers for hotels (“Klimainvest”), that offered financing of energy efficiency projects for Hotels using innovative financing models as crowdinvesting in partnership with regular clients. The business model would have foreseen to forfeiting empty rooms on a voucher basis to a financial intermediary that in turn would have sold the vouchers to guests and in turn financed various expenses of the hotel, including energy related improvements and refurbishments. Part of the investment would be coming from the crowd – long-term dedicated guests of the hotels – and they would benefit from vouchers and in terms of energy services improved hotel facilities. The business model did not materialize by the company approaching ConPlusUltra and therefore was not further envisaged.

3. Viessmann heat pump solutions for residential buildings

ConPlusUltra discussed with the staff from the company Viessmann the possibility to integrate innovative financing solution for the investment in residential heat pump systems in multi-family houses in partnership with their regular customers.

4. WEB Windenergie AG und Ökostrom AG

General interest in the E-FIX project was received by two major Austrian renewable energy suppliers. Unfortunately, both clients at that time did not have suitable energy-efficiency or renewable energy projects in their pipeline that would require additional financing. Both clients are generally seeking for financial instruments and capital requirements, which are not suitable for Crowdfunding.

5. Salzburg AG

Being the major energy provider in the province of Salzburg, the idea was to propose the setup of a project pipeline for utilities to be considered for innovative financing schemes. General Interest in the e-fix project was given. There is no specific project in the area of energy efficiency planned.



Table 4. Project pipeline - Austria

Country	Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Expected period of implementation
Austria	LED Street lightning Telfs, Tirol	EE/RES	Crowdfunding	300.000	Q2/2020
Austria	Building renovation , School Litschau	EE/RES	Crowdfunding	100.000	Q3/2020
Total				400.000	

4.2.2. Implemented Pilot Financing Campaigns

Unfortunately, due to reasons described above, none of the foreseen at least 3 pilot financing campaigns could be implemented through the facilitation of the Austrian project partners within E-FIX.

The respective project owners were committed to the project implementation, however delays have been inevitable and could not be managed under the foreseen timeline of the E-FIX pilot financing campaigns. Projects from category “A” (Supported projects on advance level) and “B” (Identified projects with implementation potential) will remain on the pipeline list and facilitation shall take place ideally during the remaining E-FIX project duration or beyond its end, within the support framework of the Energy Financing Competence Center.

4.2.3. Pilot Financing Campaigns outcomes

Austria has chosen crowdinvesting as its innovative financing mechanism since it was considered the one with a high potential for implementation according to previously conducted analyses, baseline studies and current trends in financing energy projects. The initially identified barriers were recognized and listed, along with possible solutions and recommendations on how they can be overcome.

As a conclusion of the PFC phase, that finally did not lead to pilot campaigns being implemented in Austria, two sets of feedback shall be provided, since they were present in different discussions with representatives from public and private sectors.

Financing of energy projects in the public sector

Municipalities in Austria are depending on revenue transfers from regional or national governments, and thus often face 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 programmes of capital expenditures more difficult. 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.

On the other hand, experience from E-FIX show that municipalities can usually rely on variety of ‘traditional’ financing sources, mainly commercial bank loans and public funds (zero-interest loans, grants), which made it hard to sell crowdfunding models (especially for the “non-visible” energy efficiency measures) due to their increased cost, although public sector is considered limited in its access and capacity to introduce alternative financing sources like ESCO-based approaches and off-balance structures, PPPs, leasing energy performance contracting, and/or crowdfunding/crowdinvesting mechanisms.



For the implementation of the PFCs with mentioned municipalities it was envisaged to develop an adjusted model solution for typical municipal EE and REN projects and literally mitigate the barrier through setting up innovative municipal financing campaigns in the course of the realisation of energy investment projects, by using citizen financing and crowdfunding models (either donation based or crowdinvesting models), which for the mentioned reasons and due to the COVID pandemic could not be realised in a single case in the given time period.

Financing of energy projects in the private sector

Although the Energy Efficiency Act (EEffG 2015), the implementation of the EU Energy Efficiency Directive (2012/27/EU) in Austria, has obliged large-scale consumers (businesses, industry) to conduct regular energy audits or implement energy management systems every four years, the energy audits have only marginally led to implementation of energy improvement measures. And the SME as well as public entities are not covered by this obligation and thus do not fall under the legal requirements set by the EEffG. Using this mechanism was initially introduced and followed a “market price” for implemented energy saving measures. Selling energy savings certificates to energy suppliers represents an additional incentive for the private sector to implement measures by increasing the measure’s feasibility and decreasing payback time. However, the market mechanism failed to the extent, that it did not properly reflect the market demand for EE due to an over-supply of energy certificates in the market (a large share of them coming from very low-level energy saving measures in households or transport/fuel stations).

The Austrian Energy Efficiency Act is currently being evaluated and a first draft is expected by summer 2021. In the current regime, the oversupply of measures led to a price collapse. This led to energy efficiency measures being taken on by companies or private individuals themselves primarily as a self-incentive (i.e. if they were profitable) or triggered by high subsidies.

Compared to the financing of renewable energy projects, there are the following differences:

- EE measures usually do not require local acceptance.
- Are primarily implemented by the affected parties themselves if capital and profitability are available.
- Are often not implemented through a separate legal construct, which is sometimes more common with RE plants (issue of equity capital of a limited liability company)
- Have so far been characterized by a market with high supply

What is expected under the new EE Act?

A tightening of the eligible measures and a tightening of the possible amount of savings can be expected. It is possible that there will be tenders regarding the pricing of a kWh of energy efficiency with a merit order approach. Energy efficiency can be possibly purchased by obligated suppliers and thus serve a fund. Prices for energy efficiency measures are expected to rise again (7-16 cents/kWh) which would make the implementation of EE measures more financially viable from a company perspective, but much is still uncertain.

Taking the above points into account and considering the still open questions of the amended Act, the approach of alternative financing measures for energy efficiency is considered to be worth observing in any case, but not immediately urgent at the moment. In any case, it should be kept on the agenda and further solutions evaluated and provided to the market in the near future, once the new law is in place and the market can be assessed with the updated framework conditions.



4.3. Croatia

The initial goals and KPIs for Croatia were set on implementation of crowdfunding projects and testing of innovative financing mechanisms and campaigns related to involvement of citizens in energy investments. During initial analysis and further activities within the project, the opportunity for inclusion of also ESC/EPC projects occurred due to raised interest on the market and possibilities of testing also this financing mechanism in Croatian context. Since ESC/EPC is one of the three financing mechanisms analyzed within E-FIX project, Croatian partners proposed to the consortium to also include it in their PFCs, which was agreed upon unanimously among project partners and assessment been done based on the E-FIX standardized approach.

