ClearingHouse Support

Project EIE-06-189 ClearSupport

Clearinghouse Facilitation
Paving the Way for Better Energy Building Performance
in EU Less Developed Regions

Evaluation of the PSF Action

Prepared by

ENERGY CONSULTING NETWORK

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1 Introduction

1.1 The ClearSupport Project

The EU Green Paper on Energy Efficiency from 2005 and the Energy Efficiency Action Plan from October 2006 focuses on the creation of economic and financial arrangements for energy efficiency investments – having as the overall aim to establish a European Clearinghouse for small-medium scale sustainable energy projects. Clearinghouse Support is a pilot initiative for the practical implementation of these policy goals by providing direct assistance to project owners.

This assistance is organised in the form of Project Service Facilities (PSF) operating in Latvia, Lithuania , Poland Czech Republic and Greece (Crete).These have been the catalysts for realising ClearSupport's ambitious goal of initiating 100-200 specific building renovations (RUE in building measures). At the end of December 2009, 230 projects were supported by the five PSFs.

The intervention of ClearSupport targets project owners - municipalities and residential and associated actors - in the regions.

The action entails facilitating local Clearinghouse establishment by:

- Helping to overcome organisational barriers for efficient Clearinghouse operations at local level
- Helping to create a sound framework for RUE in building projects
- Bridging the gap between project owners - municipalities and residential - and the financing sources available for project financing
- Raising awareness and channel information to the action's target groups on RUE in building projects and Clearinghouse aspects in general

The ClearSupport action is aimed to serve a vehicle for the development of a European Clearinghouse for small-medium scale sustainable energy projects, and giving feedback to the EC on the implementation process.

Its main direct impact is aimed at the initiation of a considerable number of RUE in building projects processed through the PSFs. Its further potential is to streamline project handling under a Clearinghouse, thereby addressing the huge need for sustainable energy investments.

1.2 Evaluation Methodology

The overall purposes of the evaluation have been:

- to assess how the PSFs have succeeded in improving the framework for project initiation (financing schemes, technical aspects, organisational aspects, regulatory framework), and
- to extract lessons learned from the process in terms of fulfilling EC policies/implementation of projects via systematic approach.

The specific objectives have been to:

1. Provide a statistical overview of the projects handled by the PSFs,
2. Assess the success and the added value of the PSFs in relation to accelerate the identification, development and implementation of energy efficiency projects within the building sector (What difference was made by the PSFs?). In this context to assess
    - Drivers behind the supported projects and the PSF involvement?
    - What would/could have happened with these projects without the existence of the PSF?
    - Key barriers for implementing the projects
    - Barriers for supporting other types of energy efficiency projects/target groups than the ones supported
3. Identify and assess proactive efforts that have brought added value of the PSFs in relation to overcoming prevailing barriers for financing of energy efficiency projects in buildings. This e.g. includes efforts aiming at
    - Improving existing or developing new financing schemes
    - Improving legal framework conditions
    - Raising awareness of energy saving measures and financing schemes
    - Training relevant target groups to improve quality of loan applications and considerations
    - Improving the technical quality of projects (RUE Design)
    - Others as appropriate

The evaluation has been based on collecting questionnaires on project data and progress filled out by the individual PSFs. Further by carrying out several evaluation sessions at project meetings, the major one held in Crete in September 2010, where an internal evaluation workshop was held. At this workshop each PSF presented their findings from an initial final evaluation including best practise examples. These presentations were followed up by a development session summarising and discussing the findings and the best practise examples.

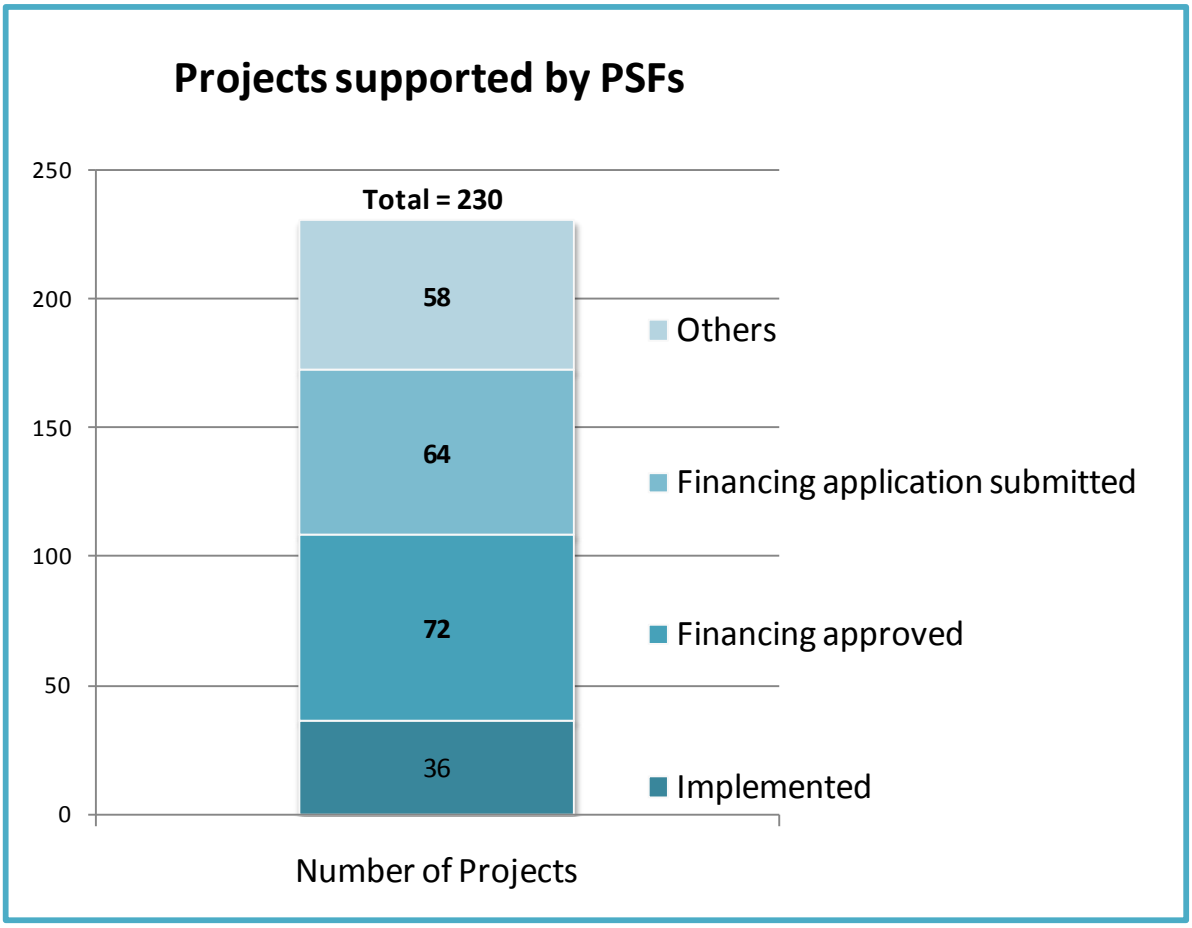
2 General Summary

2.1 Project Overview

The five PSFs were within the project period 1st May 2007 – 31st December 2009 in contact with 522 potential project owners, and provided support to **230** of these projects through the PSF activities.

Within the project period 36 of these projects were implemented, and for another 136 projects financial applications were submitted of which 72 was approved up to the end of December 2009. In addition 58 other projects were supported, most of them to be further prepared for financing. A few projects of these were terminated.

The initial aim of the CS project was to develop 100-200 projects (20-40 per region). As indicated above 172 projects were fully developed and 36 of these were implemented. Another 58 projects were supported.



Number of projects supported by the five ClearSupport Project Service Facilities (as per December 2009)

As can be seen in the table below most projects were supported in Poland among the five countries.

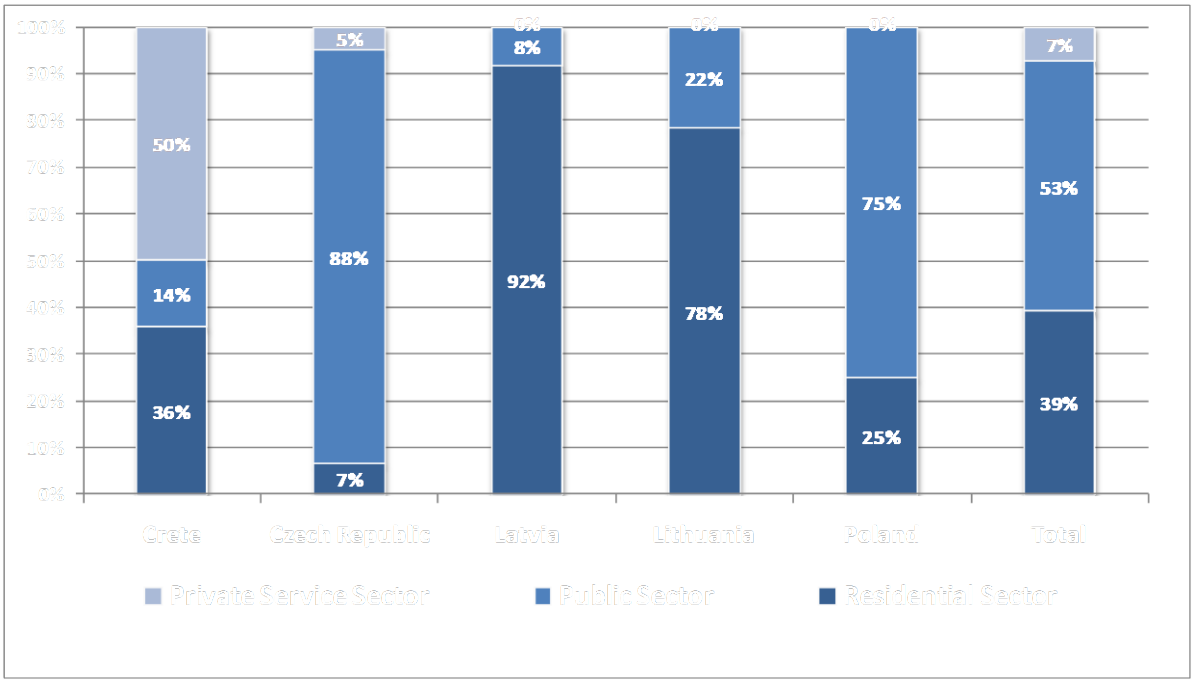
Performance Indicators	Crete	Czech Republic	Latvia	Lithuania	Poland	Total
Number of projects	**28**	**60**	**24**	**46**	**72**	**230**
Implemented projects	**1**	**9**	**6**	**10**	**10**	**36**
Projects with other status:	**27**	**51**	**18**	**36**	**62**	**194**
Financing approved	*9*	*23*	*18*	*14*	*8*	*72*
Financing under consideration	*18*	*17*	*0*	*13*	*16*	*64*
Others	*0*	*11*	*0*	*9*	*38*	*58*
Investments (MEUR)	**0.38**	**24.97**	**4.24**	**21.24**	**14.04**	**64.86**
Implemented projects	0.01	2.89	0.68	5.40	3.04	12.02
Financing approved	0.11	12.48	3.56	8.67	3.70	28.52
Under consideration	0.25	7.62		3.38	2.46	13.71
Other projects		0.77		3.79	4.84	10.61
Energy Savings (MWh)	**423.5**	**23,934.0**	**7,030.7**	**24,783.2**	**16,981.0**	**73,152.4**
Implemented projects	10.5	1,786.0	937.0	4,215.6	2,03.0	9,352.1
Financing approved	144.3	10,435.0	6,093.7	15,840.4	5,596.0	38,109.4
Under consideration	268.6	8,795.0		2,400.2	3,600.0	15,063.8
Other projects		2,918.0		2,327.0	5,382.0	10,627.0
CO2 reductions (Tonnes)	**161.1**	**8.291.2**	**2.057.0**	**2,890.4**	**6,424.3**	**19,824.0**
Implemented projects	4.3	1,787.0	358.0	551.9	2,372.1	5,073.3
Financing approved	77.8	2,540.0	1,699.0	1,270.5	1,467.0	7,054.3
Under consideration	79.0	2,173.0		595.6	1,030.2	3,877.8
Other projects		1,790.0		472.3	1,555.0	3,817,3
Number of square meters	18,266.0	406,557.0	71,078.4	130,481.6	181,849.5	808,232.5
MEUR/project	0.013	0.416	0.176	0.462	0.195	0.282
EUR/m2	20.6	61.4	59.6	162.8	77.2	80.3
MWh/project	15.12	398.90	292.95	538.77	235.85	318.05
kWh/m2	23.18	58.87	98.91	189.94	93.38	90.51
Tonnes of CO2/project	5.75	138.19	85.71	62.84	89.23	86.19
kg CO2/m2	8.8	20.4	28.9	22.2	35.3	24.5
EUR/MWh	**890.28**	**1,043.33**	**602.36**	**856.99**	**826.81**	**886.67**
Implemented projects	1,419.05	1,615.34	724.65	1,280.96	1,265.09	1,285.16
Financing approved	773.87	1,196.36	583.56	547.34	661.19	748.42
Under consideration	930.68	866.29		1,408.20	683.33	910.06
Other projects		264.22		1,628.28	899.29	998.49
EUR/tonnes of CO2	**2,340**	**3,012**	**2,059**	**7,349**	**2,185**	**3,272**
Implemented projects	**3,449**	**1,614**	**1,897**	**9,785**	**1,282**	**2,369**
Financing approved	**1,437**	**4,915**	**2,093**	**6,824**	**2,522**	**4,043**
Under consideration	**3,163**	**3,506**		**5,675**	**2,388**	**3,535**
Other projects		**431**		**8,022**	**3,113**	**2,780**

Investments are in total estimated at 64.86 MEUR, hereof 12.02 MEUR for the already implemented 36 projects. Most investments were implemented in Lithuania while the highest number of investments were prepared in Czech Republic.

The 230 projects in total represent an annual CO2 reduction of **19,823 tonnes**, hereof **5,073 tonnes** from the already implemented projects. The highest number of CO2 reductions was implemented in Poland while most CO2 reductions were prepared in Czech Republic.

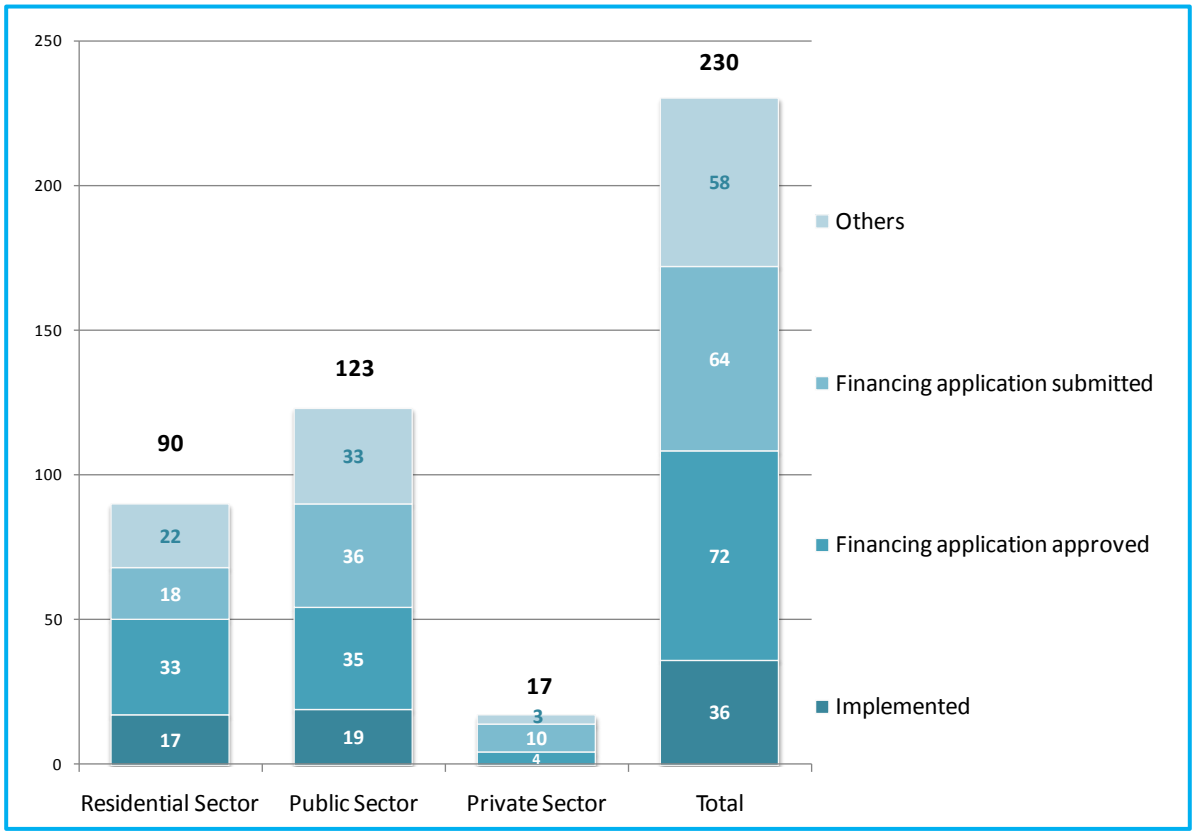
Energy savings accounts for 73,152 MWh, hereof 9,352 MWH from the already implemented projects. Electricity savings constitute 2.4% hereof. In terms of EUR needed per MWh of energy savings, the most cost effective projects were implemented or prepared in Latvia.

As can be seen in the figure below most of the projects are within the public sector, in total 53% while39 % are within the residential sector. 7% are within the private service sector mainly comprising energy efficiency projects in hotels in Crete.



