



**LESSONS LEARNED FROM ENERGY EFFICIENCY  
FINANCE PROGRAMS IN THE BUILDING SECTOR**  
**Prepared for the European Climate Foundation**

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**ENERGY EFFICIENCY FINANCING PROGRAMS**

**EXECUTIVE SUMMARY**

GreenMax Capital Advisors was retained by the European Climate Foundation (ECF) to identify successful energy efficiency (EE) financing initiatives implemented within the EU Member States. The goal of the analysis is to begin to inform the European Commission about successful EE financing models as the Commission prepares to finalize an action plan later this year which proposes to refurbish 15 million buildings by 2020 (the European Building Initiative) using a series of actions, including establishment of National Energy Efficiency Funds (NEEFs) by each Member State.

European Climate Foundation aims to promote climate and energy policies that greatly reduce Europe’s greenhouse gas emissions and help Europe play an even stronger international leadership role in mitigating climate change. As part of this mission, ECF desires to participate in and influence potential upcoming EC actions on national energy efficiency funds as described above.

This report is the first phase of an anticipated two part study. It comprises an initial desktop review of some of the highest profile EU15 and New Member States (NMS) energy efficiency financing programs, with a focus on those that are more comprehensive in nature (in terms of “whole of building” solutions) or transformative, and whose principles can provide a template for scaling into other sectors or countries. This first phase review will identify and draw lessons learned from successful programs which may best serve as potential models for EE funds. It also flags programs that were not as successful as intended, so as to identify factors that hindered program development.

One approach for the EU to encourage greater energy efficiency within buildings is to require each member state to implement their own National Energy Efficiency Fund to provide financing support for necessary EE investments. Such an initiative would focus attention on the built environment, while giving each country freedom on how to deploy funds towards specific savings goals. However, it is important that any such initiative draws from lessons learned from previous programs so that funds are deployed as efficiently as possible. This report seeks to take the first step in identifying such lessons.

Our analysis focuses on complete or operating financial/fiscal incentive programs with substantial histories in ten countries.

EU15	NMS
France Germany Italy Spain	Czech Republic Hungary Lithuania Poland Romania Slovakia

Clearly the countries we have examined are all at different stages of economic development, with differing climates, building stock and energy prices. Thus it is not surprising to find that the approach taken to energy efficiency varies widely in terms of:

- Number of programs and implementing bodies.
- Types of incentives used and sectors targeted.
- Commitment of own funds versus relying on external support (eg. EU or IFIs).

We also see a broad spectrum of strategies in terms of:

- Focussed programs targeting most wasteful sectors (eg. residential apartment buildings in Lithuania and Romania).
- Integrated programs using different instruments and targeting different sectors (eg. Germany).

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- Wide range of sectoral programs, some of which are complementary and some which are more pilot in nature, that allow market demand to dictate where resources are best directed (eg. Czech Republic and France).
- Level of integration between building energy efficiency (eg. KfW focus and brand in Germany) versus inclusion of other initiatives within the funding mechanism (eg. building EE as part of an environmental and pollution fund, as in Slovakia).
- Delivery channel variety for funding and awareness to best match scope and sector of program. For example, government bodies often directly administer large tender based programs for SME and industrial clients, while commercial banks are used to reach smaller residential clients. However, in terms of awareness, households and SMEs often first turn to home improvement stores, contractors or equipment manufacturers for advice (rather than their local bank or the government), so this is where advertising resources may be better deployed for new programs.

In general, the household sector has received the most attention in terms of building focussed energy efficiency programs, and the favoured method of providing assistance is by providing grants or interest rate subsidies through existing banking networks.

From the ten countries assessed, we selected five programs to illustrate lessons learned in more detail across a range of potential funding instruments. Note that due to vast differences in savings calculation methodologies, we have not explicitly calculated the cost of savings (and thus, true leverage of funds), as such relative assessments could possibly lead to erroneous conclusions about program success or instrument superiority.

Country	Program	Tool and delivery channel	Yearly Investment	Yearly Savings (GJ and CO2)
Germany	CO2 reduction and building rehabilitation programs	Reduced interest rate loans available through commercial banks	<b>Euro 1.1b</b> / yr in loans - average across 9 years  Euro 101-193m /yr cost of interest rate subsidies.	<b>4.4m G J</b>  300k t CO2
France	Tax credit for energy efficiency materials and renewable energies	Tax credit applied to purchase price of equipment and materials (refunds apply if don't pay income tax)	<b>Euro 1.9b</b> in 2007	Estimates not available
Poland	Thermal Modernization Fund	Loans with subsidized principal payments	<b>Euro 355m</b> in total loans in 2007  Euro 64m in loan subsidies in 2007	<b>5.5m GJ</b>
Hungary	Hungary Energy Efficiency Co-financing Program and Hungarian portion of CEEF.	Partial credit guarantees for loans made by commercial banks and ESCOs	<b>Euro 196m</b> in investment, using Euro 97m in loans based on Euro 37m in guarantees across program life.	<b>0.3m GJ</b>  30k t CO2
Czech Republic	EKO-ENERGIE Program – grants for energy savings and secondary energy sources (priority 1).	Yearly grant process using EU funds allocated by Czech Invest.	<b>Euro 41m</b> using Euro 15m in subsidies from OPEI (call 1 2007)	<b>0.5m GJ</b>  52k t CO2

Drawing from the programs described above and based on our experience with other markets, we offer the following as a preliminary set of principles for the design of the new NEEFs, to be further considered and developed during the second phase of this study:

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### 1) **The impact of current market enabling conditions on the NEEF strategy and start-up growth phase should be explicitly addressed.** These include:

- a) *Existence and planned implementation of supporting regulations, standards and legislation.* Without these frameworks in place and visible, alongside agencies able to support or enforce them, the NEEF will be limited in the sectors it can target. Any mismatches between NEEF goals and the timing of implementation of these market enablers will manifest in slowed fund deployment. Financing tools, whatever they may be, will have no uptake if the pre-conditions are not in place to facilitate investment in the targeted sectors.

As some examples of this consider that: i) building savings targets relative to standards only make sense if these are being enforced; ii) multifamily block house apartment buildings can only be upgraded if appropriate legal frameworks are in place to facilitate investment in these properties, and iii) municipalities can only utilize ESCO services if the appropriate procurement and budgetary rules are enacted.

- b) *Analysis of current and forecast energy prices.* The business case for energy efficiency is often hampered by the existence of below market rate electricity prices or market distorting cross-subsidies between sectors. NEEF growth expectations need to take into account current pricing levels and be consistent with expected changes to pricing structure over time.
- c) *Availability of appropriately priced technology, energy professionals (eg. energy auditors) and skilled tradesmen.* Significant TA is often needed to boost supporting infrastructure while new markets are developed.
- d) *Description of existing financing options.* An understanding of players, available term, interest rate and customer segments, with an assessment of how the NEEF will interact with them is essential to ensure that the NEEF is designed to complement, rather than compete with, existing sources.

### 2) **The implementing agency and delivery channels should be structured to maximize the chances for widespread deployment of funds.**

- a) In general, new programs take time to develop which means that, where available, *NEEFs may best build upon existing programs and organizations within the country* rather than import a completely different funding template or organizational model from another country. Often it is tempting to think that a brand new public or quasi-public organization will overcome entrenched interests that have focused (or limited) the growth of current programs. However, in our experience what often happens is that the new entity proves to be equally bureaucratic and quickly develops its own set of entrenched interests which also limit broader growth. Therefore, before significant resource is allocated to institution building, we recommend that clear analysis be conducted demonstrating why providing existing entities with clear goals and more influence, resources or tools is not an appropriate strategy.
- b) Whether each NEEF is solely a source of funding or will manage and deploy funds itself is a question for respective governments, however converting energy efficiency finance into a ‘mainstream’ activity requires the use of mainstream channels. *Developing completely new distribution channels is an ambitious goal at best*, as there is little evidence that players such as commercial banks, utilities and equipment vendors won’t fully support EE initiatives if provided with some level of funding support.
- c) The existence of *competing or complementary goals between the NEEF and other ongoing programs should be explicitly described.* For each segment, a clearly responsible authority, transparent funding mechanism and a long term program commitment are required to achieve program success.

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- 3) **The administration burden placed on fund recipients should be tailored to the segment targeted.**
  - a) For most of the programs assessed the level of savings measurements were not particularly rigorous (especially ex-post), which is likely due to a cost benefit trade-off amongst program designers (or due to political considerations in some). Especially when accessing the household sector, *the costs of very accurately measuring energy savings do not offset the benefits of more detailed assessments or administrative procedures*. Typically this is addressed by defining lists of eligible product types for smaller projects, while only requiring more costly upfront analysis in the case of larger commercial premises or blocks of flats.
  - b) *Standardization of supporting tools* (eg. building modelling, energy auditing, product guidelines) for smaller projects is the key to widespread deployment. Simply taking existing standards and applying them (eg. energy audit standards for large enterprises and applying them to the residential sector) will not produce cost effective results.
  - c) NEEF design should *explicitly comment on the trade-off between savings accuracy and all program goals*, and monitor this assumption over time. In the past, the impact of “free-riders” on a program has not typically been assessed due to the complexity in making accurate calculations. The same applies where energy savings goals are mixed with political objectives including regional infrastructure development, upgrading social housing or boosting employment.
- 4) **The level of incentive must be tailored to local market conditions, however should be clearly linked with supporting long term growth on a commercial basis.**
  - a) *All subsidy needs to be defined by constantly updated analysis of real market needs* – or else the market will be distorted and less, rather than more, investment occurs. There should be clear and transparent guidelines and sunset provisions. Market stability is required so that equipment manufacturers and supporting contract and service organizations can build their business in a sustainable fashion, without the ‘boom-bust’ issues that have plagued some renewable energy markets. To provide transparency, average subsidy level can be assessed at the user level or, although imperfect, also on a societal basis.
    - i) At the user level the NEEF can set income or payback guidelines, however this will require a huge administrative operation to review eligibility.
    - ii) Alternatively, the NEEF can set societal guidelines based on average energy prices, average household incomes, or average paybacks to determine annual subsidy levels or when subsidies should be phased out.
  - b) *Similarly, the funding mechanism should be designed to evolve with market need.*
    - i) Guarantee funds in emerging markets should reduce coverage over time and eventually be withdrawn as lending becomes a mainstream activity. The path and thresholds for this to occur should be made clear upfront.
    - ii) Tax credits designed to spur the provision of cost effective materials should also have a clearly defined life. Once a threshold is reached (ideally certain volumes produced to achieve scale manufacturing even as subsidies have been significantly reduced over time) then follow-on financial products (such as subsidized loans for integrated measures) should be in place to avoid a steep fall in demand.
- 5) **The type of incentive should be consistent with the goal of supporting integrated projects that provide deep savings.**
  - a) There is no singular, “right”, funding mechanism, and *a number of financial and fiscal incentive structures are possible* provided that the programs are focussed on a target segment and aligned with market enabling conditions.