4.3.1. Projects pipeline

The final Croatian project pipeline consists of 6 projects with the total value of 6,6 m€. Projects include two financing mechanisms analyzed and tested within E-FIX project (EPC/ESC, with the open possibility of using crowdfunding for the part of investment) and taking in consider that the KPIs for Croatia were 1,5 m€ we can say that we exceeded our initial plan substantially. Following, the short description of the mentioned projects is given.

Karlovac - Turanj PV solar power plant

The project involves the construction of a 30 kW solar power plant on the roof of the Homeland War Museum in Turanj, Karlovac. The beneficiary of the project (museum) will realize cost savings of a minimum of 4 000 € per year. An innovative component of the project is the financing model, ie the possibility of investment by citizens through crowdfunding/crowdinvesting. The project activities have been stopped until all the details about the implementation are clarified with the competent conservation department, since the building is protected as an individual cultural asset.

PV plant in Dorema Ltd – Zapresic

Within the project, the construction of a 100 kW solar power plant on the roof of the Dorema company in Zaprešić is planned. The project will be implemented according to the ESC / EPC model, which includes an external investor (third party, specialized company) who invests its own funds in the equipment and execution of works as well as in the operating costs of the power plant during the contract with Dorema. The contract for the supply of electricity and the execution of works (ESC / EPC contracts) implies a lower price of electricity produced in the solar power plant in relation to the price at which the customer (Dorema) procures energy from the distribution network. Upon expiration of the contract - the power plant becomes the property of the client who then enjoys free electricity produced on his own roof until the end of the life of the equipment (> 25 years). Project activities have been stopped due to the situation with COVID-19 and it is not known when the project will continue.

Enterpreneurial zone Korana

The project involves the aggregation of several locations where the construction of solar power plants with a capacity of 250 kW is planned. The project concept is the same as the previous one- ESC / EPC model, which includes an external investor (third party, specialized company) who invests its own funds in equipment and works as well as in the operating costs of the power plant during the contract with interested companies. The customer will have a lower price of electricity produced in solar power plants compared to the price from the distribution network, while upon expiration of the contract, the power plants become the property of the customer.

Karlovac County Chamber of commerce

The project is related to the construction of a solar power plant with a power of 10 kW on the roof of the building of the Chamber of Crafts in City of Karlovac. The innovativeness of the project lies in the fact that the investor in the project is one of the users – of space in the building (tenant) and pays the investment by reducing overhead costs by the amount of power plant productivity (kWh) multiplied by the price of electricity from the distribution network. Upon expiration of the contract, the power plant becomes the property of the Chamber of Crafts, which will then



make savings of up to 1 300 € per year on electricity. Project activities have been stopped due to the situation with COVID-19 and it is not known when the project will continue.

General hospital Karlovac

The project involves the construction of a 280kW solar power plant on the roof of the General Hospital in Karlova and will be implemented according to the ESC / EPC model, which includes an external investor (third party, specialized company) who invests its own funds in equipment and works as well as in the operating costs of the power plant during the contract with the hospital (the model same as in Entrepreneurial Zone Korana and PV plant in Dorema). There is also an open possibility of realization of this project through the Norwegian Fund and an 85% subsidy.

PV plant in Križevci

This investment project is related to the construction of a photovoltaic power plant in Križevci and is a project co-owned and managed by citizens. The project contributes to the mission of Križevci to become energy independent by 2030 by delivering locally produced green energy to the citizens of Križevci and surrounding areas. The PV system, with a capacity of 6740 kW, will produce electricity that will be sold to the grid and generate profits for investors. Moreover, this project will involve the city and citizens in a joint process of sustainable transformation that will bring added value to the project. The first solar power plant owned by the local community will be built in cooperation with the City of Križevci (local government), HEP Group (national electricity company) and KLIK (local energy cooperative). 20% of the power plant will be financed by citizens, through crowdfunding.

Table 5. Projects pipeline - Croatia

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Expected period of implementation
Karlovac - Turanj PV solar power plant	RES	Crowdfunding	30.000	On-hold
PV plant in Dorema Ltd - Zapresic	RES	ESC/EPC	100.000	On-hold
Entrepreneurial zone Korana	RES	ESC/EPC	900.000	Q1/2022
Karlovac County Chamber of commerce	RES	ESC/EPC	10.000	On-hold
General hospital Karlovac	RES	ESC/EPC	280.000	Q4/2021
PV plant in Križevci	RES	ESC/Crowdfunding	5.300.000	Q1/2023
Total			6.620.000	

4.3.2. Implemented Pilot Financing Campaigns

In order to test our chosen financing mechanisms, as well as developed procedures and quality criteria, in Croatia two pilot projects were implemented. One is the practice example of ESC financing mechanism, while the other crowdfunding. Both projects have the total investment value of 337 126 €, with primary energy savings of 0,76 GWh/a and RES production 0,45 GWh/a. Even though the investment values were exceeded (KPI was 250 000 €), the energy relates KPIs were not accomplished (primary energy savings of 2,0 GWh/a and RES production 0,7 GWh/a). The description of both pilots is given below.

General hospital Zabok

ESCO model was chosen as the most viable alternative solution (procurement model) for the implementation of this project. The basic task before communication with the client (Hospital) was to design and to explain this model in detail because it is not explicitly explained within Croatian regulations. Therefore, all the preparatory work-contracts between the parties and tender documentation- needed to be done from scratch.

After elaborating the task, the client was contacted for the purpose of maintaining joint coordination, where a project implementation model (ESCO) was presented. A model in which Hospital doesn't invest its own funds in the construction of a solar power plant but enters into a contractual relationship with a private investor who sells



electricity to the Hospital, in a contract period of up to 10 years. One of the criteria proposed for the public procurement procedure is the criterion of the price of electricity from the solar power plant, which must be at least 10% lower than the price of electricity that the Hospital takes over from the distribution network. In this way, the Hospital achieves savings already during the contract period with a private individual, while after the expiration of the contract, the solar power plant becomes the property and under operational management of the Hospital. A period after the contract- is a period when more significant savings are occurring.

The client accepted the proposed model which marked the beginning of a concrete preparation of tender documents, criteria for scoring applicants, etc. After the completion of the public procurement procedure and selection of a winning bidder – their first obligation was to design the project documentation and its blueprints, according to requirements from tender documentation. After the project documentation was prepared- it was submitted for the issuance of an offer for connection by HEP ODS (distribution system operator in Croatia), which is a standard procedure defined by the Rules on connection to the distribution network. After all the legal work was done- the solar power plant was constructed and put into operation in October 2019.

Overall capacity of the plant is 450 kW and on a given microlocation (Zabok) it produces around 450 000 kWh of electrical energy per year. Installation procedure was rather standard- rooftop installation on a tin roof with a slight slope and installation on a flat roof, fixed with weights. A dozen inverter units are used in this project- where each inverter is responsible for electricity conversion- from direct current (produced in photovoltaic modules) into the alternating current which is then used in the building. The system should be operational for at least 25 years (guaranteed from the photovoltaic module producers). Decommission/recycling is expected somewhere between 25th and 40th year of the project operation phase. By that time- it's foreseen that recycling technologies will be much more advanced than today, so that a close to 100% of equipment could be recycled and afterwards used in production of other products (circular economy.)