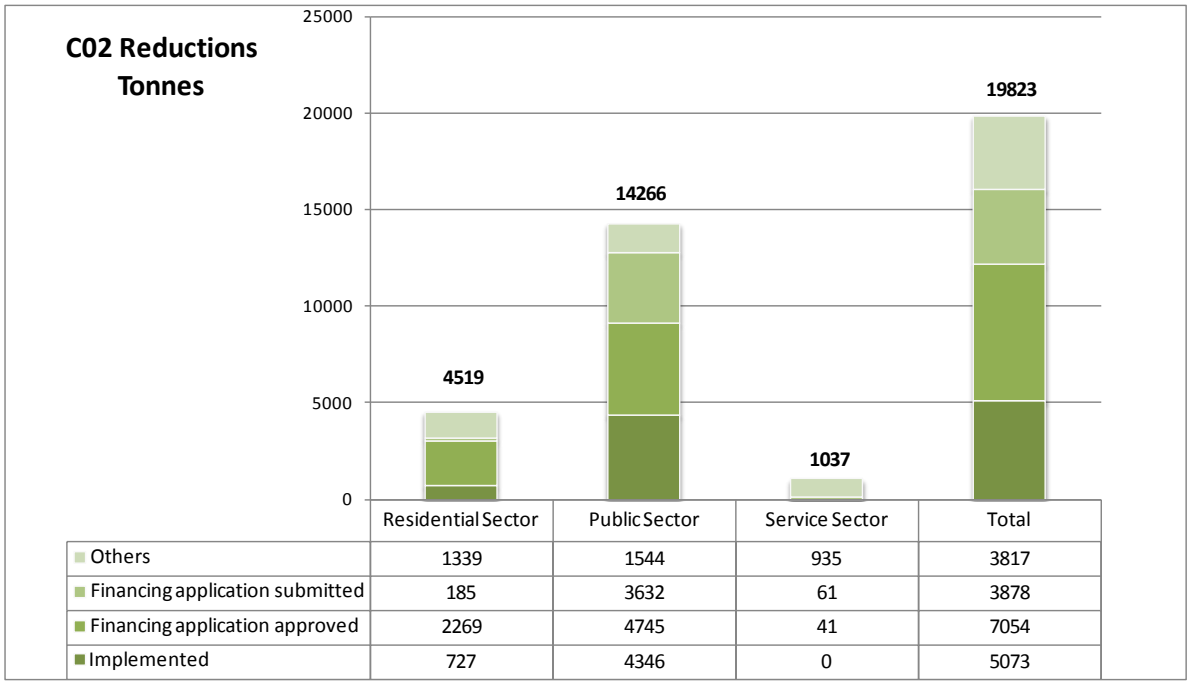
Share of projects supported on sectors (as per December 2009)

Public sector projects have been mostly supported in Poland (e.g. hospitals) and Czech Republic (mainly schools) while residential buildings have been mostly supported in Latvia and Lithuania.



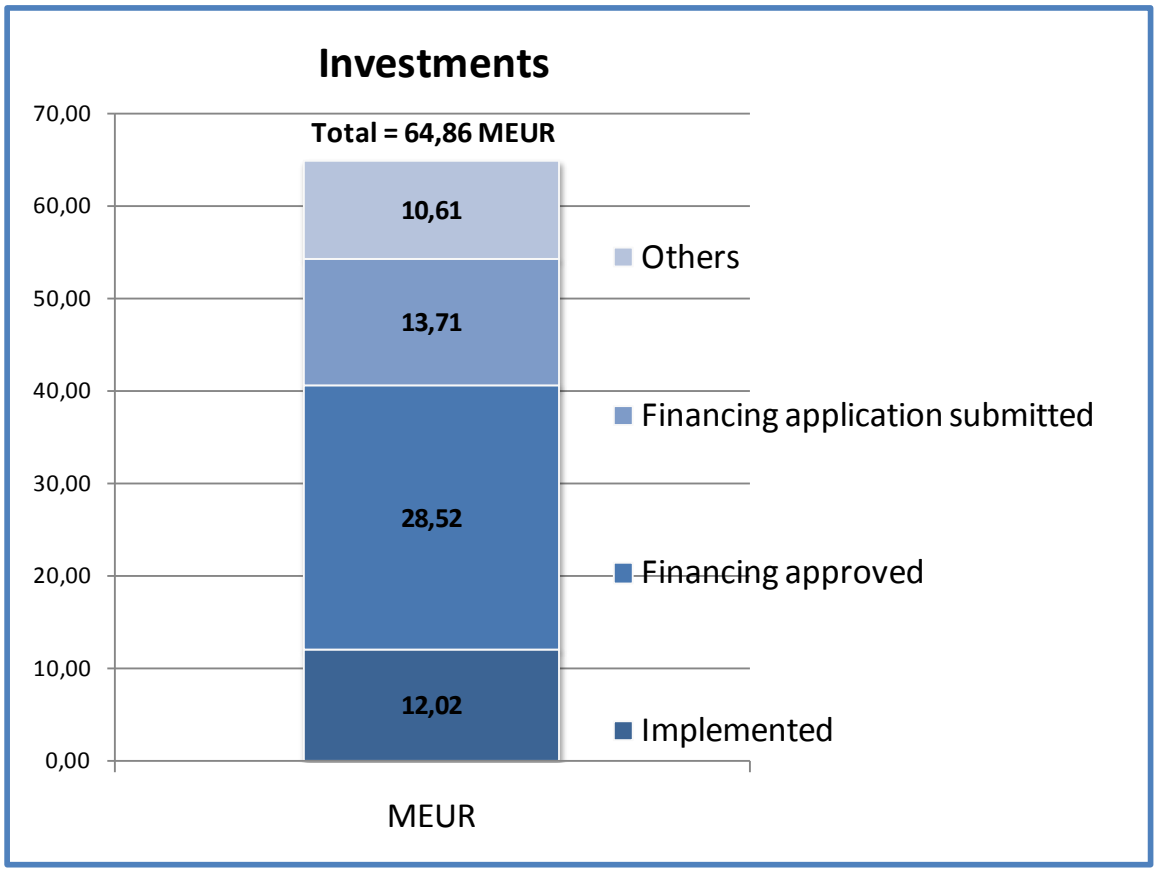
Number of projects supported

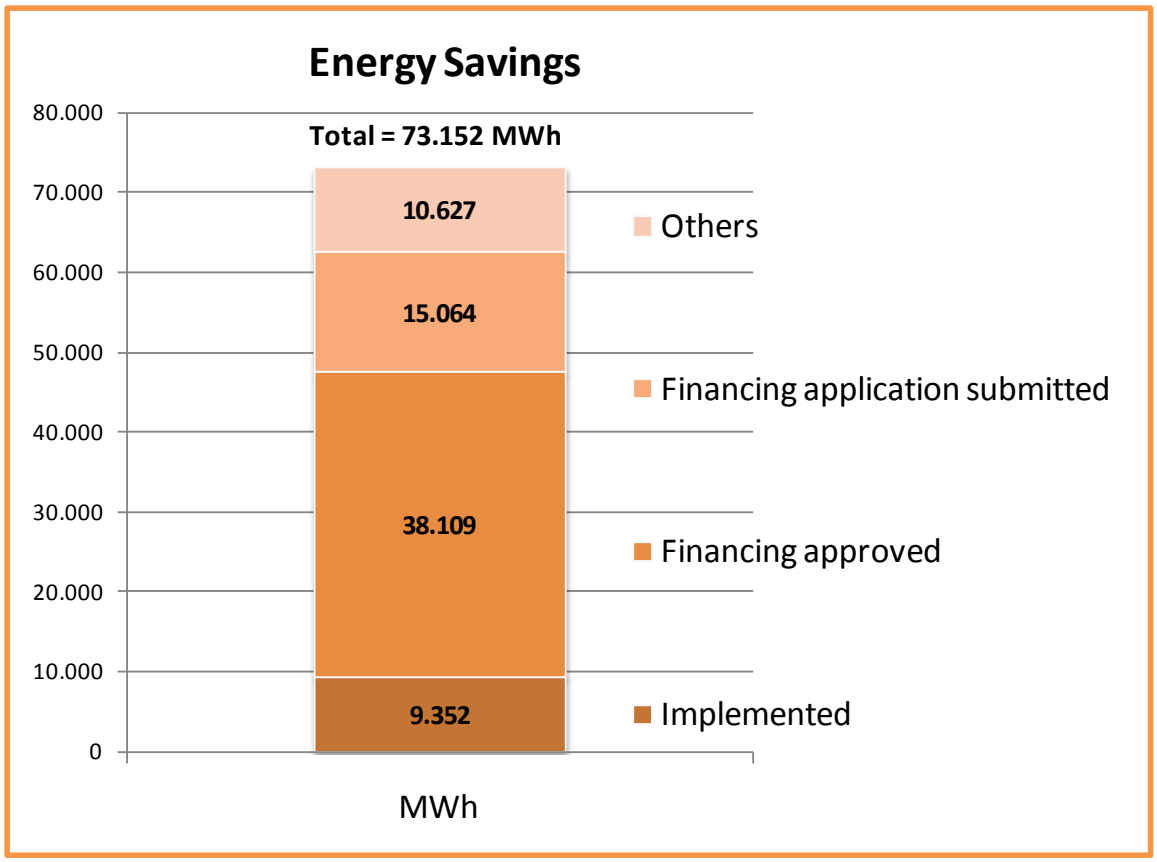
The 123 projects within the public sector (53%) represent far the most of the potential CO2 reduction, namely 14,266 tonnes (72%).



	Residential Sector	Public Sector	Service Sector	Total
Others	1339	1544	935	3817
Financing application submitted	185	3632	61	3878
Financing application approved	2269	4745	41	7054
Implemented	727	4346	0	5073

CO2 reductions from projects supported (Tonnes)


Investments
Total = 64,86 MEUR
70,00
60,00
50,00
40,00
30,00
20,00
10,00
0,00
10,61
13,71
28,52
12,02
Others
Financing application submitted
Financing approved
Implemented
MEUR


Energy Savings
Total = 73.152 MWh
80.000
70.000
60.000
50.000
40.000
30.000
20.000
10.000
0
10.627
15.064
38.109
9.352
Others
Financing application submitted
Financing approved
Implemented
MWh

As can be seen from the table below the projects within the private service sector are the relatively most cost effective in terms of investments needed per Tonne CO2 or MWh saved .

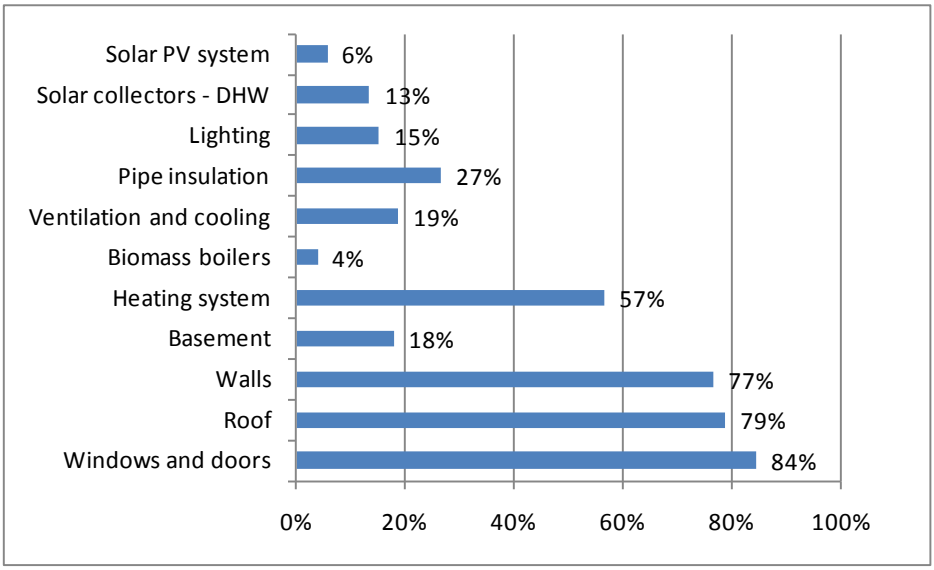
Indicators	Residential Sector	Public Sector	Private Sector	Total
Number of projects	90	123	17	230
Square meters	193,992	557,731	56,509	808,232
Investments - MEUR	19.516	44.193	1.153	64.862
Energy savings -MWh	19.802	52,137	1,213	73,152
CO2 savings -Tonnes	4,519,7	14,266,5	1,037.,6	19,823.8
MEUR/Project	0.217	0.359	0.068	0.282
EUR/m2	100.,6	79.2	20.4	80.3
EUR/MWh	985.5	847.6	950.3	886.7
Tonnes CO2/Project	50.2	116.0	61.0	86.2
Kg CO2/m2	23.3	25.6	18.4	24.5
EUR/CO2	4,318.0	3,097.7	1,111.2	3,271.9

The figures and graphs below provide a picture of the various kind of energy saving measures included within the projects.

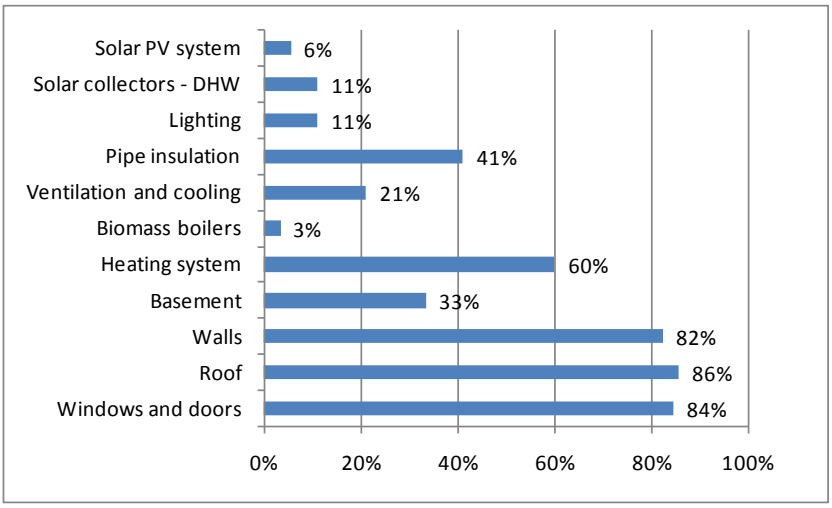
As can be seen almost all projects includes traditional energy saving measures related to refurbishment of doors, windows, roofs and walls. A little bit more than half of the projects concerns renovation of the heating systems.

As to renewable energy biomass boilers are included in one implemented project and in 9projects in total (4%). Solar energy systems are included in 5 implemented projects (3 domestic hot water systems and 2 PV systems) and in 44 projects in total.

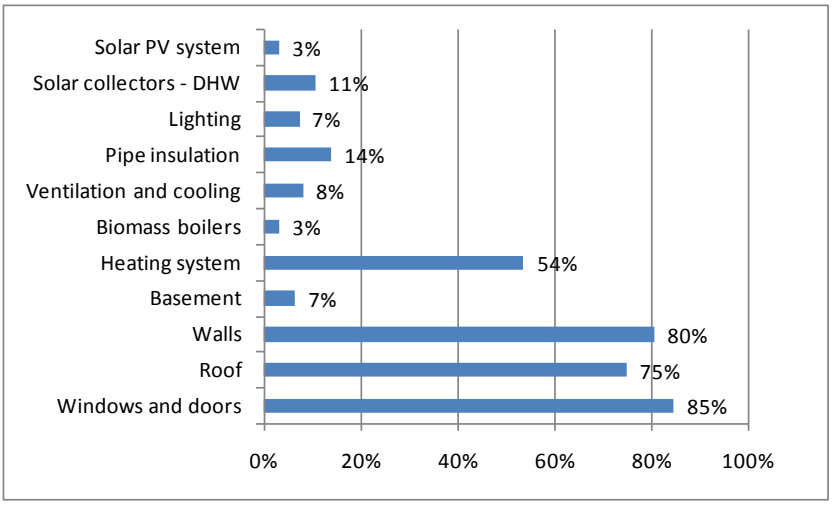
Performance indicators Technology measures Number of projects	Residential sector		Public sector		Private Service Sector		Total	
Total number of projects supported by the PSF	**90**		**123**		**17**		**230**	
Windows and doors	76	84%	104	85%	14	82%	**194**	84%
Roof	77	86%	92	75%	12	71%	**181**	79%
Walls	74	82%	99	80%	3	18%	**176**	77%
Basement	30	33%	8	7%	3	18%	**41**	18%
Heating system	54	60%	66	54%	10	59%	**130**	57%
Biomass boilers	3	3%	4	3%	2	12%	**9**	4%
Ventilation and cooling	19	21%	10	8%	14	82%	**43**	19%
Pipe insulation	37	41%	17	14%	7	41%	**61**	27%
Lighting	10	11%	9	7%	16	94%	**35**	15%
Solar collectors - DHW	10	11%	13	11%	8	47%	**31**	13%
Solar PV system	5	6%	4	3%	4	24%	**13**	6%
Number of implemented projects	**17**		**19**		**0**		**36**	
Windows and doors	13	76%	19	100%	0		**32**	89%
Roof	14	82%	13	68%	0		**27**	75%
Walls	14	82%	17	89%	0		**31**	86%
Basement	5	29%	2	11%	0		**7**	19%
Heating system	15	88%	12	63%	0		**27**	75%
Biomass boilers	0	0%	1	5%	0		**1**	3%
Ventilation and cooling	5	29%	2	11%	0		**7**	19%
Pipe insulation	8	47%	4	21%	0		**12**	33%
Lighting	1	6%	0	0%	0		**1**	3%
Solar collectors - DHW	1	6%	2	11%	0		**3**	8%
Solar PV system	1	6%	1	5%	0		**2**	6%



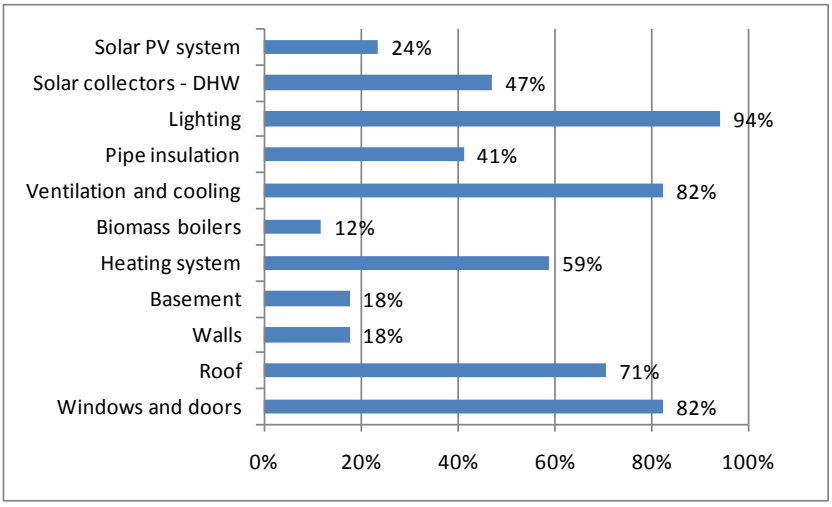
Distribution of project measures within all 230 projects



Distribution of project measures within the residential sector (90 projects)



Distribution of project measures within the public sector (123 projects)



Distribution of project measures within the private service sector (17 projects)

2.2 Overview of financing schemes

The existing financial framework for building retrofitting in **Greece** includes conventional instruments rather than innovative financial tools. Current financing possibilities typical include local bank loans and state subsidies. Various capital investment subsidies are offered from various ministries with the help of European structural funds.