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- i) Each country is starting from a different experience base, economic position and cultural perspective. Moving straight to the advanced integration level of the KfW German program example is not possible for all.
  - ii) Guarantee funds and/or higher levels of grants can initially help define the EE market in emerging market sectors.
  - iii) Tax credits are less attractive where tax is regularly avoided, upfront loan subsidies are more attractive where savings levels are low and the attractiveness of interest rate discounts varies depending on the level of price stability already existing in the market.
- b) *HOWEVER, country level savings targets will only be confidently met if the NEEF is designed so that the financial tools ultimately support integrated and comprehensive measures.* The incentives used should therefore converge over time across countries, and the NEEF design should lay out how this evolution is expected to occur.
- i) Tax credits help promote the sale (and provide manufacturers with scale to reduce costs) of particular technologies, while subsidized loans help end-users avoid capital cost incurred “cash-flow” impacts.
  - ii) Longer term, the NEEF should structure each tool so that integrated measures are encouraged and the incentive type used changes to support this. A tax credit or loan for new energy efficient windows will create very little energy savings unless the wall and roof insulation and heating/cooling system are also efficient.
- c) A useful approach employed in a number of countries is to *apply differential subsidy levels depending on project scope*, that is, bigger incentives to those projects that put in place integrated measures where energy savings are deeper or more certain. To achieve savings goals these incentives should apply regardless of recipient economic position. To date the most effective way to achieve this is to offer interest rate subsidized long term loans.
- d) Finally, over time the NEEF plan should *show a path as to how the integrated projects perform relative to the relevant building performance standards*, consistent with EU policy.

### I. OVERVIEW

#### A) Context<sup>1</sup>

The proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings was presented as part of the Energy Efficiency Package by the European Commission in November 2008. A first reading vote in the European Parliament took place on 23 April 2009. The recast provides an opportunity to tackle existing market barriers and to set ambitious targets for upgrading the energy efficiency of Europe's building stock.

On 17 November 2009 EU lawmakers forged a long-awaited compromise on the recast buildings directive, agreeing that all new buildings would have to comply with high energy-performance standards and supply a significant share of their energy requirements from renewable sources after the end of 2020.

The new legislation will require member states to list incentives from technical assistance and subsidies to low interest loans by mid-2011 for the transition to near zero-energy buildings.

Amongst the ways the 2002 directive has been strengthened are:

1. Removal of all 1,000m<sup>2</sup> thresholds, so refurbishment requirements now cover almost all homes;
2. Mandatory requirement that refurbishment must result in installation of best rated component replacements, matching best cost-optimal contemporary standards wherever appropriate;
3. ***Requirements on Member States to report on the introduction of financial instruments designed to stimulate energy efficiency investments;***
4. All building codes to include a critical path culminating in only "nearly zero energy buildings" being built by end of 2020 (end of 2018 for public authority buildings);
5. Energy Performance Certificates to be permanently displayed in all buildings, commercial as well as public, over 500 sq metres visited by the public (250 sq metres for public buildings in 2015);
6. Mutual recognition across the EU of training programmes and of certified installation personnel and inspectors;
7. Public sector buildings must set "leading examples"; governments must "encourage" full implementation of all energy performance certificate improvement recommendations in public sector buildings;
8. Stricter enforcement and compliance oversight;
9. Inspections to cover entire systems, not just components of a system;
10. Mandatory requirement to inform building tenants of the refurbishment improvements options, as well as the certificate rating.

The next steps are:

- Beginning of 2010: Parliament to formally approve the legislation.
- By end of 2018: All public buildings must have high energy-performance standards.
- By end of 2020: All new buildings must have high energy-performance standards.

In addition to the above, and the main driver behind the development of this report, further planning is underway within the Commission. A draft action plan proposes to refurbish 15 million buildings by 2020 (the European Building Initiative) using a series of actions.

1. ***The establishment of a National Energy Efficiency Fund (NEEF) in each Member State.***
2. A dedicated EC/EIB joint risk-sharing instrument.
3. Promoting awareness and technical assistance.
4. An appropriate regulatory framework.

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<sup>1</sup> Extracted from EuroAce and EuroActiv press releases.

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This report is focussed on the first action, namely to identify past programs and lessons learned so as to provide information allowing the Member States to structure their funds in a way that builds from best practice. The NEEFs are envisaged to provide support to banks or ESCOs in the form of preferential loans, loans combined with performance linked grants or guarantee/risk sharing facilities. A goal is to maximize the leverage between public grants and final investment volume. Depending on specific needs, the NEEFs will target private residential, commercial and public buildings. This action plan is expected to be ready at the earliest by Autumn 2010.

### **B) Scope of Work**

European Climate Foundation (ECF) aims to promote climate and energy policies that greatly reduce Europe's greenhouse gas emissions and help Europe play an even stronger international leadership role in mitigating climate change. As part of this mission, ECF desires to participate in and influence potential upcoming EC actions on national energy efficiency funds as described above.

This report is the first phase of an anticipated two part study. It comprises an initial desktop review of some of the highest profile EU15 and New Member States (NMS) energy efficiency (EE) financing programs, with a focus on those that are more comprehensive in nature (in terms of "whole of building" solutions) or transformative, and whose principles can provide a template for scaling into other sectors or countries. This first phase review will identify those successful programs which may best serve as potential models for EE funds. It will also flag programs that were not as successful as intended, so as to identify factors that hindered program development.

The goals of the full study will be to provide ECF with lessons learned from previous EE financing programs for buildings (incorporating residential, SME, industrial and public) and provide policy recommendations for the design of country level EE funds anticipated to be mandated by the new EU plan, so that ECF can assist the EU to mandate such funds to be structured in ways that build upon best practice. The second phase of the study would analyze the lessons learned from these programs (including documents in local language, interviews with key program stakeholders, primary analysis and assessment of program evolution leading to current and planned funding mechanisms), as well as selected additional programs from countries surrounding the EU and from North America, in greater detail in order to develop concrete policy recommendations.

The specific scope of this first phase report is to review past and current programs to finance EE upgrades/retrofits in buildings in the EU and identify 5-6 policies or programs that could be replicated or scaled up in other Member States. This will be achieved by analysing 4-6 New Member States with high profile programs and 4-6 countries from the EU15:

1. Identify programs
2. Gather data on each program
3. Analyse impact of program
4. Extract conclusions and make recommendations for other countries

### **C) Country and Program Selection**

Given the above scope of work and timeframe involved, the report was developed as follows:

- Desktop review of *previously written material and analysis* on each program.
- Program research is not exhaustive, but instead focuses on higher profile programs with more publically available information that are either *complete or with a substantial track record*.
- Programs reviewed were all based on *financial or fiscal incentives* (excluding R&D projects), as these provide the best examples for possible NEEFs.
- Often programs either include building renovation as one small part of a larger initiative (eg. broad EE initiative including policy, RE incentives, new building standards, industrial support), or focus in on particular measures (eg. lighting or appliances). We have endeavoured to focus our attention on *broader*

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*efforts at renovations to existing buildings*, so while we have typically mentioned each program, only those with specific information available were selected for further examination.

- Data consistency varies widely, particularly in respect to estimates of program impact (which in many cases was not assessed). We have *reported program results as described* (including a mix of ex-ante and ex-post assessments), rather than tried to convert all into common units or time periods (given the lack of transparency in assumptions). We also note that not many programs are commonly reported as ‘failures’, which is understandable given the political interests associated with most initiatives.

Our analysis covers both EU15 and New Member States. For the EU15 we selected four countries for examination based on quantity of past programs completed<sup>2</sup>. For the NMS we used our past experience to select six countries illustrating a range of approaches.

EU15	NMS
France Germany Italy Spain	Czech Republic Hungary Lithuania Poland Romania Slovakia

Finally, in terms of terminology we use the following broad conventions:

- 1) Funding sources:
  - a) For public institutions this includes taxes, fees, carbon revenue, utility levies etc.
  - b) For International Financing Institutions (IFIs, such as EIB, or EBRD) this includes capital markets, own cash-flow and donors.
  - c) For commercial banks, leasing companies and ESCOs this includes capital markets, own cashflow and a) and b) above.
  - d) For end users / consumers (ie. those that interact with the building) this includes own cashflow and a), b) and c) above.
- 2) Incentives are typically provided by public institutions or IFIs either through commercial banks or ESCOs, or direct to consumers (possibly through a quasi-public entity). These incentives can take a number of forms, with differing cash-flow profiles, including:
  - a) Direct fiscal subsidy: tax credits, exemptions and deductions on: VAT, income/profit, property and sales tax.
  - b) Direct financial subsidy: grants, rebates, forgiveness of loan principal, interest rate reductions.
  - c) Indirect financial subsidy: loan / energy performance contract (EPC) guarantees, loan loss reserves and other credit support/enhancements.
  - d) Supporting subsidy: administrative and program costs, marketing, establishment of new entities, other technical assistance.
- 3) Financial products are the strategy or structure for delivering a subset of the financial incentives, either directly or through an intermediary. These include, but are not limited to:

<sup>2</sup> Based on number of MURE (Mesures d’Utilisation Rationnelle de l’Energie) database listings for financial policy measures.

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- a) Vendor financing, consumer loans, home equity loans, business loans, energy efficiency mortgage loans and refinancing, leasing, property lien-secured financing, ESCO EPCs, equity / mezzanine debt investments in companies.

The focus for this report is incentives and financial products. Note that the financial products above can also be delivered on a purely commercial basis, either by public or private entities, however this report is concerned only when they are combined with an incentive (as this is what the NEEF moneys would likely be used for).

### ***D) Report Format***

The remaining three sections of this report include:

- Description of type of financing and fiscal incentive measures used, leading to a brief description of programs in each country that are possible candidates for further analysis. A series of tables show the range of programs attempted in each country.
- Description of selection process for highlighted programs, including detailed description of each one and assessment of best practice characteristics.
- Bibliography, including country specific source material.

The principal author of this report is Peter Williams, a Partner at GreenMax Capital Advisors. GreenMax staff contributing to the research included Ihor Knyazev (Lithuania), Joanna Kozak (Czech Republic and Poland) and Ioan Bejan (Romania). Significant contributions to the analysis were made by GreenMax Partners Clifford J. Aron and Jacek Kostrzewa.

## II. PROGRAM IDENTIFICATION

### ***A) Types of Measures***

There are a wide range of policy measures that can be pursued to encourage energy efficiency. For example, the MURE household database lists:

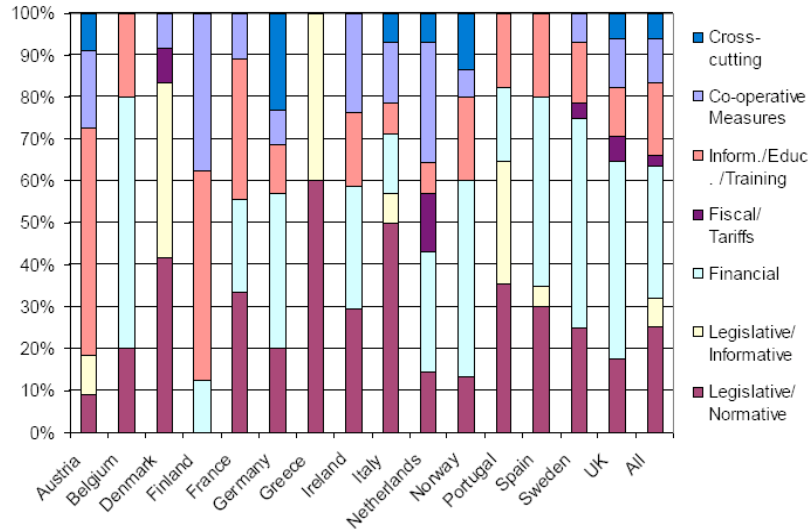
- Legislative / normative: regulative measures that set binding standards (eg. thermal building codes).
- Legislative / information: regulative measures, which are based on a mandatory approach, but which do not set standards, but serve to improve information on energy efficiency (eg. mandatory energy labels, audit schemes or individual heat metering).
- Information / education: all informational, advisory, and educational measures, which are not mandatory but based on voluntary approaches (eg. voluntary energy labels, audit schemes, education campaigns).
- Financial: financial incentives for measures to improve energy efficiency (eg. subsidies and low interest rate loans).
- Fiscal / tariffs: fiscal measures and pricing policy (eg. energy taxes, tax reductions on EE equipment, green tariffs).