Sustainable Mobility for Krugovi NGO

NGO Krugovi has launched a crowdfunding campaign called "Circles on Wheels" to raise funds for the purchase of new bicycles and related equipment (baskets, padlocks, bicycle stands), which would serve volunteers when visiting elderly and infirm, socially disadvantaged users in the area of City of Zagreb. Procurement of new bicycles would provide diligent volunteers a faster, energy efficient and healthier alternative during home visits, delivery of groceries and medicines to elderly and infirm, socially disadvantaged users, since currently they have old bicycles, which need to be repaired often.

Through the project they wanted to provide support and reduce the loneliness of the elderly people through home visits, socializing and help at home, provide psychotherapeutic support to lonely and depressed ones, encourage active and productive aging support workshops, organize local humanitarian actions and workshops for support and assistance to poor citizens and to encourage volunteering in work with the elderly.

The chosen model was reward one, where they have prepared symbolic awards, called Krugotvorine, which were made by their members and volunteers. Also, the designed expression of gratitude, bookmarks, name of the donator on the purchased bike and surprise gifts. The investment size was based on average price for one bicycle with additional equipment (baskets, padlocks, bicycle stands) and on purchase of 10 bicycles.

The campaign was launched on platform croenergy.eu, donation ranged from 7-135 €, but unfortunately only 2% was raised and Campaign wasn't successful.

Table 6. Implemented projects- Croatia

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Total energy related investment size (EUR)	Primary energy savings (GWh/a)	RES production (GWh/a)
Sustainable mobility for Krugovi NGO	EE	Crowdfunding	7.000	5.000	0,03	-
PV plant on General hospital Zabok	RES	ESC/EPC	330.126	330.126	0,73	0,45
Total			337.126	335.126	0,76	0,45



4.3.3. Pilot Financing Campaigns outcomes

Since the two implemented projects differ on financing mechanism used outcomes, barriers encountered, and mitigation measures were divided by project.

The challenge in implementation of project such as General hospital Zabok is that implementation of such and similar projects in hospital facilities depend either on the availability of grants or on the possibilities of using alternative implementation mechanisms (such as ESCO). After defining the technical solution in accordance with all existing constraints (roof area available, leased connection power)- the project implementation model was defined without the need for hospitals participation in closing the financial structure. Through market research and communication with actors from the photovoltaic industry (companies dealing with solar power plants through design and / or construction of projects), several companies were identified that showed interest in investing their own (or credit funds) into the project design and construction, where in return they would expect the Hospital to buy electricity produced on its own roof during the contractual period- until the moment when the investment of a private individual is returned and justified. Technical barriers were unknown at the beginning of the project development - PV connection cost can raise quite a bit depending on the condition of the building's substation (the cost is known after evaluation done by the Distribution System Operator which is based on previously sent conceptual design blueprints). Also, one of the problems is that ESCO model is still not used regularly in Croatia, especially for public buildings.

The solutions for mitigation of all the potential problems which were identified were: financial and implementation risk was transferred to ESCO, dedicated tender and contractual documentation suitable for both sides in the agreement was developed and market research and consultations with actors from the photovoltaic industry in order to test the potential market and investment possibilities were conducted.

The barriers encountered during preparation and implementation of the crowdfunding campaign for Krugovi NGO were mainly related to COVID-19 situation and lockdown which occurred during preparation and implementation of activities, as well as earthquake in Zagreb which occurred in March 2020 and the advances from both public bodies and citizens to overcome this major problem. Besides these occurrences which were not something on which they could influence directly, the problems in the conduction of the campaign as itself were recognized- not wide enough scope of the action and Insufficient contact with backers- especially private companies.

As a way to mitigate identified problems, the Campaign has been additionally promoted, and besides the internet pages of Krugovi and croenergy.eu platform, also on social media channels (Facebook). Krugovi developed special video for the campaign in order to additionally sensitize potential backers- the plan was also to have stands on the main points of the City but due to COVID-19 situation this was postponed. Also, the duration of Campaign was prolonged in order to gather more funds.

Since the Campaign wasn't successful despite all the undertaken measures, Krugovi NGO did not give up on the initiative and are planning to initiate 2nd campaign in late Spring/beginning of Summer 2021. Also, they will launch the campaign on other platform with wider scope of audience and more socially focused than croenergy.eu.



4.4. Czech Republic

4.4.1. Projects pipeline

The final Czech project pipeline consists of 1 project with the total value of 5 m€. Project include one financing mechanisms analyzed and tested within E-FIX project (EPC/ESC) and taking in consider that the KPIs for Czech were 5 m€ we can say that we exceeded our initial plan substantially. Following, the short description of the mentioned project is given.

EE on Statutory City of Ceske Budejovice buildings

The project includes the reduction of energy intensity of 10 buildings, which are owned by the City of Ceske Budejovice (8 basic schools and 2 retirement homes). In these days was successfully chosen the external company, which is preparing the documentation for EPC project. The realization will be divided into 2 stages. 1st stage includes energy efficiency in lightning, installing of photovoltaic panels and ventilation systems in schools. 2nd stage includes thermal insulation of 3 buildings (2 retirement homes and 1 school). Expected savings of the whole project is 2,412 GWh and the total investment will be 5 mil €.

Table 7. Projects pipeline- Czech Republic

Country	Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Expected period of implementation
Czech Republic	EE on Statutory City of Ceske Budejovice buildings	EE	EPC	5.000.000	Q3/2021 +
Total				5.000.000	

4.4.2. Implemented Pilot Financing Campaigns

Reconstruction of the family care house of Centre of Christian Help Krabčice (Horní Řepčice)

Reconstruction and extension of the old rectory – transformation into the building suitable for living in group of people with Alzheimer's disease. Project includes the creation of one double room and six single rooms, on the ground floor there will be a spacious living room with dining area and kitchen and facilities for doctors and the care team.

The reconstruction contains heating and cooling using a heat pump, including low-temperature distribution and radiant surfaces, collection and use of rainwater for toilets and service water, photovoltaic panels on the roof and ventilation of the building using recuperation.

Reconstruction of the building of Centre of Christian Help in Litoměřice

Reconstruction of the barracks building - conversion into buildings for sheltered housing. The workshops will be operated on the ground floor, and sheltered housing will be on the first floor and attic. Housing is conceived as variable - adapted to residents (adults with mental disabilities) according to their abilities and possibilities, from community-type housing with more assistance to apartments for individuals or couples with less support.

The reconstruction contains heating and cooling using a heat pump, including low-temperature distribution and radiant surfaces, ventilation of the building using recuperation and thermal insulation of building.



For both projects the applications for EU funding were submitted to Integrational Operational Programme (iROP). CF Campaign was focused on collecting funds that would co-finance (5%) selected environmental measures within both reconstructions projects.