The most popular financing of the energy efficiency projects in **Czech Republic** are subsidies and are in many of the ClearSupport projects combined with energy performance contracting (ESCO). The ESCO market is quite developed in Czech Republic and particularly within the public sector.

Subsidies have within the last two years been available from Structural Funds, concretely from Operational Programmes. The most exploited Operational Programme for energy efficiency projects within the public sector is the Operational Programme of Environment administrated by the Ministry of Environment (or more precisely State Fund of Environment). The part of the projects that are subsidized are typically insulation measures and replacement of windows and doors while other measures are typically financed by the ESCO contracts. To obtain subsidies it is necessary to provide own co-financing. The co-financing is covered partly by bank loans and partly by own financial sources.

In **Latvia** the most promising scheme currently is local credits. Structural Funds Financing is expected to play an increasingly role(ERAF).

In **Lithuania** refurbishment of State Public Buildings is financed from Cohesion and Structural Funds (100%) while refurbishment of residential buildings are financed through the “Apartment Building Modernisation Programme”, through which the Lithuanian State has subsidised up to 50% of building retrofitting costs depending on energy efficiency of RUE measures to be implemented. More than 300 apartment buildings have been renovated since the Apartment Building Modernization programme started in 2004 (out of a potential of approx. 30,000 apartments).

In **Poland** refurbishment of public buildings are financed from the national-level financing from Infrastructure and Environment Program, UE funds 2007-2013. Residential buildings, and to some extent public buildings, are financed from the Thermomodernisation and Renovation Fund, which provides subsidies in combination with local bank loans.

Crete: 28 projects in total			
Implemented	Residential sector	1	Local bank loan
Other projects	Residential Sector	10	Local bank loans
	Public Sector	4	State subsidies
	Private Service Sector	14	Bank loans combined with state subsidies (6)
Czech Republic: 60 projects in total			
Implemented Projects	Residential sector	2	Own financial resources
	Public Sector	7	Operational Programme of Environment
Other projects	Residential Sector	1	Local bank loan
		1	Own financial sources
	Public Sector	22	Operational Programme of Environment
		19	Operational Programme of Environment combined with ESCO contracts
		5	Own financial sources
	Private Service Sector	1	Local bank loan
		2	Own financial sources
Latvia: 24 projects in total			
Implemented Projects	Residential sector	4	Local bank loans
	Public Sector	1	85% grant (Norway) and 15 % municip. grant
		1	ERAF (Structural Funds)
Other projects	Residential Sector	18	Local bank loans
Lithuania: 46 projects in total (37 applications submitted)			
Implemented Projects	Residential sector	7	Apartment Building Modernization Programme
	Public Sector	3	Structural Funds (100% state grant)
Other projects	Residential Sector	21	Apartment Building Modernization Programme
	Public Sector	6	Structural Funds (100% state grant
Poland: 72 projects in total (62 applications submitted)			
Implemented Projects	Residential sector	3	Thermomodernisation and Renovation Fund
	Public Sector	5	Thermomodernisation and Renovation Fund
		1	Regional Operational Programme
		1	Norwegian Fund
Other projects	Residential Sector	15	Thermomodernisation and Renovation Fund
	Public Sector	4	Thermomodernisation and Renovation Fund
		8	Operational Programme
		25	Regional Operational Programme

ESCO arrangements have only been targeted directly in Czech Republic while in the other countries the possibilities for developing the ESCO market has been assessed. The ESCO market is well-developed in Czech Republic as to public buildings but needs further development in the other countries as well as within the residential sector in general.

The table below shows an estimate of the division between commercial based and public based financing. As can be seen most of the projects are financed by means of public based financing. Only in Latvia most of the projects are financed from commercial sources (local banks).

Country	Commercial based financing		Public based financing		Total	
	MEUR	%	MEUR	%	MEUR	%
Crete	0.157	42%	0.220	58%	0.377	100%
Czech Republic	1.261	5%	23.71	95%	24.971	100%
Latvia	3.766	89%	0.469	11%	4.235	100%
Lithuania	0	0%	21.239	100%	21.239	100%
Poland	0	0%	14.04	100%	14.04	100%
Total	**5.184**	**8%**	**59.678**	**92%**	**64.862**	**100%**

2.3 PSF Achievements in Project Developments

The main drivers for initiation of the projects supported by the PSFs have been:

- The availability of PSF services in terms of technical, legal and financial advice
- Awareness raising activities carried out by the PSFs
- Availability of proper financing schemes
- High consumption of energy and the related high energy costs

The success of the PSF activities with regard to implementation of concrete projects has largely depended on the availability of proper financing schemes in the individual countries. The PSF activities has ensured that the number of applications to the financing programmes has accelerated and that financing applications are of sufficient quality thereby reducing front-up costs as well as the time needed to consider applications.

The major drivers in the individual countries as reported by the PSFs have been:

Crete:

- Large interest in energy conservation measures due to a rather high consumption of energy and the related high energy costs.
- Creation of publicity to already implemented success stories.

Lithuania:

- Availability of financing combined with the project services offered by the PSF in relation to technical, legal and financial issues.

Poland:

- The capability of the PSF to support projects in all key phases, from the initiation of the projects to the concrete implementation of the projects. The PSF responds completely to the market needs, in the situation of highly variable surrounding conditions.

Czech Republic:

- Increasing energy prices, availability of financing and use of the ESCO-concept.
- The major problem is not related to obtaining of financial sources, but preparation and documentation of the project for financing. It is not easy for project owners to complete all documents needed to obtain financing. Consequently, a rather lot of projects are not ready to be financed at the beginning of realization. Thus this is a very important field for the PSF.

Latvia:

- Availability of PSF services, which have been used actively to promote identification and initiation of projects.

In response to the question "What would have happened without the PSFs" there are different points of views in the individual countries depending on the actual local market situation. In Czech Republic and Lithuania it is assessed that the projects supported by the PSFS would have been implemented without the existence of the PSFS, due to a well developed market for project services. However the PSF has ensured an acceleration of the projects.

On the contrary the PSFs in Latvia and Crete have assessed that their existence has been a prerequisite for the initiation and development of most of the projects supported by them. This is partly due to current gaps in the energy service market, and particularly in Crete where e.g. the consulting market is poorly developed.

In Poland it is also assessed that many of the project initiations and developments have depended on the unique features of the PSFS comprising services in all project phases and a continuously updated overview of the framework and the market conditions. Investors do often feel lost in a flood of rules, required documentation, changing law and other regulations. The PSF meet their need for full support from "one unit" from idea to realization.

All in all, the PSF concept can be assessed to have made a significant difference in all of the five countries. Particularly all of the five PSFs have contributed to fill out the need at project owners for a "ONE STOP" full package of services to identify, prepare and document projects, and which has been identified as a major problem in all of the five targeted regions.

2.3.1 Barriers for further project development

In relation to implementation of further projects various barriers exists such as shortage of funds and inappropriate legal frameworks in addition to unclear ownership structures and lack of awareness of financing options. However, these barriers vary from region to region.

As already described above a major barrier in all countries are improper quality of the loan applications and the documentation of the projects towards the requirements of financing institutions.

Other barriers prevailing in the individual countries are summarised below:

Crete: There is a general lack of awareness about energy savings options and financing schemes.

Poland: If projects are technically and financially well prepared there are in principle no barriers for project development apart from lack of financial resources.

Czech Republic: Inadequate governmental support.

Latvia: Lack of financial ability, awareness and poor quality of construction work.

Lithuania : A reduction of the subsidy from the state has created a psychological barrier, despite the fact that the profitability of the projects still are rather high.

To get a further picture of prevailing barriers and future challenges in relation to RUE in building measures a separate analysis was made for Lithuania (*Financing Energy Efficiency Measures in the Building Sector, Lithuania, ClearSupport 2010*).

Due to intensive government actions, since 1996 nearly 700 apartment blocks were renovated and modernized in Lithuania. This, however, makes up only 1.5-2% of the whole building stock. Renovation is now moving to a standstill. In an attempt to overcome unfavourable developments government designed a new model for renovation of apartment blocks. Due to financial difficulties maximum government grant was reduced to 15%. It may be further reduced, if specific modernisation project is insufficiently energy-efficient.

This poses questions as to how long renovation of the whole building stock will take and whether there is a need to speed it up.

The main problems are assessed to be poor management of apartment blocks, which is inappropriate for raising initiatives and decision-making and leads to insufficient motivation of apartment owners, and improper organisation of finance in apartment blocks.

Consequently an important step forward is assessed to be introduction of good management practices and finance organisation schemes in these houses, rather than a top-down approach where Government attempts to solve problems for apartment owners.

Compared to residential buildings, public buildings proved much easier to renovate and modernise. To date, a good number of government and local initiatives were implemented and a lot of public buildings have been retrofitted.

The Lithuanian case underlines the need for proactive efforts to overcome barriers for exploiting the big potential for RUE in building measures. Still many barriers are related to other circumstances than identification and development of projects, and PSFs could also contribute to the overcoming of these barriers.

2.4 PSF Proactive Efforts

In addition to support project initiation and development the PSFs have been pro-active in relation to changing the framework conditions for RUE in building projects in relation to prevailing barriers, e.g.

- Improving existing or developing new financing schemes
- Improving legal framework conditions
- Awareness raising
- Training (improving quality of loan applications and considerations)
- RUE Design (improving technical quality of projects)

2.4.1 Improving Financing Schemes

The local knowledge of the PSFs and their targeted assistance towards linking projects with financing sources combined with the overall cross national efforts of the ClearSupport Project has brought the PSFs in a unique position to contribute to improvement of financing schemes.

For example the ClearSupport Project generally promoted the idea of establishing revolving funds. This idea was particularly adopted in Lithuania where the PSF is supporting the Ministry of Finance in further actions on the topic. Establishment of such Fund in combination with the Apartment Building Modernization Programme is considered to be the most realistic proposal for improvement of the current refurbishment financing model. The PSF arranged a workshop on 7th April 07, 2009 for detailed presentation of a Revolving Fund as a financing instrument for buildings refurbishment. Currently the Lithuanian Government conducts negotiations with the European Investment Bank (EIB) as the expected manager of the Revolving Fund.

Also in Poland the project contributed significantly to promote new financing options, using the PSF financial guidelines as important tools.

In Czech Republic the project contributed to a further development of the ESCO market, including combining Energy Performance Contracting subsidies (including structural funds). This combination has ensured a better utilisation of available financial resources.

Finally in Latvia the PSF took part in the working group on developing the Latvian Green Investment Scheme for increasing energy efficiency in buildings. The Green Investment Scheme is based on the transaction of Assigned Amount Units, where the revenue of the sale is used to generate CO_2 reductions. The scheme was implemented in June 2009.

In all countries the PSFs were active in relation to promoting ESCO schemes, particularly the Greek PSF and a.o. in relation to the experience from the Czech Republic

The financial studies and tools within the ClearSupport Project has actively been used by the PSFs to provide recommended measures on how to improve the financial framework in the PSF regions and helping to adopt those.

2.4.2 Improving Legal Framework Conditions

As to contribute to this process, most progress was achieved in Lithuania and Poland. In Lithuania the PSF carried out various consultancies for high-level decision makers in relation to establishment of the revolving fund and identified shortages in the Apartment Modernisation Programme. In Poland the PSF forwarded various recommendations to improve the legal environment, which were taken into account by the national authorities. This was e.g. related to lack of new Polish standards for heat calculation and inconsistency in the regulation for certification of buildings.

Also in Latvia the PSF provided assistance to set up new national financing schemes.

The framework in the Czech Republic the legal framework for energy efficiency is assessed by the PSF to be unclear and the support of state institutions very weak. The same is valid for Crete.

As to Crete the Greek Ministry of Development during 2009 set in public consultation the new legal framework, to comply with the EU directive 91/2002. The Cretan PSF proposed various modifications through the Technical Chamber of Crete.

2.4.3 Awareness Raising and Training

In all PSFs various awareness raising activities have been targeted towards the various stakeholders including local web sites, newsletters, workshops, seminars, training and individual consultancies with project owners and other main stakeholders. This has contributed to the identification of projects and linking of these projects to available financing schemes. Further some actions have aimed at qualifying various stakeholders in the project development process.

For example in Poland 10 training events were arranged attended by more than 400 Trainees, and which generally provided a positive feedback.

2.4.4 Improving Technical Quality of Projects

The PSFs contribution in this field has first of all been the direct technical assistance provided. An important tool has been the RUE Guideline developed within the ClearSupport Project describing typical / standard RUE in building measures. This guideline was adapted to local conditions in all of the targeted regions.

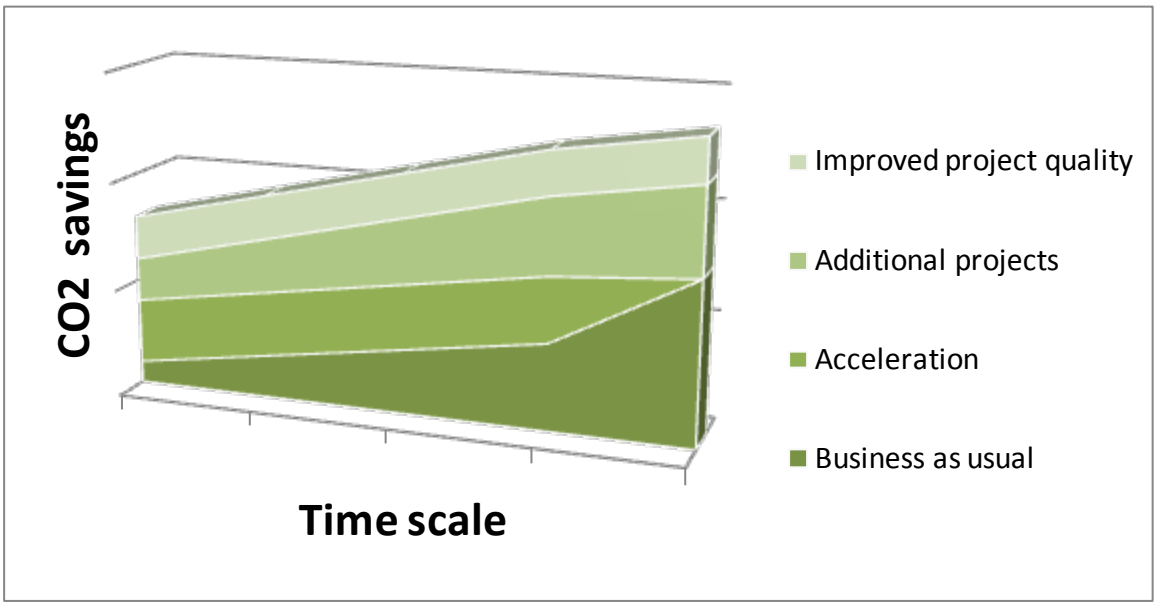
3 Lessons Learned

The major lessons learned from the PSF operations are assessed to be

- ✓ Targeted and coordinated assistance to energy efficiency projects can significantly accelerate the identification and the implementation of these
- ✓ Local support combined with exchange of know-how and experience in an European Cooperation Network can contribute to improve the quality of project documentation and implementation
- ✓ Experience from the PSF process can contribute to develop framework conditions in RUE projects at the local level as well at the EU level (pro-active efforts from the PSFs)

The five PSFs succeeded in supporting 230 projects, 36 were implemented and for another 136 projects financial application were submitted of which 72 was approved up to the end of December 2009. In addition 58 other projects were supported, most of them to be further prepared for financing.

Without the support of the PSFs most of the projects would either never have happened or would have happened at a later stage. Consequently, the PSF support has ensured an acceleration of CO2 reductions as well as additional CO2 reductions obtained through additional projects and improvement of the project quality through technical assistance.



A beforehand local knowledge and experience combined with the experience from the PSF process, and the focus on all aspects related to project implementation and development, has brought the PSFs in an unique situation to respond to current framework conditions in interaction with the various stakeholders.

To this should also be added the important European dimension, comprising exchange of know-how, tools, expertise and experience across the PSFs in the regions, which has added further to the strengths of the PSFs.

All in all the idea of setting up a local anchored PSFs operating in an European Cooperation Network has proven to add value to the process of initiating, developing and documenting projects, and in this context linking projects with proper financing mechanisms. The PSFs should be designed to support the various stakeholders along the process of planning and developing RUE projects in buildings.

The ClearSupport project has indicated that the role of the PSFs would vary from country to country. Thus, when setting up the PSF the needed capacity and capability to support stakeholders along the project cycle must be carefully assessed in relation to local conditions and circumstances.

Stakeholders along the value chain include: Local governments, regulators, project owners, financing institutions, end-users, different kind of project service providers (engineers, architects, ESCOs, constructors, installers etc.).

The PSF could e.g. be envisaged to have a role in relation to:

- Project identification
- Project initiation
- Support to the further steps along the project cycle, including linking projects with financing schemes
- Analysis of project feedback

Assistance can be provided to new or already on-going projects.

Further the PSF should work closely with financing institutions and local authorities to improve framework conditions for EE projects, a.o. in relation to experience gathered from the projects.

The PSF would first of all have a role as a facilitator supporting project owners to identify and initiate projects and put them in contact with potential financing institutions. The initial contact may be derived from information workshops, awareness campaigns, training and short consultations.

The further contact may include initial project analysis and assistance towards establishing a financial set-up in relation to available financing sources.

However, the PSF should not necessarily possess capacity to support projects in all phases, which would require very big resources and further distort the market for project services. Particularly in the implementation phase the role of the PSF should be expected to be minimal.

Many service providers already exist in the market and are in a position to deliver many of the required project services (ESCOs, energy auditors, engineering companies, architects, institutes,

energy agencies etc.). Possibly more capacity is needed in the market. Nevertheless, the needed capacity and capability of the PSF will depend on local needs and the current local market capacity.

The PSF could have an essential role towards ensuring that market players are mobilised towards the huge amount of EE projects and that projects are developed and documented in accordance with the requirements of the financing institutions. Some projects may be defined and initiated by project service providers, but could still be coordinated with and supported by the PSF structure.

