Local investments options in Energy Efficiency in the built environment

Identifying best practices in the EU

Client: DG Energy

Rotterdam, 7 November 2012

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Client: Directorate General for Energy of the European Commission

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ECORYS

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Executive Summary

The European Union considers energy efficiency (EE) is one of the primary objectives of the EU, as it is considered one of the most cost effective ways to enhance security of energy supply and reduce emissions of greenhouse gases (GHG). Yet, so far, only about half of the energy efficiency improvement potential is actually realised due to market barriers and inefficient enforcement of related legislation. Several programmes have been set up in order to stimulate EE investments, particularly in the building stock.

The aim of this study is to find out which programmes are successful and which best practice elements contributed to their success by following these steps:

- Mapping study for the identification of projects, focusing on EE programmes across the EU with and without EU involvement;
- Case study research, providing a project description, its financial characteristics and an analysis and conclusions per case study;
- Analysis of the case studies to identify best practice elements.

25 case studies were analysed in order to identify best practices. Furthermore, a geographical analysis was undertaken in order to emphasize the regional market barriers. The market barriers have been grouped in financial barriers, institutional and administrative barriers, and information and awareness barriers. The regional analysis provided the following market barriers in the East, West, North and South of Europe.

	Financial	Institutional & administrative	Information & awareness
East	Limited availability of access to capital; low purchasing power	Little regulation, (local) governments are mistrusted, and need to improve their credibility and capability	The poor (energetic) quality of many buildings and rising energy costs are a powerful incentive to invest in EE.
West	Poor access to capital, lack of incentives (too long PBP)	(Relatively) a lot of expertise available, (local) governments are trusted, credible and capable	EE is low on the priority list, benefits are underestimated. Weak regulatory frameworks
North	Reasonable access to capital, lack of incentives (long PBP)	(Relatively) a lot of expertise available. Governments are trusted, credible and capable	EE is low on the priority list, benefits are underestimated
South	Temporarily very important due to crisis	Governments could improve their skills and expertise	Lower priority for EE due to warm climate

Even though the success of each scheme depends on more factors than just the financial terms and conditions, some general conclusions regarding the financial instruments have been drawn. At the core of most successful programmes are preferential loans, potentially complemented with a grant and/or TA package, along with measures focusing on behaviour and confidence building among energy users. Furthermore, providing an incentive to invest is essential for a successful energy efficiency programme, especially in the West and the North. Incentives can take the form of grants or regulation, of which regulation is the most powerful. The preferential loans enable the investments and the performance standards drive demand for the loans. In addition to these observations, we have identified the following best practice elements:

1. A

simplified, possibly one-stop shop, administrative procedure;
2. A revolving fund;
3. Inclusion of local expertise;
4. Informing citizens;
5. Flexibility in (European) funding conditions;
6. Imposing obligations;
7. Provision of a Technical assistance (project development) package.

However, the analysis of regional specific market barriers and characteristics showed that successful programmes cannot be extrapolated one-on-one to other countries. Therefore, these best practice elements should be catered according to the regional differences identified. While some elements, such as simplified administrative procedures and informing citizens, are important in all regions; others should be emphasized depending on the region.

- **Revolving funds** should be region specific, given that their complexity requires expertise which is readily available in the West and lacking in the East.
- **Grants** of region specific magnitude (possibly through Cohesion funds) should take into account that Eastern European countries require a larger grant component.
- Inclusion of **local expertise** should be emphasized in Western Europe due to the available expertise. This is also related to capabilities regarding the EPC markets which are starting to develop in Western European countries, but are less developed in the East.
- The provision of a **TA package** is especially relevant for Eastern Europe due to their lack of expertise among key actors in public and financial institutions.
- In the West and North, an important boundary condition is providing an incentive, which is made effective by **imposing obligations.**

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1 Introduction

The European Union considers energy efficiency (EE) as one of the most cost effective ways to enhance security of energy supply and reduce emissions of greenhouse gases (GHG) and other pollutants[1]. Energy efficiency is specifically mentioned in the Lisbon Treaty as one of the four primary objectives of EU energy policy[2]. Yet, so far, only about a half of the energy efficiency improvement potential is actually realised. Imperfections in the market (market barriers) and inefficient enforcement of related legislation inhibit energy efficiency improvements, preventing the complete realisation of the existing (and future) energy efficiency potential. Several programmes have been set up across the EU to overcome these barriers and stimulate EE investments, particularly in the building stock, recognising that "the greatest energy saving potential lies in buildings" (EC, 2011, p.3)[3]. These programmes are usually initiated by (local) governments. Some of these initiatives are supported by the EU, by providing funds and/or expertise. The aim of this study is to find out which programmes are successful and which best practice elements contributed to their success. This knowledge can be used to improve the effectiveness of EE programmes in the future.

To identify the best practice elements, we studied 25 EE programmes across the EU. The EU is involved in 12 of these programmes. Between EU Member States, there are differences in climate, available resources, history and economic strength. To identify best practices, case studies were drawn from all regions in the EU as EE programmes need to take the specific conditions in that country or region into account.

1 European Commission – EC (2011). 'Energy Efficiency Plan 2011'. COM (2011) 109. Brussels

2 Treaty on the Functioning of the European Union Part Three – Title XXI – "Energy" – Art. 194.

3 EC, 2011, Communication Energy Efficiency Plan 2011, SEC(2011) 280 final.

2 Methodology

The study followed the next steps:

- Mapping study for the identification of projects;
- Case study research;
- Analysis of the case studies to identify best practice elements.

2.1 Mapping Study for the identification of projects

The mapping study involved a literature review and the creation of a project database.
The literature review covered (if available) the background, benefits, barriers, methods of finance, technical assistance sought and utilised, as well as key players for local and regional energy efficiency projects. Both, (peer reviewed) scientific articles and studies from consultancy firms and research institutes, have been used for this review.
A database of eligible projects was created to enable the selection of cases to be studied. The database contains local, regional or national energy efficiency projects and programmes in the building sector, varying from funding schemes to a pool of refurbishment projects. Project information includes:

- Level of energy efficiency improvements**;**
- Nature and location, i.e. type of technology, scale, investment (CAPEX) and alike;
- Key players in the projects (authorities – mainly local and regional, project developers, investors, possible end-consumers, etc.);
- Details on how the projects were financed (capital structure; type of structural fund applied for, subsidy granted and level of (total) subsidies) ;
- What technical assistance they have sought or received – and how has this helped;
- What impacts have the projects had – carbon, employment, economic etc.;
- Time line, lead time and outcome (successful versus unsuccessful; year of operation);

Project data was obtained from a wide range of sources, including:

- Intelligent Energy Europe (IEE) – projects;
- Structural fund projects;
- ELENA project pipeline – e.g. Province of Milan case currently under implementation;
- Clinton Climate Initiative's building retrofit programme;
- Institute for building efficiency;
- Members of the European Council for an Energy Efficient Economy;
- European Bank for Reconstruction and Development (EBRD);
- Framework Programmes – although focussed on Research and Development, some projects would be relevant;
- European Investment Bank (EIB);
- Kreditanstalt für Wiederaufbau;
- Concerto+ projects;
- Life+ projects;
- Energy Agencies and Manage Energy – the news feed of these bodies and this website would provide data to be mined to glean project titles / outlines which could then be further researched;
- Active local & regional authorities implementing green public procurement (GPP) (e.g. via ICLEI's Procurement programme);
- Trade literature – data mining to identify projects which would then be further researched.

As such, data was obtained mostly from the involved institutions and the project teams. An overview of who we interviewed is given in Annex 1; all the sources, including some website links are given in Annex 2.

At the start of this study, it was decided - together with the client - to select projects with and without EU involvement on a 50/50 basis. This allows learning from both type of projects and it can shed a light on the added value of EU involvement. Over 30 projects were selected for case study research, out of which 25 cases proved usable for analysis (see 2.3).

2.2 Case study research

The case study research consisted of the collection and analysis of available information and data regarding the projects/programmes. We then carried out detailed telephone interviews with the representatives from the identified projects with the aim to fill the knowledge gaps, provide new insights, and verify and complement acquired knowledge. This enabled us to check and refine the data we collected and to seek views on potential policy options, particularly technical assistance, and their impacts. The interviews were conducted in a semi-structured manner. This means that there was a set of questions to structure the interview and maintain a focus on the key issues to be addressed, but it also allowed the interviewer to follow up on the interviewees' answers, giving the interviewee the opportunity to mention hidden themes and provide new angles. Important questions that were addressed are:

- What is the main purpose of the project/programme and what is the target group?
- What is the general financial structure? How are risks divided?
- What is the specific (financial) barrier that this funding scheme aims to overcome and is this barrier taken away?
- What were the main barriers you encountered in implementing and running the programme? How were these barriers overcome?
- To what extent is the instrument tailored to the target group?
- If you were to set up this project/programme again, what adjustments would you make and why?
- What do you consider to be a key success factor of your project/programme?

The interviews were conducted both by telephone and face to face during stakeholder visits.

This approach provided us with enough information to fill in a pre-defined template according to the following general structure:

- Project description;
- Financial characteristics:
  - Financial construction;
  - Conditions and instruments applied;
  - Risk profile.
- Analysis;
- Conclusion.

2.3 Analysis of the case studies to identify best practice elements

At this stage of the process, the case studies were analysed more closely to draw lessons for the future. This required a certain quality level from the case studies. Cases which, for whatever reason, did not match this requirement were dismissed for further research.

The remaining 25 case studies were analysed to identify best practice elements. The wide array of projects and programmes does not allow for a quantitative analysis following pre defined parameters. Therefore, this study used qualitative criteria to determine which elements of a project or programme were successful. The main questions to be answered include:

- Was the target of the project reached?
- Was there a heavy overhead structure?
- What are the conditions for success of this programme and are these conditions present in other MSs as well?

An overview of all the questions can be found in Annex 3.

2.4 Region specific analysis

The identification of best practice elements is followed by an analysis of the relevant differences between EU Member States, including elements such as climate, available resources, history and economic strength. Due to the heterogenic nature of the EU, Ecorys expects some barriers to be more prominent in one region than in another. The success of best practice cases is then linked to these regional specific characteristics. This enables Ecorys to provide recommendations on how to tailor funding instruments to the regional needs.

3 Analysis

This chapter presents a short analysis of the 25 case studies. Of these 25 case studies, ten are linked to Energy Performance Contracting (EPC) (cf. 3.1.1) and four are seen as cases which lack good practice (cf. 3.1.2). The remaining cases (+ one EPC case) are analysed in detail in section 3.2. For a more detailed analysis of the cases, we refer to the separate case study documents.

3.1 Case study analysis – identification of best practices

We analysed 25 programmes and projects in countries across Europe that aim to improve the Energy Efficiency (EE) of buildings. These case studies include programmes and funds to (co) finance EE and individual refurbishment projects. The aim was to analyse the financial structure and instruments applied to identify best practices. The most applied financial instruments are:

- Grants and subsidies;
- Preferential loans;
- Revolving funds;
- Energy Performance Contracting (EPC);
- Fiscal measures.

Non-financial instruments include regulation and soft instruments, such as information, awareness programmes, training and Technical Assistance (TA). Non-financial instruments, like regulation and training that are not part of an investment programme are beyond the scope of this study. In line with the Terms of Reference, the focus of this study is on investment projects. In many cases, non-financial instruments are part of an investment project/programme, as they are often a combination of the aforementioned instruments.

The funders of the financial instruments, usually governments, wish to maximise the effect of their investments by leveraging private equity. The ratio between public and private money is referred to as the Leverage Factor (LF). It has to be noted that there is a difference in leveraging money with a loan and leveraging it with a grant, since the loan will be repaid and the grant not. For ELENA funded projects, we also use the Multiplication Factor (MF). The MF is the ratio between ELENA funding and total invested money. Including the MF gives a better picture of the strength of ELENA and allows for a comparison of ELENA projects amongst each other.

A '/' means there is no information on the leverage factor (yet). **Error! Reference source not found.** provides an overview of the studied cases, including the financial structure used, size of investment, Leverage Factor (LF) and whether Technical Assistance (TA) was provided.