The description of campaigns

The campaign to support both projects was designed in October 2020. Due to the Covid outbreak and enormous number of competing campaigns on the most important CF platform in the Czech Republic (www.hithit.cz), the decision for creating standalone campaign using the mixture of dedicated landing page (<https://www.diakonie.cz/prolidi/>) and social media campaign along with the follow up e-mail campaign towards large companies was made. Promotional materials were created for the campaign, it was promoted in the regional and thematically focused press and on the Facebook.

At the same time, a payment gateway was created, active from the beginning of the first round of the campaign until the end of the E-FIX project. The campaign was conceived as a collection to promote the dignified housing of disadvantaged citizens of the Diaconia organization. The applied conditions were its arrangement in the period outside the traditional collections (The three kings, Christmas, etc.) and non-exploitation of regular contributors.

Table 8. Implemented projects- Czech Republic

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Total energy related investment size (EUR)	Primary energy savings (GWh/a)	RES production (GWh/a)
Reconstruction of the building of Centre of Christian Help in Litoměřice	EE/RES	Crowdfunding	1.273.600	159.200	0,14	0,10
Reconstruction of the family care house of Centre of Christian Help Krabčice (Horní Řepčice)	EE/RES	Crowdfunding	770.000	385.000	0,05	0,05
Total			2.043.600	544.200	0,19	0,15

4.4.3. Pilot Financing Campaigns outcomes

Barriers encountered:

- within the whole period of negotiation with owner and investor (Diakonie) default conditions has changed several times
- by the end of 2020 as the result of Covid pandemic the number of similar orientated organizations (social care providers) started to initiate CF campaigns in order to maintain their services at least at minimum which led to the shift of donors' behaviour and the campaign had to be postponed to Spring 2021
- one of the main presumption for feasibility of those two projects is financing based on subsidy from iROP (regional operational programme)
- In March 2020 managing authority of the programme didn't select project Krabčice for funding, but in September 2020 the project was re-evaluated and the subsidy was granted, the subsidy contract is supposed to be signed by the August 2021 with modified budget (still under negotiation)
- Reconstruction in Litoměřice has started 14.5. 2021 by signing the contract with construction company and it'll be finished by November 2022.
- The CF campaign on Facebook was launched in mid April and ended in mid May with following results:
Reach: 103 926 users, Views: 177 145, Clicks (landing page) 2015 users

Nevertheless, CF campaign hasn't been successful in terms of collecting needed resources for co-financing environmental measures within reconstruction of both buildings however Diakonie will keep the landing page with the campaign online and promote it using their own channels during their traditional fundraising activities.

Possible mitigation measures:

- Risk no.1 – the default volume of the investment not suitable for CF



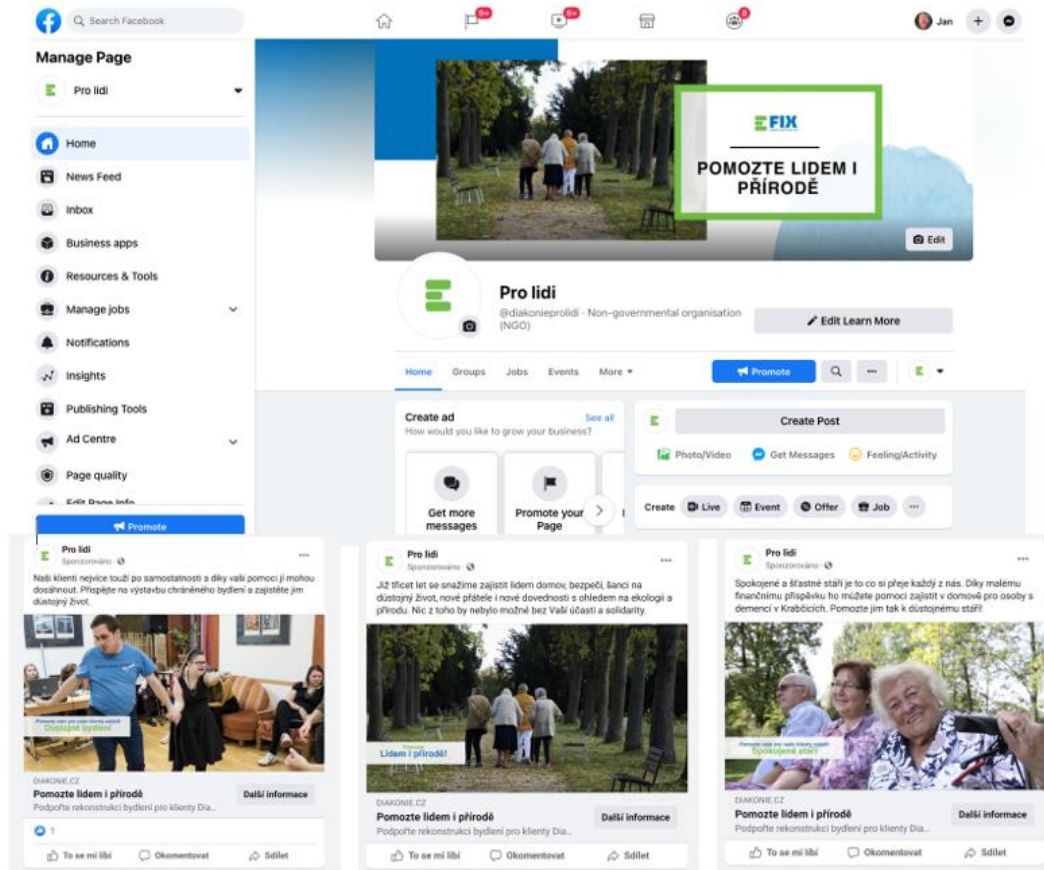
Measure: The subject of CF campaign focused only on co-financing of the part related to the energy saving measures

- Risk no.2 – securing enough resources to implement the whole project

Measure: The investor submitted project proposal to get funding followed up by re-submission and budget modification

- Risk no.3 – shift of interest from potential donors due to the Covid pandemic

Measure: Timing of the campaign taken into account the situation within other CF / charity campaigns



Picture 1. Graphic elements of the Campaigns (Facebook page and adds)



4.5. Georgia

4.5.1. Projects pipeline

Georgian Leasing Company will continue promotion and financing energy efficient equipment, as this was already done successfully in piloting phase. Company mainly concentrates on financing energy efficient construction equipment, where it was huge experience and knowledge. But even company has such knowledge such step from it's side should be still considered as risky one as In general, leasing financing is bit expensive on Georgian market, so leasing companies have to offer some additional benefits to the customers to be able to make leasing more attractive form of financing. Georgian Leasing Company tries to make leasing financing very fast, easy and hassle free process which means company has to make decisions based on a small information available, as there is no room for time consuming financial analysis etc. This automatically leads to the fact that leasing is becoming riskier product for leasing companies, meaning to mitigate risks Georgian Leasing Company have to be very cautious about assets financed, as those assets are only security in case of defaults. This ultimately leads to the fact that financed assets should be easily re-marketable, which is quite hard to say about EE machinery, which is still new for Georgian, not very much developed, market as its innovative and expensive nature still fears potential buyers. So for any leasing company financing EE machinery is risky and hard task to do, as it has to 1. Take more risks; 2. Offer better rates to the customer as machinery is expensive and it should be somehow mitigated; 3. Develop more detailed sales approach, which requires additional time and effort, to be able to convince customer to go for modern, expensive EE machinery.