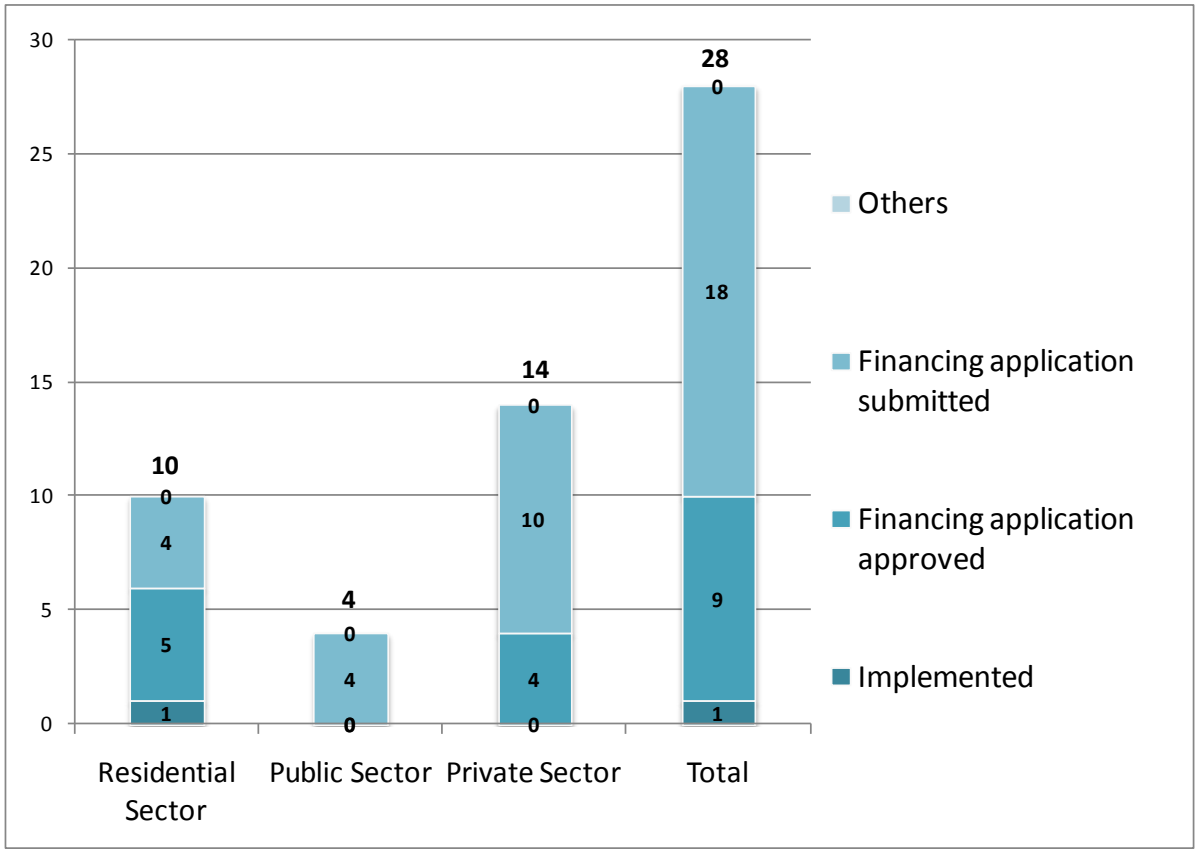
As to the feedback from projects the PSF could have a role in relation to summarize lessons learned from the projects, including impacts of measures. This should be done to facilitate exchange of know-how and experience between projects as well as supporting identification of shortcomings and needs in the current framework conditions.

Annex 1: Project Overview Crete

Project Initiations and Developments

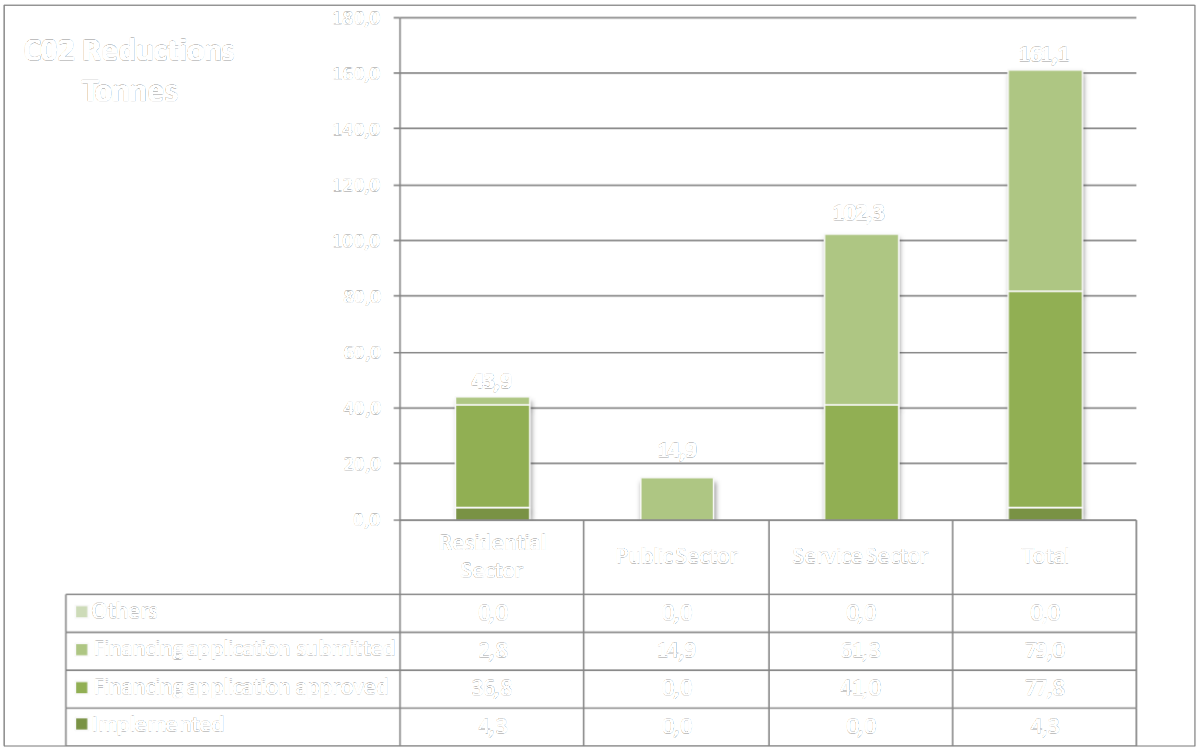
The Cretan PSF has within the project period 1st May 2007 – 31st December 2009 been in contact with 57 potential project owners, and has provided support to 28 of these projects through the PSF activities.

Within the project period 1 of these projects were implemented (within the residential sector), and for another 27 projects financial applications were submitted of which 9 was approved up to the end of December 2009.



Number of projects supported by the PSF in Crete (Greece)

The 28 projects in total represent an annual CO2 reduction of 161 tonnes, hereof **4 tonnes** from the already implemented project.



Various indicators are given in the table below. As can be seen, the projects in Crete are relatively small-scale in relation to the other PSF regions with an average investment volume of approximately 130.000 Euro per project.

Projects supported in the private and public sector concern hotels and schools respectively.

Indicators	Residential Sector	Public Sector	Private Sector	Total
Number of projects	10	4	14	28
Square meters	2,172	5,190	10,904	18,266
Investments - MEUR	0.124	0.035	0.218	0.377
Energy savings -MWh	99.3	45.8	278.3	423.5
CO2 savings -Tonnes	43.9	14.9	102.3	161.1
MEUR/Project	0.012	0.009	0.016	0.013
EUR/m2	57.1	6.7	20.0	20.6
EUR/MWh	1,249.0	763.5	783.2	890.3
Tonnes CO2/Project	4.4	3.7	7.3	5.8
Kg CO2/m2	20.2	2.9	9.4	8.8
EUR/CO2	2.827.2	2.349.0	2.130.2	2.340.2

Project Volume	Residential sector	Public sector	Private service sector	Total
Total of projects	**10**	**4**	**14**	**28**
Number of square meters	2,172	5,190	10,904	**18,266**
Invest volume (MEUR)	0.124	0.035	0.218	**0.377**
Energy savings (MWh)	99.28	45.84	278.34	**423.46**
- Heat	65.54	29.80	153.10	**248.44**
- Electricity	33.74	16.04	125.24	**175.02**
CO2 Reductions (Tonnes)	43.86	14.90	102.34	**161.10**
Implemented projects	**1**	**0**	**0**	**1**
Number of square meters	465			**465**
Invest volume (MEUR)	0.0149			**0.01**
Energy savings (MWh)	10.50			**10.50**
- Heat	7.04			**7.04**
- Electricity	3.46			**3.46**
CO2 Reductions (Tonnes)	4.32			**4.32**
Projects with approved financing application	**5**	**0**	**4**	**9**
Number of square meters involved	1,123		4,065	**5,188**
Invest volume (MEUR)	0.0266		0.0851	**0,110**
Energy savings (MWh)	52.01		92.33	**144.34**
- Heat	32.77		34.65	**67.42**
- Electricity	19.24		57.67	**76.91**
CO2 Reductions (Tonnes)	36.75		41	**77.75**
Projects with financing application under consideration	**4**	**4**	**10**	**18**
Number of square meters	584	5,190	6,839	**12,613**
Invest volume (MEUR)	0.082	0.035	0.133	**0.25**
Energy savings (MWh)	36.77	45.84	186.01	**268.62**
- Heat	25.73	29.80	118.45	**173.98**
- Electricity	11.04	16.04	67.67	**94.75**
CO2 Reductions (Tonnes)	2.79	14.9	61.34	**79.03**
Other projects	**0**	**0**	**0**	**0**
Number of square meters				
Invest volume (MEUR)				
Energy savings (MWh)				
- Heat				
- Electricity				
CO2 Reductions (Tonnes)				

As can be seen from the figures and the graphs below almost all projects in the residential and public sector include traditional energy saving measures related to refurbishment of doors and windows while in the private sector (mainly hotels) it is about 82%. Not surprisingly ventilation and cooling systems and solar energy systems are widely included in the projects (hotels). Biomass boilers are included in one fifth of all projects and within all of the sectors.

A typical project within the residential sector for example includes:

- Installation of new flat plate solar thermal collectors for hot water
- New wood- fired stoves for space heating
- Replacing the old windows with double glaze windows
- Replacing all the old bulbs with new of low consumption

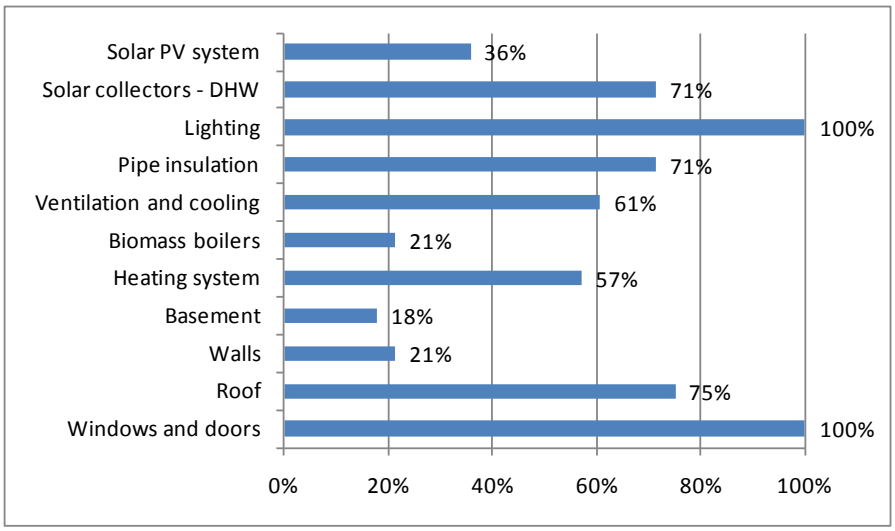
In addition to traditional energy saving measures a hotel project typically include:

- Installing a solar thermal system with flat plate collectors to cover needs for hot tap water.
- Installing a PV system to balance all the electricity needs. The PV system is connected to the grid and the annual electricity input equals to the annual output.

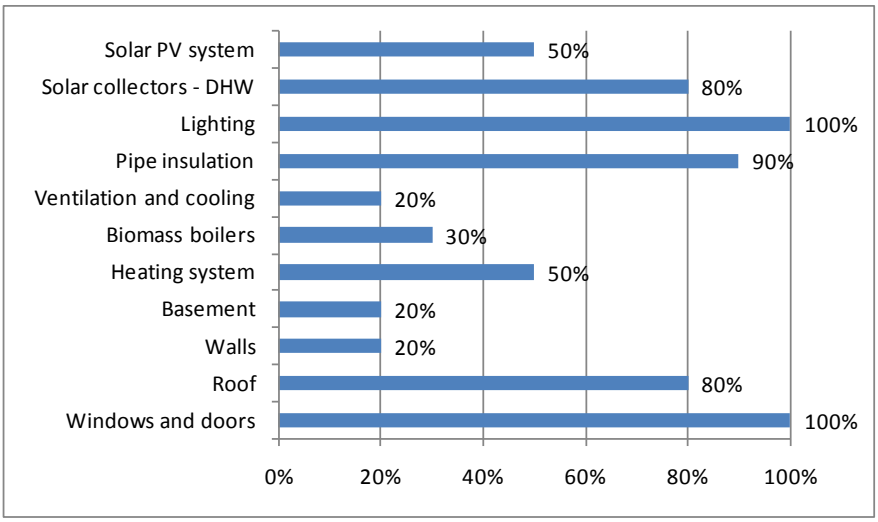
During the summer the hotels do not need any heating and the preparation of foods are often obtained with the use of LPG.

The potential for replication of energy efficiency projects in hotels is rather high, since the percentage of incoming environmentally tourists being environmentally conscious are increasing. It should also be noted also that these projects are considered financially profitable in Greece, due to high feed-in tariffs for selling the PV electricity to the grid.

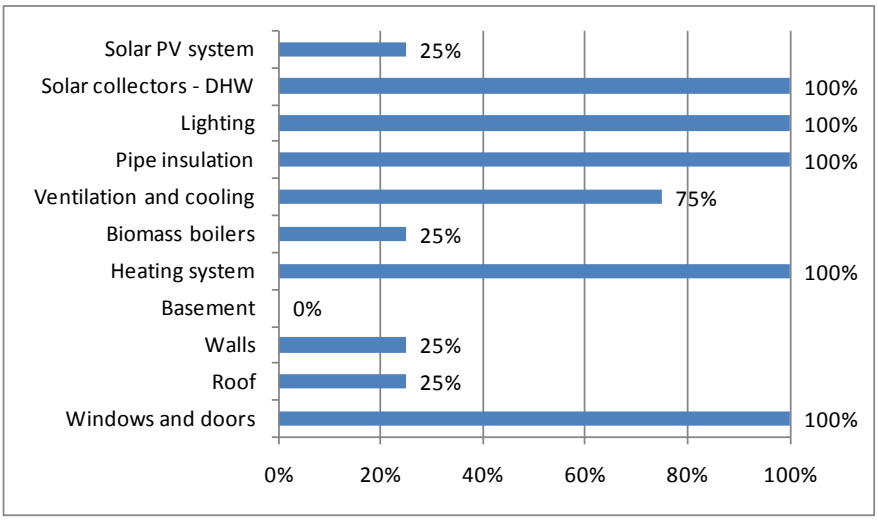
Performance indicators Technology measures Number of projects	Residential sector		Public sector		Private Service Sector		Total	
Total number of projects supported by the PSF	**10**		**4**		**14**		**28**	
Windows and doors	10	100%	4	100%	14	100%	**28**	100%
Roof	8	80%	1	25%	12	86%	**21**	75%
Walls	2	20%	1	25%	3	21%	**6**	21%
Basement	2	20%	0	0%	3	21%	**5**	18%
Heating system	5	50%	4	100%	7	50%	**16**	57%
Biomass boilers	3	30%	1	25%	2	14%	**6**	21%
Ventilation and cooling	2	20%	3	75%	12	86%	**17**	61%
Pipe insulation	9	90%	4	100%	7	50%	**20**	71%
Lighting	10	100%	4	100%	14	100%	**28**	100%
Solar collectors - DHW	8	80%	4	100%	8	57%	**20**	71%
Solar PV system	5	50%	1	25%	4	29%	**10**	36%
Number of implemented projects	**1**		**0**		**0**		**1**	
Windows and doors	1	100%					**1**	100%
Roof	1	100%					**1**	100%
Walls								
Basement								
Heating system	1	100%					**1**	100%
Biomass boilers								
Ventilation and cooling	1	100%					**1**	100%
Pipe insulation	1	100%					**1**	100%
Lighting	1	100%					**1**	100%
Solar collectors - DHW	1	100%					**1**	100%
Solar PV system	1	100%					**1**	100%



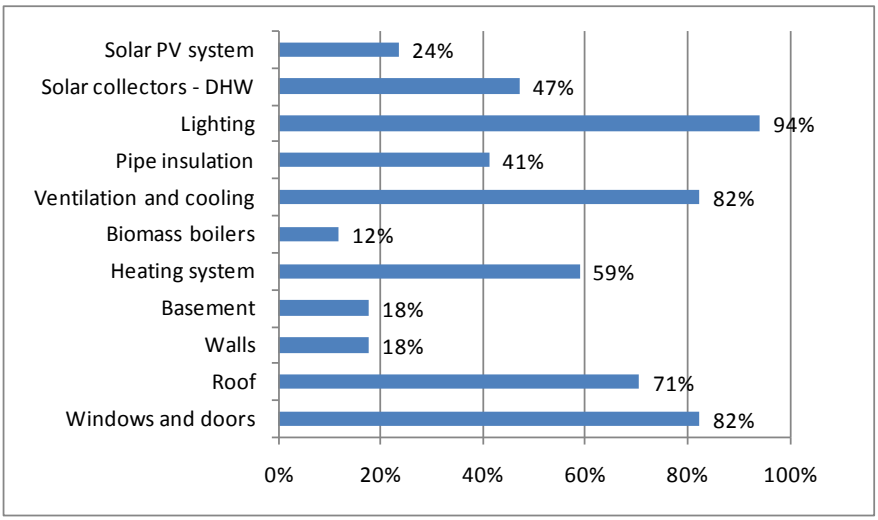
Distribution of project measures within all 28 projects



Distribution of project measures within the residential sector (10 projects)



Distribution of project measures within the public sector (4 projects)



Distribution of project measures within the private service sector (14 projects)

Family houses in Chania considered for PSF support

Financing Schemes

The existing financial framework for building retrofitting in **Greece** includes conventional instruments rather than innovative financial tools. Current financing possibilities typical include local bank loans and state subsidies. Various capital investment subsidies are offered from various ministries with the help of European structural funds.