Table 3.1 Overview of the 25 case studies

Case name	Country	Financial structure	Size of fund/investment	LF	TA	Energy Savings
ELENA London RE:FIT	UK	EPC + preferential loans to ESCOs	M€ 59.6	2, MF: 41.7	y	28% carbon reduction per project (average predicted savings)
ELENA public schools Paris	France	EPC - Private Finance Initiative (PFI)	M€ 52	MF: 37.8	y	10.7 GWh/y

Case name	Country	Financial structure	Size of fund/investment	LF	TA	Energy Savings
ELENA Rediba	Spain	EPC + preferential EIB loan + grant	M€ 500	1, MF: 50-250	y	280 GWh/y
EIB thermal rehabilitation Sector 6 in Bucharest	Romania	80% grant	M€ 140	0,25	n	There is no quantified energy savings per year in GWh reported per project. However, the label requirement guarantees minimum 10% of energy savings per sub-project.
EIB Facilité Haute Qualité Énergie Environnement (HQE)	France	Preferential loans	M€ 350	3,43	n	160 GWh/y
EBRD REECL	Bulgaria	Preferential loans + grants	M€ 114.6	1	Y	133 GWh/y
JESSICA Kredex	Estonia	Revolving fund, preferential loans + grants	M€ 32	/	Y	885,000 m sq refurbished with an average energy reduction of 36%
JESSICA Holding Fund Lithuania	Lithuania	Revolving fund, preferential loans + grants	M€ 227	1,05	y	Save 7.7 GWh, 11.6 kilotonnes of carbon emissions by 2015
ERDF Arbed Wales	UK	Grant scheme	M€ 35	2	n	300 GWh/y
ERDF Exoikonomisi Kat' Oikon "energy conservation in houses"	Greece	Revolving fund, preferential loans + grants	M€ 396	2	n	1 500 GWh/y projected
ERDF France social housing	France	Preferential loans, + other instruments varying per region	M€ 320	6,14	n	1,013 GWh/y
EBRD SlovSEFF	Slovakia	Preferential loans + grants	M€ 180	1	y	472 GWh/y
EPC project municipalities Norway	Norway	EPC + preferential loans + grant	M€ 4.6	18,4	n	7.8 GWh/y
KfWs Energy-efficient Refurbishment Programme	Germany	Preferential loans + grants	M€ 6,900	1	n	2 450 GWh/y
National building support programme Switzerland	Switzerland	Grant scheme funded by industry through petrol charge	M€ 130	8,33	n	58,000 tonnes of CO_2/year

Case name	Country	Financial structure	Size of fund/investment	LF	TA	Energy Savings
Renovating the Dutch Ministry of Finance	Netherlands	EPC - construction + O&M contract including energy service	Not applicable	1	n	n.a.
Incentives for low energy housing Norway	Norway	Financial and fiscal incentives	M€ 1.7	/	n	Reduce the total amount of energy used in new buildings by 25%
Energy savings obligations in the UK	UK	Grant scheme funded by energy suppliers	M€ 6,500	/	n	It is estimated that natural gas savings of the programme amount to more than 583 TWh over the lifetime of the measures.
Green loans for social housing France	France	Preferential loans	Not applicable	1	n	n.a.
Berlin Energy Savings Partnership	Germany	EPC	M€ 51.6	/	y	219 GWh/y
Sustainability loans in municipalities of NL	Netherlands	Preferential loans	M€ 8.4	>1	n	7.5 GWh/y
ECP policy programme Upper Austria	Austria	EPC + government grant to ESCO	M€ 31	<8	y	50 GWh/y
Buildings Pardubice	Czech Rep.	EPC + forfeiting	M€ 1.5	1	y	Total cost savings: € 367 600 year
Refurbishment Universitat der Kunste	Germany	EPC	M€ 1	/	n	4,87 GWh/y
BadRadkersburg	Austria	EPC	M€ 0.23	/	y	0.35 GWh/y

The analysis of the cases will first focus on the effectiveness of the (financial) structure to identify best practice elements. Then, a geographical analysis will shortly address the regional differences between East, West, North and South Europe with respect to EE in buildings. A final analytical step will match these characteristics to the best practice elements.

Finally, we provide a short word on EEEF. The EEEF facility offers a combination of a preferential loan and a TA grant. Because this scheme has been launched only recently, no cases could be evaluated for this study. One case had been selected (Berlin Jewish Museum), but the project was delayed and did not allow for evaluation yet. However, it seems to be an interesting opportunity to be considered as a potential source of funding for public authorities.

3.1.1 Energy Performance Contracting

From table 1, it becomes clear that there are ten cases with an – broadly speaking –Energy Performance Contracting (EPC) business model, usually involving Energy Service Companies (ESCOs).

The EPC business model has some major advantages:

- Up-front capital investments by the involved building or property owners are not needed;
- EPC has a positive impact on client's cash flow and cost structure;
- The ESCO has professional knowledge regarding the technical requirements, installations and the (local) legislation regarding permits and (fiscal) support schemes.

Yet, there are also some serious limitations[4]:

- There are few qualified ESCOs. They need to be large and credible to get sufficient access to capital from financial institutions. Few regions in Europe have a functioning ESCO market[5] [6];
- EPC is a complex set-up. It is therefore time consuming to establish such programmes and it requires (external) expertise[7];
- Each project needs to be assessed individually to estimate potential savings;
- EPC is mainly suitable for large scale or bundled projects due to this complexity. The associated overhead costs are unlikely to be coverable on a single-household level[8];
- ESCOs tend to focus on the low hanging fruit[9], as this gives the highest profit margins;
- An EPC typically only concerns an agreement on savings, not on the measures to be implemented. Overall, energy saving measures tend to improve the working and living conditions, as well as to provide greater value to the buildings.

There is an on-going debate about the potential scope of the EPC concept. Some present EPC as the silver bullet to realise more energy efficient buildings, whereas others are more sceptical. Based on stakeholder interviews and literature research, we draw the conclusion that under the current market conditions, the success of EPC is limited to a niche market. The drawbacks mentioned above are currently hampering large scale implementation of this business model (see case study descriptions for more detail). Successful implementation of this concept in the building sector is expected to be confined mainly to public buildings (due to long term credibility of public bodies). Within this niche, one case, 'ELENA London RE:FIT', is highlighted to show under which conditions EPC can have an added value. The other EPC cases (due to similarities) are not analysed further in detail.

Whereas the success of EPC has been limited thus far, the new Energy Efficiency Directive (EED) is expected to improve the outlook for the European EPC market. The new directive requires large energy companies to achieve annual energy savings of 1.5% of their energy sales. To realise this, the energy companies will try to find the most cost-effective energy savings, thus acting more or less as an ESCO[10]. The EED further stimulates the expansion of the current success of EPC in public buildings by encouraging public bodies to hire ESCOs to implement building renovations.

3.1.2 Cases lacking best practices

We could not identify best practices in the following four cases:

1. ERDF Exoikonomisi Kat' Oikon "energy conservation in houses" - due to the current financial crisis in Greece, loans are virtually not provided any more (or against +30% interest, which is not bankable in normal EE business cases);

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4 Primary research Ecorys.

5 Mora Associates (2010). Energy Service Companies (ESCO): Monetization of energy efficiency. [Online] Wagner, L. Publication is available at: http://www.moraassociates.com/publications/1002%20ESCO.pdf.

6 Berliner Energieagentur GmbH (2008). International Experiences with the Development of the ESCO Markets. [Online] Lamers, P., V. Kuhn and A. rechting.

7 JRC, 2010, Energy Service Companies Market in Europe- Status Report 2010 -EUR 24516 EN – 2010.

8 JRC, 2010, Energy Service Companies Market in Europe- Status Report 2010 -EUR 24516 EN – 2010.

9 Milin, C., and Bullier, A., 2011, Energy Retrofitting of Social Housing through Energy Performance Contracts, A feedback from the FRESH project : France , Italy , United Kingdom and Bulgaria, in Energy (2011).

10 This set up bears strong resemblance to the 'Energy saving obligations' case study in the United Kingdom. This case study shows that insulating houses of clients proved to be the most cost effective way for energy companies to achieve the demanded energy savings.

2. “Incentives for low energy housing Norway” - because of insufficient information;
3. “Green loans for social housing France” - because the programme still needs to start up;
4. “EIB-Bucharest thermal rehabilitation” - the programme is popular, delivers significant energy savings (due to compulsory ex-post energy audits) and improves the area. However, the 80% grant (in Bucharest 6) makes it inefficient from a cost perspective, and hampers up-scaling potential. Questions can thus be raised regarding the longevity, efficiency and replicability of the programme.

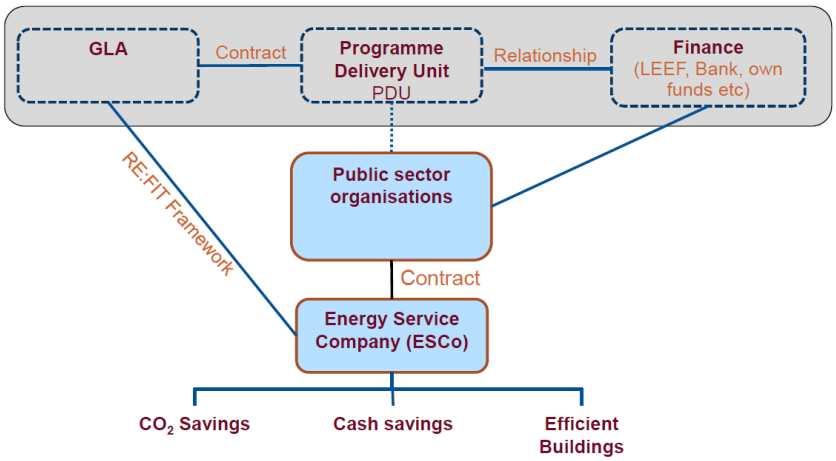
3.2 Best practice analysis

The case studies have been scrutinised in terms of removal of barriers, cost effectiveness, conditions and generalisation potential. Not all effects of a programme can be assessed and measured. Successful programmes raise awareness, set an example (i.e. Romania, Bulgaria, Slovakia, Lithuania) and provide an impulse to the EE market (e.g. EPC cases, Bulgaria, Arbed). The effects thus stretch beyond the duration of the programme. This is especially relevant for programmes in countries where EE investments are uncommon, as such countries do not have an established EE market yet. As we are especially interested in the most successful programmes, this analysis excludes the less successful cases mentioned under 3.1.1 and 3.1.2. Best practices elements have been identified in the following programmes:

1. Elena - London REFIT;
2. Sustainability loans in municipalities of NL;
3. ERDF - France Social Housing;
4. ERDF - Arbed Wales;
5. Jessica – KREDEX;
6. Jessica - Holding Fund Lithuania;
7. EIB - France HQE;
8. EBRD – SlovSEFF;
9. EBRD - REECL Bulgaria;
10. Energy savings obligations in the UK;
11. KfWs Energy efficient Refurbishment Programme;
12. National building support programme Switzerland.

3.2.1 Elena - London REFIT

Project title		**London RE:FIT Building Energy Efficiency Programme**
Type of building(s) or construction		Public Sector Building retrofit
Overall aim/objective of project		Save energy and reduce carbon emissions
Type of project		Energy Performance Contracting - procurement framework
Main technologies / approaches		Energy efficiency retrofit
Location		London
Time frame	Start date	Jan 2010
	(Planned) end date	Jan 2014
Project originator/host		Greater London Authority (GLA)
Key stakeholders:		Project originator / host – Greater London Authority
		Public funding sources – ELENA, London Green Fund, ERDF, London Waste and Recycling Board LEEF – London Finance Facility?
		Private funding sources – Royal Bank of Scotland



The RE:FIT framework streamlines the procurement process for energy services by providing pre-negotiated, EU-regulation compliant framework contracts through which a group of prequalified ESCOs can undertake the design and implementation of energy conservation measures in London's public building sector.

The London RE:FIT programme was developed with a range of different operational and financial models enabling the investments being "on" or "off" balance sheet. Making the investment off balance sheet was seen as a complex option. The issues around ownership, liability and the assigning of risk could not be overcome. Additionally, the public sector, at the time of initial project development was simply not interested in this type of approach. However, the project is now entering a critical phase where they are looking to develop a second phase with a revised procurement framework for RE:FIT. Due to the recent economic crisis and the effects it has had on public sector finances the option of going off balance sheet is now more attractive. This will be explored as a potential financial option for the revised framework; however these discussions are still at a very early stage of development.

In terms of what could be done better, or changed in future, the importance of ambitious initial applications was noted as important. Public sector cautiousness means applicants with extensive building stocks may initially only apply for a small proportion of their buildings to be refurbished unless there is a similar credible and applicable example. However, on successful implementation of a few buildings they have returned (often within 12 months) to reapply. The process of reapplication is time consuming and expensive for all involved (the applicant, the funders and the programme delivery unit). In the future, a phased approach to renovations will be promoted, so that renovations can still be done at a speed comfortable to the public body involved, whilst also leaving the option open to future renovation phases, without the need to reapply to the scheme from scratch.

ESCO partners undertaking energy performance contracting (EPC) require an established baseline of information in order to estimate and guarantee what savings they will be able to generate for the public sector client. This baseline energy information has not always existed and this has limited the number of buildings within which renovations could take place. Initial project experience has demonstrated this and there is now more active education of participating public organisations regarding the importance of establishing a verifiable baseline of energy data. This is now demanded of potential applicants as the first step in the project cycle.