All above mentioned make EE financing bit hard task to do, but Georgian Leasing Company is determined to make these moves for better future, as its team is convinced that with such steps demand on the market can be changed soon, as EE equipment will become a new norm. For sure this is not an easy move, but company considers these times best for such changes.

Table 9. Projects pipeline- Georgia

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Total energy related investment size (EUR)	Expected period of implementation
GLC - Leasing of equipment	EE	Leasing	25.000.000	25.000.000	
Total			25.000.000	25.000.000	

4.5.2. Implemented Pilot Financing Campaigns

Projects financed by Georgian Leasing Company in piloting phase are mainly in construction business, which is one of the most important business sector for the company, as in construction equipment company has highest knowledge and competency.

In total 53 projects were financed under piloting phase, with the total investment size of EUR 6.08M, whereas leasing company's investment (financed amount) amounted EUR 5.03M. Energy saving for all mentioned projects financed is 21.44 GWh/a, which is more than triple of planned figures.

Table 10. Implemented projects- Georgia

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Total energy related investment size (EUR)	Primary energy savings (GWh/a)	RES production (GWh/a)
Georgia Leasing Company, LLC - leasing of construction equipment (53 sub-projects)	EE	Leasing	6.080.684	6.080.684	21,44	-
Total			6.080.684	6.080.684	21,44	-



4.5.3. Pilot Financing Campaigns outcomes

Piloting process proved to be quite challenging, interesting and profitable at the same time. With this process company was able to:

- Gathered/developed better knowledge in energy efficient equipment
- Understood how market perceives EE machinery, what main obstacles are in sales process and better understood what can be done to further sell and finance such equipment
- Strengthened relationship with suppliers, as helping them to sell EE machinery is very important issue for them, thus leading to better and stronger relationship establishment

In total, company has gained very valuable experience in this process. But still, Georgia needs some additional time to more actively transfer on EE machinery. For local market EE machinery is still very expensive and convincing buyers to choose EE proved to be very hard task. Nevertheless, with lots of work, numerous meetings and discussions, it was possible to fulfill set targets under piloting phase and build some ground for better future sales.

4.6. Poland

4.6.1. Projects pipeline

No projects in pipeline

4.6.2. Implemented Pilot Financing Campaigns

Energy for the future - renewable energy sources in the municipalities of Eastern Mazovia: Dobre, Jakubów, Stanisławów, Stara Kornica

The project is located in four municipalities: Stara Kornica, Dobre, Jakubów and Stanisławów. The Stara Kornica municipalities is located in in the district of Łosice. The other three partner municipalities are located in the Minsk powiat. The investment in question will be located in the area the above-mentioned four municipalities as part of residential buildings, farm buildings, on land and on utility buildings public:

- Stara Kornica Municipality - 247 installations (energy generation units) implemented within 238 locations,
- Dobre Municipality - 161 (energy generation units) installations implemented within 142 locations,
- Jakubów Municipality - 23 (energy generation units) installations implemented within 22 locations,
- Stanisławów Municipality - 37 installations (energy generation units) implemented within 34 locations.

The subject of the project is to carry out construction works consisting in the assembly of photovoltaic devices and installations, solar collectors in buildings and places of private property as well as on and next to public utility buildings. The entire project concerns the construction of new installations and does not include the reconstruction of the existing power generation units electricity and heat from RES.

Renewable energy sources as a chance to improve the quality of the natural environment in the Pokrzywnica, Obryte, Ojrzeń and Pułtusk poviats

The main goal it aims to achieve the implementation of the project in question is to increase the use of renewable energy in the overall production of energy in the Municipalities of Pokrzywnica, Obryte, Ojrzeń and in the Pułtusk powiat. This goal will be achieved through

- Increasing the volume of electricity and heat production from renewable energy sources in the Municipalities of Pokrzywnica, Obryte, Ojrzeń and in the Pułtusk powiat



- Improvement of atmospheric air quality in the Municipalities of Pokrzywnica, Obyte, Ojrzeń and in the Pułtusk County
- Increasing the quality and standard of living of the local municipalities in the area covered by the partnership

The material effect of the implementation of the project will be the introduction of the technology to be used in the area covered by the partnership renewable energy. Photovoltaic installations will use the energy of the sun to support the production of electricity. Installations solar plants will use the sun's energy to heat domestic water. Air source heat pumps will use air for heating domestic water and / or central heating. The biomass boiler will be used to heat the facility. The planned total number of RES installations is 710, of which 697 are installations on private buildings owned by residents area covered by the partnership, and 13 installations concern public buildings.

Replacement of heating devices in the Pokrzywnica municipality

The assumption of the project is to reduce air pollutant emissions in the Pokrzywnica Municipality, thanks to the replacement of heating devices in 35 single-family houses (20 gas boilers and 15 biomass boilers) and in 4 public buildings - 4 gas boilers (area subject to change of heating method 11405.17 m²): at the School Primary in Gzów (including thermal modernization), in the Public Primary School in Pobyków Duży, in the Village Community Center in Pobyków Mały and at the Primary School in Dzierżenin. The investment will also include the installation of 3 photovoltaic cells on the buildings: Primary School in Gzów, Public Primary School in Pobyków Duży, and Village Community Center in Pobyków Mały. Project in progress is in an area where an approved and implemented program of support for the poorest people is being implemented.

Replacement of heating factors along with the assembly of renewable energy installations in the Korczew and Jabłonna Lacka municipalities

The aim of the project is to improve air quality in the Korczew and Jabłonna Lacka municipalities by reducing the emission of pollutants and greenhouse gases from households. There is no centralized heating system in the participating municipalities. It does not function in their area no district heating company and buildings are supplied with heat centrally through the district heating network. Heating of residential buildings is carried out with the use of individual boiler rooms or heating stoves. Loose structure the development of municipalities does not provide economic and technical grounds for building a centralized power source. The solution to reduce low emissions from residential buildings is the replacement of heat sources. The investment consists in replacing 106 low-efficiency heat sources (solid fuel central heating boilers) for automatic biomass, oil, wood gasifying, electric and gas boilers. The subject of the project is also the installation of 15 photovoltaic and 10 solar devices in residential buildings. The action is aimed at to increase the energy efficiency of residential houses and reduce CO₂ emissions.