Within the EU15 it is apparent that countries take very different choices in terms of policy focus<sup>3</sup>.

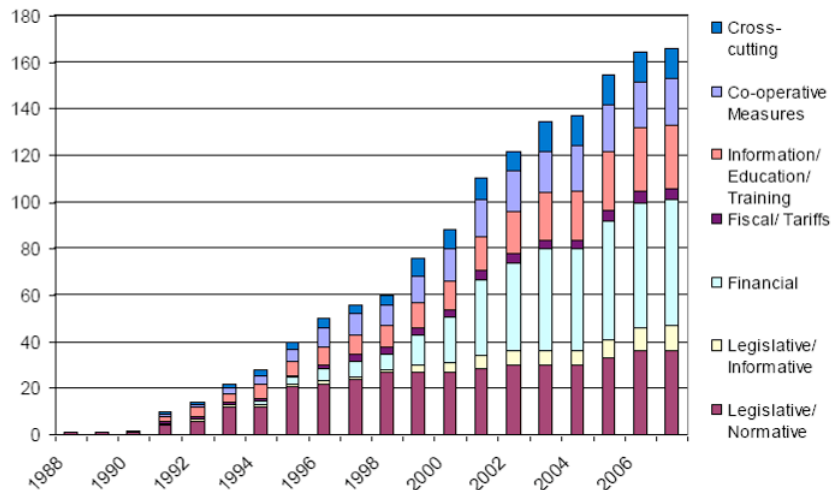
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<sup>3</sup> Chart taken from: ADEME, Evaluation of Energy Efficiency in the EU15, 2007

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These policy choices have altered over time, with financial options becoming increasingly popular<sup>4</sup>.



To provide lessons learned for an EE fund structure for building renovations, we have focussed on financial and fiscal incentive measures (both direct and indirect). Note that it is likely that significant interactions exist with other policy measures that may influence the success of these economic programs however this is beyond the scope of this report. Also, we have not addressed white certificate programs<sup>5</sup>, as typically they are more legislative / normative in nature.

Measures are typically not exclusive and a wide variety of approaches and restrictions are possible, including variations in qualification, eligibility and performance requirements, administration procedures and timing of incentive. A number of channels can also be used to reach the end user, including through local or state

<sup>4</sup> Chart taken from: ADEME, Evaluation of Energy Efficiency in the EU15, 2007

<sup>5</sup> White certificates refer to units of energy savings that are used to meet mandated savings targets (and may be traded). Leading programs exist in France and Italy.

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government, ESCOs, the tax system, private banks, vendors and dedicated funds, each with differing requirements for supporting infrastructure and administration.

The tables for each country below contain a subset of EE programs (that are completed or have available operating history) using financial or fiscal incentives, with the intent of highlighting those (shown in bold font) that we have chosen for more detailed examination. Programs with a clear and explicit goal and supporting mechanism for achieving integrated building performance savings (this is likely a subset of a broader group due to the difficulties at this stage of examining detailed program eligibility criteria) are highlighted using a dark box around the program title. Note that the MURE code is included purely to enable the reader to more easily examine specific documentation in the database if desired, while the MURE impact is a semi-quantitative assessment made by the participating institution in each country (and therefore may not be consistent) as to the impact the measure had (or is forecast to have) on total energy savings in the relevant sector (low = less than 0.1%, medium = 0.1 - 0.5% and high = greater than 0.5% savings).

### B) EU15

#### France

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Fiscal Subsidy – Tax Credits</b>					
Household	FRA5	VAT reduction on EE investments	Reduction of VAT from 20.6% to 5.5% for dwellings older than 2 years for restoration or maintenance works.	1999 -	High
	<i>Results from 2002 study.</i> 61% of households that have invested in EE have benefited from a VAT reduction. In total, 7% of the 25m French households have invested in restoring works. Total investment averaged Euro 2,640 per household. Estimated CO2 savings of 0.6 t CO2 per household, or 1 Mt CO2 in total for 2002.				
Household	FRA7	Tax credit for works on EE	Range of tax credits (15-20%) for heating, insulation, thermostats, with amounts modified over time.	1990 – 2004	Medium
	<i>Results.</i> In 1999, 19% of families applied for tax reduction for repairs and 5% for interest on loans related to building improvements. In 1995, this measure cost the State 13m, while it generated additional revenue (through VAT on incremental works performed) of 550m FF. Initially the deduction was linked to taxable income, however this was later changed.				
<b>Household</b>	<b>FRA23</b>	<b>Tax credit for EE materials and RE</b>	<b>Tax credit (15-40%) applied to purchase price of boilers, insulation, heating regulation and RE. Replaces FRA7 and FRA11 (solar thermal subsidy).</b>	<b>2005 -</b>	<b>High</b>
	<i>Results.</i> Provisional results for 2005 show substantial increases in unit sales from 2004, in particular for solar water heating, combined solar systems, wood boilers and condensation boilers. Tax credit was seen to have revitalized the market for energy saving equipment. Market size in 2006 is estimated to be between Euro 3-4 billion.				
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	FRA6	Subsidies for dwelling retrofits: OPAH & PALULOS	Grants (10-15%) for rehabilitation of old buildings (OPAH) or low income rental dwellings (PALULOS).	1978 -	Medium

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Tertiary	FRA2	EE of residential and tertiary buildings – Program OPATB	Studies, awareness and subsidies to communities to pursue thermal and energy improvement of tertiary buildings, schools and social/private housing.	2003 -	Medium
<p><i>Results.</i> In 2002, 15 communities were selected. Four were in operation by the end of 2005 and three others started in 2006. Results were only available from the first community (SIPHEM) after 18 months - Euro 1.4m in subsidies for Euro 4m in works across 168 buildings / dwellings produced 2,000 MWh/yr saved and 400 tons of CO2 prevented.</p>					
<b>Financial Subsidy (Direct) – Low interest rate loans</b>					
Household	FRA32	Sustainable development account (CODEVI -> Livret)	Bank savings account that pays fixed, tax free, interest rate (2.5% in 2009). A set portion of savings must be onlent for improving energy performance of housing .	2007 -	Unknown
<p><i>Results.</i> None available yet, however expected to collect approximately Euro 60 billion in savings per year, of which 2% (2008), 5% (2009) and 10% (2010) must be used for loans for improving energy performance of housing. This mechanism is expected to strengthen the impact of the tax credit tool (FRA23).</p>					
Household	FRA41	Green loan for social housing	Euro 1.2b of loans with 15 year fixed rate of 1.9% available for restoring social housing.	2009 -	Unknown
<b>Financial Subsidy (Indirect) - Guarantee</b>					
Industry	FRA4	FOGIME guarantee fund for energy conservation	Euro 260m guarantee fund (70% of grant, or Euro 750k per company) for SME to buy energy savings materials, use RE in production process and to use more efficient machinery.	2000 -	Low
<p><i>Results.</i> At end of 2005, 96 loans had been guaranteed with total investment of Euro 21.3m.</p>					
Industry	FRA9	SOFERGIE funds for EE investments	Fund for EE to facilitate lease financing using third party investors remunerated out of energy project savings.	1980 -	Low
<p><i>Results.</i> In 2006, 90 operations (corresponding to Euro 255m) benefited from SOFERGIE. However, role of funding has been small and according to a government assessment, maintaining the funding system does not appear justified.</p>					
<b>Financial Subsidy (Supporting) – Grant / Rebate</b>					
Household Tertiary	FRA13 FRA1	Audit subsidies in buildings	Since 1999 ADEME sponsored audits (at 50% of cost) of varying level of detail.	1980 -	Medium
<p><i>Results.</i> 49,490 buildings audited between 2000-2006. Review done on 237 audits in 2000-2001, where 513 recommendations were made. 55% of audits resulted in implementation of recommended action, with a further 21% planning action. Average investment cost per building = Euro 8,900. Average payback = 3.2 years. Average energy saving per building = 12 MWh. Average CO2 reduction per building = 1.331 tCO2. Total energy saved between 2000-2006 = 629 TJ (fuels) and 1,467 TJ (electricity).</p>					
<b>Other</b>					
Household	FRA37	CO2 credits for household projects	Carbon credits for projects not covered by quotas. Could be generated by thermal renovations.	2007 -	Low
Cross	FRA1	Energy efficiency	Energy savings obligations (Euro	2006 -	Medium

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cutting		certificates	2c/kWh penalty) for 2,500 energy suppliers to access household and tertiary savings.		
		<p><i>Results.</i> End of December 2007, 9.52 TWh cumac (discounted savings) have been certified. Bulk of program is housing (95%), of which heating systems (77%) and insulation (18%) were main standardized measures followed. Price was Euro 0-1c/kWh cumac. End of December 2008, 36 TWh cumac delivered, of which 88% is residential building (71% heating systems) and price is Euro 0.32c /kWh cumac. Scheme cost is unknown as results still too marginal to be representative.</p>			

Other regional programs, for which less data has been gathered, include<sup>6</sup>:

Financial Subsidy (Direct) – Low interest rate loans
<p><b>Interest free loans.</b> Households which live in the Regions “Centre”, “Picardie” and “Nord Pas de Calais” and which wish to invest in thermal insulation of their housing can benefit from zero interest loans co-financed by local authorities (regional councils) and by banks.</p>
<p><b>Eco-Loans.</b> The 2009 finance law introduced interest free eco-loans (up to a maximum Euro 30k) for major renovation activities to buildings used as a main residence, in particular for thermal installation, heating and hot water upgrades. These home owners are still eligible for the tax credits described above.</p>

Other
<p><b>Equity participation schemes.</b> In terms of innovative public financing, the Nord-Pas de Calais and Picardie regions of <i>France</i> have adopted a novel and promising approach by launching Regional Climate Investment Funds. Their objective is to support projects of ESCOs, small and medium enterprises (SMEs) and local authorities through the creation of companies dedicated to energy efficiency. The Funds are used in quasi-capital or equity participation schemes at beneficial conditions for project managers, thus facilitating the debt pay off. In this scenario, local authorities become both local investors bringing in capital, as well as potential beneficiaries of the plans.</p>

## Germany

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	GER35	Joint program economic recovery in new Federal States	Subsidies (20% or 500 DM/m <sup>2</sup> ) in new Federal States to modernize heating systems, insulation and other measures.	1990 – 1992	High
		<p><i>Results.</i> 1.5b DM for 1991-1992. CO<sub>2</sub> reduction of 1,400 kt CO<sub>2</sub>. 882k apartments. 1,200 TJ of energy saved.</p>			
Household	GER9	On-site energy advice	Grant (Euro 327) if housing owners take on-site advice by experts on potential energy conservation measures.	1991 -	Medium
		<p><i>Results.</i> Approximately 5,000 advice services per year for last few years. Yearly estimated CO<sub>2</sub> savings of 22k tons, based on 64% implementation rate. Strong interaction with other financing</p>			