Originally the main barriers to these investments may have been technical capacity, lack of resources, procurement complexity and lack of financial instruments. Many of these have been

overcome, but banks and the public sector's attitude to lending has hardened over recent times. This is likely to remain the main challenge to this project in the foreseeable future.

Overall, the RE:FIT programme is on track to achieving what it set out to do. Some of the learning points outlined above may make it more effective in the future, but most of these effects were unforeseeable. The RE:FIT programme is considered widely to be at the forefront of public sector energy performance contracting. Furthermore, the RE:FIT framework has value out of London, as various regions and cities around the UK are in the process of copying and creating similar initiatives of their own. There is no reason why this approach could not be utilised more widely around Europe. Particularly, in times of limited public finances energy performance contracting provides an attractive mechanism to fund large capital intensive energy efficiency investments within the public sector building stock. If not for the combination of EPC framework, LEEF funding and delivery unit, many of these investments would unlikely have taken place.

This case relies on EPC, and thus suffers from the drawbacks mentioned above. Yet, the ELENA facility provides funding for technical assistance to deal with the complex nature of the concept. RE:FIT allows public sector building owners to procure and implement large scale retrofit programmes up to six times faster than if they were to undertake their own[11] process for public sector procurement. Another major problem with EE funding is the difficult access to cheap capital, which the RE:FIT programme has tackled by setting up a financing facility (LEEF).

From the outset of this project the main barriers to public sector investment were recognised as internal resources, procurement complications and capital availability. It has successfully overcome these challenges through the setting up of the programme delivery unit, financed by the ELENA Facility, the RE:FIT procurement framework, and the complementary LEEF financing scheme. However, much has changed since the original model was devised, i.e. the banking and Euro zone financial crisis. With this in mind, it may necessitate a new approach and the possibility of carrying out public energy efficiency loans and renovations off balance sheet may need to be explored. External expertise, i.e. TA, will be essential for the design and implementation of such unfamiliar ways of financing.

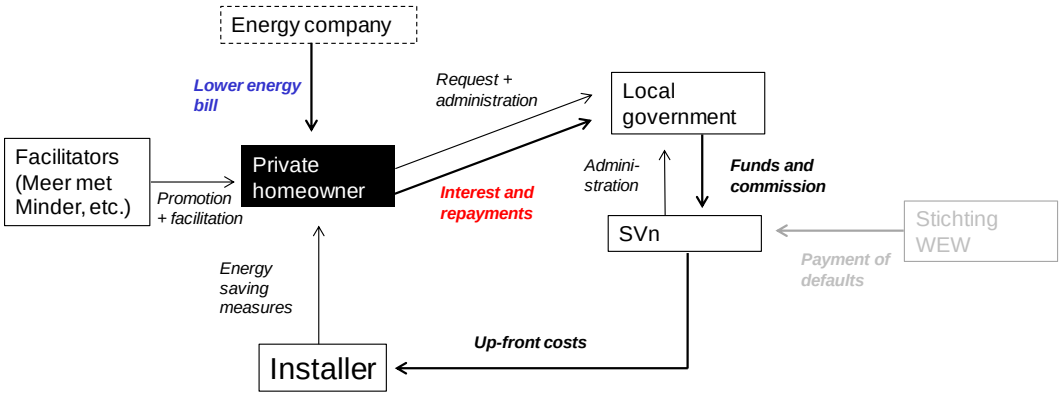
In principle the RE:FIT model works and nothing major would be done differently for the second phase. The core pillars on Energy Performance Contracting, **simplified procurement frameworks**, **guaranteed savings** and low cost finance are sound and will be tweaked to improve their effectiveness for future phases. Water savings may also be included within the scope of the scheme to maximise the environmental benefits of the programme.

3.2.2 Sustainability loans in municipalities of NL

Total (projected) energy saving per year (in GWh/y)		
Costs	Depreciation period (years)	Loan period: 10 years (loan if below 7.500 Euros) or 15 years (if above 7500 Euros)
	CAPEX (total, in mEUR)	2008-2011: 8.4 million of loans provided for 623 sustainability loans, including loans to apartment associations (which are multiple houses). The investments are taken by the municipalities. The average investment per dwelling is estimated by SVn to be around 10,000 Euros.

[11] Official Journal of the European Community; a European Union mandated procurement process.

Total (projected) energy saving per year (in GWh/y)		
	CAPEX (annualised, in mEUR)	-
	OPEX (in mEUR/y)	SVn charges (once-only) settlement costs to homeowners of 2% of the amount of the loan, and yearly charges 0.5% of the amount of debt outstanding to participating local governments for administrating the loans (as of 2011).
	Other costs	Unknown
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	Unknown, due to the lack of a central evaluation system of municipalities' results. When only natural gas savings (not total savings) are considered, ECN estimates an amount of around 8 GWh of natural gas savings per year of all loans together (8.4 million investments). Assumed is a payback time of 15 years and ¾ of the investments lead to natural gas savings. Considering an assumed lifetime of insulation measures of 30 years, total lifetime natural gas savings of the loans would then be 225 GWh.
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	Knowledge sharing between municipalities, for example on how to set up the municipal regulation for a sustainability loan.



This is a government programme executed by municipalities in the Netherlands, who can set up a fund to finance sustainability loans. These are preferential loans for private homeowners to realise energy improvements. The interest rate is the market interest rate (depending on the loan period) which is always deducted by 3%-points. As trusted creditors, municipalities pay lower interest rates for their loans than private homeowners. This allows them to pass on the following loans under favourable terms: Minimum loan is 2.500 Euros, maximum loan is 15,000 Euros. Loan periods can be 10 years (below 7,500 Euros) or 15 years (above). A government organisation used to back up these loans with a guarantee, minimising the risks for municipalities.

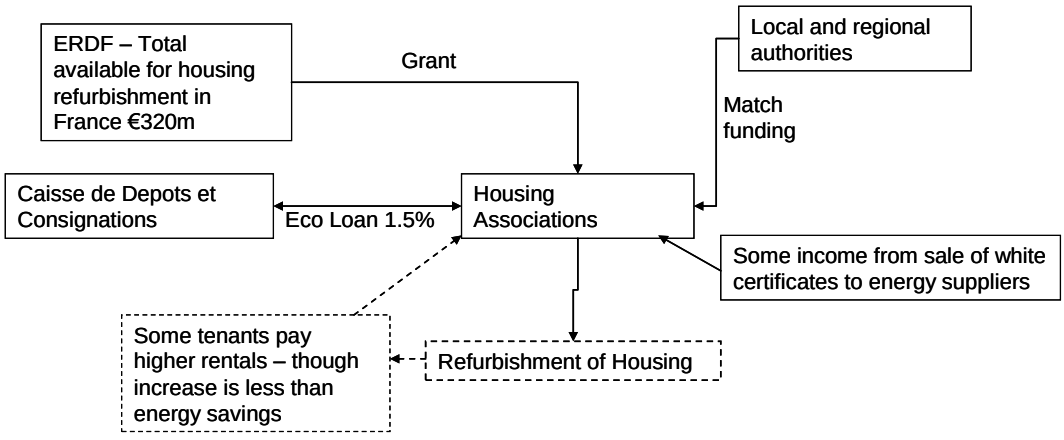
Barriers at the start of the programme were the search for early adopters, the first municipalities willing to offer the loans. Also, the political, governmental and official process to get the programme in operations took quite some time. At the moment, municipalities need to improve efforts, funding in communication and active support to homeowners. Municipalities very active in this respect reach the best results. The cooperation between market parties and municipalities is also important.

The concept of this programme seems good. The sustainability loans are very attractive for private homeowners, because of the large interest deduction. It has a high potential, and the set up **ensures a low administrative burden.** It is organised efficiently and effectively. Yet, not all municipalities are willing or able to provide funding (which is not expected to be different in other MSs). The scale of the programme so far is modest (8.4m€), so the scheme has yet to prove its success. The chances of success have decreased considerably since the government withdrew its guarantee, taking away an important success factor. This is a pity, since **loans that are provided by municipalities often provide more confidence with house owners** than from a national public body.

However, savings are not monitored by the programme which limits the knowledge regarding the actual benefits of the programme. Nonetheless, the homeowners pay for the energy saving measures and thus have an incentive to verify that their savings in energy and money are actually realised.

3.2.3 ERDF - France Social Housing

Total (projected) energy saving per year (in GWh/y)		**1,013**
Costs	Depreciation period (years)	
	CAPEX (total, in mEUR)	320
	CAPEX (annualised, in mEUR)	n/a
	OPEX (in mEUR/y)	n/a
	Other costs	
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	n/a – project by project basis
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	40% reduction in heating costs 15,000 local jobs created 50,000 low income householders better off

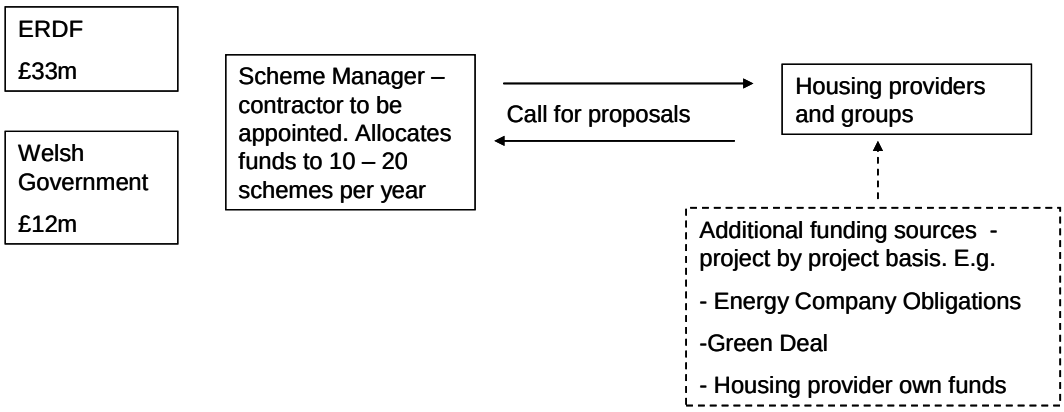


France used 4% (max allowed) of its total ERDF allowance to improve the energy performance of social housing. It is difficult to generalise about the financial characteristics of how the ERDF has been allocated throughout France as it differs between different regions and Housing Associations. At the core of the scheme are preferential loans (1.9% interest).The scheme coincides with a new energy policy and associated targets for the French social housing sector.

Overall, the change to the ERDF allocation process and eligibility has led to massive investments in energy efficiency in social housing throughout France. It has provided multiple benefits including reduced fuel poverty, protection from future fuel price volatility, increased local employment, supply chain development, carbon emission reductions and improved standards of living (40% reduction in heating costs, 15,000 local jobs created, 50,000 low income householders better off). Whilst this is an impressive achievement, the process by which this has happened could be improved. The actors involved all had similar overall objectives, but very different approaches and mechanisms with which to achieve these objectives. The scale and complexity of the project requires a more uniform approach and the establishment of formalised partnerships.

3.2.4 ERDF - ARBED Wales

Total (projected) energy saving per year (in GWh/y)		**11,600 tonnes CO2 saved by end of 2015**
Costs	Depreciation period (years)	n/a
	CAPEX (total, in mEUR)	55.45 (£45,000,000)
	CAPEX (annualised, in mEUR)	18.47
	OPEX (in mEUR/y)	
	Other costs	
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	Save 7.7 GWh, 11.6 kilotonnes of carbon emissions by 2015
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	Reduction in fuel poverty, low carbon job creation and emission reduction



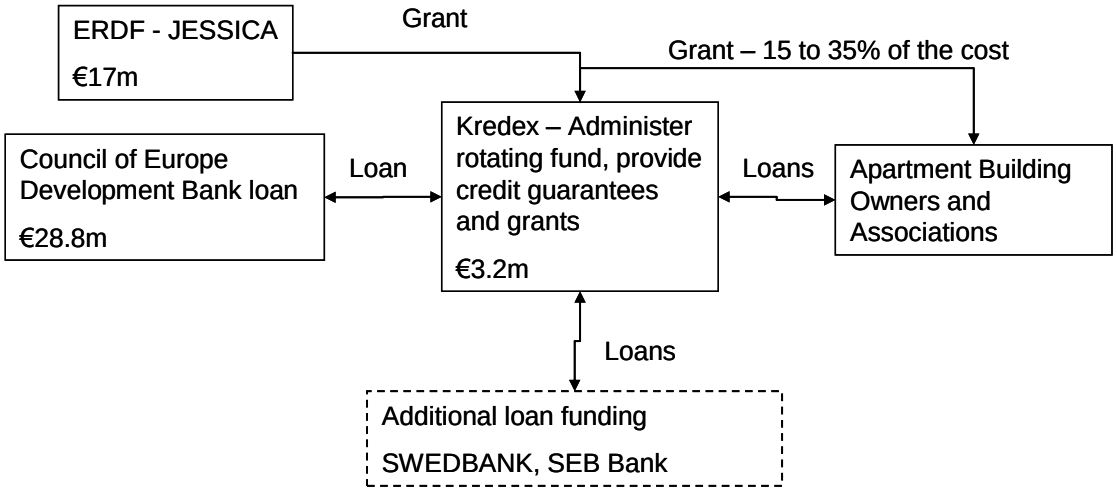
The ARBED programme uses ERDF funds to provide grants for energy efficiency investments in socially deprived homes. Each year there is a call for projects and the highest quality applications with the greatest scope for energy and fuel poverty reduction are selected for delivery. The scheme management and delivery is carried out by an external contractor with experience in this field. Projects were delivered by either local authorities or social housing partners.