Reduction of air pollution by replacement of heating devices, thermo-modernization and installation of photovoltaic panels in the Mochowo municipality

The project covers the replacement of heat sources in 21 single-family houses, the installation of 7 PV micro-installations with a total capacity of 36 kWp and operation thermomodernization with replacement of a coal-fired boiler with a pellet boiler in 1 single-family house. Immediately after the project is completed the 150 kWh / (m²xyear) standard will be met for all single-family houses planned to replace the heat source, which will be confirmed by appropriate documentation (ex-post audits, energy certificates). The project covers the replacement of gas and pellet fired boilers in accordance with location assignment as in the feasibility study. As a result of the replacement, a significant increase in efficiency will be achieved energy.

Improving the quality of the urban environment by replacing heating devices in Sochaczew



The project consists in the replacement of heat sources and thermal modernization works in 43 residential buildings located in the municipality and the city of Sochaczew. 2 RES installations (1 heat pump and 1 PV) will be also included in the project.

Thermomodernization of the public kindergarten of Podkowa Leśna in to passive building with use of RES

The project includes thermal modernization of the public kindergarten building in Podkowa Leśna and the replacement of equipment with energy-saving ones. The project will include: thermomodernization of the facility (consisting of: thermal insulation of external walls, roofs, floors on the ground, replacement of windows and doors, modernization of ventilation), replacement of heat sources for central heating on heat pumps, modernization of the facility's lighting system using LED technology, installation on the roof of a PV installation.

Modernization of street lightning in the Municipality Stara Kornica

The project entitled "Modernization of external lighting in the Municipality of Stara Kornica" covers the scope of 159 light points in the Stara Kornica Commune. Therefore, it is planned to replace the existing ones 108 light points (84 light points 350W and 24 light points 250W) for 159 light points (129 light points with a power of 83W and 30 points of light with a power of 31.5W). Additionally, the scope of the project includes the thickening of poles in order to adapt them to the new central heating luminaires requires an increase in the number of poles and a partial reconstruction of the existing infrastructure. The project involves the replacement of the existing lighting condition with luminaires with semiconductor light sources 159 LEDs equipped with motion sensors, to which the luminaire reacts when there is no movement. IN In this situation, the illuminance may be reduced to a minimum value. Modernization of lighting is associated with increasing the number of lighting points and the installation of new devices on selected sections of the roads of the Stara Kornica Municipality, in order to adjust the number of luminaires and their power to be met applicable requirements for the adopted lighting class.

Modernization of the power supply in KOMR facilities - from oil heating to natural gas cogeneration unit

The project is located in National Residential and Rehabilitation Center for People with Multiple Sclerosis in Dąbek city. The project provides thermal modernization of buildings in the center, replacement of the internal heating installation and modernization of the heat source of the local boiler room with installation of a CHP unit. The project also includes a small PV installation.

PCU Piaseczno - heating network modernization

The scope of the project includes the restructuring, modernization and expansion of the heating system with using renewable energy sources in the City of Piaseczno to further improve efficiency energy and lowering its emissivity and improving the reliability of its operation. The aim of the project is to reduce the negative impact of the heating company PCU Piaseczno on the environment, and thus improvement of air quality. The aim of the project is also to achieve the status of the Effective System by the heating system and reaching the level of 50% of heat production from cogeneration and renewable sources. Additional objectives of the project implementation will also be the improvement and equalization of energy efficiency buildings and ensuring the safe operation of the heating plant



Table 11. Implemented projects- Poland

Pilot project	Type of project (EE/RES)	Financial model (ESC/EPC, CF, Leasing)	Total investment size (EUR)	Total energy related investment size (EUR)	Primary energy savings (GWh/a)	RES production (GWh/a)
Energy for the future - renewable energy sources in the municipalities of Eastern Mazovia: Dobrze, Jakubów, Stanisławów, Stara Kornica	RES	EPC	1.556.060	1.556.060	0	1,057
Renewable energy sources as a chance to improve the quality of the natural environment in the Pokrzywnica, Obryte, Ojrzeń and Pułtowski powiats	RES	EPC	2.702.913	2.702.913	0	2,07107
Replacement of heating devices in the Pokrzywnica municipality	EE/RES	EPC	399.990	399.990	1,078	0,52583
Improving the quality of the urban environment by replacing heating devices in Sochaczew	EE	EPC	321.433	321.433	0,25715556	0,01775
Thermomodernization of the public kindergarten of Podkowa Leśna County in to passive building with use of RES	EE	EPC	2.197.802	2.197.802	0,30616485	0,01136
Modernization of the power supply in KOMR facilities - from oil heating to natural gas cogeneration unit	EE	EPC	479.489	479.489	0,88862	0,04572
Replacement of heating factors along with the assembly of renewable energy installations in the Korczew and Jabłonna Lacka municipalities	EE/RES	EPC	445.840	445.840	2,1063367	0,08714
Reduction of air pollution by replacement of heating devices, thermo-modernization and installation of photovoltaic panels in the Mochowo municipality	EE	EPC	136.055	136.055	0,16427218	0,24925
Modernization of street lightning in the Municipality Stara Kornica	EE	EPC	237.278	237.278	0,374	0
PCU Piaseczno - heating network modernization	EE	EPC	11.369.525	11.369.525	20,774	21,11
Total			19.846.386	19.846.386	25,95	25,18

General conclusion after introducing EPC model in Polish pilot investment is that four schemes were in place. They differed mostly in the external money absorption: 1) in case of Stara Kornica and KOMR investors were able to finance 100% of the project value with EPC due to short return periods and substantial energy outputs which allowed to finance the projects with energy savings; 2) in case of PCU Piaseczno the investor had to leverage the project in 50% with subsidies because the total value of the project was evaluated too risky for EPC contract only and the activities undertaken didn't offer reasonable paybacks; 3) in case of Podkowa Leśna the investor – in fact as the only one – used own funding to start the investment process quick and to allow ROI amount to 20 years; 4) and the fourth case – the most popular in Poland was a simple combination of subsidies and EPC financing – with external money only engaged and providing external resources to the investment.

4.6.3. Pilot Financing Campaigns outcomes

The MAE has chosen the EPC as its financing instrument. EPC is only slowly becoming a new alternative to financing energy projects in Poland, and still, mainly for local government units, it is not the most desirable form of financing. The process of finding suitable projects and beneficiaries was very long and time-consuming. Most municipalities use public funds, but most of the financing is not 100 percent coverage. Here MAE found a place for the EPC, starting first with small projects, with less EPC participation, ending with large projects where EPC was the main financing method. The main goal is to open, mainly for local government units, a new way for financing and promoting EPC instrument thanks to successfully implemented projects

Barriers encountered and possible mitigation measures:

- Barrier 1: Problems with choosing a contractor. - No suitable contractor that meet all the requirements took part in the tender. A new procedure had to be started
Solution 1: Solution: It was necessary to introduce a new approach to public tender process where quality criteria are allowed to play a substantial role during the evaluation. Normally only cost related criteria



decide on the tender outcome, in case of EPC the model had to be re-valuated. The requirements had to be adjusted and changed letting more companies to enter the procedure. What is important investment effectiveness was the most relevant at the end and each contractor was to prove energy efficiency and energy effectiveness. That argumentation helped to convince public investors to change the selection criteria.