<sup>6</sup> Taken from ADEME report “Energy efficiency in the European Union: overview of policies and good practices”

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	programs.				
Household	GER20	Ecological bonus program for owner-occupied houses	Grant (2% of cost, up to Euro 256) over 8 yrs to support solar, heat pumps and heat recovery for people building or buying homes. Extra bonus (Euro 205) for homes of low energy standard.	1996 – 2002	Low
	<i>Results.</i> 50-60k new and 20-30k old buildings used program in 1996-1998 at cost of Euro 870m. Estimated savings of 6,000TJ and 0.4 Mt of CO <sub>2</sub> .				
Household Industry Tertiary	GER32	Market incentive program for RE	Grants to support use of RE sources (solar, biomass) for heat in existing residential and non-residential buildings.	1999 -	High
	<i>Results.</i> Number of evaluations across different time periods. Estimate Euro 540m (600k m <sup>2</sup> ) of solar collectors per year (two thirds for households) and Euro 100m for biomass from 2000-2004.				
<b>Financial Subsidy (Supporting) – Grant / Rebate</b>					
Industrial	GER36	Special fund for EE in SME's	Grants (60-80%) for energy saving advice and low interest loans for energy projects.	2008 -	High
	<i>Results.</i> 1,800 initial consulting studies in 2008 and 400 detailed consulting assignments. Euro 315m in loans across 558 projects, of which building efficiency is a component (also includes machinery and processes etc).				
<b>Financial Subsidy (Direct) – Low interest rate loans</b>					
Household	GER1	Housing modernisation program for new Federal States	Low interest loans (10yrs, up to 2% below market) for renovations or creation of new apartments in existing buildings in East Germany. Two phases.	1990 – 2002	Medium
	<i>Results.</i> Euro 42b in loans. 700k loans extended. 4m flats modernized, rehabilitated or reconstructed. About 15% of funds were committed to energy conservation.				
Household	GER7	KfW housing modernisation program 2003	Extension of GER1, but to all of Germany for modernization and repairs, plus improvement in surrounding areas and demolition of empty buildings.	2003 – 2004	Medium
	<i>Results.</i> Euro 5.5b in loans. 139k loans extended. 1,500k t CO <sub>2</sub> savings estimated.				
Household	GER26	KfW CO <sub>2</sub> reduction program	<b>Low interest rate loans (&lt;Euro 5m) with initial grace period (up to 3yrs) for investment measures in existing buildings or building new KfW 40/60 houses. Initially applied to East Germany before being expanded in 2001 to all of Germany.</b>	<b>1996 – 2004</b>	<b>Medium</b>
	<i>Results.</i> Euro 6b loans between 1996 and 2004. 56.8m <sup>2</sup> living space in existing buildings improved. 66% of loans for heat insulation, 20% for EE boilers. Range of energy and CO <sub>2</sub> savings estimates produced – 1.9Mt CO <sub>2</sub> phase 1, 0.6-0.79 Mt CO <sub>2</sub> phase 2.				
Household Industry Tertiary	GER31	100k roof solar power program	Low interest rate loans (up to 4.5% less than market) with initial grace period (2 yrs) to range of customers including SME for PV over 1kW. Effective subsidy up to 37% of cost.	1999 – 2003	Low
	<i>Results.</i> Started slowly (3,500 installations in first year for 9MW, 50% of plan). From 2000 very successful due to introduction of fixed feed in tariff of 48c (GER17). Euro 500m in funds ran out in 2003 after 350MW was installed. Mostly used by households rather than tertiary or industrial sector.				

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Household	GER33	KfW CO2 building rehab program	Loan (fixed rate, 10yrs, up to 100% of cost) or grant (5-17.5% level depends on standards reached) for extensive energy savings measures in existing housing.	2001 -	High
<i>Results.</i> Number of evaluations across different time periods. Euro 2.4b from 2001-2003 for 10m m2 of living space improvement and 2TWh savings in 2003 and following years.					
Household	GER42	KfW program housing modernisation	Low interest rate loan for standard or “plus” measures in residential buildings. Replaces GER7 and GER26.	2005 -	Medium
<i>Results.</i> Ex ante evaluation assuming Euro 1.5b per year gives 0.6m t CO2 or 9,600 TJ in savings by 2010.					
Household	GER43	KfW program ecological construction	Low interest rate loan (10yrs, 2yr grace, 100% of costs) to construct KfW 40/60 houses or install RE in new buildings	2005 – 2009	Low
<i>Results.</i> Estimated 1-3 PJ of savings by 2010.					
Household	GER44	KfW program solar power generation	Low interest rate loan (5-10yrs, grace period, fixed rate) of up to Euro 50k to install or extend PV systems.	2005 -	Low

### Italy

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Fiscal Subsidy – Tax Credits</b>					
Household	ITA30	Fiscal incentives for energy savings in the household sector	Fiscal deduction (55%) for works to improve building performance of existing and new buildings, and for appliances.	2006 - 2010	High
Industry	ITA14	Efficient lighting system	Corporate income deductions (36% of costs) to replace older fluorescent lamps with more efficient models. Also generates white certificates.	2007 -	Low
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	ITA6	Financial package for high efficiency equipment installation	Grants (20-40%) for insulation, boilers, CHP, heat pumps, PVs, meters, lighting.	1991 – 1997	Low
Industry	ITA8	Financial package for the establishment in municipal gas utilities of low grade heat production equipment	Incentive paid to municipalities to install solar thermal equipment on real estate to save energy for municipal owned gas utilities.	2001 – 2002	Low
Tertiary	ITA7	Installation of solar thermal in Central and Southern Italy	Funding for municipalities to install 24k m2/yr of solar collectors from 2002-2005 on public buildings, provided that certain conditions were met.	2001 – 2008	Low

## ENERGY EFFICIENCY FINANCING PROGRAMS

	<i>Results.</i> Failure, as 22 of 30 local authorities dropped out of project for reasons not described.				
Tertiary	ITA5	Installation of PV roofs connected to the grid (10k PV roofs)	Grants covering up to 75% of overhead costs to try and reach 300MW by 2012.	2001 – 2006	Low
	<i>Results.</i> Lot of requests from Southern areas, in particular schools. 393 financed projects.				

### Spain

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	SPA15	Plan for promotion of RE in Spain	Subsidies for RE in general, including solar thermal, PV and passive solar design for household sector.	2000 - 2005	High
Household	SPA26	Action plan 2005-2007: Renovation of thermal envelope of existing buildings	Economic and legislative support for renovating thermal envelope of buildings to reduce heating and cooling energy consumption.	2005 – 2007	High
	<i>Results expected.</i> Euro 73m in public support, alongside Euro 1.1b in associated investments giving 2007 energy savings of 119 Ktoe thermal and 2005-2007 CO2 avoided of 544 Mt.				
Household	SPA27	Action plan 2005-2007: Improvement of EE of thermal installations in existing buildings	Economic and legislative support to promote replacement of heating and sanitary hot water production boilers.	2005 – 2007	High
	<i>Results expected.</i> Euro 101m in public support, alongside Euro 1.5b in associated investments giving 2007 energy savings of 104 Ktoe thermal and 407k MWh electric, and 2005-2007 CO2 avoided of 913 Mt.				
Household	SPA28	Action plan 2005-2007: Improvement of EE of indoor lighting installations in existing buildings	Economic and legislative support to replace 7m incandescent lamps in residential sector and 30m m2 in tertiary.	2005 – 2007	High
	<i>Results expected.</i> Euro 41m in public support, alongside Euro 625k in associated investments giving 2007 electric savings of 1.8k MWh electric, and 2005-2007 CO2 avoided of 2,069 Mt				

Note that while Spain had a large number of programs, many are not shown above as they were purely focussed on renewable energy or industrial equipment. Other sectoral programs are part of the same Government led Action Plan applying to the housing programs shown above. Little information has been gathered to date on program results.

## ENERGY EFFICIENCY FINANCING PROGRAMS

### C) New Member States

#### Czech Republic

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household Tertiary	CZ7	Investment subsidies in the framework of the annual government program A	Subsidies (<30%) for EE apartment building renovation and new buildings. This program is subset of cross cutting CZ28 below.	2006 – 2006	Low
Household	CZ8	Investment subsidies in the framework of the annual government program B	Subsidies (<50%) for RE in housing including solar, biomass and heat pumps. This program is subset of cross cutting CZ37 below.	2007 – 2007	Unknown
Cross cutting	CZ28	Government Program for support of EE and RE 2002-2006 part A	Wide ranging program using multiple measures to support energy saving and RE.	2002 – 2006	Medium
<p><i>Results.</i> Total subsidy for comprehensive package of measures to reduce energy demand for 2002-2005 was 157,594k CZK out of cost of 1,251,919k CZK across 138 projects. Many of these were thermal insulation and window conversion projects in blocks of flats and schools.</p>					
Cross cutting	CZ37	Government Program for support of EE and RE part B	Wide ranging program include support (50%) for residential building heating and water heating.	2002 – 2005	Medium
<p><i>Results.</i> 2005 cost was 73,715k CZK for 18191 GJ/yr of heat and 4,222 kW heat capacity, avoiding 2,467 t/yr of CO<sub>2</sub>. 2004 cost = 60,388k CZK; 2003 = 22,677k CZK; 2002 = 114,384k CZK.</p>					
<b>Financial Subsidy (Direct) – Low interest rate loans</b>					
Industry	CZ6	FINESA program	Low interest rate loan with guarantee for RE and EE, run by IFC CEEF program with Ceska Sporitelna bank.	2004 -	Unknown

Note that the Czech Energy Agency, which was responsible for administering many of the programs above, no longer exists and its obligations have been split between CzechInvest (eg. program Eko-Energie - SMEs) and the Ministry of Trade and Industry (eg. program EFEKT - energy savings and RES):

<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
<p><b>Eko-Energie.</b> Is an ongoing European funded program to support entrepreneurs (primarily SMEs) in the reduction of energy intensity of production and the consumption of primary energy sources, including through the insulation of buildings (specifically excluding family houses and apartment buildings). Two calls for grant applications (40% subsidy for energy savings and secondary energy sources projects) have been issued, with CZK 1.7 and 2 billion being allocated for the calls respectively.</p> <ul style="list-style-type: none"> <li>In the first call (2007), 138 applications for energy savings projects were received with subsidy demand of 1,122m CZK and total investment cost of 3,208m CZK. Of these 67 were approved for an ex-ante savings of 511,234 GJ/year.</li> </ul>					
<p><b>EFEKT.</b> Is a continuation of the government program part A for support of EE and RE as described in the table above and is implemented on a yearly basis. For example, the EFEKT 2008 program received 560</p>					

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requests and provided support to 250 applicants. CZK 60m out of a budget of CZK 70m was used. 105 projects were supported in buildings at a cost of 26.6m CZK. The majority of these projects were for energy performance certificate buildings over 1,000m2, so were considered to contribute to energy savings indirectly (and thus savings analysis was not done by the Ministry).