Crete: 28 projects in total			
Implemented	Residential sector	1	Local bank loan
Other projects	Residential Sector	10	Local bank loans
	Public Sector	4	State subsidies
	Private Service Sector	14	Bank loans combined with state subsidies (6)

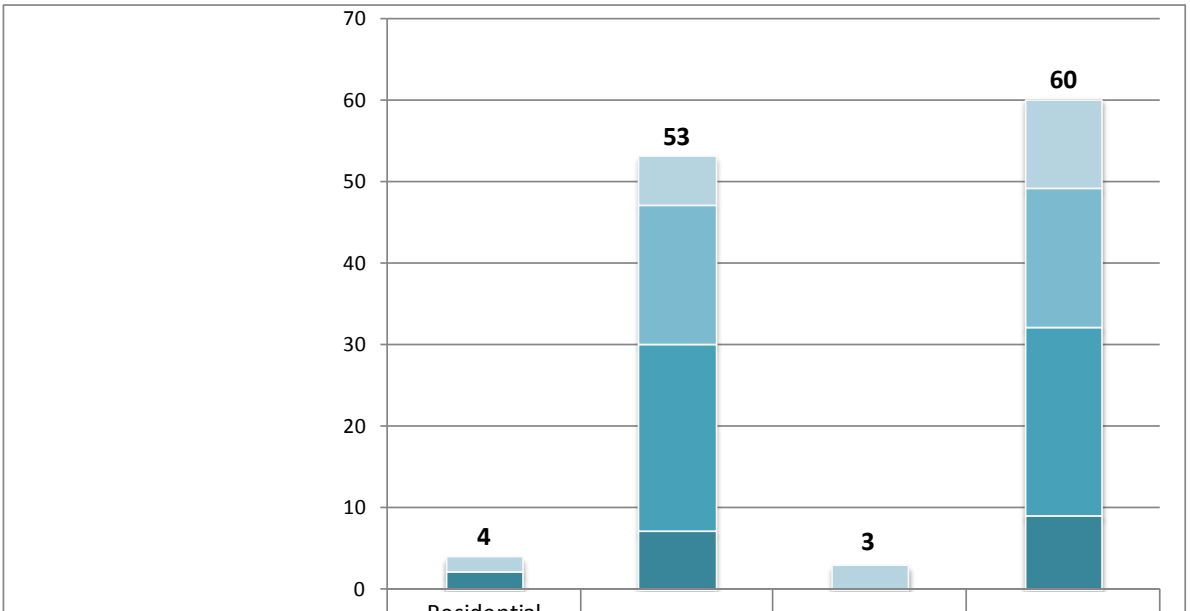
The Cretan PSF has aimed at promoting the creation of Energy service companies (ESCOs) in Crete. ESCOs did not exist in Greece until three years ago, when the first one was created in Athens. PSF got in contact with a group of experts, who have decided to proceed in the creation of an ESCO in the region of Crete. Currently they are in the first steps of creation of the company. It is expected that the existence of such a company in Crete will support the promotion of energy efficient investments in buildings, both in private and in the public sector.

Annex 2: Project Overview, Czech Republic

Project Initiations and Developments

The Czech PSF has within the project period 1st May 2007 – 31st December 2009 been in contact with 97 potential project owners, and has provided support to 60 of these projects through the PSF activities.

Within the project period 9 of these projects were implemented, and for another 40 projects financial applications were submitted of which 23 was approved up to the end of December 2009.

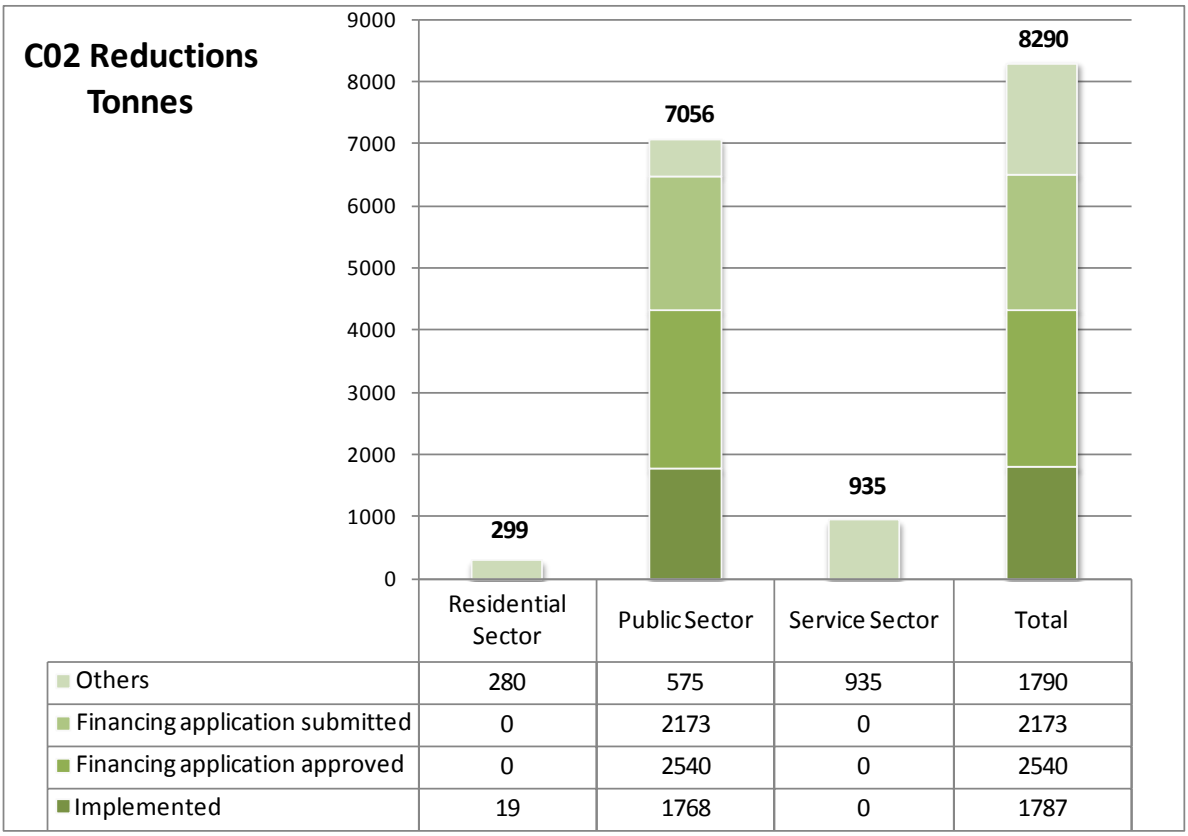


	Residential Sector	Public Sector	Private Sector	Total
Others	2	6	3	11
Financing application submitted	0	17	0	17
Financing application approved	0	23	0	23
Implemented	2	7	0	9

Number of projects supported by the PSF in Czech Republic

The 60 projects in total represent an annual CO2 reduction of 8,290 tonnes, hereof **1,787 tonnes** from the already implemented projects.

88% of the projects are within the public sector, in total 53 projects representing 85% of the CO2 reductions (see figure below). These have concerned: school buildings, hospitals, administration buildings and other types of buildings.



	Residential Sector	Public Sector	Service Sector	Total
Others	280	575	935	1790
Financing application submitted	0	2173	0	2173
Financing application approved	0	2540	0	2540
Implemented	19	1768	0	1787

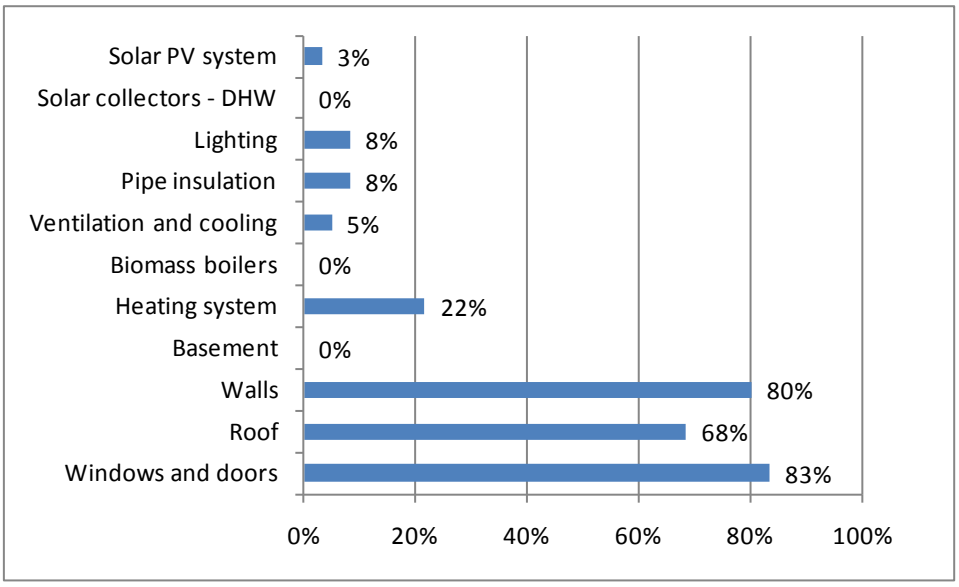
Various indicators are given below. As can be seen the projects within the public sector in Czech Republic are the least cost effective in terms of investments needed per Tonne CO2 or MWh saved.

Indicators	Residential Sector	Public Sector	Private Sector	Total
Number of projects	4	53	3	60
Square meters	11,459	349,493	45,605	406,557
Investments - MEUR	0.326	23.71	0.935	24,971
Energy savings -MWh	487	22,512	935	23,934
CO2 savings -Tonnes	299.8	7,056.1	935.3	8,291.2
MEUR/Project	0.082	0.447	0.312	0.416
EUR/m2	28.4	67.8	20.5	61.4
EUR/MWh	669.4	1,053.2	1,000,0	1,043.3
Tonnes CO2/Project	75.0	133.1	311.8	138.2
Kg CO2/m2	26.2	20.2	20.5	20.4
EUR/CO2	1,087.4	3,360.2	999.7	3,011.7

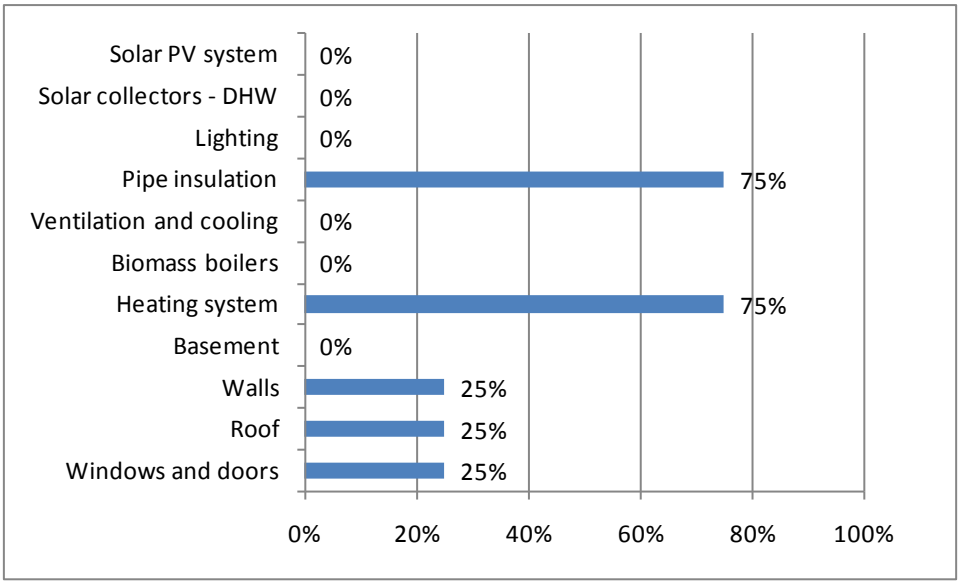
Project Volume	Residential sector	Public sector	Private service sector	Total
Total of projects	**4**	**53**	**3**	**60**
Number of square meters	**11,459**	**349,493**	**45,605**	**406,557**
Invest volume (MEUR)	**0.326**	**23.710**	**0.935**	**24.971**
Energy savings (MWh)	**487**	**22,512**	**935**	**23,934**
- Heat	**487**	**22,512**	**935**	**23,934**
- Electricity				**0**
CO2 Reductions (Tonnes)	**299.8**	**7,056.1**	**935.3**	**8,291.2**
Implemented projects	**2**	**7**	**0**	**9**
Number of square meters	1,299	27,605		**28,904**
Invest volume (MEUR)	0.050	2.835		**2.885**
Energy savings (MWh)	34	1,752		**1,786**
- Heat	34	1,752		**1,786**
- Electricity				**0**
CO2 Reductions (Tonnes)	19	1,768		**1,787**
Projects with approved financing application	**0**	**23**	**0**	**23**
Number of square meters involved		154,699		**154,699**
Invest volume (MEUR)		12.484		**12.484**
Energy savings (MWh)		10,435		**10,435**
- Heat		10,435		**10,435**
- Electricity				**0**
CO2 Reductions (Tonnes)		2,540		**2,540**
Projects with financing application under consideration	0	17	0	**17**
Number of square meters		129,009		**129,009**
Invest volume (MEUR)		7.619		**7.619**
Energy savings (MWh)		8,795		**8,795**
- Heat		8,795		**8,795**
- Electricity		0		**0**
CO2 Reductions (Tonnes)		2,173		**2,173**
Other projects	2	6	3	**11**
Number of square meters	10,960	37,380	45,605	**93,945**
Invest volume (MEUR)	0.276	0.771	0.935	**1.982**
Energy savings (MWh)	453	1,530	935	**2,918**
- Heat	453	1,530	935	**2,918**
- Electricity				**0**
CO2 Reductions (Tonnes)	280	575	935	**1,790**

As can be seen from the figures and the graphs below most of the projects include traditional energy saving measures related to refurbishment of doors, windows, roofs and walls. Renewable energy measures are included in the form of solar pv systems in 2% of the projects (public sector).

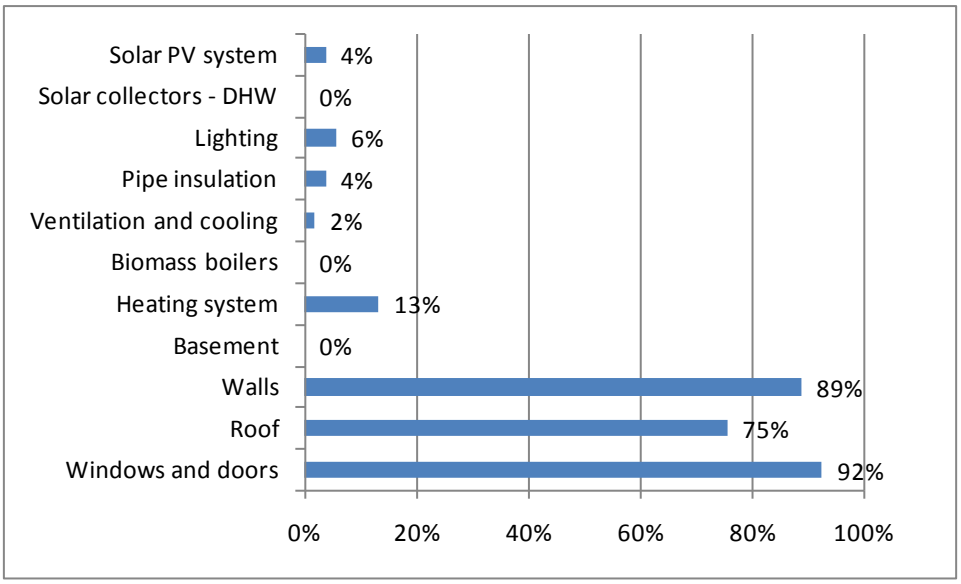
Performance indicators **Technology measures** **Number of projects**	**Residential sector**		**Public sector**		**Private Service Sector**		**Total**	
Total number of projects supported by the PSF	**4**		**53**		**3**		**60**	
Windows and doors	1	25%	49	92%			**50**	83%
Roof	1	25%	40	75%			**41**	68%
Walls	1	25%	47	89%			**48**	80%
Basement							**0**	0%
Heating system	3	75%	7	13%	3	100%	**13**	22%
Biomass boilers							**0**	0%
Ventilation and cooling			1	2%	2	67%	**3**	5%
Pipe insulation	3	75%	2	4%			**5**	8%
Lighting			3	6%	2	67%	**5**	8%
Solar collectors - DHW							**0**	0%
Solar PV system			2	4%			**2**	3%
Number of implemented projects	**2**		**7**		**0**		**9**	
Windows and doors			7	100%			**7**	78%
Roof			3	43%			**3**	33%
Walls			7	100%			**7**	78%
Basement							**0**	0%
Heating system	2	100%					**2**	22%
Biomass boilers							**0**	0%
Ventilation and cooling							**0**	0%
Pipe insulation	2	100%					**2**	22%
Lighting							**0**	0%
Solar collectors - DHW							**0**	0%
Solar PV system							**0**	0%



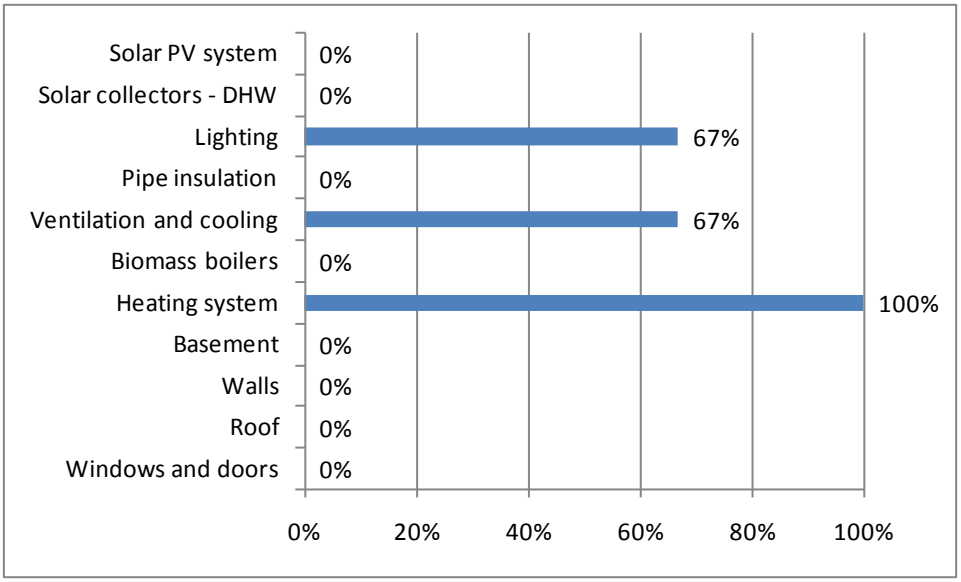
Distribution of project measures within all 60 projects



Distribution of project measures within the residential sector (4 projects)



Distribution of project measures within the public sector (53 projects)



Distribution of project measures within the private service sector (3 projects)

Picture from one 15 schools in the area of Prague supported by the Czech PSF. This was done as an ESCO initiative.