Whilst this project has been successful in delivering significant investment in energy efficiency projects within deprived areas of Wales, its longevity in its current guise, is limited by changes in wider UK policy related to energy efficiency i.e. the introduction of the Green Deal (scheduled for autumn 2012). Its introduction will impact upon the current Phase II scheme and its effectiveness at leveraging additional funds into energy efficiency investment. In the future, the Welsh Government will have to make a decision on its preferred role within the Green Deal scheme. In summary, it is felt that there is still a massive amount to be done in this area in terms of poverty reduction,

improved public health, job creation and carbon reduction. Enormous financial resources are still required to address these issues in the future. The recent changes to the ERDF regulations have proved to be very beneficial, but more could be done to **unlock and bring additional public funds into this area from an EU level**. Energy efficiency investment provides real jobs and training opportunities in the real economy. This has a direct impact on local employment and can also act to stimulate the local low carbon supply chain. ARBED II resulted in the creation of 49 new jobs focused on the production and fitting of energy efficient products, taking the total number of jobs created by phase 2 of ARBED to 283[12]. Additionally, these investments help to lift people out of fuel poverty by providing them with healthier more efficient homes and additional disposable income. These impacts are lasting and provide long term benefits that are well understood.

3.2.5 Jessica - KREDEX

Total (projected) energy saving per year (in GWh/y)		
Costs	Depreciation period (years)	10 (@ fixed rate, average 14 years total)
	CAPEX (total, in mEUR)	32 (to date)
	CAPEX (annualised, in mEUR)	12,8
	OPEX (in mEUR/y)	0.510 570
	Other costs	
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	885,000 m sq refurbished with an average energy reduction of 36%
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	Speeding up energy efficiency investments in Estonia. Improved standards of living, better health, improved comfort etc. Contributing to energy efficiency targets Increased property value Supporting the construction industry



In Estonia, the EU Structural Funds are combined with the funds from CEB to form a revolving fund for housing refurbishment and offer a long time low interest loan for apartment buildings to achieve energy efficiency: the KREDEX facility. A grant scheme ran alongside the KREDEX loan provides beneficiaries with between 15-35% of the project total in the form of a grant.

[12] http://wefo.wales.gov.uk/news/latest/111115welshhomes/?lang=en

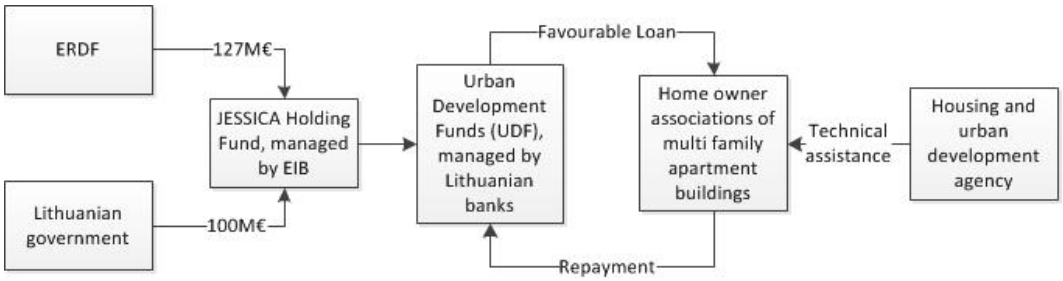
Although time consuming and frustratingly slow in its development, the KREDEX energy efficiency loan scheme / revolving fund (and its associated support measures) are providing a real benefit to Estonian people, particularly those in low income homes. With hindsight, the following learning points have emerged:

- Single measures rarely work; incentivising investment requires a range of instruments (in this case a combination of legal framework, awareness campaigns, loan scheme, guarantees and consultancy services);
- **Revolving funds** are preferable to grant schemes in terms of value for money, although they are more difficult to establish;
- A good relationship with an understanding bank is important when establishing a new scheme;
- **Existing experience within the local banking sector** of working with multi-apartment building investments led to the effective development of the project;
- **Auditing, administration and reporting can be burdensome**.

The scheme has had considerable success. So far, 13,771 apartments have been upgraded through the scheme, 885,000 m^2 have been refurbished with an average energy reduction of 36%. Yet, generating demand for loans and investment has been a struggle in the current economic climate. Any moves to introduce minimum building standards, or incentivise building owners to achieve them, would be welcomed by the KREDEX team.

3.2.6 Jessica - Holding Fund Lithuania

Total projected energy saving per year	**300 GWh/y**
Conditions of loan	Relative low interest rates at a fixed rate of 3% (commercial Lithuanian loans are normally around 3.75%)[13]; Grace period of 2 years; Long tenors: max. 20 year loans; Lenders put in 5% of own capital; Additional tax deduction of 15% of loan amount in case energy savings are met; Low income families receive a grant instead of a loan.
Total fund size	€ 227 million



The concept of the JHF Lithuania is very similar to the KREDEX set up. The fund offers long term loans with fixed interest rate (3%) for the improvement of energy efficiency in multifamily buildings. 15% of the loan can be deducted from taxes if a certain energy efficiency level has been achieved upon completion. For applicants/families with a low income, up to 100% of the loan can be converted into a grant. The loans are provided through two Lithuanian banks.

[13] http://www.lb.lt/eng/statistics/nsdplt.htm

The renovation programme is successful but also (too) complicated. The **revolving nature** of the JESSICA Holding Fund Lithuania is well suited for large scale operations such as this renovation programme. The risk of exhausting a revolving fund is smaller than for a public grant financing scheme.

Setting up the JHFL was complicated for a government with limited experience on innovative financing instruments. **Technical assistance** in the implementation phase helped to train the public servants and to streamline this process. However, missing TA at the project level led to very long lead time for forming of the project pipeline.

In general, the JHFL operators would like to have more **flexibility** in the programme. This can enable them to expand their programme to other sectors or combine it with other funds for instance, thereby further increasing energy savings.

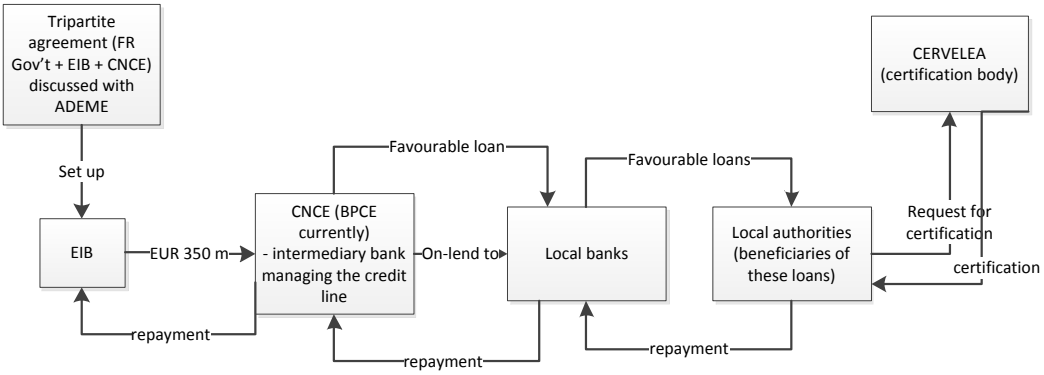
The success of the JHFL so far originates from the fact that:

- There is a market demand, amongst other reasons, because:
  - JHFL is targeting a market where most of the stakeholders directly benefit from energy savings (lower energy bills, higher quality of living, stable real estate value);
  - JHFL is flexible in the sense that stakeholders with less financial means can benefit from a grant instead of a loan;
- The instrument is accompanied with sufficient marketing, communication and promotion. Here the Lithuanian Housing & Urban Development Agency plays an important role;
- The instrument is accompanied with sufficient technical assistance to local banks and other stakeholders on successful approaches. The Housing & Urban Development Agency also plays an important role here.

3.2.7 EIB - France HQE

Total (projected) energy saving	**There is no quantified energy savings per year in GWh reported per project. However, the label requirement guarantees minimum 10% of energy savings per sub-project.**
Sub-project statistics	There have been 173 sub-projects submitted by 94 beneficiaries being co-financed through this facility. Only 4 sub-project applications were rejected. The average cost of sub-projects = € 12.75 million Type of beneficiary: Municipality (48%) Regions (8%) Department (12%) Inter-municipalities (22%) Communes (4%) Other (6%) Sector: Educational and extracurricular activities (57%) Administrative buildings (13%) Sports & leisure (11%) Social (11%) Health (4%) Sundry (4%)

Total (projected) energy saving	There is no quantified energy savings per year in GWh reported per project. However, the label requirement guarantees minimum 10% of energy savings per sub-project.
Conditions of loan	Offer of EIB to CNCE - Euribor -3bp (9 years) Tertiary sector projects Costing between €0.5 – 150 m Projects above € 50m: an individual appraisal is required Compliant with labels HEP, VHEP, low-consumption buildings, HEQ or higher
Total fund size	€ 350 million



The programme Facilité Haute Qualité Énergie Environnement (HQEE) was set up to accelerate the attainment of the EPBD targets. It provides preferential loans for the construction and rehabilitation of public buildings in accordance with more stringent environmental and energy efficiency standards than those currently in force. Projects are eligible between 0,5 M€ et 50 M€. The maximum loan duration is 27 years. The EIB finances up to 50% of the total investment if the project meets high energy performance standards.

The programme is large scale, effectively run and there is a high demand for the loan. This programme has been viewed as successful by the EIB, Caisse Nationale des Caisses d'Épargne (CNCE) as well as by beneficiaries of the fund. The investments generated by the programme are estimated at 1200m€, There is no concern, yet, about the cost-effectiveness of these projects. Applicants must show proof of having achieved higher standards by being certified by one of the certification bodies.
The concept is straightforward and should be easy to replicate. It uses existing financial infrastructure, ensuring low overhead costs. A critical note can be placed though, the programme seems more suitable for the wealthier MSs because it funds relatively large projects and it requires credible and wealthy public authorities.

More specifically, the success factors relate to these aspects:

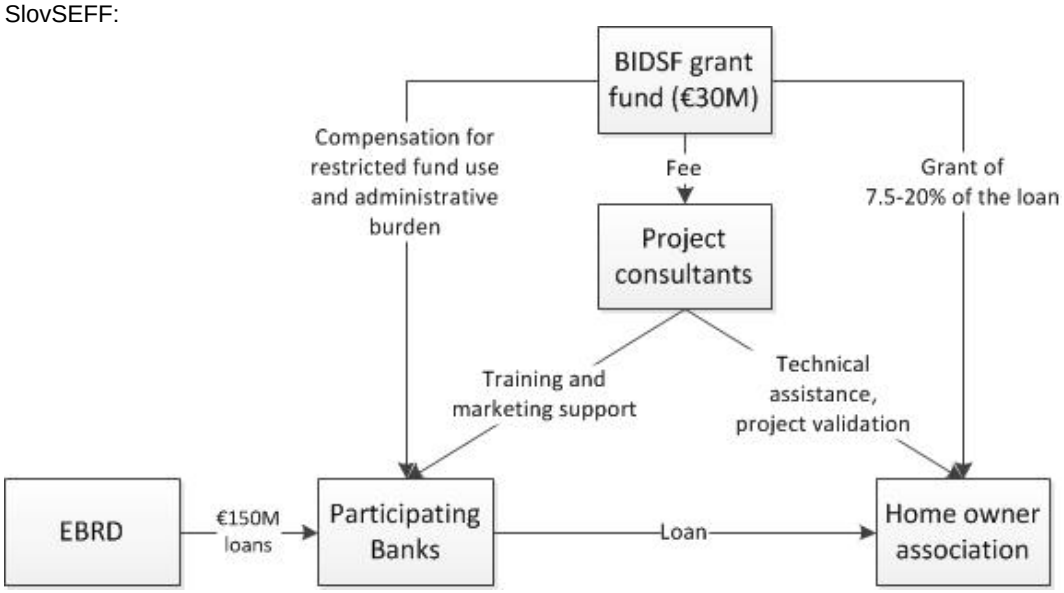
- CNCE is highly experienced, highly credible and a proactive financial intermediary - leader in the sector in France, with capacity to implement the project and who poses negligible credit issues and implementation risk;
- Alternative access to funding has been more difficult to obtain and the **EIB loan** provided the financial intermediaries the possibility to offer competitive rates and conditions of loans;
- The programme was managed efficiently from the side of EIB, i.e. fast response.