Other programs identified using the IEA database include:

<b>Financial Subsidy (Direct) – Low interest rate loan &amp; Grant / Rebate</b>
<p><b>PANEL program.</b> The Ministry of Regional Development (MRE) through the State Housing Development Fund provides support for the repair, reconstruction and modernisation of apartment buildings constructed using the concrete panel technology, of which there are more than 1.1 million apartments in the Czech Republic. Financial subsidies are provided along with contributions to cover interest and guarantees for activities related to repairs and reconstruction of concrete panel apartment buildings; non-apartment residential units are explicitly excluded from the program. Preference is given to economically depressed areas and areas with disturbed environment. Support is also provided for insulating buildings, improving heating systems, distribution pipes and sources of heat and hot tap water, and use of renewable energy sources in buildings which could have a favourable effect on energy efficiency, and thus on GHG emissions. The Panel program was modified in May 2009, and continues to provide, in partnership with banks, preferential treatment when receiving loans, as well as subsidy payments to reduce loan interest. The program applies to owners, who can receive guarantees for loans used to undertake a list of measures. When significant renovation or repair activity is undertaken affecting the building envelope, the building must then meet building energy performance standards. In addition, the program offers subsidies amounting to between 2.5% and 4% of applicants' loan interest rate. A higher proportion of the interest is reimbursed if more measures are undertaken, or if the building meets Class B energy performance standards. The subsidy is provided up to a maximum of CZK 5,500 per m2 of floor area, and paid every six months for the duration of the loan.</p>
<p><b>PHARE loans.</b> The Phare Energy Saving Fund was established by the European Commission and the Czech Ministry of Industry and Trade to enable financing small and medium-sized energy efficiency projects. EU Phare Program for the Czech Republic provided EUR 4.5 Million as a credit line. A local commercial bank (CSOB) was selected for the Management of the Fund in 1997. Supervisory functions of PHARE ESF are executed by the Ministry of Industry and Trade through the Monitoring Board. CSOB uses funds from the PHARE ESF to make loans for investments in energy savings projects in compliance with the appraisal, lending, administration, reporting and monitoring conditions set by the Contract. PHARE ESF is a revolving fund i.e. part of its principal repayments is used for new loans. ESF enables to provide loans for eligible energy efficiency projects at a reduced interest rate. Each loan shall be composed of a blend of 33% PHARE ESF resources and of the 67% bank's own resources. Eligible projects for ESF loans generate savings by reducing energy consumption, but also by reducing the costs of energy (using cheaper fuel), by lower operating and maintenance costs, etc. To qualify for assistance through the ESF, at least 40% of the total savings achieved by the implementation of the project must originate from reduced energy consumption. All projects must demonstrate energy savings on the demand side.</p> <ul style="list-style-type: none"><li>• Conditions to obtain the loan: Own client's resources from 20% to 40% of the investment costs. At least 60% of the project costs need to be covered by the ESF. Loan duration is from 4 up to 10 years with maximum grace period of 1 year. Possible maximum disbursement for a single project is CZK 50 million.</li><li>• Target sectors are: industry; district heating; public buildings (schools, hospitals, social care, etc.); residential buildings.</li></ul>

## ENERGY EFFICIENCY FINANCING PROGRAMS

### Hungary

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Indirect) - Guarantee</b>					
Household	HUN10	<b>Hungarian EE co-financing program (HEECP)</b>	<b>Guarantee fund from IFC/GEF to promote EE through financial sector.</b>	<b>1998 - 2008</b>	<b>Medium</b>
<i>Results.</i> IFC guarantee as % of loan reduced from 50% in 2000 to 12.2% in 2005. EE investment triggered by IFC guaranties increased from US\$2.1m in 2000 to US\$23.1m in 2005.					
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	HUN11	Financial assistance for domestic energy savings (Panel program)	Subsidy (1/3) for energy modernization of flats. Banks were encouraged to lend to this sector through the HEECP initiative described above.	2001 - 2006	Low
<i>Results.</i> Accepted evaluations from 2001 – 2004 were 3750, 7694, 4643, 4216, and expected energy savings were 137.1, 282.1, 180.7 and 177.4 TJ/year respectively.					
Household	HUN20	Residential energy saving program for 2008 (NEP 2008)	Subsidy (20-30%) for energy modernization of flats and promotion of use of renewable energy resources.	2008	Low
<i>Results.</i> Received 9,026 applications and supported 6,865 applications using HUF 3.1b subsidy. Subsidies affected 10,956 flats and facilitated an investment of HUF 11.8b in total.					
Industry	HUN51	Environment and energy operative program (KEOP2007)	Grants for RE and EE in industrial and tertiary sector, including for lighting, insulation and heating of buildings.	2007 -	Unknown
Tertiary	HU08	UNDP/GEF municipal EE project	Grants for audits (<40%) and projects (<40%) to improve EE in municipalities.	2001 - 2008	Low
<i>Results.</i> 225 audits, 10 feasibility studies, 14 investments for 3.7kt CO <sub>2</sub> , 19 ongoing investments for 2.1 kt CO <sub>2</sub> .					
Tertiary	HU77	Encouragement of reduction of energy use in the Regional Operating Programs	Grants for municipalities (90%), institutions, civil organisations, plus joint owned panel houses (70%) for lighting and insulation.	2007 - 2013	Medium
<b>Other</b>					
Industry	HU76	Third party financing within KEOP program	Financial assistance for ESCO projects.	2007 – 2013	Unknown
Tertiary	HU09	Apple of our Eyes program for EE in schools	ESCO program for heating and lighting modernisation in public educational institutions.	2005 - 2007	Medium

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### Lithuania

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	LT5	Energy efficiency housing pilot project (EEHPP)	Soft loans (10 yrs, 10% down) and subsidy (30%, no VAT) to support HOA of multi apartment buildings to improve maintenance and EE.	1996 – 2001	Medium
<p><i>Results.</i> 96 monitored projects giving 25% comfort adjusted savings and average simple payback of 10.5 years. Over 60% of 250 surveyed households indicated loan repayment represented negligible burden on family budget. Renovated more than 730 multifamily buildings, with investment over Euro 20m and annual savings of 100 GWh (worth Euro 3m). No defaults as of October 2005. Project success required integration of: tailored legal framework allowing loans with mortgage, affordable financing through grants, comprehensive support via regional advisory centres, enhanced public awareness and improved services of local energy consultants.</p> <p>Following the completion of the EEHPP in 2004, the Lithuanian Government approved a housing policy including the program for refurbishment of multifamily buildings. It commenced at the end of 2005 and uses a state grant of 15, 30 or 50% depending on the extent of measures undertaken. From 2005 until February 2008, 242 projects were implemented (625 projects were approved) at a cost of Euro 23.4m. Insulation of walls and roofs made up 52% of the measures.</p>					

### Poland

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household Tertiary	PL2	Thermal Modernisation Fund	Grant (<25% of loan) for residential and tertiary building EE, reduction of losses in heat distribution and RE.	1998 -	High
<p><i>Results.</i> Until 2002 when the act was amended it was not successful, as it only had 500 proposals in 3 yrs (Euro 15m), due to high interest rates and unattractive payment schedules. However, as rates dropped and administration procedures were refined the volume of investment increased from 80m PLN in 2002 to 1,369m PLN in 2007. Yearly total savings estimated at 131ktoe.</p>					
Cross cutting	PL6	EcoFund Foundation	Grants (10-50%) for EE and RE in private and public sector, including financing of heat insulation works.	1989 -	High
<p><i>Results.</i> The material effects in the EcoFund projects were chiefly achieved through the replacing of traditional coal-fired heat sources with boiler plants where renewable energy sources (straw, wood chips, solar collectors) were used or through the construction of new facilities of this type. However, energy savings were gained thanks to the financing of work related to the improvement of heat insulation of buildings. At the projects completed in 2005, additional heat insulation was applied to 78,000 m2 of walls as well as draughty windows and doors of almost 5,000 m2 total area were</p>					

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	replaced.				
<b>Financial Subsidy (Direct &amp; Indirect) – Grant / Rebate and Guarantee</b>					
Tertiary	PL10	Grant from GEF	Grant (if payback 10+yrs) and guarantees to commercial banks for EE of buildings, district heating and heating networks.	2005 – 2011	Low
<b>Financial Subsidy (Direct) – Low interest rate loan &amp; Grant / Rebate</b>					
Cross cutting	PL5	National fund for environmental protection and water management	Subsidies and soft loans, including to EE and RE. The loans are soft loans from 0.2 to 1.0 times the Polish base rate, for up to 50% of total project costs. Loans are available for 20 years, however usually they are granted for 5 years. Every year around 800 projects receive support from the National Fund. Usually 200 projects receive loans and the rest grants. A portion are for the thermal performance of public buildings.	1989 -	High
<p><i>Results.</i> In the years 1989-2008, more than 14,000 contracts were concluded (mainly in respect of loans and borrowings granted through Bank Ochrony Środowiska S.A.), and almost PLN 21.4 billion was allocated to funding environmental projects. Expenditure on projects which were co-financed from the resources of the National Fund in this period exceeds PLN 76.5 billion. During that time, the largest amounts of money were allocated to the protection of water and water management and to the protection of air.</p> <p>Note that one way that the fund was able to expand its reach to EE in buildings was to sign agreements with the manufacturers of EE equipment so that they could offer vendor financing. GreenMax strongly supports this approach.</p>					

Early market development programs not present in the MURE database include:

<b>Financial Subsidy (Direct) – Low interest rate loan</b>	
<p><b>Polish Development Bank.</b> In 1992 the Polish Development Bank set up a specific energy efficiency credit line of \$20m, where it offered a reduced interest rate for a specific list of eligible household measures.</p>	

### Romania

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	RO27	Programs for thermal rehabilitation of multi-level residential buildings built up to 1950 – 1990.	Grants (34% State budget, 33% local authorities) to assist thermal rehabilitation of blocks of flats (built 1950-1990). Remaining 33% to be funded by tenants association. Law changed in 2008 so that state covers	2002 -	Medium

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			50%, local authorities 30%, leaving the residents with up to 20% of the cost.		
	<p><i>Results.</i> 2003: pilot program with 12 buildings. 2005: 23 buildings with audits and certificates. 2006: works on some of 2005 buildings, plus audits on 614 buildings. 2007: feasibility and technical design for buildings from 2006, works started on 13 buildings and finished on 6.</p> <p>By the end of 2009 around 21,500 apartments located in approx. 600 buildings are expected to be rehabilitated. For 2009 the total allocated state budget was in the amount of 85 mil. Euro. In 2008 less than 90 multi-storey housing buildings were rehabilitated (around 2,500 apartments). In the early stages of the program the full cost of energy audits was paid for by the Ministry – this led to a large number of expensive, yet virtually identical audits being completed (due to similarities in building stock). Subsequently the government has upgraded the process to require a building inventory to be done for each region, with audits becoming more standardized.</p>				

Note that Romania also possesses the Romanian Energy Efficiency Fund (FREE), which is a financial institution that manages funds from the Global Environment Fund to invest in projects that promote energy efficiency. At the end of 2009 it had concluded 23 financing agreements amounting to US\$12m, although none of these were purely for improving efficiency within buildings. In 2008, a case study of the program by the World Bank<sup>7</sup> noted some problems relative to the original business plan caused by changing economic conditions (opening up of international capital markets thus reducing interest rates in general) and restrictive product offering (based on collateral rather than recognizing improved cash flow through energy bill savings):

- *“This project provides an example of the need to tailor the financing mechanism carefully to the country institutional environment, and more important, to provide flexibility in the products and terms to allow the mechanism to adjust quickly to changing market characteristics. The slow development of the project pipeline also reinforces the need to build up a strong project development function up front”.*

### Slovakia

Sector	MURE Code	Title	Focus	Period	MURE Impact
<b>Financial Subsidy (Direct) – Grant / Rebate</b>					
Household	SK2	Program for reduction of energy consumption in apartment houses and flats	Subsidy for additional thermal insulation and installation of regulation of heating in panel houses.	1991 – 1999	Medium
	<p><i>Results.</i> 1992-1997 additional thermal insulation total budget cost 960,300k SKK, state subsidy 540,818k SKK and heat saved 196,866 GJ. 1993-1999 installation of regulation and modernisation of heating systems total cost 895,068k SKK, state subsidy 233,223 and heat saved 1,451TJ</p>				
Household	SK7	Subsidies for housing development	Subsidies (<50%) for eliminating system failures in apartment houses, including inadequate thermal insulation	2007 -	Medium
Tertiary	SK13	Eko Fund	Subsidy for environmental protection, including for improvement of EE in buildings (allocation of 49m SKK)	2008 -	Medium

<sup>7</sup> “Financing Energy Efficiency, Lessons from Brazil, China, India, and Beyond”, World Bank, 2008.