Financing Schemes

The most popular financing of energy efficiency projects in **Czech Republic** are subsidies and are in 19 of the ClearSupport projects combined with energy performance contracting (ESCO). The ESCO market is quite developed in Czech Republic and particularly within the public sector.

Subsidies have within the last two years been available from Structural Funds, concretely from Operational Programmes. The most exploited Operational Programme for energy efficiency projects within the public sector is the Operational Programme of Environment administrated by the Ministry of Environment (or more precisely State Fund of Environment). The projects subsidized are typically insulation measures and replacement of windows and doors. Other measures within the same projects are typically financed by the ESCO contracts. To obtain subsidies it is necessary to provide own co-financing. The co-financing is covered partly by bank loans and partly by own financial sources.

Czech Republic: 60 projects in total			
Implemented Projects	Residential sector	2	Own financial resources
	Public Sector	7	Operational Programme of Environment
Other projects	Residential Sector	1	Local bank loan
		1	Own financial sources
	Public Sector	22	Operational Programme of Environment
		19	Operational Programme of Environment combined with ESCO contracts
		5	Own financial sources
	Private Service Sector	1	Local bank loan
		2	Own financial sources

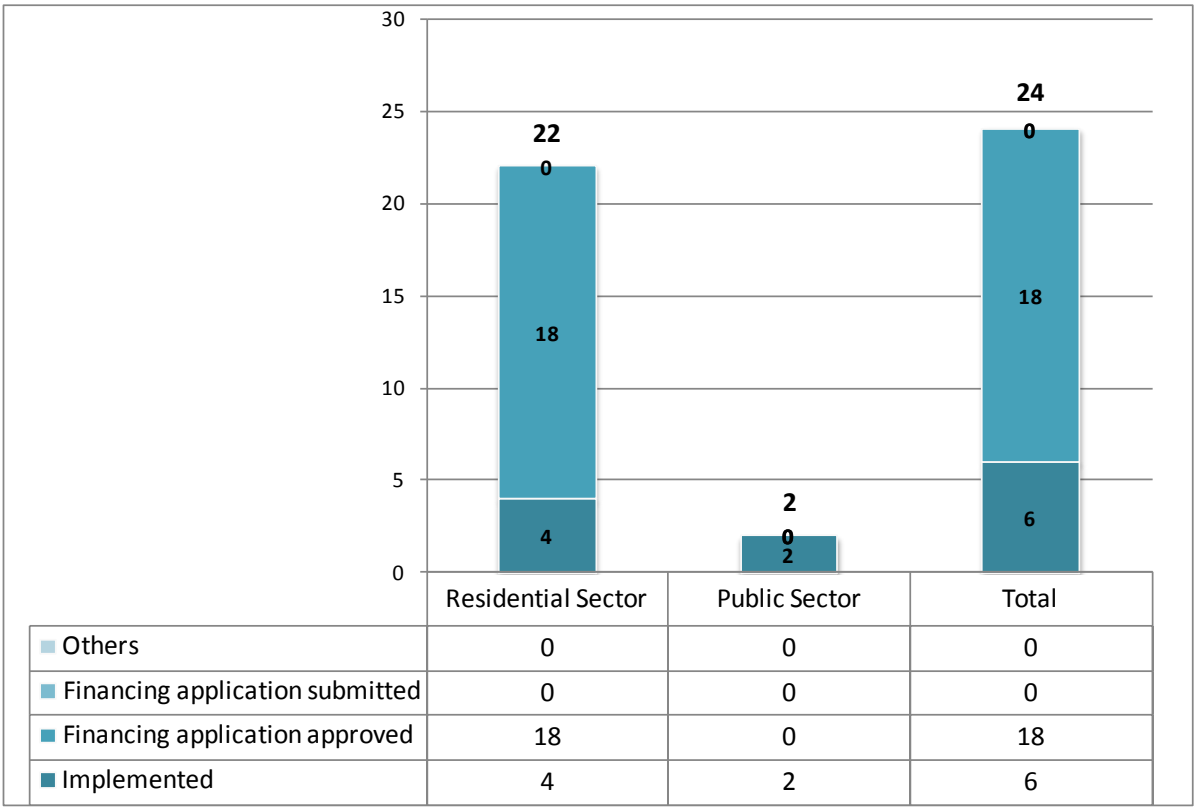
In Czech Republic the ClearSupport project has contributed to a further development of the ESCO market, including combining Energy Performance Contracting and subsidy schemes (including structural funds) as mentioned above. This combination has ensured a better utilisation of available financial resources.

Annex 3: Project Overview, Latvia

Project Initiations and Developments

The Latvian PSF has within the project period 1st May 2007 – 31st December 2009 been in contact with 185 potential project owners, and has provided support to 24 of these projects through the PSF activities.

Within the project period 6 of these projects were implemented, and for another 18 projects financial applications were submitted of which all were approved.

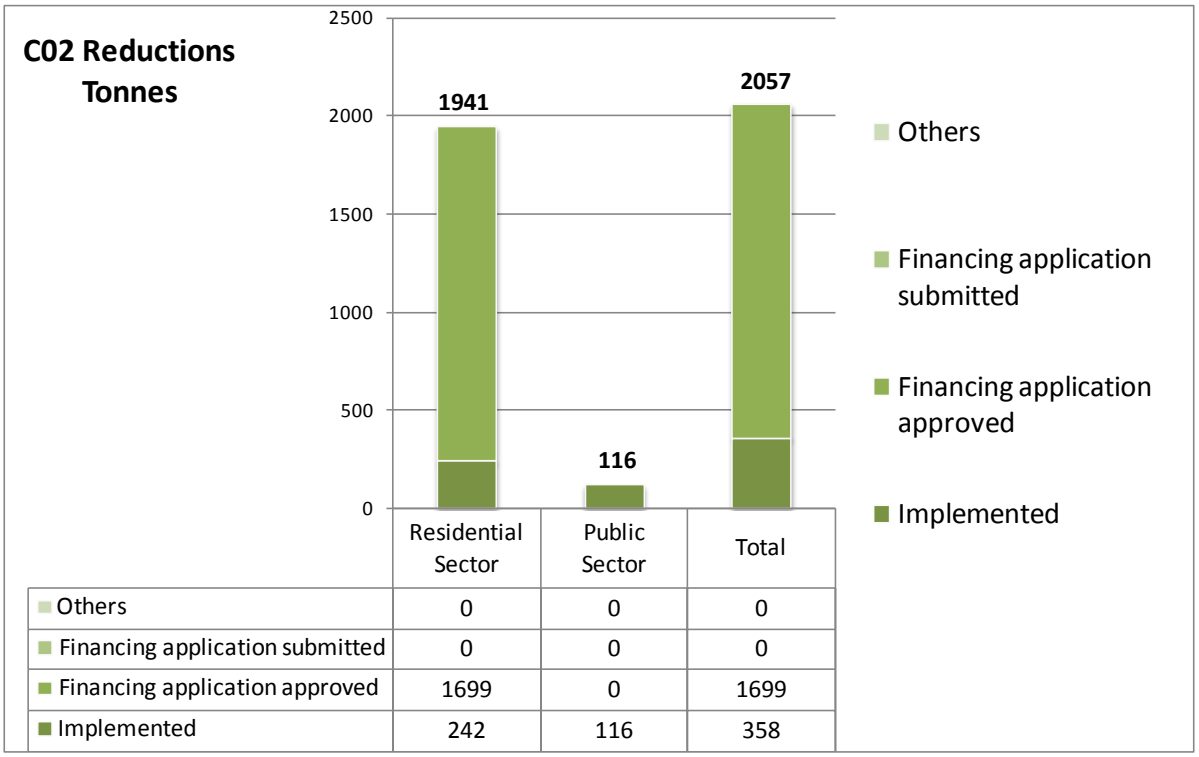


	Residential Sector	Public Sector	Total
Others	0	0	0
Financing application submitted	0	0	0
Financing application approved	18	0	18
Implemented	4	2	6

Number of projects supported by the PSF in Latvia

Most of the projects are within the residential sector, in total 22 out of the 24.

The 24 projects in total represent an annual CO2 reduction of **2,057 tonnes**, hereof **358 tonnes** from the implemented projects (see figure below).



	Residential Sector	Public Sector	Total
Others	0	0	0
Financing application submitted	0	0	0
Financing application approved	1699	0	1699
Implemented	242	116	358

Various indicators are given below. As can be seen the 2 projects within the public sector are relatively less cost effective in terms of investments needed per Tonne CO2 or MWh saved than the 22 projects within the residential sector.

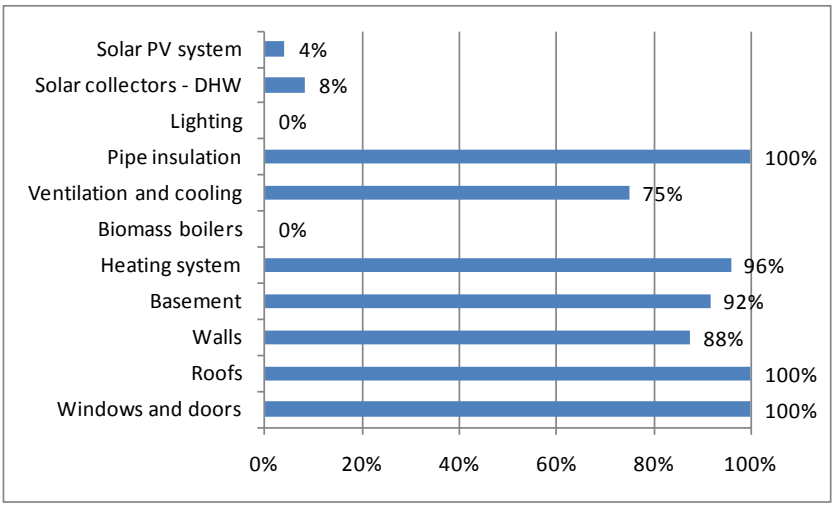
Indicators	Residential Sector	Public Sector	Total
Number of projects	22	2	24
Square meters	65,403.4	5,675.0	71,078.4
Investments - MEUR	3.766	0.469	4.235
Energy savings -MWh	6,819.7	211.0	7,030.7
CO2 savings -Tonnes	1,941.0	116.0	2,057.0
MEUR/Project	0.171	0.235	0.176
EUR/m2	57.6	82.6	59.6
EUR/MWh	552.2	2,222.7	602.4
Tonnes CO2/Project	88.2	58.0	85.7
Kg CO2/m2	29.7	20.4	28.9
EUR/CO2	1,940.2	4,043.1	2,058.8

Project Volume	Residential sector	Public sector	Private service sector	Total
Total of projects	**22**	**2**		**24**
Number of square meters	65,403,4	5,675.0		**71,078.4**
Invest volume (MEUR)	3.766	0.469		**4.235**
Energy savings (MWh)	6,819.7	211.0		**7,030.7**
- Heat	6,819.7	210.0		**7,029.7**
- Electricity		1		**1**
CO2 Reductions (Tonnes)	1,941	116		**2,057**
Implemented projects	**4**	**2**		**6**
Number of square meters	5,083.2	5,675.0		**10,758.2**
Invest volume (MEUR)	0.210	0.469		**0.679**
Energy savings (MWh)	726	211		**937**
- Heat	726	210		**936**
- Electricity		1		**1**
CO2 Reductions (Tonnes)	242	116		**358**
Projects with approved financing application	**18**			**18**
Number of square meters involved	60,320.2			**60.320.2**
Invest volume (MEUR)	3.556			**3.556**
Energy savings (MWh)	6,093.7			**6,093.7**
- Heat	6,093.7			**6,093,7**
- Electricity				**0**
CO2 Reductions (Tonnes)	1,699			**1,699**
Projects with financing application under consideration				
Number of square meters				
Invest volume (MEUR)				
Energy savings (MWh)				
- Heat				
- Electricity				
CO2 Reductions (Tonnes)				
Other projects				
Number of square meters				
Invest volume (MEUR)				
Energy savings (MWh)				
- Heat				
- Electricity				
CO2 Reductions (Tonnes)				

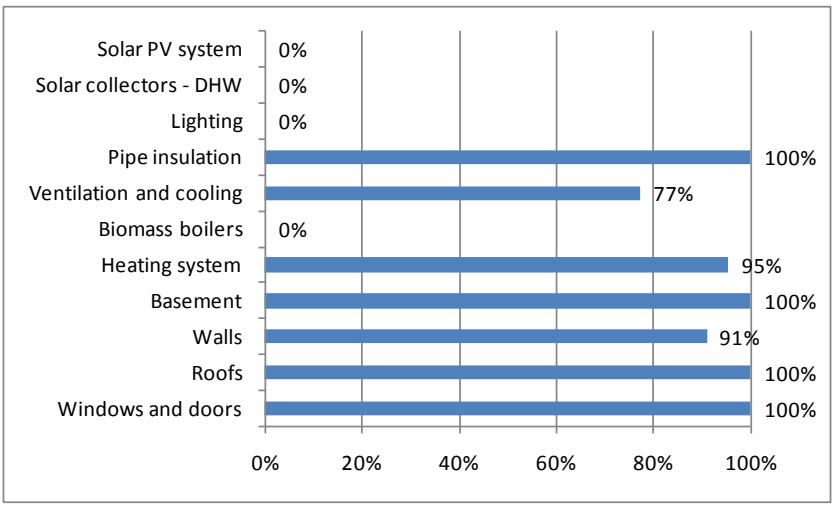
As can be seen from the figures and the graphs below almost all projects includes typical energy saving measures related to refurbishment of doors, windows, roofs and walls. Improvement of ventilation and cooling systems and insulation of heating pipes are also included within most of the projects. Two of the projects within the public sector include investments into renewable energy systems (solar energy).

The typical view of apartment buildings during retrofitting is presented in pictures below:

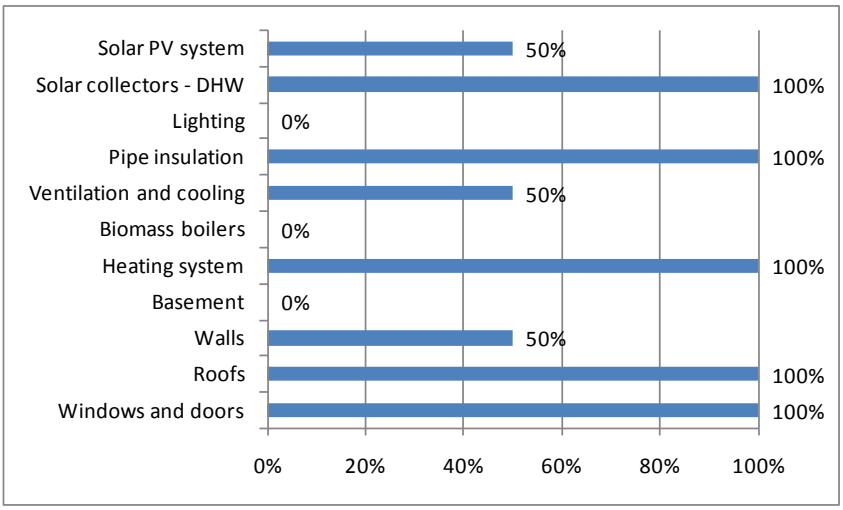
Performance indicators Technology measures Number of projects	Residential sector		Public sector		Total	
Total number of projects supported	22		2		24	
Windows and doors	22	100%	2	100%	**24**	100%
Roof	22	100%	2	100%	**24**	100%
Walls	20	91%	1	50%	**21**	88%
Basement	22	100%			**22**	92%
Heating system	21	95%	2	100%	**23**	96%
Biomass boilers					**0**	0%
Ventilation and cooling	17	77%	1	50%	**18**	75%
Pipe insulation	22	100%	2	100%	**24**	100%
Lighting					**0**	0%
Solar collectors - DHW			2	100%	**2**	8%
Solar PV system			1	50%	**1**	4%
Number of implemented projects	4		2		6	
Windows and doors	4	100%	2	100%	**6**	100%
Roof	4	100%	2	100%	**6**	100%
Walls	4	100%	1	50%	**5**	83%
Basement	4	100%			**4**	67%
Heating system	4	100%	2	100%	**6**	100%
Biomass boilers					**0**	0%
Ventilation and cooling	4	100%	1	50%	**5**	83%
Pipe insulation	4	100%	2	100%	**6**	100%
Lighting					**0**	0%
Solar collectors - DHW			2	100%	**2**	33%
Solar PV system			1	50%	**1**	17%



Distribution of project measures within all 24 projects



Distribution of project measures within the residential sector (22 projects)



Distribution of project measures within the public sector (2 projects)

Financing Schemes

In **Latvia** all of the projects are financed by means of local credits while public buildings are financed by structural funds or grants. Structural funds are expected to play an increasingly role.

Latvia: 24 projects in total			
Implemented Projects	Residential sector	4	Local bank loans
	Public Sector	1	85% grant (Norway) and 15 % municip. grant
		1	ERAF (Structural Funds)
Other projects	Residential Sector	18	Local bank loans

The Latvian PSF has taken active part in a working group on developing the Latvian Green Investment Scheme (GIS) or increasing energy efficiency in buildings. The Green Investment Scheme is based on the transaction of Assigned Amount Units, where the revenue of the sale is used to generate CO_2 reductions. The scheme was implemented in June 2009. As of October 2008, Latvia had established the legal framework and institutional system.

Green Investment Schemes have been introduced in a number of countries to enhance the climate effectiveness of International Emission Trading (IET), a system undermined by the excessive number of Assigned Amount Units (AAUs) allocated to former communist countries in the first round of Kyoto commitments. GIS is thus a "hybrid" of two mechanisms: IET of the AAUs, plus greening activities using the revenue from their sale.

Latvia has been a pioneer in setting up a green investment scheme, and has attracted investors from the Netherlands, Finland, Austria and Japan.