- Barrier 2: Problems with inhabitants, multiple cancellations. - Many residents withdrew from participating in the project

Solution 2: When energy project concepts are prepared many people find them desirable and easily decide to enter the consortium. They simply want to be part of modernization programme in their commune and want to benefit privately at the same time. In practice investors should prepare reserve list of beneficiaries (although it takes longer time for document preparation) to be sure that during project execution the energy indicators, number of households, etc. will be met. Vast educational/ informational campaigns – similar to E-FIX – should be undertaken to promote RES and energy efficiency measures and achieve public understanding for the implementation stage.

- Barrier 3: Problems with calculated energy savings in one of the project. – the energy and saving effect was not satisfactory.

Solution 3: The problem described here corresponds to some extent to the point no.2 (above). It takes place when people aren't informed and convinced enough and withdraw from the consortium. In practice It's hard to replace a household 1:1 since buildings and energy profiles differ. As a consequence energy projects have to be expanded, more adjustments and technical solutions are in place. What ends up with higher investment costs – on the preparation stage and during implementation. Due to the financing model the indicators must be kept and the investor need to undertake any risk mitigation actions that will help to deliver status quo.

- Barrier 4: Too small investment size

Solution 4: EPC model involves external money and human resources that should be financed by the investor. In some cases the project scope was too limited to offer big enough returns and energy savings to cover all the resources. That's why umbrella projects were suggested – that allowed to combine beneficiaries and expand the investment scope.



5. LESSONS LEARNED

At the beginning of the E-FIX project, the importance of capturing lessons learned was recognized, especially for the development of projects within project duration, as well as those which were put in the project pipeline. Lessons learned reflect both the positive and negative experiences important for identifying project management process improvements, since by not learning from project failures we can repeat similar situations/mistakes. Taking in consider that each country has its own legal and project framework, the lessons in continuation are prepared according to their experiences during implementation of E-FIX project.

Armenia

- There is a significant potential for the energy efficiency financing in Armenia, which can be utilized via innovatively structured financial mechanisms addressing market failures. The integrated approach to finance and innovative design of EE financing mechanisms can be replicated in Armenia across all sectors of economy to accelerate transition to green economy;
- The investments in EE projects are hampered by specific market failures such as high up-front costs, capacity and information gaps among potential project developers and in some cases vendors. The project developers usually do not have enough technical knowledge to calculate the financial benefits of the investments in the energy efficient technologies. At the same time, vendors and suppliers are usually reluctant to provide technical assistance or to give any binding obligations on savings to their potential clients. The financial institutions can play central role in closing the information gap faced by the developers via for example creation of the databases for energy efficiency investments. Such databases can be very useful for the evaluation of the investments in standard equipment (such us trucks, construction equipment etc);
- The limited access to finance especially in SME sector hinders the investments in energy efficiency. Typically, SMEs are highly leveraged and cannot finance the new investments via traditional loans due to high collateral requirements from the local banks. Leasing as an off-balance sheet financing instrument allows to overcome financing barriers as it does not require additional collateral from the lessee;
- The integrated approach to EE financing by blending leasing instruments with technical assistance, and provided by the suppliers and vendors, helps to address financial, technical and knowledge gaps. The leasing instrument were especially useful and efficient for financing of SMEs in transport and construction sectors.

Austria

- Municipalities can usually rely on variety of 'traditional' financing sources, mainly commercial bank loans and public funds (zero-interest loans, grants). CF is therefore hard to sell due to their increased cost (especially for the "non-visible" energy efficiency measures). However, CF is considered a complementary financing source, especially when considering the 'energy financing mix' with public funds, EPC or bank loans. Its main advantage is that the "crowd" is known and usually linked to the local community;
- EE measures usually do not require local acceptance (exception: large scale-projects) and are primarily implemented by the affected parties themselves if capital and profitability are available. Private investments are often not implemented through a separate legal construct, which is sometimes more common with RE plants (issue of equity capital of a limited liability company). The "need for action" in regard to EE improvements is still limited and have so far been characterized by a market with high supply rate;
- Both, 'donation-based' CF and 'lending-based' CI models were requested, but mainly from public or non-profit making institutions (e.g. municipalities, private schools). In case of availability of cheap funds there is a value-added for project owners to 'promote/market' their EE investments through online CF campaigns, in case the 'crowd' is known. COVID-19 impacted the E-FIX pilot activities in Austria. Two foreseen CF campaigns had to be postponed to autumn 2021, following the factual standstill of public life. However, there is an uptake of mainly public investments (incl. EE and RE) and boost expected to make-up for the delays.



Croatia

- Crowdfunding
 - Croatian market is rather small with a non-existent regulatory framework for crowdfunding, accompanied with small overall awareness about CF opportunities among all key stakeholders: general public, potential backers, as well as national institutions in charge of legal framework;
 - Lack of quality support from business support organizations, absence of professional CF platforms and non-realistic or well-elaborated business/marketing plans from project developers;
 - Opportunities for wider uptake of crowdfunding lie in promotion and capacity building activities for potential backers and project developers, introduction of more effective regulatory framework and enabling support mechanisms and combination between crowdfunding resources and ESIF grants / financial instruments.
- EPC
 - EPC is still rarely used regularly in Croatia (especially in public buildings) and there is a lack of knowledge and general distrust in ESCOs due to poor track record of previous EPC contracts;
 - Unavailability of standardized documentation, underdeveloped market with small, individual projects, lack of initiative from national authorities to develop tailor made ESIF financial instruments for EPCs are recognized as major obstacles for introducing EPC as a mainstream model for sustainable energy projects;
 - Key measures needed to overcome market barriers include aggregation of smaller projects into larger bundles, development of standardized contracts/tender documentation and development of dedicated financial instruments (grant, equity, loans, guarantees) for private partners.

Czech Republic

- In the Czech Republic, the CF market is still in its developing phase, with project size and investment volume being relatively modest. Cultural and social projects significantly outnumber start-up funding or other business transactions not mentioning the energy investments;
- Existing Czech Crowdfunding platforms usually chose the Rewards Model due to the fact that the regulations of capital markets or of collective investment together with regulations on public collections do not apply on the Rewards Model. The Equity Model, due to the regulatory requirements, is the most expensive variant;
- Timing - pandemic followed by number of parallel ongoing campaigns. The lessons learnt in this case was inevitable;
- Topic - "green" measures not as attractive as social aspects of the campaign (Czech specific);
- Authenticity goes a long way rather than a professional campaign meaning that CF as tested on the Czech case is basically attractive and thus successful when it has a strong (rather emotional than rational) topic - in this case we should have focused more on the social aspect of the project (developing space for social care rather than saving energy);
- Crowdfunding in the Czech Republic at the moment is a simple and efficient tool for rather smaller target amounts (up to 10.000 EUR) in "traditional" sectors (culture, art, start-ups), whilst new ways of CF applications are penetrating the market right now however mainly as equity based model (e.g. www.upvest.cz).