### **C) International Financing Institutions**

In general IFIs have historically adapted an approach of providing credit lines (typically subsidized through reduced interest rates) alongside Technical Assistance (for end-users, fund delivery channels and supporting service providers). With a particular focus on the NMS, these include:

- EIB, KfW, EBRD, CEB deploying EU sponsored Energy Efficiency Finance Facilities (2006, 2007) alongside credit lines in Romania and Bulgaria.
- EBRD sustainable energy credit lines deployed through local banks in Slovak Republic, Romania and Bulgaria.
- KfW EE/RE credit lines deployed through local banks in Poland, Romania and Bulgaria.

These approaches are also currently being extended in the Caucasus, Western Balkans and Turkey, so it is clear that the IFIs believe that maximum leverage can be obtained by deploying funds through local financial institutions for smaller projects (and through fund structures for larger projects). A more detailed discussion on program evolution and lessons learned should be included in phase 2 of this project.

Others products previously offered in the NMS include:

- IFC/GEF Commercializing Energy Efficiency Finance partial guarantee program in partnership with local banks for EE in buildings, municipalities and industrial processes in Estonia, Latvia, Lithuania, Slovak Republic, Czech Republic and Hungary. This included cover for innovative ESCO forfaiting transactions in Czech Republic and Hungary.

### **D) Common Program Characteristics**

Clearly the countries we have examined are all at different stages of economic development, with differing climates, building stock and energy prices. Thus it is not surprising to find that the approach taken to energy efficiency varies widely in terms of:

- Number of programs and implementing bodies.
- Types of incentives used and sectors targeted.
- Commitment of own funds versus relying on external support (eg. EU or IFIs).

We also see a broad spectrum of strategies in terms of:

- Focussed programs targeting most wasteful sectors (eg. residential apartment buildings in Lithuania and Romania).
- Integrated programs using different instruments and targeting different sectors (eg. Germany).
- Wide range of sectoral programs, some of which are complementary and some which are more pilot in nature, that allow market demand to dictate where resources are best directed (eg. Czech Republic and France).
- Level of integration between building energy efficiency (eg. KfW focus and brand in Germany) versus inclusion of other initiatives within the funding mechanism (eg. building EE as part of an environmental and pollution fund, as in Slovakia).
- Delivery channel variety for funding and awareness to best match scope and sector of program. For example, government bodies often directly administer large tender based programs for SME and industrial clients, while commercial banks are used to reach smaller residential clients. However, in terms of awareness, households and SMEs often first turn to home improvement stores, contractors or equipment manufacturers for advice (rather than their local bank or the government), so this is where advertising resources may be better deployed for new programs<sup>8</sup>.

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<sup>8</sup> GreenMax impact evaluation assessment of energy efficiency credit line offered by Opportunity Bank, Montenegro. Approach also used by BOS Bank program in Poland.

## ENERGY EFFICIENCY FINANCING PROGRAMS

In general, the household sector has received the most attention in terms of building focussed energy efficiency programs, and the favoured method of providing assistance is by providing grants or interest rate subsidies through existing banking networks.

### III. DETAILED PROGRAM ASSESSMENTS

#### A) Program Selection

As can be seen in the sections above, data availability and consistent forms of analysis of program success vary greatly. Our ability to draw out clear lessons learned is complicated due to:

- Program changes over time (both in terms of incentive and administrative requirements), although these can provide a guide to problems that needed to be overcome (and thus avoided in other countries).
- Interaction with other policy measures, both financial and otherwise (regulation, awareness etc.).
- Energy efficiency in buildings being a subset of a larger program.
- Lack of rigorous analysis of program success relative to expectations.
- Lack of rigorous analysis of program achievements in terms of energy or CO2 savings

Given the variety of approaches undertaken and subjectivity in choosing the ‘best’ programs to provide lessons learned, we have selected a cross section of the more well known programs with accessible data (providing variety by country, sector and financing tool) from which common lessons are drawn. Also, while these programs (or their successors) are still running in most cases, we focus on historical time periods, where results are already available. The programs further described in the next section are:

Country	Program	Sponsor	Main Sector	Tool
Germany	CO2 reduction and building rehabilitation programs	KfW	Households	Reduced interest rate loans
France	Tax credit for energy efficiency materials and renewable energies	Ministry of Ecology, Energy, Sustainable Development and the Sea	Households	Tax credit for purchase of materials
Poland	Thermal Modernization Fund	Bank of National Economy, Ministry of Finance, Ministry of Infrastructure	Households – high rise apartment buildings	Reduced principal loans
Hungary	Hungary Energy Efficiency Co-financing Program	IFC / GEF	Households – high rise apartment buildings <sup>9</sup>	Partial credit guarantees
Czech Republic	EKO-ENERGIE Program (Operational	Czech Energy Agency / Ministry of Industry and Trade / EU Structural	SME	Yearly grant process

<sup>9</sup> Note that the program also covered other countries (due to a later merging of programs with CEEF) and sectors, however our analysis focuses on the apartment building results (plus a brief discussion of program extension to schools and other municipal institutions) which were primarily in Hungary.

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	Program Enterprise and Innovation)	Funds		
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Note that there is little attention paid in the above initiatives to public or commercial buildings, however this is due to a lack of such programs rather than selection bias. An evaluation of MURE done by ADEME in 2007 notes that (when describing policy measures in general, not just financial/fiscal):

- *In the MURE-database about 250 policy measures are present for the tertiary sector in Member States plus Norway, or on average almost 17 policy measures per country. .. Contrary to households only a very small number of EU policy measures are aimed at tertiary energy use.*
- *Limited focus of policy on public sector... Half of the EU-countries have no such policy measures; the other half has up to two measures. On average about one measure out of fifteen is focused on the public sector.*

**B) Program Details**

**i. KfW Soft Loans (reduced interest rate) under the CO2 Reduction and Building Rehabilitation Programs (1996 – 2004)<sup>10</sup>**

KfW CO2 Reduction Program (KfW-CO2-Minderungsprogramm)

The program was established in January 1996 and was first available only for Eastern Germany and Eastern Berlin. However, in 1999 it was extended to the whole of Germany. The program originally supported individual renovation measures in existing buildings, such as improvements to the heating features. From 1998 the program was used to support measures in new buildings, such as construction and initial purchase of KfW energy-saving houses 60, 40 and passive houses<sup>11</sup>. The program was also used for financing the introduction of renewable energy sources in new and existing buildings.

KfW CO2 Building Rehabilitation Program (KfW-CO2-Gebäudesanierungsprogramm)

This program, established in January 2001, provides favourable loans for retrofitting buildings built before 1979 in the whole of Germany, as well as demolition of empty residential rental buildings in Eastern Germany and East Berlin. In 2003 a partial debt relief was introduced. A precondition for receiving a debt relief is that the applied measures lead to an annual reduction of 40kg CO2 per m2 of living space. The program offered 6 packages of measures as shown in the table below. The measures included in the Packages 0-3 are assumed to fulfil the requirement of 40 kg CO2 (and the savings do not have to be calculated in order to receive the debt relief). The Packages 4 and 5 include individual measures of the Packages 0-3 and some additional measures, which are designed for buildings which were renovated in the past. The measures in these packages do not account for the full

<sup>10</sup> Much of the text and analysis on the KfW programs was extracted from an Intelligent Energy Europe ex-post evaluation report conducted by Katarina Korytarova in May 2006, entitled “Evaluation of KfW Soft Loans for Building Modernisation; Within the Framework of the AID-EE Project” (AID-EE = Active Implementation of the European Directive on Energy Efficiency). The report focused on the energy savings achieved through the KfW-CO2 Reduction Program and the KfW CO2 Building Rehabilitation Program in the period 1996-2004, and draws from past studies, interviews and analysis (please consult the original report for full references). In 2005 the KfW CO2 Reduction Program and the KfW CO2 Building Rehabilitation Program were combined into a New Building Modernization Program, however less analysis has been completed on the reasons for success of this program. Additional primary research and an extension of analysis from 2005 onwards is envisaged as part of phase 2 of this report.

<sup>11</sup> The KfW CO2 Reduction Program supported construction of two types of low-energy houses: low energy house 40 / 60. The condition for receiving the support is that the annual primary energy demand of the KfW low energy house does not exceed more than 40kWh/m2, and 60 kWh/m2. The construction of the low-energy houses was only supported until the end of 1999.

## **ENERGY EFFICIENCY FINANCING PROGRAMS**

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40 kg CO<sub>2</sub>/m<sup>2</sup> reduction per annum. If the house-owner achieves a reduction worth less than 40 kg CO<sub>2</sub>/m<sup>2</sup>, support is provided but lowered accordingly. In this case, the legal minimum level for building insulation (given by the Energy Saving Ordinance) has to be met. Achieving such reductions has to be certified by an authorized energy consultant. The height of the debt relief was originally set at 20% (2003), and later decreased to 15%.

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*Packages of measures in the CO2-Building Rehabilitation Program:*

Package	Combination of individual measures
0	<ul style="list-style-type: none"> <li>• Thermal insulation of the external walls</li> <li>• Insulation of the roof</li> <li>• Insulation of the cellar ceiling or the exterior surfaces of heated rooms that have a ground contact</li> <li>• Replacement of the windows</li> </ul>
1	<ul style="list-style-type: none"> <li>• Replacement of the heating system</li> <li>• Insulation of the roof</li> <li>• Insulation of external walls</li> </ul>
2	<ul style="list-style-type: none"> <li>• Replacement of the heating system</li> <li>• Insulation of the roof</li> <li>• Insulation of the cellar ceiling or the exterior surfaces of heated rooms that have a ground contact</li> <li>• Replacement of the windows</li> </ul>
3	<ul style="list-style-type: none"> <li>• Replacement of the heating system</li> <li>• Conversion of heating system to a different energy source</li> <li>• Replacement of the windows</li> </ul>
4	<ul style="list-style-type: none"> <li>• Combination of the measures from Package 0-3</li> </ul>
5	<ul style="list-style-type: none"> <li>• Replacement of coal, oil and gas furnaces by installation of modern heating systems</li> <li>• Replacement of the old boilers (installed before 1 June 1982) by standard oil and gas boilers in combination with solar collectors and installation of renewable energy sources technologies</li> </ul>

The target groups for these programs were private individuals, housing enterprises, housing cooperatives, real estate agents, municipalities, local associations (communities), districts, civic groups and other establishments of public law. In the period 1996 - 2000 the vast majority of the applicants for the support from the KfW incentive program were private households, both in terms of loans provided and dwellings renovated. These were followed by construction enterprises and cooperatives.