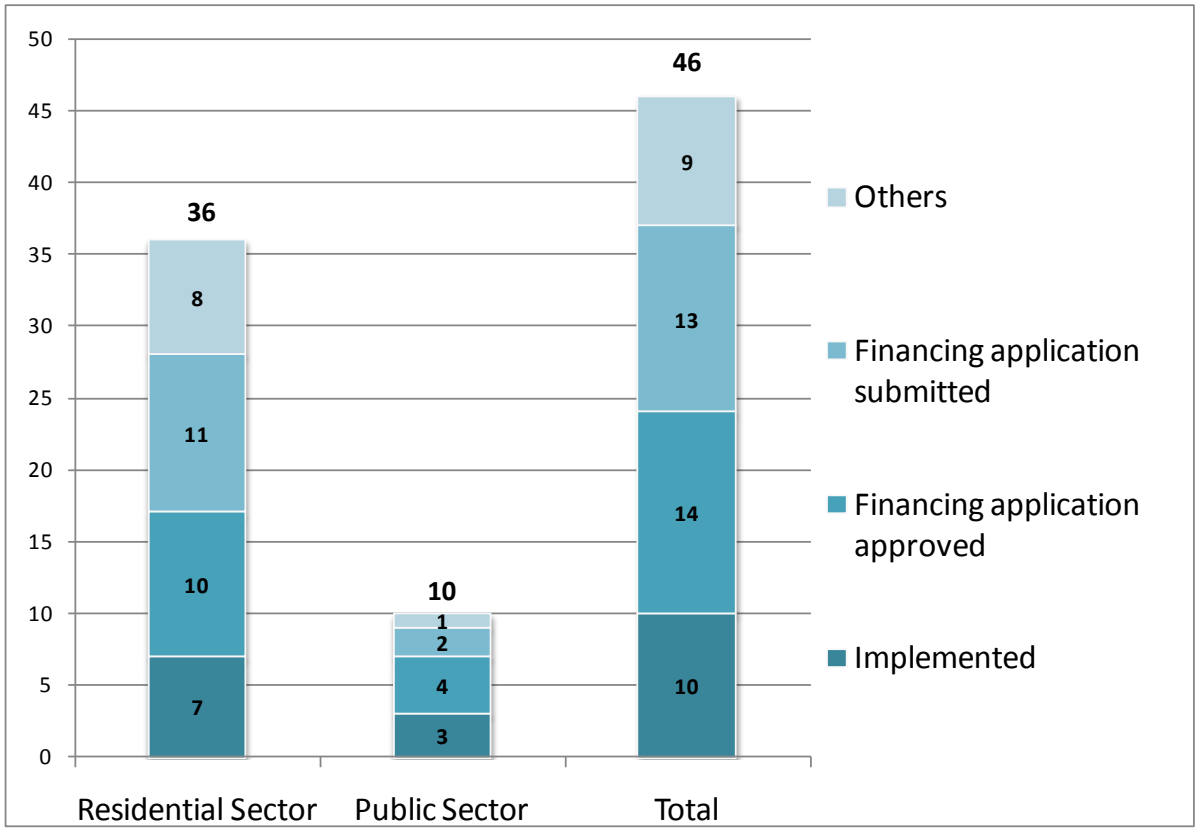
A GIS system can be set up in cooperation with e.g. the EBRD who can enter an agreement with a certain country to buy a certain amount of AAUs, provided that the country in question will put the revenue from the sale in a Green Investments Scheme in cooperation with EBRD that can save at least the agreed amount of CO2 over the next 20 years. The Fund that is established is then also attracting other financial sources with a guarantee in the revenue from the sale of AAUs. The fund is now developing standardised energy retrofitting projects in residential buildings and is promoting and issuing loans to these projects against only limited guarantees.

Annex 4: Project Overview, Lithuania

Project Initiations and Developments

The Lithuanian PSF has within the project period 1st May 2007 – 31st December 2009 been in contact with 111 potential project owners, and has provided support to 46 of these projects through the PSF activities.

Within the project period 10 of these projects were implemented, and for another 27 projects financial applications were submitted of which 14 was approved up to the end of December 2009.

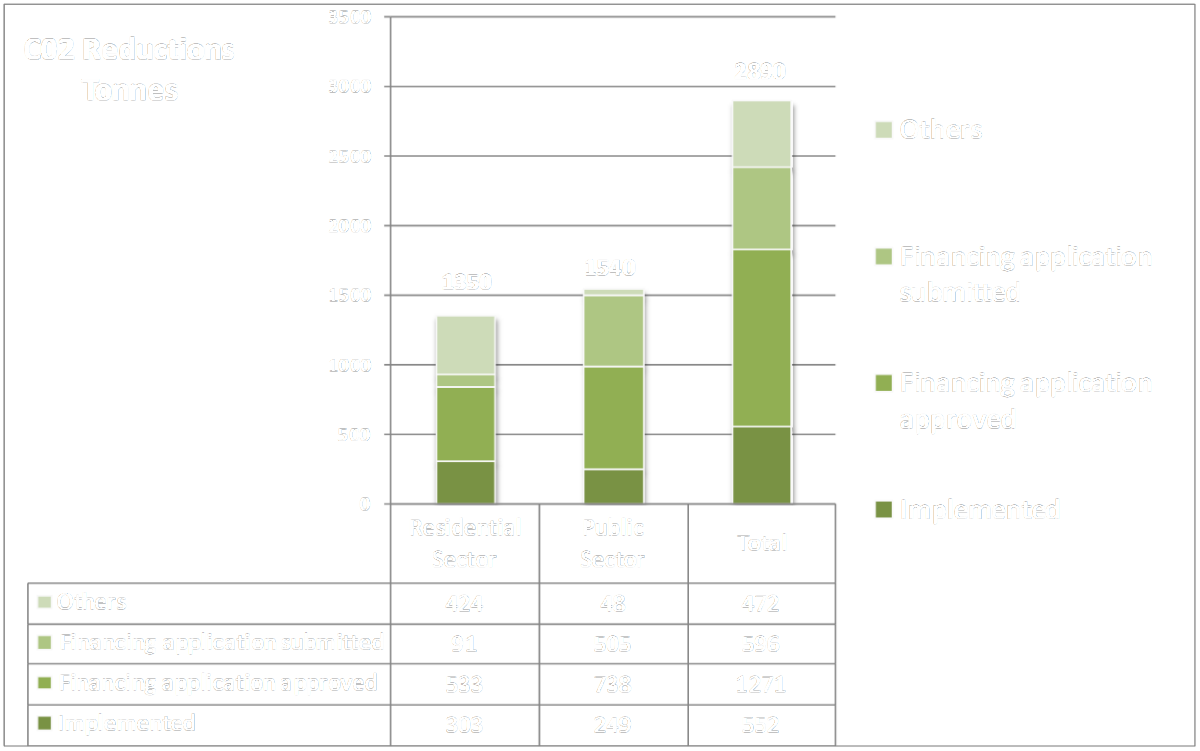


Number of projects supported by the PSF in Lithuania

The 46 projects in total represent an annual CO2 reduction of 2,890 tonnes, hereof **552 tonnes** from the implemented projects.

Most of the projects are within the residential sector, in total 36 while 10 are within the public sector.

However, the 10 projects within the public sector represent more than half of the potential CO2 reduction (see figure below).



Various indicators are given below. As can be seen the projects within the public sector are relatively more cost effective in terms of investments needed per Tonne CO2 or MWh saved .

Indicators	Residential Sector	Public Sector	Total
Number of projects	36	10	46
Square meters	76,214.4	54547.7	153,136.4
Investments - MEUR	13.15	8.09	21.24
Energy savings -MWh	9,618.2	15,165.0	24,783.2
CO2 savings -Tonnes	1,350.5	1,539.9	2,890.4
MEUR/Project	0.365	0.809	0.462
EUR/m2	172.5	149.1	162.8
EUR/MWh	1,367.2	533.5	857.0
Tonnes CO2/Project	37.5	154.0	62.8
Kg CO2/m2	17.7	28.4	22.2
EUR/CO2	9,736.8	5,253.0	7,348.6

Project Volume	Residential sector	Public sector	Private service sector	Total
Total of projects	**36**	**10**	**0**	**46**
Number of square meters	76,214.44	54,267.12		**130,481.56**
Invest volume (MEUR)	13.15	8.089		**21.239**
Energy savings (MWh)	9,618.19	15,165.00		**24,783.19**
- Heat	9,618.19	15,165.00		**24,783.19**
- Electricity	0	0		**0**
CO2 Reductions (Tonnes)	1,350.34	1,539.89		**2,890.23**
Implemented projects	**7**	**3**	**0**	**10**
Number of square meters	15,854.61	25,660.89		**41,515.5**
Invest volume (MEUR)	2.45	2.95		**5.4**
Energy savings (MWh)	1,240.16	2,975.44		**4,215.6**
- Heat	1,240.16	2,975.44		**4,215.6**
- Electricity				**0**
CO2 Reductions (Tonnes)	302.59	249.26		**551.85**
Projects with approved financing application	**10**	**4**	**0**	**14**
Number of square meters involved	32,584.48	17,886.41		**50,470.89**
Invest volume (MEUR)	5.35	3.32		**8.67**
Energy savings (MWh)	5,401.15	10,439.22		**15,840.37**
- Heat	5,401.15	10,439.22		**15,840.37**
- Electricity				**0**
CO2 Reductions (Tonnes)	532.97	737.56		**1,270.53**
Projects with financing application under consideration	**11**	**2**	**0**	**13**
Number of square meters	5,401.15	10,439.22		**15,840.37**
Invest volume (MEUR)	1.78	1.6		**3.38**
Energy savings (MWh)	868.88	1,531.34		**2,400.22**
- Heat	868.88	1,531.34		**2,400.22**
- Electricity				**0**
CO2 Reductions (Tonnes)	90.78	504.77		**595.55**
Projects when retrofitting was cancelled after completing of EA&IP	**8**	**1**	**0**	**9**
Number of square meters	22,374.2	280.6		**22,654.8**
Invest volume (MEUR)	3.570	0.219		**3.789**
Energy savings (MWh)	2,108	219		**2,327**
- Heat	2,108	219		**2,327**
- Electricity				**0**
CO2 Reductions (Tonnes)	424	48.3		**472.3**

As can be seen from the figures and the graphs below almost all projects includes energy saving measures related to refurbishment of doors, windows, roofs and walls. A little bit more than half of the projects concerns renovation of the heating systems.

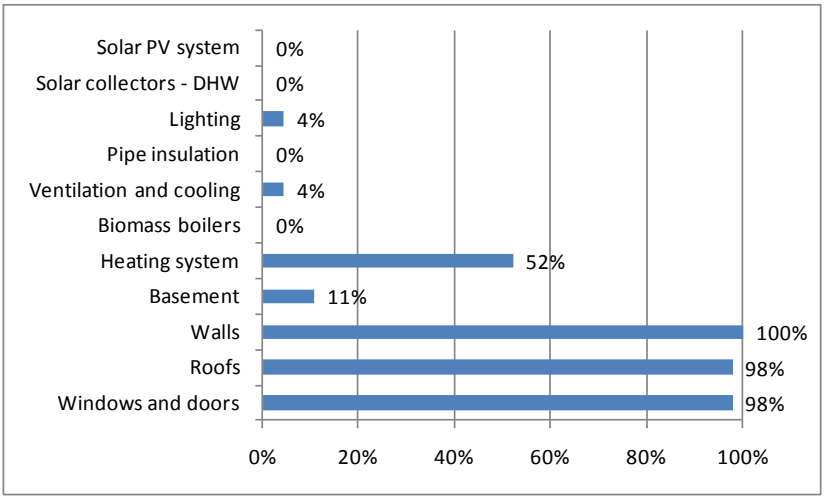
None of the projects include investments into renewable energy systems. Major part of buildings in Lithuania are supplied with district heating, including biomass fired DH.

According to the PSF typical RUE measures applied during building retrofitting in Lithuania are:

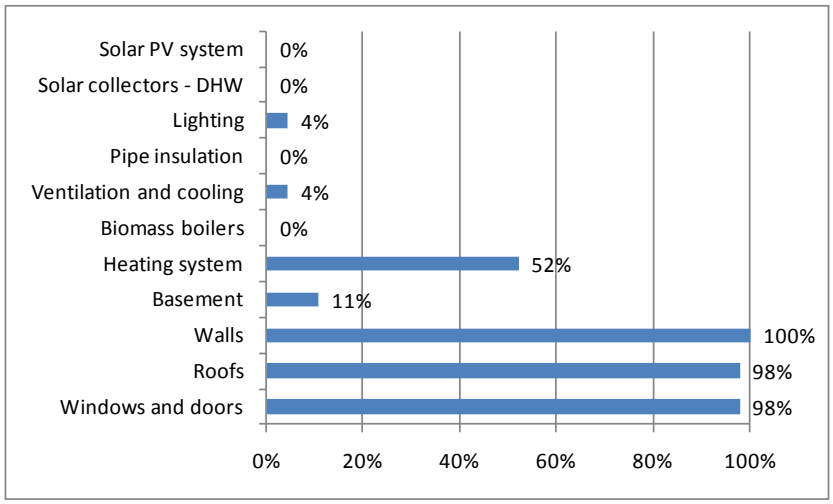
- ✓ Replacement of windows and entrance doors
- ✓ Extra insulation of external walls
- ✓ Roof refurbishment including extra isolation
- ✓ Extra insulation of basement walls and ceiling
- ✓ Installation of thermostatic valves and heat allocators on radiators
- ✓ Glazing of balconies (loggias) according to technical design

The typical view of apartment buildings during retrofitting is presented in pictures below:

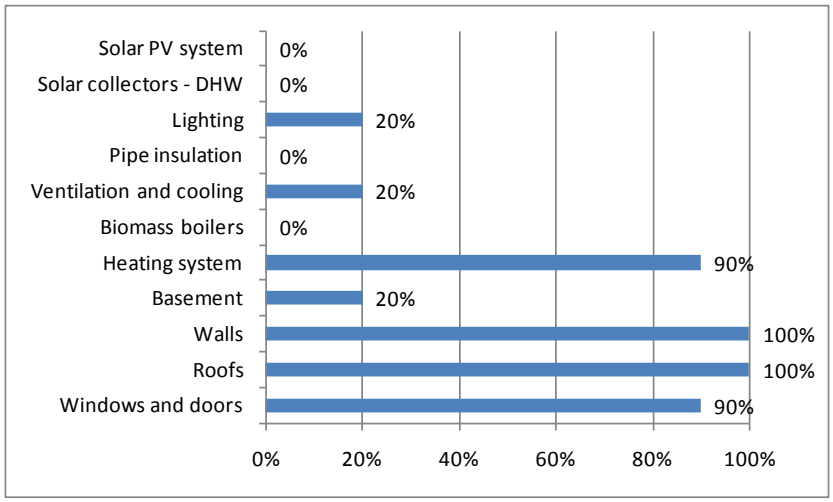
Performance indicators Technology measures Number of projects	Residential sector		Public sector		Total	
Total number of projects supported	36		10		46	
Windows and doors	36	100%	9	90%	45	98%
Roof	35	98%	10	100%	45	98%
Walls	36	100%	10	100%	46	100%
Basement	3	8%	2	20%	5	11%
Heating system	15	42%	9	90%	24	52%
Biomass boilers						
Ventilation and cooling			2	20%	2	4%
Pipe insulation						
Lighting			2	20%	2	4%
Solar collectors - DHW						
Solar PV system						
Number of implemented projects	7		3		10	
Windows and doors	7	100%	3	100%	10	100%
Roof	6	86%	3	100%	9	90%
Walls	7	100%	3	100%	10	100%
Basement	1	14%			1	10%
Heating system	5	71%	3	100%	8	80%
Biomass boilers						
Ventilation and cooling			1	33%	1	10%
Pipe insulation						
Lighting						
Solar collectors - DHW						
Solar PV system						



Distribution of project measures within all 46 projects



Distribution of project measures within the residential sector (36 projects)



Distribution of project measures within the public sector (10 projects)

Financing Schemes

In **Lithuania** refurbishment of State Public Buildings is financed from Cohesion and Structural Funds (100%) while refurbishment of residential buildings are financed through the "Apartment Building Modernisation Programme", through which the Lithuanian State has subsidised up to 50% of building retrofitting costs depending on energy efficiency of RUE measures to be implemented. More than 300 apartment buildings have been renovated since the Apartment Building Modernization programme started in 2004 (out of a potential of approx. 30,000 apartments).

Lithuania: 46 projects in total (37 applications submitted)			
Implemented Projects	Residential sector	7	Apartment Building Modernization Programme
	Public Sector	3	Structural Funds (100% state grant)
Other projects	Residential Sector	21	Apartment Building Modernization Programme
	Public Sector	6	Structural Funds (100% state grant

During the ClearSupport project the PSF has worked actively towards establish a revolving fund as proposed by the CS project. A revolving fund accumulates savings from EE projects for self-perpetuating investments in more and later EE projects. If it is managed properly, the operation of the funds accumulates adequate savings over time, sustaining future financing.

This has included a workshop and cooperation with the local commercial bank SWEDBANK and the Ministry of Finance in order to investigate the possibilities for establishing of the fund.

The local knowledge of the PSFs and their targeted assistance towards linking projects with financing sources combined with the overall cross national efforts of the ClearSupport Project has brought the PSFs in a unique position to contribute to improving financing schemes.

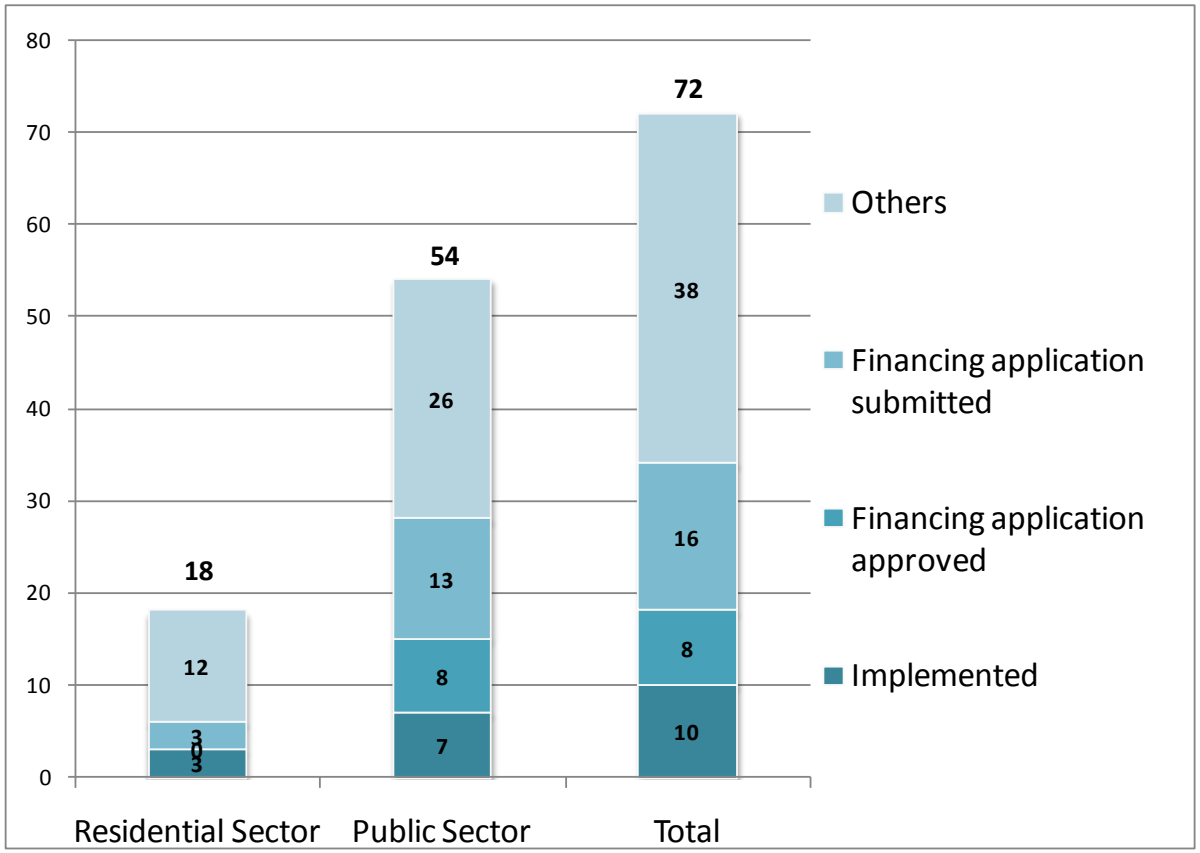
For example the ClearSupport Project generally promoted the idea of establishing revolving funds. This idea was particularly adopted in Lithuania where the PSF is supporting the Ministry of Finance in further actions on the topic. Establishment of such Fund in combination with the Apartment Building Modernization Programme is considered to be the most realistic proposal for improvement of the current refurbishment financing model. The PSF arranged a workshop on 7th April 07, 2009 for detailed presentation of a Revolving Fund as a financing instrument for buildings refurbishment. Currently the Lithuanian Government conducts negotiations with European Investment Bank as expected manager of the Revolving Fund.