3.2.8 EBRD-SlovSEFF & EBRD-REECL Bulgaria-Intermediated financing schemes

REECL:

Total size		€ 90 million (Oct 2005 to Dec 2014) commercial financing from EBRD, complemented with € 24.6 million from KIDSF
Total (projected) energy saving per year		163 GWh/y
Results up to date (Dec. 2011)		€ 46.5 million disbursed to residential Borrowers, complemented with € 12.4 million from KIDSF for incentives to residential Borrowers and for technical assistance
		30 600 projects (~7 000 per year)
		75 200 residents affected
Results	Financial revenue	€ 10.6 million/y (average energy tariffs for 2011)
	Energy savings	133 GWh/y
	Energy generation substitution	27 MW
	Carbon emission reduction	176 200 tonnes CO_2/y

SlovSEFF:



These two facilities are evaluated together as they are similar in their set-up. They are successful programmes.[14] Both report high demand for the loans and grants, and savings are guaranteed due to the ex ante validation of the project by the project consultants. The set-ups are already identified as a best practice structure by the EBRD, rolling out similar structures in the EBRD region.

The Residential Energy Efficiency Credit Line/REECL is a scheme designed for building house owners in Bulgaria, while SlovSEFF targets home owner associations in flat blocks in Slovakia. The schemes offer an opportunity to apply for financing of energy saving measures based on given criteria. It provides homeowners with loans and grants through participating local banks. The grants amount to 20-35% of the total project costs. Because of the high demand, the SlovSEFF program officials decided to downscale the grant a little. Grants are now between 7,5 and 20% of the loan sum, depending on the actual realised energy savings.

[14] For REECL, more than 30000 projects have been financed by the end of 2011, good for 133GWh energy savings a year (or 10,6 million euros a year on a total investment of 46,5 million euros).

There is a high demand for both schemes and they have a significant impact on the market for energy efficiency investments. The SlovSEFF facility is somewhat more efficient as it targets home owners associations rather than individual home owners. This cannot be replicated in every country as it requires specific legislation regarding ownership structures and financial liabilities of associations of homeowners (which is mainly seen in Eastern Europe).

The project consultant, funded by the BIDSF/KIDSF grant fund, is essential for the success of these schemes. These funds are set up to (partly) compensate Bulgaria and Slovakia for the demanded decommissioning of nuclear facilities. This unique character of the grant funds prevents a one-on-one replication of this programme design. In other countries, alternative funding needs to be found for this grant (e.g. Cohesion policy funding).
In spite of the relatively weak financial position of many home owners, the schemes reported strong leverage effects.

The key best practice elements that we have identified in these two programmes are:

- The comprehensive package, i.e. the **one-stop shop**[15] concept, offers reduced financial as well as administrative barriers, and enables a simple approach towards final beneficiaries;
- Using **local banks as intermediaries** makes effective use of their local expertise and networks. Local banks have knowledge of the local market and the local actors involved. They often have established trust relationships with local actors. Schemes that are operated by third parties are generally more effective[16];
- **Technical Assistance (TA)** provided by project consultants in the programme streamlines the process and reduces many barriers, such as the absence of technical expertise to assess the eligibility of the projects, the lack of information about the technical risks and financial benefits of energy conservation and the additional costs in the loan appraisal process. The TA package also includes an elaborate **communication programme** by the project consultant, raising demand, taking away fear and perceived risks, and without the burden for local authorities;
- By targeting home owner associations, the programme made efficient use of the favourable Slovak legislation, which enables home owner associations to apply for a loan. **Economies of scale** can be reached, creating business cases that would otherwise not be there. Point of critique: the necessary legislation need to be in place to facilitate this strength;
- The scheme provides good basis for proper monitoring of achieved results, thanks to the involvement of both ex-ante energy audit and ex-post verification. Although the transparency and availability of results should be improved, this model is a learning example for many other EU financed schemes where monitoring of impacts was an issue.

Replication of this scheme into other MSs is a possibility as the scheme offers guarantees for a good uptake of EE investments. Conditions are that (international) funds should be made available; the local banks involved should have a very good network of local branches; there should be a liaison with technical assistance; and, the scheme should incorporate the one-stop shop concept. Structural funds could help if administration is limited and funding is set up by the retail banking sector on a one-stop shop basis.

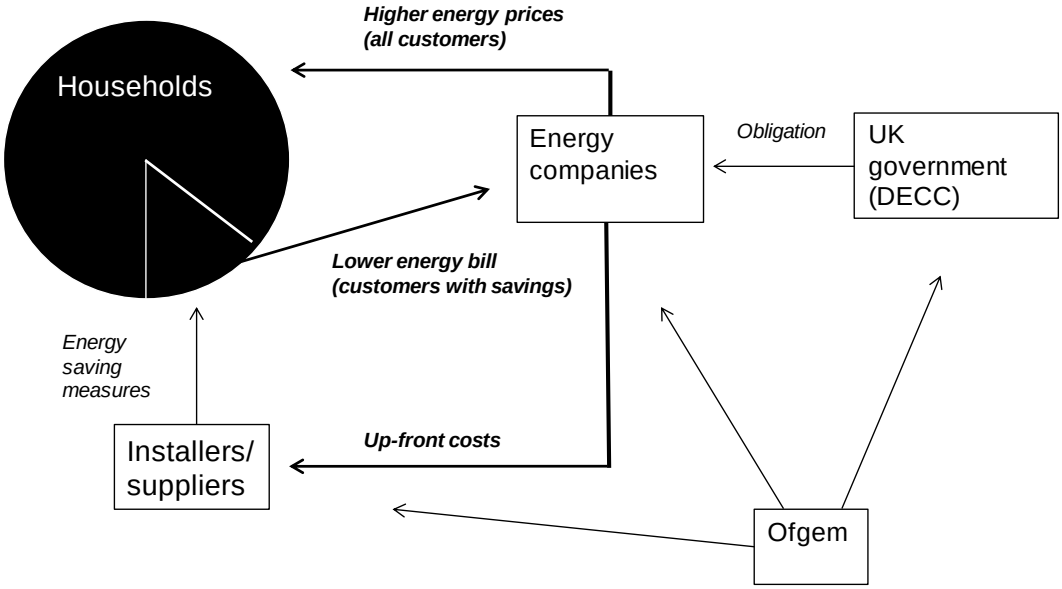
[15] A one-stop shop concept is a comprehensive package of loans, grants and technical assistance (thus at once offered). It reduces the financial as well as the administrative barriers.

[16] Klinckenberg Consultants (2010): Making Money Work for Buildings - Financial and Fiscal Instruments for Energy Efficiency in Buildings. Commissioned by EuroAce.

3.2.9 *Energy savings obligations in the UK*

Total (projected) energy saving per year (in GWh/y)		
Costs	Depreciation period (years)	Unknown.
	CAPEX (total, in mEUR)	*Energy suppliers:* Over the period of April 2008 to December 2011, CERT estimated the installation costs of measures at almost 3.2 billion pounds, or roughly 1 billion per year. Over the whole period running until 2012, expected supplier costs are 5.5 billion pounds. These costs are expected to be largely passed on to households by raising energy prices. *Ofgem:* A few hundred thousand pounds for setting up required systems. Expected to be fully passed on to energy suppliers via their supplier licenses. *Households:* Installation costs and other 'hidden costs' of taking measures (e.g. time, renovation) are estimated to be a few billion pounds over 2008-2011.
	CAPEX (annualised, in mEUR)	See above.
	OPEX (in mEUR/y)	*Ofgem:* Administrator costs are estimated to be 1.7 million pounds per year. Expected to be financed by energy suppliers through their supplier license.
	Other costs	No.
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	Over the period April 2008 up until September 2011 (end of the quarter), CERT realised around 181 Mt CO2 emissions reductions to be achieved over the lifetime of the measures (this excludes savings carryover from the earlier EEC2 scheme, otherwise total savings are 218.7 Mt CO2). Insulation accounts for 62% and lighting for 24% of total cumulative savings of CERT so far. The CERT update provides detailed information on the cumulative volumes of the measures installed. When only the share of natural gas savings (estimated at ¾ of total emissions reduction) in the 181 Mton CO2 reduction is considered, and looking at the current fuel mix for space heating in the UK (80% of space heating comes from natural gas), it is estimated that natural gas savings of the programme amount to more than 583 TWh over the lifetime of the measures. The assumed lifetime in CERT evaluations is unknown.
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	The government has quantified billions of pounds of overall societal benefits from the programme. These follow from saved energy costs, improved air quality and comfort, and avoided purchase of emissions allowances. A growth rate of jobs at

Total (projected) energy saving per year (in GWh/y)		
		insulation manufacturing and installation has been experienced as of 2002. This rate is larger than the government expected it to be without the EEC and CERT in place. In the insulation industry, 27,000 new jobs are estimated to have been created.



The basic organisational and financial structure of the Energy savings obligations programme in the UK is that energy suppliers are obliged to meet CO_2 reduction targets. They have to encourage households to voluntary take-up energy saving measures. Suppliers therefore invest in measures, such as insulation, to be able to offer it to any household. Energy suppliers are free to decide how to achieve their targets, but will typically promote the most cost-effective measures (cavity wall insulation, loft insulation) using subsidy. The households eventually pay for the suppliers' investments via higher energy prices.
Energy suppliers will get a penalty from Ofgem, if they do not reach their target. This fine can be substantial (up to 10% of their global turnover), but will depend on the nature of their short-fall.

This programme is extensive and successful. Although the instrument is legislative, it results in a financial structure for EE financing which has some similarities with Energy Performance Contracting. The utilities act similar to ESCOs by paying the upfront costs and recouping their investments through monthly bills, while guaranteeing an overall cost reduction for their clients. Like in EPC, this set-up causes investors to pick the low hanging fruit.
The programme is on track to meet the target. It is expected to result in 5.5 billion pounds of EE investments over the whole project period (2008-2012). The investments are completely covered by the energy supply companies. The programme requires **no public funding**. The government passed legislation to enforce energy suppliers to reduce the energy demand. The very set-up of the programme ensures that it is cost effective for the stakeholders involved. The energy supplier covers the up-front investment costs, which are recouped from their clients through higher energy tariffs.

In other words, the major success factor of the **energy savings obligation programme** is the mandatory nature. Energy companies are enforced and have no choice but to realise investments, and they are capable of doing so. The programme is further able to realise savings in the existing

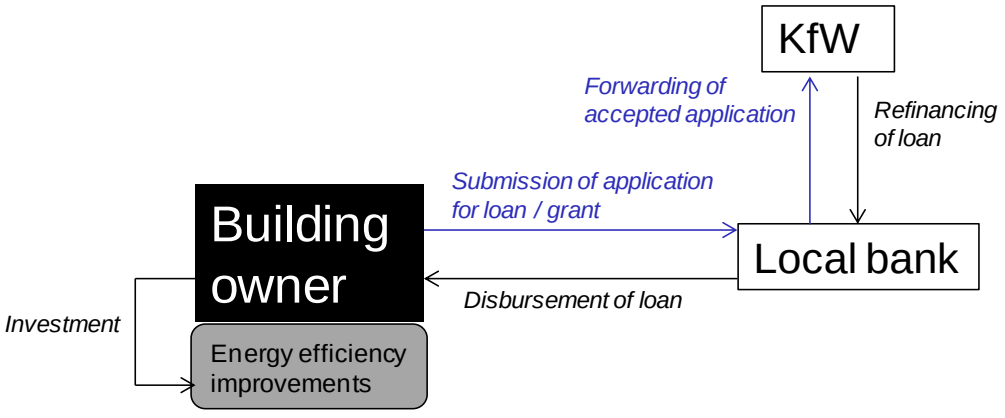
housing stock where it is difficult to realise energy savings by voluntary policies or commercial activities. Main barriers are the large up-front investments the energy suppliers need to make and often low (energy saving) ambition of renovations.

The business model helps to make the programme cost effective for stakeholders involved and reduce financial risks for homeowners. It enables suppliers to charge higher energy prices to customers to earn back their investments, whereas customers do not have to make an up-front investment.

The extrapolation potential of this concept depends on the willingness of governments to impose demand reduction targets on energy suppliers. On 11 September, the European Parliament adopted the new Energy Efficiency Directive which bears strong resemblance to the UK's energy savings obligation programme. The Directive imposes an annual savings target on energy suppliers' equivalent to 1.5% of their annual sales volumes. It is expected that the Directive will be adopted this autumn.