Context

The building stock in Eastern Germany and Eastern Berlin was in a very poor condition at the beginning of the 1990s. Therefore the federal government and KfW developed an incentive program for building modernization, called Living-space Modernization. This program provided loans for general reconstruction of the buildings without a specific requirement on the energy standard of each building.

The energy measures were first introduced at the beginning of 1996, when the KfW CO2 Reduction Program started. This program financed individual retrofit measures (insulation of the walls etc.) in Eastern Germany and Eastern Berlin and in 1998 extended to Western Germany as well.

In 2001 a new program for the whole of Germany, the KfW CO2 Building Rehabilitation Program, was put in place through which additional modernizing measures were financed. The measures in this program were combined into several packages. In 2000 this program was incorporated by the National Climate Protection Program (NCPP) into the strategy to meet the Kyoto Protocol target of Germany (reduction of 21% CO2 emissions by 2008-2010) and the Germans’ own national target (25% by 2005). In NCPP 2000 the German federal government committed to finance the program for the next three years. At the same time the government requested KfW to prolong the existing CO2 Reduction Program for at least five more years. In 2003 the KfW CO2 Building Rehabilitation Program was extended until 2004.

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### Budget and Expected Impact

In the period 1990-1999 the KfW provided 40 billion Euro of loans. Initially, KfW mainly focused on standard reconstruction measures (new facades, new bathrooms, new staircase etc) and only 25% of the investment went into energy saving measures. In order to achieve 5-7 Mt of CO<sub>2</sub> reductions in the “Climate Protection Program for Existing Buildings” the Federal government envisaged to make available to KfW 200 million Euro for the initial 3 years (NCPP 2000). It was expected that afterwards KfW would finance the programs from its own resources. The subsidy of 200 million Euro allocated to lower the interest rates was exhausted in the first year of functioning of this program. At the same time (2000) the Federal government requested that KfW extend the existing CO<sub>2</sub> Reduction Program by at least 5 years and to increase the loan volume.

The NCPP 2000 estimated that the soft loan program for energy savings in existing buildings including energy audits (in NCPP 2000 called “Climate Protection Program for Existing Buildings”) would result in a reduction of 5-7 Mt of CO<sub>2</sub> emissions in the period 2000-2005. This estimate, however, proved to be over-optimistic. Evaluation in 2004 (by Prognos IER) calculated that the energy improvements of existing buildings will not provide for more than 2-2.5 Mt CO<sub>2</sub> reductions by 2005, i.e less than half of what was expected.

The introduction of the soft loan program was based on previous experience that loans were more cost-efficient than subsidies. Additionally, the costs are spread over the whole period, which does not put such a large pressure on the federal budget. In parallel, other instruments were implemented alongside the KfW incentive program, which helped to raise awareness and motivation to save energy demand in the household sector.

### Level of Financial Support

CO<sub>2</sub> Reduction Program. This program financed individual measures. The maximum loan provided was 5 million Euro (and maximum loans for low-energy house was 30.000 and for passive house 50.000 Euro).

CO<sub>2</sub> Building Rehabilitation Program. With this program up to 100 % of the investment costs including ancillary costs (architect, advice on how to save energy, etc.) could be financed. The maximum loan for Packages 0-3 was EUR 250 per m<sup>2</sup> of floor space. For Package 4 the financing was as follows: for CO<sub>2</sub> savings of at least 35 kg per m<sup>2</sup> of building floor area per year up to a maximum of EUR 200 per m<sup>2</sup> of living space and, for CO<sub>2</sub> savings of 30 kg or more per m<sup>2</sup> of building floor area, up to a maximum of EUR 150 per m<sup>2</sup> of living space. Maximum loan for the measures in the Package 5 was EUR 80 per m<sup>2</sup> of floor space.

If the modernization brings the building’s energy consumption down to the level of a new building as defined by energy regulations (i.e. to the level of so-called low energy house standard), then 15% (formerly 20%) of the loans from the CO<sub>2</sub> Building Modernization Program can be waived. The waiver is approved upon the results of the energy audit.

### Loans Granted

In the period 1996-2004 KfW provided EUR 9.7 billion of loans via the two programs. With this, 73.1 million m<sup>2</sup> of dwellings were renovated. In this aspect the program exceeded expectations.

In the period 1996-2004 the CO<sub>2</sub> Reduction Program 1996 provided on average a loan of 100 Euros per m<sup>2</sup>, while the KfW CO<sub>2</sub> Building Rehabilitation Program 2001 provided on average 248 Euro/m<sup>2</sup>. This could be partly explained by the fact, that while the 1996 Program supported only individual measures, the latter Program supported combinations (packages) of measures (insulation and replacement of windows). Thus we can assume that the 2001 Program supported measures which required larger modernization per household. This is true also for the average loans per dwelling – the latter program provided almost a 3 times higher loan per dwelling (20,643 Euro/dwelling) in comparison to the CO<sub>2</sub> Reduction Program 1996 (8,317 Euro/dwelling).

On average the two KfW programs provided a loan of 133 Euro/m<sup>2</sup> and 11,059 Euro/dwelling (calculated using a weighted average). In the period 1996-2004 881,000 houses and apartments were renovated through

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the two KfW CO<sub>2</sub> programs: 685,000 in the CO<sub>2</sub> Reduction Program and 196,000 in the CO<sub>2</sub> Building Rehabilitation Program. From the above we see that while the first program supported more dwellings in terms of living space (m<sup>2</sup>), the latter included more financially demanding renovations.

On average the interest rates in these programs ranged between 2 and 4% p.a. depending on the type of program, type of measures and the payback period. In comparison to market interest rates, KfW provided rates about 1.04 - 1.98% lower.

### Energy Savings

In the period 1996-2004 the house-owners who applied for the KfW loan for modernization through its two programs saved 45 PJ. This is the gross amount of energy savings claimed by the program, and it includes also the energy savings of those house-owners who would implement the energy saving modernization measures in absence of the KfW incentive programs (so-called “free riders”, for which scenarios of 30% and 50% were assessed with a corresponding reduction in savings attributable to the programs)<sup>12</sup>.

### Effectiveness

The government expected that the “subsidy program for energy savings in existing buildings including energy audits” (as cited from the National Climate Protection Program 2000) would result in reductions of CO<sub>2</sub> emissions by 5-7 Mt by 2005 compared to 1990 levels. In 2004 it was clear that this goal cannot be achieved and it was estimated that the programs would reduce the CO<sub>2</sub> emissions by 2-2.5 Mt by 2005. As the periods covered by the target (1990-2005) and the current assessment (1996-2004) do not correlate, it is difficult to compare the effectiveness of the program in terms of achieving this target. However, we can state, that the actual gross reductions brought by the two examined KfW programs in the period 1996-2004 were 2.9 Mt, which is approximately half of the NCPP 2000 estimations. However, the KfW program reached the emission reductions as it was estimated in 2004 Prognos IER. The same applies to the achievement of the program in terms of energy savings: 23-32 PJ achieved through the program vs. 74-103 PJ estimated in the NCPP 2000 and 30-37 PJ in the Prognos IER estimate.

### Net impact, effectiveness and cost efficiency

The total energy savings (gross impact) in the period 1996-2004 account for 39.5 PJ. The net impact was 21.7 PJ energy saved. This corresponds to 2.9 Mt CO<sub>2</sub> and the net impact to 1.5-2.1 Mt CO<sub>2</sub> reductions. These numbers are much lower than the reductions expected by the National Climate Protection Plan from 2000: 5-7 Mt CO<sub>2</sub> for the period 1990-2005. However, they are close to the estimate of Prognos IER, namely 2-2.5 Mt CO<sub>2</sub>. Note, that the periods of the target and this study are not comparable.

The program is seen very positively by the policy makers. The amount of applications was higher than expected and the provided governmental funds to lower interest rates were fully exhausted. The KfW program was also successful in driving public attention towards modernization using more energy efficient measures. The instrument contributed to the change of the market, as the energy measures were used more often along with the standard reconstruction measures by buildings renovation.

In the period 1996-2004 the government provided 9.7 billion Euro through KfW. The cost for providing loans with reduced interest rates was 101-193 million Euro per year. This investment brought a net reduction of 1.5-2 Mt CO<sub>2</sub> emissions. The costs for the government are the subsidies provided to the KfW bank to reduce the interest rate below the level of the market interest rate. In other words, the difference between the reduced interest rate and the market interest rate is the lost opportunity for the government (the government could invest in other programs with higher interest rates etc.), and thus the cost.

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<sup>12</sup> Note, that the energy savings are calculated here by using a weighted average of the main energy sources used for heating in Germany. The weighted average is calculated by multiplying the total CO<sub>2</sub> emissions reductions (resulting from the two KfW programs) by the ratio of the different types of energy sources. This is then divided by the conversion factor for each energy source.

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The cost efficiency is lowest for the end-user (1 Euro/GJ) through 4 Euro/GJ for the society and 3-9 Euro/GJ government (for low interest rates and 50% share of free riders, and 9 Euro/GJ for high interest rates and 30% share of free riders).

Success factors

One of the main success factors was well targeted information dissemination together with the reduced interest rates, which attracted more people than expected. The large variety of modules of the KfW programs and possibility to combine the loans from several modules (e.g. CO2 Reduction program with House ownership program or Ecological Building Program) allowed for cheap loans to cover most project costs. Also, implementation at the level of the Federal KfW bank enabled transparent administration which built trust.

Learning experiences

The main lesson is that such programs should start with a small focus, with a few demonstration projects, from which the optimum packages of economic measures should be identified. If this is successful then the program can be expanded further. Further, based on the experience during implementation of the KfW program, it is recommended to create a goal based on an indicator such as CO2 reduction per m2. The Building Rehabilitation Program (2001-2006) conditioned receiving financial support by achieving 40 kg CO2/m2. However, the policy makers responsible for the KfW program learned that this target can be achieved by more or less effective measures depending on the state and age of the building. In other words, while the requirement can be currently achieved in one house by the best available techniques, in another house this can be done by simple measures, but without a long lasting effect. (The indicator of reduced CO2/m2 is an indicator of improvement and not of a standard, which would bring the savings every year.) Thus, this requirement can lead to sub-optimal measures, which will necessitate further work in the near future. Instead, the incentives should cover either specific separate measures, or should be based on the requirement of the energy demand of new building.