Annex 5: Project Overview, Poland

Project Initiations and Developments

The Polish PSF has within the project period 1st May 2007 – 31st December 2009 been in contact with 72 potential project owners, and has provided support to all of these 72 projects through the PSF activities.

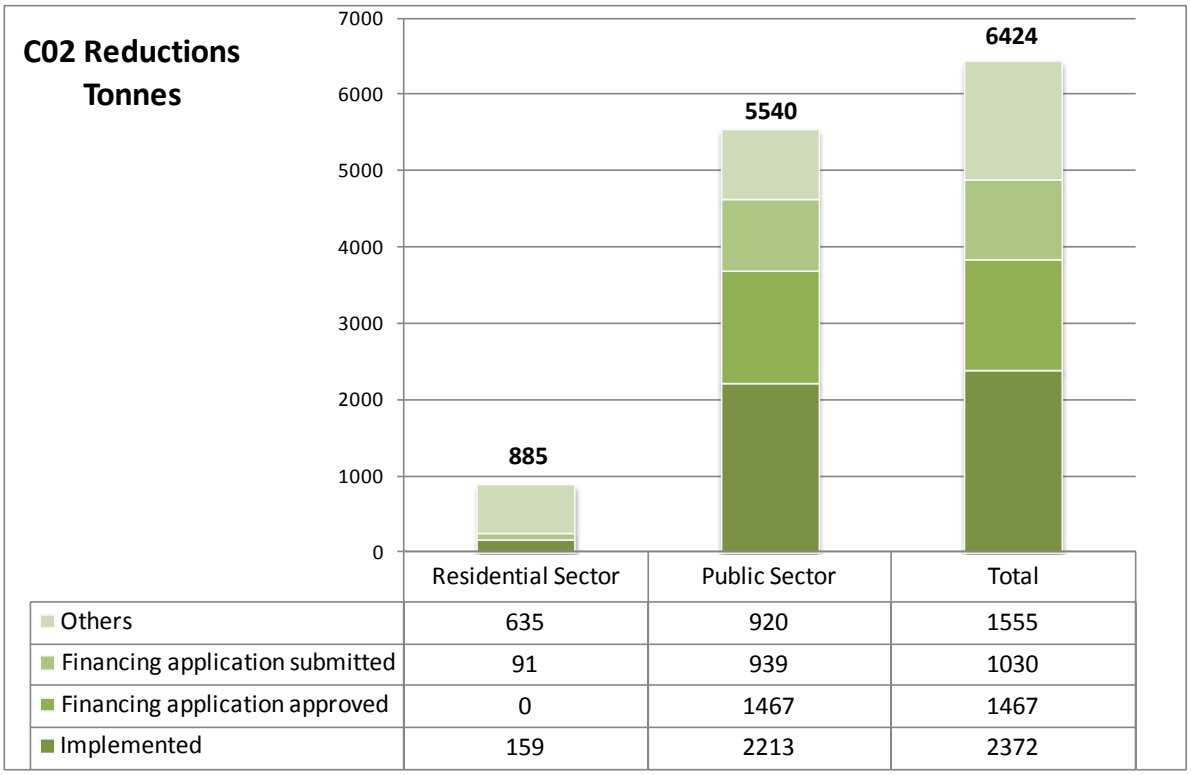
Within the project period 10 of these projects were implemented, and for another 24 projects financial applications were submitted of which 8 was approved up to the end of December 2009.



Number of projects supported by the PSF in Poland

The 72 projects in total represent an annual CO2 reduction of 6,424 tonnes, hereof **2,372 tonnes** from the implemented projects.

75% the projects are within the public sector, in total 54 projects representing 86% of the CO2 reductions (see figure below).



	Residential Sector	Public Sector	Total
Others	635	920	1555
Financing application submitted	91	939	1030
Financing application approved	0	1467	1467
Implemented	159	2213	2372

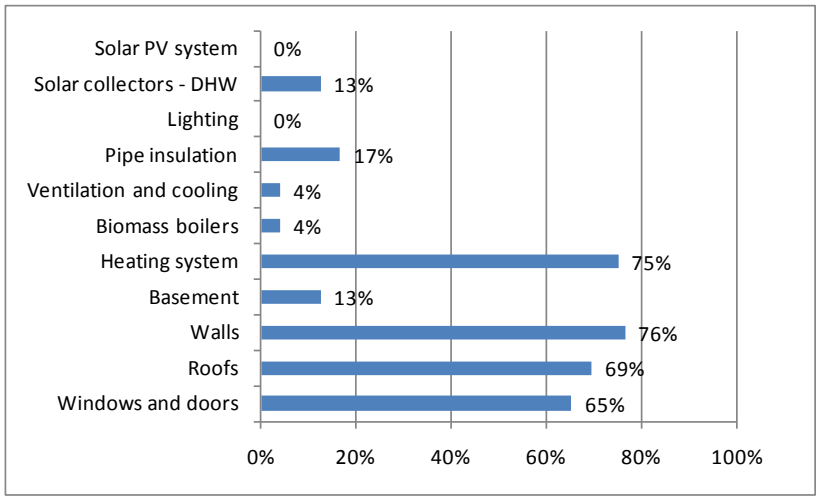
Various indicators are given below. As can be seen the projects within the public sector are relatively more cost effective in terms of investments needed per Tonne CO2 saved .

Indicators	Residential Sector	Public Sector	Total
Number of projects	18	54	72
Square meters	38,743	143,106	181,849
Investments - MEUR	2.15	11.89	14.04
Energy savings -MWh	2,778	14,203	16,981
CO2 savings -Tonnes	884.7	5,539.6	6,424.3
MEUR/Project	0.119	0.220	0.195
EUR/m2	55.5	83.1	77.2
EUR/MWh	773.9	837.1	826.8
Tonnes CO2/Project	49.2	102.6	89.2
Kg CO2/m2	22.8	38.7	35.3
EUR/CO2	2.430.1	2,146.4	2,185.5

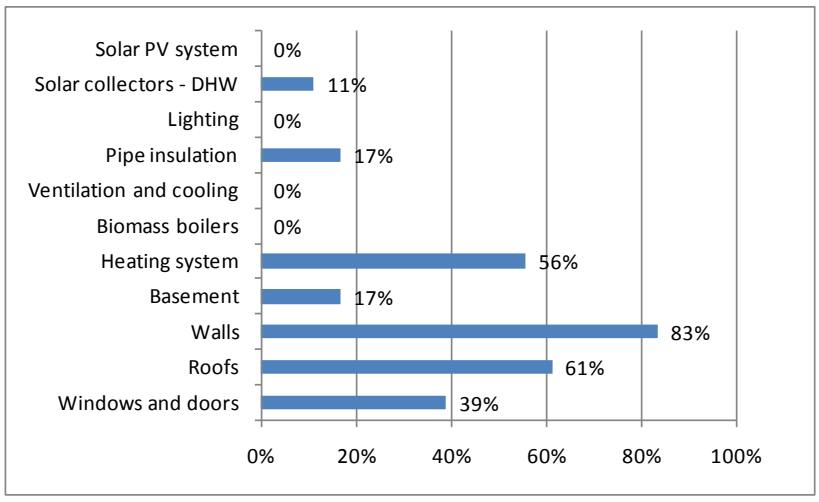
Project Volume	Residential sector	Public sector	Private service sector	Total
Total of projects	**18**	**54**		**72**
Number of square meters	38,744	143,106		**181,850**
Invest volume (MEUR)	2.15	11.89		**14.04**
Energy savings (MWh)	2,778	14,203		**16,981**
- Heat	2,778	14,203		**16,981**
- Electricity				**0**
CO2 Reductions (Tonnes)	884.72	5,539.58		**6,424.3**
Implemented projects	**3**	**7**	**0**	**10**
Number of square meters	13,365	20,666		**34,031**
Invest volume (MEUR)	0.353	2.687		**3.04**
Energy savings (MWh)	626	1,777		**2,403**
- Heat	626	1,777		**2,403**
- Electricity				**0**
CO2 Reductions (Tonnes)	159.11	2,213.00		**2,372.11**
Projects with approved financing application	**0**	**8**	**0**	**8**
Number of square meters involved	0	44,942		**44,942**
Invest volume (MEUR)	0	3.7		**3.7**
Energy savings (MWh)	0	5,596		**5,596**
- Heat	0	5,596		**5,596**
- Electricity				**0**
CO2 Reductions (Tonnes)		1,467		**1,467**
Projects with financing application under consideration	**3**	**13**		**16**
Number of square meters	1,393	40,.520		**41,913**
Invest volume (MEUR)	0.126	2.334		**2.460**
Energy savings (MWh)	286	3,314		**3,600**
- Heat	286	3,314		**3,600**
- Electricity				**0**
CO2 Reductions (Tonnes)	91.08	939.14		**1,030.22**
Other projects	**12**	**26**		**38**
Number of square meters	23,986	36,78		**60,964**
Invest volume (MEUR)	1.671	3.169		**4.84**
Energy savings (MWh)	1,866	3,516		**5,382**
- Heat	1,866	3,.516		**5,382**
- Electricity				**0**
CO2 Reductions (Tonnes)	634.53	920.44		**1,554.97**

As can be seen from the figures and the graphs below approximately 75% of the projects include traditional energy saving measures related to refurbishment of doors, windows, roofs and walls. Renewable energy measures are included in the form of solar energy collectors in 13% of the projects (mainly residential sector) and as biomass boilers in 4% of the projects (public sector).

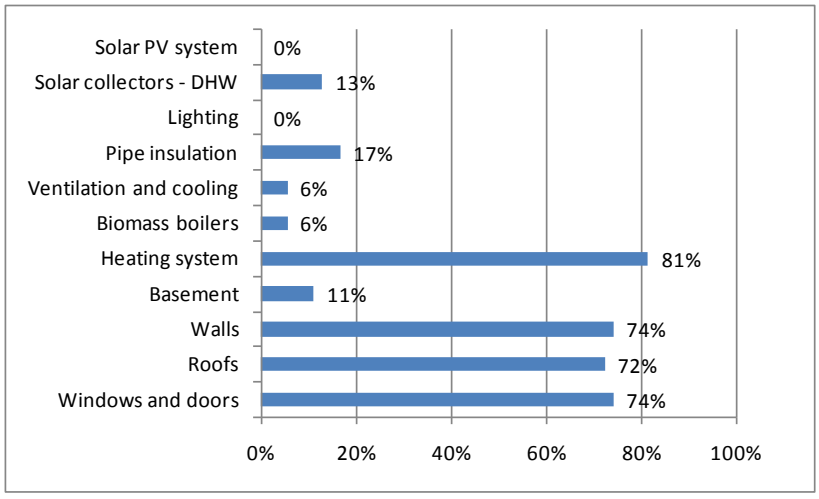
Performance indicators Technology measures Number of projects	Residential sector		Public sector		Total	
Total number of projects supported	18		54		72	
Windows and doors	7	39%	40	74%	47	65%
Roof	11	61%	39	72%	50	69%
Walls	15	83%	40	74%	55	76%
Basement	3	17%	6	11%	9	13%
Heating system	10	56%	44	81%	54	75%
Biomass boilers			3	6%	3	4%
Ventilation and cooling			3	6%	3	4%
Pipe insulation	3	17%	9	17%	12	17%
Lighting					0	0%
Solar collectors - DHW	2	11%	7	13%	9	13%
Solar PV system					0	0%
Number of implemented projects	3		7		10	
Windows and doors	1	33%	7	100%	8	80%
Roof	3	100%	5	71%	8	80%
Walls	3	100%	6	86%	9	90%
Basement			2	29%	2	20%
Heating system	3	100%	7	100%	10	100%
Biomass boilers			1	14%	1	10%
Ventilation and cooling					0	0%
Pipe insulation	1	33%	2	29%	3	30%
Lighting					0	0%
Solar collectors - DHW					0	0%
Solar PV system					0	0%



Distribution of project measures within all 72 projects



Distribution of project measures within the residential sector (18 projects)



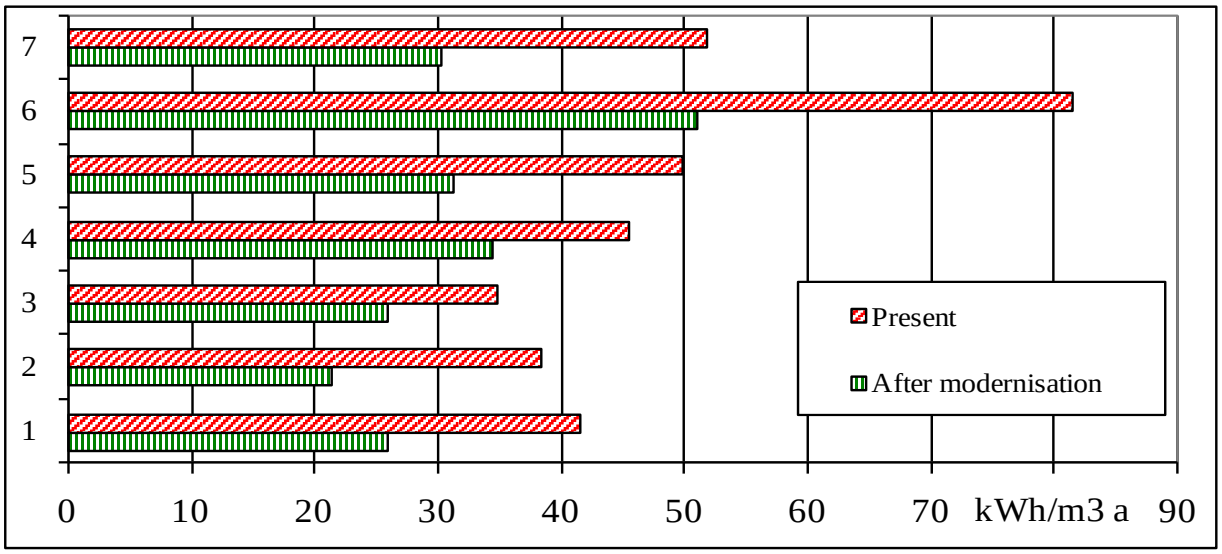
Distribution of project measures within the public sector (54 projects)

As to the public sector 7 hospitals are supported representing a total heated volume of approx. 600,000 m^3

For each hospital the set of energy efficiency measures has been identified in energy audits, including an assessment of buildings and facilities:

- Building envelope
- Heating systems
- Ventilation and air conditioning systems
- Tap hot water (THW) systems
- Steam systems
- Heat production and distribution

Based on this an optimal set of measures was defined based on the estimated costs savings and other appropriate criteria. The below graph shows energy consumption in the hospitals before and after the implementation of the recommended measures. As it can seen from the graph the energy efficiency measures at the 7 hospitals will lead to considerable energy savings.



The benefits can be summarized to:

- Considerable reduction of primary energy demand/energy costs
- Increase of RES share
- Expected reduction of CO_2 emission shall reach 3,450 tons annually

Another achievement of the Pomeranian PSF has concerned assistance to 6 primary schools in the Town of Lebork. The 6 schools represent a total heated volume of approx. 87,000 m^3**.** All schools are heated from the district heating network, supplied from coal-fired HOB.

The key service of PSF Pomerania has been, similar to the hospital projects mentioned above, to help identifying the appropriate measures and analysis of the investments. The benefits of the recommended measures in the 6 schools comprise:

- Reduction of energy costs
- Reduction of primary energy demand
- Increase of RES share (biomass boilers)
- Expected reduction of CO_2 emission shall reach 945 tons annually.

As regards both the hospital and school projects the energy audits and feasibility study of the Pomeranian PSF have provided basis for application for EU Structural Funds. The applications were submitted in the Spring 2009 and the renovation works is planned for 2010-2012.

Financing Schemes

In **Poland** refurbishment of public buildings are financed from the national-level financing from Infrastructure and Environment Program, UE funds 2007-2013. Residential buildings, and to some extent public buildings, are financed from the Thermomodernisation and Renovation Fund, which provides subsidies in combination with local bank loans.

Poland: 72 projects in total (62 applications submitted)			
Implemented Projects	Residential sector	3	Thermomodernisation and Renovation Fund
	Public Sector	5	Thermomodernisation and Renovation Fund
		1	Regional Operational Programme
		1	Norwegian Fund
Other projects	Residential Sector	15	Thermomodernisation and Renovation Fund
	Public Sector	4	Thermomodernisation and Renovation Fund
		8	Operational Programme
		25	Regional Operational Programme

A key instrument for energy retrofitting in Poland concerns the Thermomodernisation Programme. This programme has very successfully provided state grants for energy saving measures primarily in multifamily buildings, thereby achieving considerable amounts of savings. At the same time the

programme has helped to raise the financiers' awareness & confidence of building renovation and as one positive consequence resulted in a lower interest level.

The Polish PSF has contributed significantly to promote new financing options and improve existing ones , using the PSF financial guidelines as important tools.