3.2.10 KfWs Energy efficient Refurbishment Programme

Total (projected) energy saving per year (in GWh/y)		**2'450 GWh/y (energy savings for heating and warm water resulting from 2010 investments),**
Costs	Depreciation period (years)	depends on measures taken
	CAPEX (total, in mEUR)	6'900 mEUR (total investment costs in 2010)
	CAPEX (annualised, in mEUR)	n/a
	OPEX (in mEUR/y)	n/a
	Other costs	n/a
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	214 m EUR/year (energy savings for heating and warm water resulting from 2010 investments), 2'450 GWh/y
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	Emission reductions: 847'000 tons of CO_2eq per year; Job creation: 92'500 person years



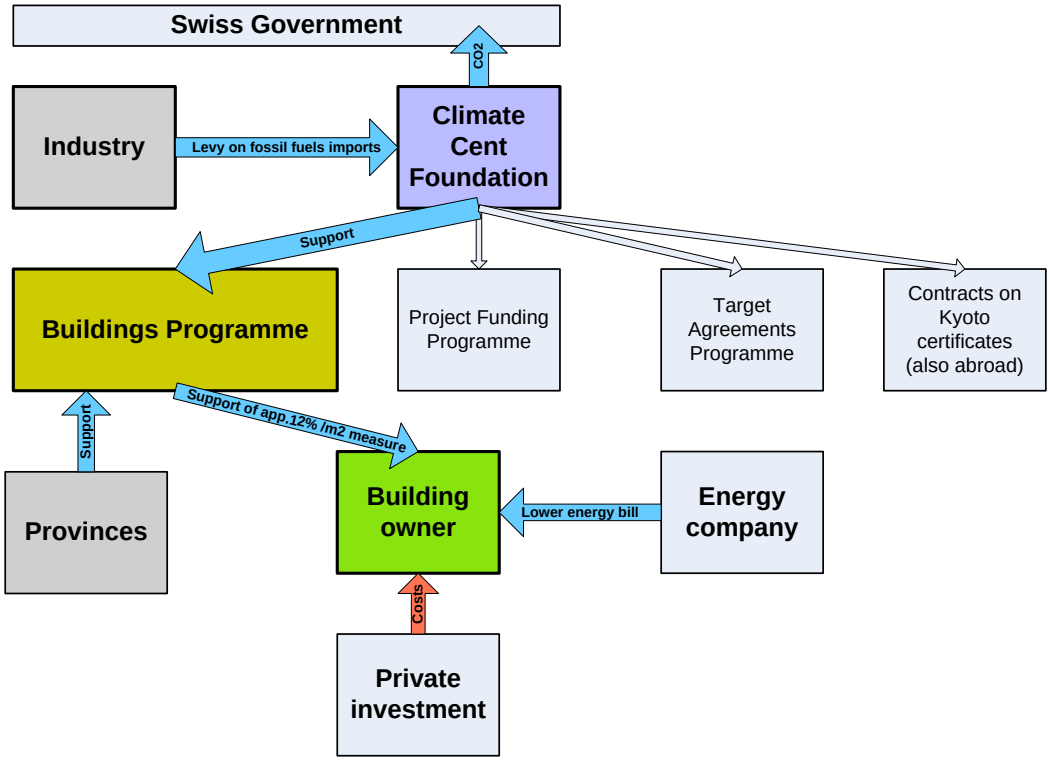
Government-owned development bank KfW provides soft loans to local banks, which on-lend these funds to: private homeowners, homeowners' associations and housing companies. The "Energy-Efficient Refurbishment" programmes apply a mixture of soft loans and grants. The more efficient the house becomes after refurbishment, the less of the loan the building owner has to repay.

KfW's "Energy- Efficient Refurbishment" programme and its predecessor programmes have been remarkably successful. Important features are the focus of the programme on a comprehensive approach to refurbish buildings, thus allowing for optimal energy efficiency improvements; the use of a **combination of grants and soft loans** for up to 100% of required investment costs, which fully overcomes the barrier of 'access to capital' for building owners; the requirement to improve energy efficiency whenever a building owner plans to undertake substantial renovation measures; and the fact that the KfW programmes are closely aligned with Germany's broader strategy on energy performance of buildings and economic targets such as job creation and economic growth. Linking the amount of subsidies and size of loans with the ambitions of the energy-efficiency retrofit incentivised home owners to undertake more ambitious measures.

However, due to the specific German context and the fact that KfW is quite a unique institution, it is probably not so evident to closely replicate a similar set-up in other countries. This will require a similar public promotional bank or a selected commercial bank that would be willing to pick up the task.

3.2.11 National building support programme Switzerland

Total (projected) energy saving per year (in GWh/y)		**58,000 tonnes of CO_2/year (total: 232,000)**
Costs	Depreciation period (years)	4
	CAPEX (total, in mEUR)	175 million Swiss Francs (app. 130 million Euro)
	CAPEX (annualised, in mEUR)	Not available
	OPEX (in mEUR/y)	Not available
	Other costs	42 million Swiss Francs (app. 30 million Euro) contributed by the Provinces
(Projected) benefits	Energy savings (in EUR/y and/or in GWh/y)	58,000 tonnes of CO_2/year (total: 232,000) av. 935 Francs/tonne Co_2 (697 Euro)
	Other benefits (e.g. demonstration, learning, example setting, local energy saving goals, etc.)	Contribution to overall CO_2-emission reduction goal of the Swiss Confederation



The Swiss industry pays a levy of 1.5 cent for each litre of imported oil to the Climate Cent Foundation. The Climate Cent Foundation has agreements with the government on investing the levies in energy efficiency in buildings. The Climate Cent Foundation is a voluntary measure of Swiss industry aimed at effective and sustainable climate protection, in accordance with the Swiss Carbon Law. The funds are used to provide measure specific grants, at an average of 12% of the total investment.

The Building Programme has been successful with all parties being happy with the results achieved in this clear win-win situation. The programme is a good example of partnership among governmental, industrial and private parties, which contributes to the CO_2 reduction goal of Switzerland and is highly cost-effective.

One of the most important features that contributed to the high cost-effectiveness of the Building Programme is the sophisticated support scheme (Fördermodell). Basically, the responsibility is **in the hands of the industry**, while the government is only steering with **fiscal instruments** by imposing levy on all petrol and diesel imports at a rate of 1.5 cent per litre. This allowed the industry to pay an incentive grant of 12%, which makes for a high leverage factor.

Quality of implementation and accuracy when determining the optimal support amount for various types of buildings and measures are a crucial part of the programme. Also a steady increase of the support amounts, in order to find the optimal support rates, has contributed to the cost-effectiveness.

The large extent of the programme made it possible to reach the requirement of maximal 5% of the indirect costs on the total investments. The Building Programme is national-wide, but it proved that it does not have to be necessarily the same in all regions. To implement this kind of programs Europe-wide would not work, as every country has too many specific features, which should be respected.

Finally, a major achievement of the project is that it has raised awareness among building owners on the importance and cost-effectiveness of energy efficiency renovations of the building envelope.

It is questionable, though, whether the industries in other Member States would be willing to levy the charge, or that the political arena can withstand lobbying from the industries against such a fiscal measure.

3.3 Best practice elements

The structure, set-up and impacts of financial instruments cannot be separated from the framework in which they are embedded. The success of a scheme depends on more factors than just the financial terms and conditions. However, some general conclusions regarding the financial instruments can be drawn.

At the core of most successful programmes are preferential loans, potentially complemented with a grant and/or TA package. Flexibility in height of the grants enhances the effectiveness of a scheme. Measure specific grants enables programmes to pick also the higher hanging fruit by providing extra subsidy for measures with long PBP (Switzerland, KfW). A successful strategy is to offer financing with very attractive conditions when implementing a programme, along with the measures (such as cash-back subsidies) focusing on behaviour and confidence building among energy users. Such programmes become popular and can then decide to decrease their grant percentage (SlovSEFF) or set higher standards (EIB HQE France, REECL), to maximise effect. Note that too many changes may undermine confidence, especially in countries where people already inclined to mistrust state programmes (e.g. JHF Lithuania, EIB Bucharest). Minimum thresholds for co-funding improve the leverage factor. The downside is that during financial downturns, commercial co-funding can become more difficult since banks tighten their loan terms, making a scheme vulnerable to economic fluctuations. Flexibility, again, is important.
EPC can be an effective way to channel private funding into large scale projects, but requires a lot of expertise due to the sometimes complex set ups of ESCOs and the contractual procedures between the three parties (financial institution, technical partner and the building owner).

In addition to these observations, we have identified the following best practice elements:

1. A simplified, possibly one-stop shop, administrative procedure

In a one-stop shop concept, a project applicant deals with only one agency where ideally only one application has to be filed. From this moment on, the agency takes over the whole procedure using the same application for as many services as needed (E.g. loan, grant, TA, information) saving time and effort. This concept reduces red tape and the application threshold. Intermediated financing schemes are a good example of this concept.

2. A revolving fund

This set up enhances fund longevity and liquidity predictability, as opposed to a regular fund.

3. Inclusion of local expertise

EE programmes are preferably run by local institutions, such as a policy department on a municipal level, local banks and companies dedicated to technical assistance. This allows the actors to build up a trust relation and provides an impulse to the local economy. This best practice shows similarities with an ESCO set-up, according to the EPC business model, but without the heavy

overhead structure that results from the complex (negotiated) contracts and required verification of savings[17] [18] [19].

4. Informing citizens,

This enhances demand and removes fear and perceived risks.

5. Flexibility in (European) funding conditions

As explained, this creates room to adapt the national/local schemes to the specific barriers and opportunities in that region, increasing effectiveness in terms of energy saved, and efficiency in terms of Euros spent.

6. Imposing obligations

Imposing obligations for the industry, utilities, new buildings and/or housing associations provides an incentive to invest in EE and enables programme designers to set pre-defined performance standards as a minimum threshold for eligibility.

7. Provision of a Technical Assistance (project development) package

The provision of project level Technical Assistance provides programme managers with the required expertise to facilitate the process, deal with marketing and information services, and evaluate the installed measures. The ELENA financing is a good example of successful TA.

[17] Berliner Energieagentur GmbH (2008). International Experiences with the Development of the ESCO Markets. [Online] Lamers, P., V. Kuhn and A. rechting.

[18] Views on the emerging Dutch ESCO market: Can it become successful?, Sanne de Boer, Utrecht University, available at: http://www.struktonpps.com/SiteCollectionDocuments/Publicaties/Views%20on%20the%20emerging%20Dutch%20ESCO%20market_%20Can%20it%20become%20successful_Sanne%20de%20Boer.pdf

[19] Mora Associates (2010). Energy Service Companies (ESCO): Monetization of energy efficiency. [Online] Wagner, L. Publication is available at: http://www.moraassociates.com/publications/1002%20ESCO.pdf.

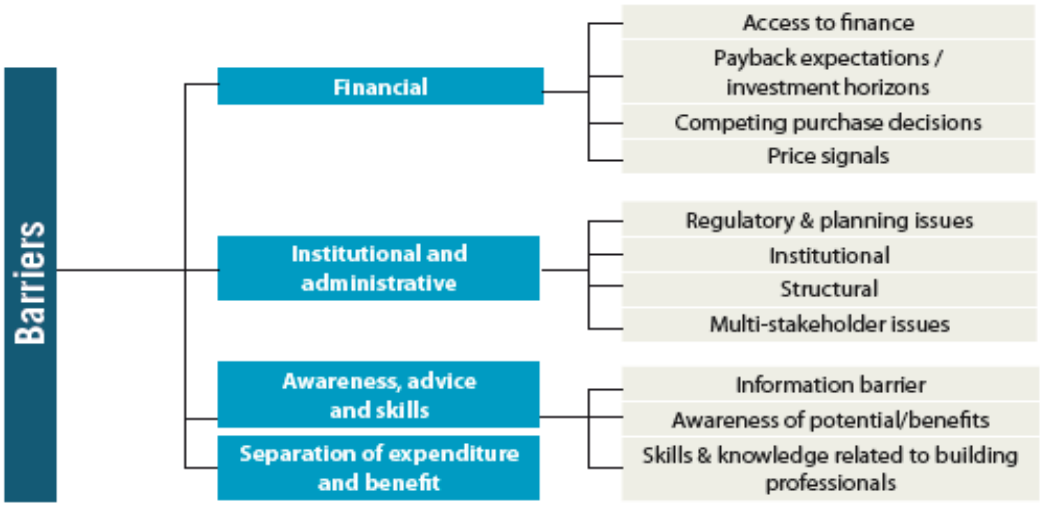
4 Barriers and geographical analysis

This chapter will address the regional differences in Europe with respect to EE in buildings. We distinguish between East, West, North and South Europe, to be able to identify best practices in function of regional characteristics. Note that a certain degree of generalisation is inherent to an assessment of these characteristics.
After shortly introducing the main market barriers, their relevance per region (East, West, North, South) will be discussed.

4.1 Barriers

This study distinguishes three main types of market barriers, following the classification of the Buildings Performance Institute Europe (BPIE)[20] (**Error! Reference source not found.**).