Georgia

- One of the hardest part in EE financing is to explain to customers the benefits of more expensive EE equipment. Explaining such benefits is not an easy task:
 - Companies should know these benefits and should have deep knowledge in it for it to be believable and convincing
 - Meaning they need to spend lots of time with suppliers
 - They need to develop different materials to make those benefits easily understandable and evident
 - And finally, leasing companies need to offer better conditions, to make purchase of expensive assets attractive (as EE efficiency is not yet an important point for majority of local businesses);



- Georgian market is quite limited in terms of EE equipment as current infrastructure is not ready for such technologies yet. One example is fuel, which is not sufficient for newest standards meaning equipment import is limited to some, bit older models/technologies;
- Support from suppliers – as equipment suppliers are used to make bit cheaper but easier deals, as chances for sale is higher, it is hard to convince them to order EE machinery and then offer them actively to customers. For them such decisions may imply numerous risks (e.g. not been able to sell on time, increased stocks, losses etc.).

Poland

- Overcome mental barriers – investors nowadays have a range of subsidies available on the market at their disposal, including dedicated to energy projects. That's why it was crucial during project preparation to encourage investors to implement projects with loan funds, not wait for future EU funded interventions and get savings immediately and start the ROI stage. Moreover, the attitude towards loans in public institutions requires vast political agreement and it's crucial to reach not only decision makers but also their councils and political opponents. Without consensus, implementation of an innovative financing instrument will not be possible and won't be officially approved;
- Explain the financial model applied – public institutions have longtime experience with EU funding and external funds (subsidies) utilization. New financial models are to be thoroughly described and frankly explained due to many technical aspects that have to be overcome with decision makers. Consequently, each project delivered to the investor with a novel financing scheme should be precisely calculated showing partners' contributions and benefits. In case of public institutions it's necessary also to get a formal approval from "accountant certification body" which is an external body that oversees public finances. That's why the investor should have a full understanding of the process, as well;
- Offer tailor-made technologies – energy projects should be calculated case by case since local environments differ and offer different ROI in similar projects. It needed to provide technologies that prove investment effectiveness – balancing energy and financial side. In other case, the project outputs might not be interesting enough for investors and the incentives could be not strong enough to decide on innovative financing.



6. CONCLUSION

The whole piloting and implementation phase of E-FIX project was done according to identified potentials, along with analyses and requirements on national and international levels. In order to fulfill set targets and related activities, the importance of strong set of dissemination activities in all phases of PFC implementation was recognized, as well as inclusion of stakeholders in all phases of the process.

E-FIX piloting process has been conducted mostly without hindrance- from setting of implementation groups, Bilateral Master Classes which provided the partners with the necessary skillset needed for planning and implementation, preparation of Action plans for implementation of PFCs to preparation of pipeline and monitoring templates using developed E-FIX methodology. The study events which were planned to be organized in the form of study visits directly using a “show and tell”-approach were conducted as on-line events, combined by countries, due to current COVID-19 situation and recommendations.

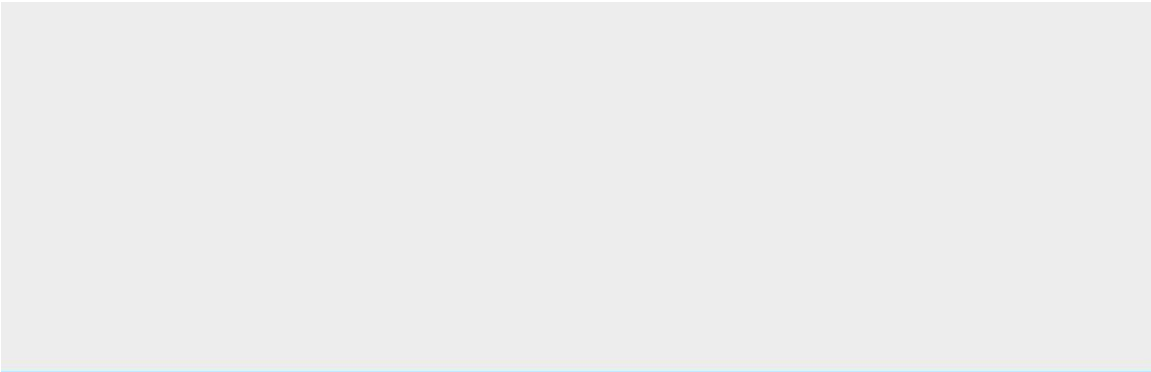
The most challenging part of the WP4 activities were implementation of the PFCs and building up a project pipeline of potential energy projects to be implemented after the project ended which will be administrated by the Energy Finance Competence Centres. All countries faced some issues during implementation and, along with mitigation measures and lessons learned, are in detail described in previous chapters by countries. Even though some countries did not fulfill their national targets in PFC implementation, on project level the KPIs related to both financial and energy indicators were more than achieved. The expected cumulative investments made by European stakeholders in sustainable energy of 48 m€ were also achieved despite current COVID-19 situation and inability of stakeholders to plan and commit to future project implementation, as well as uncertainty in the state of the budget (especially with public bodies) and current energy market. Seeing the potential problem at the beginning of the pandemic, and as a part of mitigation measures, the consortium agreed to an Amendment and prolongation of the project to set more ambitious targets and increase the number of activities within the project duration and with achieving new targets and pipeline volume justified asked project prolongation.

The table below gives the final joint results and achieved targets for the Pilot Financing Campaigns, from triggered energy investments, primary energy and RES production to fulfilling the targets going beyond the project duration.

Table 12. Summary of PFC results

Country	Financial model (ESC/EPC, CF, Leasing)	Actual pipeline Investments (EUR)	Pipeline targets (EUR)	Actual pilot investments (EUR)	Pilot investment targets (EUR)	Actual primary energy savings (GWh/a)	Primary energy savings targets (GWh/a)	Actual RES production (GWh/a)	RES production targets (GWh/a)
Armenia	Leasing	13	10	2,9	1,65	5,75	2,50	-	-
Austria	CF	0,4	5	-	0,75	-	7,00	-	0,02
Croatia	CF/ESC	6,6	1,5	0,3	0,25	0,76	2,00	0,45	0,70
Czech Republic	CF	5	1,5	2	0,1	0,19	0,10	0,15	0,02
Georgia	Leasing	25	25	6	5	21,44	6,00	-	0,90
Poland	EPC	-	5	19,8	14	25,95	1,60	25,18	3,90
Total		50	48	31	21,75	54,09	19,20	25,78	5,5





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