Figure 4.1 Classification overview of market barriers to energy efficiency take-up.



Source: BPIE, 2011

The separation of expenditure and benefit barrier is more commonly referred to as the split incentives barrier, and is classified as an institutional barrier in this study. This leaves three main categories of market barriers:

- financial barriers;
- institutional and administrative barriers;
- information and awareness barriers.

This section will discuss the market situation in the East, West, North and South of Europe and its implications for the aforementioned market barriers.

4.2 East

Energy efficiency investments in buildings are especially interesting in Eastern Europe. The building stock is in a relatively poor condition, and the high concentration of flat blocks allows investors to

[20] BPIE (2011), 'Europe's buildings under the microscope – A country-by-country review of the energy performance of buildings', Buildings Performance Institute Europe (BPIE), November 2011, Brussels, Belgium

profit from economies of scale, given that renovating many similar apartments at the same time can significantly reduce costs. The relatively poor (energetic) quality of many buildings in the East of the EU, combined with rising energy costs, forms a powerful incentive to invest in EE. Renovation is often required anyway, which makes marginal costs for EE investments lower. However, the economic conditions and the regulatory and institutional framework currently prevent the large scale uptake of EE investments. It is even argued that a too high intensity of EE subsidies has hampered the development of an EE market in some countries. High grants reduce the necessity to make a closed business case. Many subsidised measures will no longer be implemented when the subsidy is revoked. Building owners tend to postpone investments in absence of a subsidy scheme, anticipating that another one will be announced soon.

Eastern Europe is economically the weakest region of the EU. This is reflected in the financial position of building owners, which have low purchasing power; and banks, which cannot easily access cheap capital. Furthermore, banks tend to have little knowledge about, and experience with, EE investments. As a result, they demand high collateral and interest rates for loans to finance EE measures. The relatively weak financial position of many building owners makes for an unpredictable financial future which hampers long term EE contracts as in EPC. This is one of the reasons why the EPC market in Central and Eastern European countries is less developed than in countries like Germany and Austria (ECP Policy Programme Upper Austria)[21].

Eastern European countries generally lack a strong regulatory framework to support and/or enforce EE investments in buildings. Hungary, for instance, lacks an effective energy efficiency programme and a multi-year EE strategy for the built environment[22]. In Estonia, EE programme officials suggest that the government should enforce minimum energy performance standards as this would not only drive uptake of the scheme, but have real benefits to low income households, often in the worst quality housing (Kredex).

A serious barrier for EE investments in buildings in Eastern Europe is a lack of knowledge and expertise among public authorities, building owners, the construction sector and the financial sector to adequately assess and implement EE measures in buildings[23] (SlovSEFF, REECL, Bucharest, Kredex, JHF Lithuania). This is reflected in unnecessarily high costs for the development and implementation of projects (SlovSEFF, REECL, Bucharest).

In some Eastern European countries, there tends to be mistrust towards government programmes, which can hamper the uptake of government financing schemes (JHF Lithuania, Bucharest).

Concluding, there is a lot of low hanging fruit (mainly in the form of poor quality flat blocks) in Eastern Europe. Yet, a lack of capital and expertise prevent the market from picking up this potential. In some countries the development of a healthy EE market is hampered by too high grant intensity. Market barriers:

- Financial: limited availability of and limited access to capital; low purchasing power;
- institutional and administrative: little regulation, (local) governments are mistrusted, and need to improve their credibility and capability;
- information and awareness: the poor (energetic) quality of many buildings in the East of the EU, combined with rising energy costs, forms a powerful incentive to invest in EE.

4.3 West

Although the building stock in the West of Europe is in a better condition than the Eastern European stock, there is still a huge energy saving potential in the building sector. The cost-effectiveness of

[21] Berliner Energieagentur GmbH (2008). International Experiences with the Development of the ESCO Markets. [Online] Lamers, P., V. Kuhn and A. rechting

[22] Primary research Ecorys

[23] Primary research Ecorys

such investments is much debated. The market perception is that payback periods are too high. Furthermore, the interest in energy efficiency is lacking due to low public awareness regarding the need for greater insulation and its potential for reducing energy costs[24]. People are not interested in their energy bill, and face EE measures as something difficult and complex[25]. Other purchasing decisions and investments usually take priority over EE investments. There usually is no need for refurbishment and stand-alone EE investments are relatively expensive.

Awareness of the need for and benefits of EE investments in the building sector is emerging in governments. This causes them to set up a supportive regulatory framework, which increases the uptake of EE schemes (UK, France, Germany, Austria cases). Investors in energy efficiency can also rely on institutional expertise, for instance from energy agencies which can provide technical assistance, or act as intermediaries (UK, France, Germany, Netherlands, Austria cases). Governments are seen as credible and their involvement increases trust in EE programmes (Germany case).

Thus, building owners in Western European countries lack awareness and incentives to invest in EE measures and regard them as uneconomical. A regulatory framework is emerging to support and/or enforce EE investments. The institutional framework is sufficiently developed to support EE investments.

Market barriers:

- Financial: poor access to capital, lack of incentives (too long PBP);
- institutional and administrative: (relatively) a lot of expertise available, (local) governments are trusted, credible and capable;
- information and awareness: EE is low on the priority list, benefits are underestimated;
- weak regulatory frameworks.

4.4 North

Although climatic and economic conditions are very similar in the Northern countries, there is a huge difference in policy. In Norway, there is little to no information regarding actual national goals or plans. There is mention of the EU directives that affect the environmental performance in the building and housing sector, such as energy labelling on household appliances and boiler efficiency directives, but concrete national directives or plans are absent (Incentives for low energy housing Norway). Traditionally, there is a low focus on energy use in Norway due to low electricity prices (EPC project municipalities Norway). Norway is an oil and gas exporter, and it sees its priorities for energy savings not in the short to medium term but rather in the long term. The Norwegian government programme to provide incentives for low-energy housing is focused on capacity building, with the clear aim not to pass on these costs to consumers through strict legislation and standards (Incentives for low energy housing Norway).

In Sweden on the other hand, stringent legislation led to a 70% reduction in CO_2 emissions since the 1990s[26]. This makes Sweden's building stock one of Europe's most energy efficient. The total use of energy in the residential sector is now about 19 % compared to the EU average of 40%[27].

In Sweden, the common barrier for energy efficiency improvement in buildings and industry is lack of access to capital. Scepticism to the profitability of energy efficiency investment increases the interest rates given on loans. In many cases this off-sets the possible financial gains made by the investment. An additional barrier in Norway is the lack of legislation.

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24 IEA, 2006, Energy Technology Perspectives 2006: Scenarios and Strategies to 2050, OECD Publishing. International Energy Agency, doi: 10.1787/9789264109834-en.

25 Primary research Ecorys.

26 Naturvårdsverkets (2008) Styrmedel i klimatpolitiken: Delrapport 2 i Energimyndighetens och Naturvårdsverkets underlag till Kontrollstation 2008.

27 Mata, E. A. Kalagasisdis, and F. Johnsson (2010) Assessment of retrofit measures for reduced energy use in residential building stock – simplified cost calculations. SB10Mad: Sustainable Building Conference.

Market barriers:

- Financial: reasonable access to capital, lack of incentives (too long PBP);
- institutional and administrative: (relatively) a lot of expertise available, (local) governments are trusted, credible and capable;
- information and awareness: EE is low on the priority list, benefits are underestimated.

4.5 South

Due to the warmer climate in Southern Europe, the focus on energy efficiency in buildings is traditionally low. The energy use in buildings is relatively lower than in the rest of the EU. In Spain for instance, the residential sector accounts for 17% of final energy consumption[28], compared to for instance 34% in Hungary[29]. In Spain the expenditure in energy only represents 3% of general expenditures in buildings of the tertiary sector and households, which makes energy saving measures unattractive[30]. As a result of this low priority, Spain has thus far failed to transpose the EPBD into national legislation. The lack of regulation regarding energy certification in existing buildings caused the EU to start an infringement procedure[31].
Related to a lack of legislation is a lack of experience and expertise regarding EE programmes. Programme officials from both Greece and Spain declared that public bodies lack the skills and expertise to quickly implement and procure complicated and large scale retrofit programmes (ERDF Greece, Rediba). This lack of trained professionals is also observed in the building sector[32].
The current financial crisis has hit the Southern countries harder than the rest of the EU. The lack of liquidity in the banks causes them to demand high collateral and interest rates for loans (Rediba). The situation in Greece is particularly severe, resulting in a situation where everything is put on a hold, and no money is lent (ERDF Greece). On top of that, the economic crisis forces governments in the Southern countries to drastically cut expenses. This threatens financial stimuli that are in place for EE investments (Rediba). Moreover, the housing market and construction sector in Spain collapsed, which makes EE (and any other) investments in buildings currently even less attractive[33]. For the Spanish government however, EE investments in the building sector could prove an attractive option to generate employment[34] and stimulate economic recovery.

Concluding, EE investments in buildings are low on the priority list, especially in the face of a financial and economic crisis, which also severely hampers the access to capital. A lack of expertise in governments and the building sector forms a further barrier for EE investments in the building sector.
Market barriers:

- Financial: temporarily very important due to crisis;
- institutional and administrative: (local) governments could improve their skills and expertise;
- information and awareness: lower priority for EE in homes due to warm climate.

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28 Instituto para la Diversificacion y Ahorro de Energia - IDAE (2010). 'Informe anual de consumos energeticos – 2009'. Recovered on December 12th, 2011 from http://www.idae.es/index.php/mod.documentos/mem.descarga?file=/documentos_Informe_consumos_energeticos_2009._28.03.11_e740946d.pdf

29 http://www.negajoule.eu/en

30 Ministry of Industry, Tourism and Commerce (MITyC) and Instituto para la Diversificación y Ahorro de la Energía (IDAE). (2007). 'Saving and Energy Efficiency Strategy in Spain 2004-2012. Action Plan 2008-2012'.

31 http://www.buildup.eu/news/12614

32 Primary research Ecorys.

33 Primary research Ecorys.

34 As observed in many case studies (e.g. KFW programme, Energy saving obligations UK, ERDF allocation in France, ARBED, etc.).

5 Region specific best practices

Some best practice elements emerged from the case study analysis (**Error! Reference source not found.**). All these elements contribute to the success of an EE programme, but the geographical analysis shows that each region requires another emphasis. This is also the reason that flexibility in European funding conditions is mentioned as one of the best practice elements.
This section will show which elements should be emphasised in each region. Some elements are important in all regions, such as simplified administrative procedures and informing citizens.

Financial instruments are at the core of each programme. The most successful programmes offer preferential loans, potentially complemented with a grant, to tackle financial barriers. These loans with attractive terms and conditions can be issued by public financial institutions, such as the EIB, EBRD or the German KfW bank.
The ratio between loan and grant should be adjusted to the specific economic conditions of each country. Eastern European countries require a larger grant component than Western European countries. The programme officials of the National building support programme in Switzerland successfully experimented with the height of the grant to find the optimal ratio for their programme. In Eastern European schemes, the additional grant is essential to enable also the poorest building owners to invest in EE. The financial position of some building owners allows only minor monthly repayments.

Another major barrier in the Eastern countries is a lack of expertise among key actors, most notably in the public sector and financial institutions. Providing technical assistance proved to be a crucial best practice element for the success of the programmes in Eastern Europe (SlovSEFF, REECL, Kredex, JHF Lithuania). The professional technical assistance enables an effective implementation of the schemes and streamlines processes by providing technical, administration and marketing services. Some important services that are provided include:

- Assisting with loan applications;
- providing administration;
- providing counselling on legal, technical, financial, organizational and other issues;
- implementing marketing and communication strategies;
- organising training and education in the areas of management, accounting, house administration and planning.

Inclusion of a project consultant proved to be a particularly important best practice element in Eastern Europe. All but one of the case studies in Eastern Europe relied on technical assistance.

The two most successful cases in Eastern Europe are the SlovSEFF and REECL programmes, which offer loans through local banks, according to the one-stop-shop principle (see best practice element 1 in section 3.3). These programmes consist of a comprehensive package of loans, grants and technical assistance and manage to successfully target the most important barriers in Eastern Europe: a lack of capital and a lack of expertise. The use of local banks as intermediaries increases trust and reduces the application threshold. The scheme has already been extended to Bulgaria and Slovakia. With some amendments the set-up could be replicated across Europe. The height of the grant needs to be tailored to the country's specific needs and new funding sources have to be found for the grant, and potentially for the loan as well.

The Kredex and JHF Lithuania schemes are similar in set up, with the notable difference that they issue loans out of a revolving fund. This makes the schemes more complex and, due to the lack of expertise in Eastern Europe, less suitable for this region. It took a long time to establish these

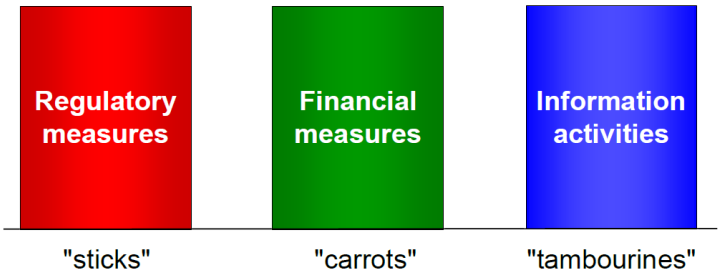
programmes and a lot of effort from the programme officials to get used to it. As a best practice element, revolving funds are considered more applicable in Western Europe, where the required expertise is more readily available. For the same reason, inclusion of local expertise, which is also mentioned as a best practice element, is mainly successful in Western Europe. This includes the use of specialised ESCOs for energy performance contracting. EPC markets are starting to develop in Western European countries, but are less developed in the East. The concept can be successfully applied to offices and public buildings, but does have its limitations, as mentioned in 3.1.1.

Imposing obligations also proved a best practice element in the following three programmes, which had considerable success in the West of the EU.

- EIB Facilité Haute Qualité Énergie Environnement (HQE) ;
- KfWs Energy-efficient Refurbishment Programme;
- Energy savings obligations in the UK.

These three schemes rely heavily on regulation. The Energy savings obligations in the UK are purely legislative. The KfW scheme in Germany and the EIB's HQE programme in France combine preferential loans with performance standards. In the West of the EU, there is a lack of incentives but there is enough expertise and reasonable access to capital. Providing an incentive to invest is thus essential for a successful EE programme. Incentives can take the form of grants or regulation, of which regulation is the most powerful incentive. The preferential loans enable the investments and the performance standards drive demand for the loans. In the ECP programme in Upper Austria, this approach is referred to as 'stick, carrot, tambourine'. As **Error! Reference source not found.** shows, the stick refers to the regulation, the carrot is the preferential loan and the tambourine is the necessary supply of information.

Figure 5.1 Source: Presentation Christiane Egger for WSED 2012



The information component is more important in programmes such as the ECP than in the three programmes mentioned above. The ECP programme in Upper Austria concerns energy performance contracting, which is complex and requires more information than a loan scheme. Recently the EU launched a stimulus package for EPC that includes the three elements in figure 2. The new Energy Efficiency Directive[35] provides the regulatory part (sticks), while the EEEF facility offers the financial measures (carrots) and a TA facility including funding for awareness raising (tambourines). Although, this facility could not be evaluated yet, the stimulus package appears to contain the right mix of measures to become successful.

An assessment of the effectiveness of financial instruments in Southern Europe is currently difficult because the financial and economic crisis severely affects private and public funding. Energy efficiency is not a priority for either households or commercial building owners; it is generally considered as a side issue. In the face of budget cuts, EE is thus among the first issues to be dismissed. This is currently a decisive factor for the uptake of EE investments in the South.

[35] See paragraph 3.1.1

The crisis is not limited to the South alone. Wealthier MSs also observe that the banks and the public sector's attitude to lending has hardened over recent times (RE:FIT).

Generally, tackling financial barriers alone is not sufficient. Often, several other boundary conditions have to be fulfilled for a financial instrument to become effective. In the West and North, an important boundary condition is providing an incentive (e.g. by imposing obligations). In the East capacity building is a more prominent issue.

6 Conclusions

Energy efficiency is a priority in the EU. However, only about half of the existing potential is being realised due to market barriers and inefficient enforcement of related legislation. Currently, there are many programmes that focus on promoting EE investments, particularly in the building stock. In addition, energy efficiency should be seen as a priority for driving national and EU growth plans. It offers a clear economic stimulus opportunity, now and for years to come.

The analysis of regional specific market barriers and characteristics showed that successful programmes cannot be extrapolated one-on-one to other countries. However, one of the conclusions from the Kredex case study holds for all programmes: “Single measures rarely work; incentivising investment requires a range of instruments (in this case a combination of legal framework, awareness campaigns, loan scheme, guarantees and consultancy services)”. Furthermore, the following best practice elements aimed at driving and accelerating investment in and development of projects emerged from our case study analysis:

- A simplified, possibly one-stop shop, administrative procedure;
- a revolving fund;
- inclusion of local expertise;
- informing citizens;
- flexibility in (European) funding conditions;
- imposing obligations;
- provision of a Technical assistance (project development) package.

However, the geographical analysis showed that these best practice elements should be catered according to the regional differences identified. While some elements, such as simplified administrative procedures and informing citizens, are important in all regions; others should be emphasized depending on the region. In this sense, the following aspects should be taken into account in order to offer best value solutions according to the region:

- **Revolving funds** should be region specific, given that their complexity requires expertise which is readily available in the West and lacking in the East.
- **Grants** should be of region specific magnitude (possibly through Cohesion funds) taking into account that Eastern European countries require a larger grant component.
- Inclusion of **local expertise** should be emphasized in Western Europe due to the available expertise. This is also related to capabilities regarding the EPC markets which are starting to develop in Western European countries, but are less developed in the East.
- The provision of a **TA package** is especially relevant for Eastern Europe due to their lack of expertise among key actors in public and financial institutions.
- In the West and North, an important boundary condition is providing an incentive, which can be made effective by **imposing obligations.**

Overall, successful initiatives tend to provide a combination of financing opportunities, incentives and technical assistance:

- **Financing** opportunities (Potential sources of funding are ERDF and EEE F):
  - **EPC** model where ESCOs can access capital from finance facilities (London RETRO:FIT)
  - Preferential loans provided through **local intermediaries** (SlovSEFF, REECL) coming from **revolving funds** (KREDEX, JHF Lithuania)

- **Incentives:** Either through grants/subsidies or energy savings obligations (UK)
- **Technical assistance** for the investment/project development (ELENA) along with a communication/information programme, including local expertise if available
- **Legal enabling framework**, both on European and MS level
- **One-stop shop model** (REECL, SlovSEFF) that addresses financial and administrative barriers by enabling a simple approach towards beneficiaries by having one agency provide (or be the link for providing) different services such as TA, grants, loans, information.

Annex 1 Interviews

	Project name	Stakeholders interviewed
1.	Elena London RE:FIT	Virginie Caujolle-Pradenc (Project Manager, Environment Team, Greater London Authority)
2.	Elena: City of Paris	Arnaud Lebel Hermile (Service technique du bâtiment durable, Chef de projet CPE- écoles)
3.	Elena: Rediba	Albert Vendrell Roca (OTCCS-Gerència de Serveis de Medi Ambient)
4.	EIB: Bucharest S6 Thermal Rehabilitation	Ralf Goldmann (EIB)
5	EIB: HQEE Programme (France)	Didier Bosman (EIB) Thierry Redon (BPCE) Isabelle Paris (BPCE)
6.	EBRD: Sofia/Bulgaria District Heating Rehabilitation project	Ivan Cerovski (EBRD) Daniel Berg (EBRD) Peter Hobson (EBRD)
7.	EBRD: Krakow District Heating	Janusz.Miechowicz (Min. of Ener) Katarzyna Kurbiel-Auleytner (EBRD)
8.	EBRD: REECL Bulgaria	Aleksandar Hadzhiivanov (EBRD)
9.	Jessica: The Credit and Export Guarantee Fund - KREDEX (Estonia)	Mirja Adler (Head of Housing and Energy Efficiency Division, Kredex)
10.	Jessica Holding Fund Lithuania	Junona Bumelytė (EIB)
11.	Jessica Holding Fund Sicily	Pietro Valenti (Local council) Gianluca Galati (Local council) Giuseppe Scorciapino (energy agency) Felice Bonanno (local authority) Luca Mattiotti (DG Regio)
12.	ERDF Wales ARBED Phase 2	Claire Bennett (Deputy Director Climate Change and Water Division)
13.	ERDF Greece: EXOIKONOMISIKAT' OIKON	Georgios Peroulakis (DG Regio)
14.	ERDF France: EE Social Housing	Carine Puyol (Union sociale pour l'habitat)
15.	EEF: Berlin Jewish Museum	Zarpana Massud Baqa (Deutsche Bank) Lada Strelnikova-Huebner (Deutsche Bank)
16.	EBRD: SlovSEFF	Daniela Diedrich (EBRD)
1.	EPC project municipalities Norway	Ms Thea Marie Mørk (Norsk Enøk og Energi AS – NEE)
2.	Loans and subsidies KfW Germany	A lot of information and review studies were available and a full analysis could be drafted without need for an interview or additional contacts
3.	National building support programme Swiss of the climate cent foundation (Swiss)	Mr Thomas Nordmann (TNC Consulting AG) Mr Marco Berg, Managing Director (Climate Cent Foundation)
4.	Renovation of public buildings by PPP, NL	Karst van den Borg (GTI/Cofely) Cees Dorst (BurgersErgon/Safire) Mieke van Hooven (MinFin)
5.	Incentives for Low Energy	Husbanken (the state housing bank); NOVA (the Norwegian social

	Project name	Stakeholders interviewed
	Housing Norway	research centre).
6.	Energy saving obligations UK	Mr. Alan Clifford, UK Department of Energy & Climate Change (DECC).
7.	Green loans for social housing France	Frederic Bougrain, CSTB (Centre Scientifique et Technique du Bâtiment) Université de Paris-Est ;CDC head office in Paris
8.	Federal promotion of extraordinary efficiency in buildings Austria	Ms. Melitta Mum, Lebensministerium, Vienna, Austria Ms. Marie-Theres Bristela, Lebensministerium, Division V/10, Environmental Economics, Energy Policy, Vienna, Austria (Mr. Wolfgang Müller, Verbindungsstelle der Bundesländer, Austria (Ms. Christine Oehlinger, ESV (Energiesparverband), Austria (e-mail)
9.	EPC Berlin energie agentur Germany	A lot of information and review studies were available and a full analysis could be drafted without need for an interview or additional contacts
10.	Sustainability loans municipalities Netherlands	Mr. Reinoud Veldman and Mr. Richard Luigjes, both of the Dutch Stimuleringsfonds Volkshuisvesting (SVn).
11.	EPC Policy programme Upper Austria	Christiane Egger (ESV)
12.	Renovation of buildings Pardubice region Czech Republic	Miroslav Marada (ENESA)
13.	Refurbishment Hospital Juan Ramón Jimenez	Agencia Andaluza de la energía Hospital Juan Ramon Jimenez
14.	Refurbishment Universität der Künste	Ing. Udo Schlopsnies (project leader Energy Saving Partnerships (ESP) of the Berliner Energy Agency)
15.	LPZ Bad Radkersburg – Energieeffizienzteil	Alfred Scharl (Landesimmobiliengesellschaft Steiermark)
16.	Support for Energy Efficiency in Buildings Spain	Francisca Rivero (IDAE)

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Annex 3 Questionnaire

Introduction

What is your (organisation's) role in the fund scheme?

Is the fund operational? Are loans/grants being issued?

Is there a closing date?

What is the target of the fund?

What is the target group of the funding scheme? Why was this target group selected?

What is the main purpose of the funding scheme? Is it only about saving energy, or does it have more goals, such as:

- Generating employment
- Poverty alleviation
- Neighbourhood improvement
- …

Which projects are eligible for funding? What are the requirements/conditions?

How is the fund supposed to help achieving the target?

Could you (briefly?) describe the general financial structure? Which parties provide the actual capital? Who issues the loans? How are the financial risks divided?

Why is this fund necessary? Was a financial gap identified? What specific (financial barrier) is this funding scheme aiming to overcome?

(Why) do you think this particular funding instrument is the most appropriate/efficient one to overcome the barrier? i.e. Why was this particular type of funding chosen

Effectiveness of the fund

Did/does the fund have the desired effect? Are (financial) barriers taken away?

Does the funding scheme mobilise a lot of private capital? What is the leverage factor of the EU investment?

How does total invested capital in EE relate to a BAU scenario? Can you assess what would have happened in absence of this funding instrument?

Is there a healthy balance between overhead costs and issued loans/grants?

Are the funds easily accessible? Is it difficult for the target group to access the scheme and apply for funding?

Are European regulations improving or hindering the efficiency of the fund scheme?

Barriers encountered

What were the most important risks identified when the funding scheme was set up?

To what extent have these risks materialised? Any unforeseen issues arisen?

What were the main barriers you encountered in setting up the fund and how were these barriers overcome?

Are any national or regional policy/targets/regulations interfering with this funding scheme?

If you were to set up this fund again, what adjustments would you make?

What do you consider to be a key success factor of your funding scheme?

Do you have recommendations for changes in EU and/or national policy?

Can this fund scheme easily be repeated in the EU? How do you evaluate the up scaling potential?

Concluding

What is the main message (regarding the financing of sustainable energy projects) you would like to convey to the study team and DG Energy?

Are there any remaining issues we have overlooked in this interview?

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