A representative from the Federal Ministry for Transport, Construction and Housing Affairs (BMVBW) recommended that the support for energy savings (and CO2 reduction) should be developed and implemented in two parallel paths: a. support in form of single measures (replacement of windows, retrofit of roof, cellar, replacement of boilers); and b. complex retrofit regulations with a goal of bringing the energy demand of the existing building to the level of new buildings (ie. EU Energy Performance of Buildings Directive). Such arrangements would motivate both owners of the apartments as well as the owners of the residential buildings to retrofit.

**ii. French Tax Credit for EE Materials and RE (2005 - 2008)**

In 2005, the French government recalibrated the tax credits for purchases of equipment for primary residences (Article 200 of the General Tax Code) to promote both sustainable development and energy conservation. Specifications regarding equipment covered were modified in 2006 and 2007, to account for technological change. These were modified again in 2009, when the credit was extended to 31 December 2012 (from end of 2009). To be eligible for the tax credits the building in which the equipment is used must be a primary residence and at least two years old; for renewable energy equipment the building can be new or old. A summary of program requirements and results is shown in the table below.

<b>Tax credit for energy efficiency materials and renewable energies</b>	
<b>Type</b>	Tax credit.
<b>Description</b>	Tax credit applied to the purchase price of equipment and materials for tenants and owner occupiers (2005 – 2009). If other aid is provided then this is subtracted from the price. The cost of installation is not taken into account. This program replaced FRA7 tax credits and FRA11 solar thermal subsidies. Due to the tax year in France, the credit (or refund) is only

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	effective in September from the year following when the investment was made.
<b>Eligibility</b>	For 2005 the credits were: low temperature boilers (15%), condensation boilers (25%), thermal insulation products (25%), heating regulation equipment (25%), and energy producing equipment using renewable energy (40%). These credit levels were increased in 2006 for many of the measures (to 40%). Note that specific performance eligibility standards apply for each type of equipment.
<b>Caps</b>	From 1/1/05 – 31/12/09, for the same dwelling the maximum expenditure was Euro 8,000 per single and Euro 16,000 per couple, with minor increases (Euro 400) allowed per child.
<b>Results</b>	<p>According to the MURE analysis, the program had a high (semi quantitative) impact (savings &gt;= 0.5% of final energy/electricity consumption of the household sector).</p> <p>Provisional results for 2005 show substantial increases in unit sales from 2004, in particular for solar water heating, combined solar systems, wood boilers and condensation boilers.</p> <p>For the first 3 years of the program, 50% of the total budget of this measure was used for windows replacements and a very low percentage of the budget was used for wall and roof insulation. Since 2009, the installation costs for thermal insulation of walls, floors, roofs and ceilings are also covered by the tax credit.</p> <p>The amount of tax credit used from 2005 to 2008 was Euro 397m, 990m, 1,870m and 2,050m respectively. In 2008, 132,900 households made use of the tax credit.</p>
<b>Conclusions</b>	<p>The tax credit was seen to have revitalized the market for energy saving equipment. Potential market size in 2006 is estimated to be between Euro 3-4 billion for equipment and installation for investments realized by private individuals.</p> <p>However, the program can be made more efficient:</p> <ol style="list-style-type: none"> <li>1. In the short term, raise the performance requirements to avoid a free-rider effect and assure most efficient use of public funds. In particular, increase performance required from window double-glazing, wood heaters and hot air pumps. Also, increase incentive for wall insulation to better balance amount of window projects. These measures are expected to save Euro 180m and double efficiency in terms of tons of avoided CO2.</li> <li>2. Over the next 1-2 years, move towards a system based on post project performance. From 2008 to 2020 the government wants to reduce the energy consumption of existing buildings from 240 kWh/sqm/year down to 150 kWh/sqm/year.</li> </ol>

**iii. Polish Thermal Modernization Fund Soft Loan (principal forgiveness) Program (1999 – 2007)<sup>13</sup>**

Before 1997, the Government provided assistance for cooperative housing in the form of financing projects for buildings mainly built in the sixties and seventies. From 1994 to January 1997, the Ministry of Spatial Planning and

<sup>13</sup> Case study taken from MURE and ADEME report “Energy efficiency in the European Union: overview of policies and good practices”. Program result table and graph taken from MURE. Additional data obtained from Bank of National Economy.

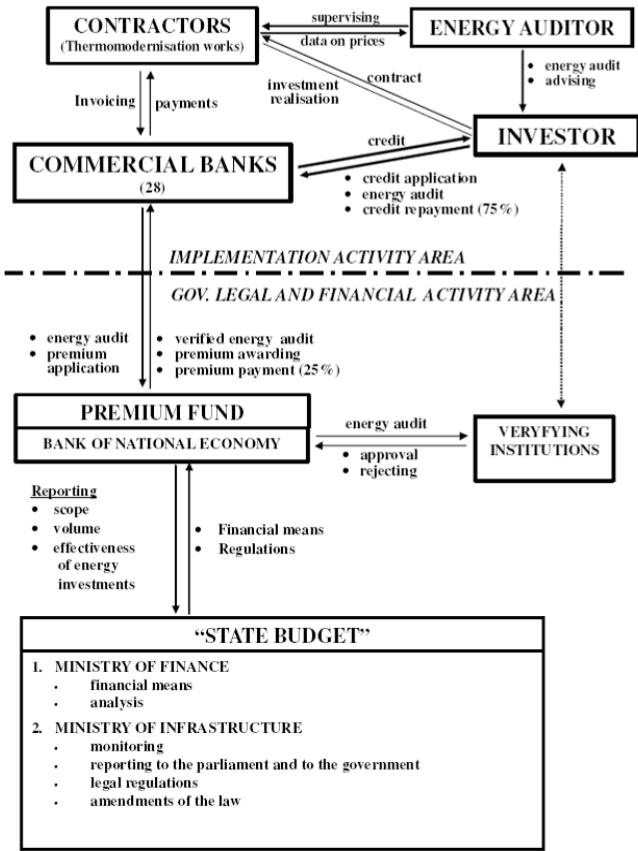
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Construction set a so-called scheme aimed at “elimination of technological defects in panel buildings”. Within the framework of this scheme, thermo-renovation of the external walls (mostly pre-fabricated multilayer walls) was made in 773,000 housing units, i.e. 24.2% of the total cooperative’s housing stock (it is 10% of total housing stock in cities and towns). Technical inspections made up to January 1997 showed very poor quality of refurbishment works (maximum 5 cm of additional insulation) and negligible energy efficiency improvements. The scheme was also socially unfair as only stocks of housing co-operatives were included (only 37 % of total number of flats), as neither private nor communal or public buildings were supported. In 1998 the Thermal Modernization Act (of full name: “Act on Support for Thermo-Modernization Investment in Buildings”) came into force, assisted by the Thermo-Modernization Fund.

Established in 1998, the Thermal Modernization Fund provides premiums to commercial credit loans granted to owners of buildings, local boiler station and heat distribution networks investing in undertakings improving energy efficiency in the residential and public services sectors.

The premium can cover up to 25% of the loan: it is paid directly to the crediting bank as a repayment of the part of credit loan just after the all of the modernization works are completed. To be eligible, the projects must result in a reduction of a certain level of energy saving (e.g. at least 25% in case of buildings where no improvement measures have been done before).

An energy audit for identification of the optimal scope of works possible to be done in building as well as for evaluation of energy and economic performance is a prerequisite to granting the premium. The audit is conducted by an independent expert and has to pass additional checks by verifying institutions.

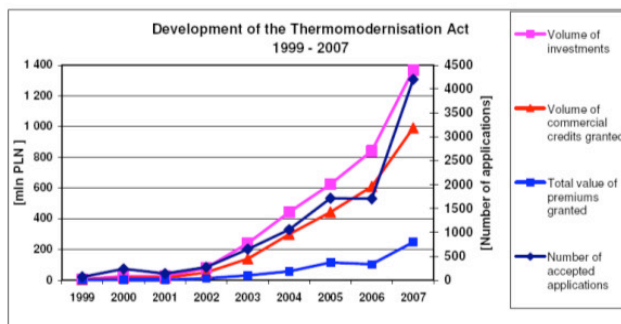


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The fund is managed by the Bank of National Economy and financed by the Ministry of Finance. The Ministry of Infrastructure is responsible for monitoring of the scheme and for possible regulatory adjustments, in particular considering progress in technology development.

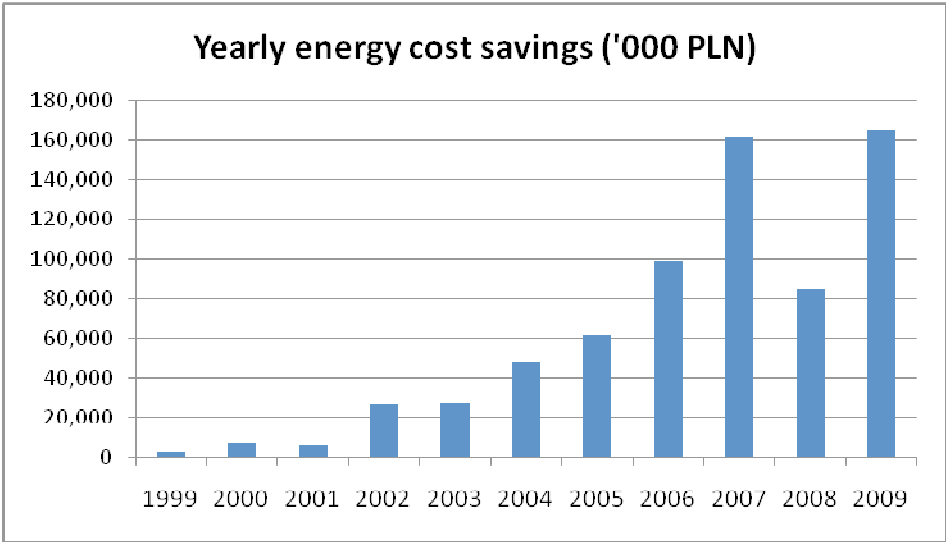
Until June 2002, when the act was amended it was not a successful scheme. For three years only 500 proposals were submitted and the total volume of investments was approximately 60m PLN (Euro 15m). This was likely caused by the high level of lending interest rates, uncertainty around the subsidy available from the state budget, general low energy prices and most importantly, the fact that the subsidy was only available to pay off the final portion of the loan (the Bank of National Economy essentially paid the commercial bank to forgive the final portion of the loan repayments). From June 2002 when the act was amended and the subsidy was made available once the EE measures were implemented, the number of application significantly increased. 144 projects were financed under this scheme in 1999 as compared to 4,201 cases in 2007. Nearly 73 million Euros of premiums were paid in 2007 against 0.3 in 1999. The budget allocated to the Fund's premiums more than doubled between 2006 and 2007 and exceeded in mid-2008 the budget for the year 2007. However, impacts in terms of energy savings are only evaluated through occasional impact surveys conducted by KAPE for the Ministry of Infrastructure.

Year	Number of accepted applications	Volume of investments [mln PLN]	Volume of commercial credits granted [mln PLN]	Total value of premiums granted [mln PLN]
1999	71	6,6	4,2	1,06
2000	235	26,6	15,4	3,86
2001	141	25,35	15,4	3,85
2002	271	80,0	50,64	12,66
2003	651	240,6	139,8	30,3
2004	1059	443,2	299,7	58,55
2005	1714	625,7	443,67	115,73
2006	1706	841,7	610,75	103,45
2007	4201	1 369,04	991,39	247,86
1999-2007	10049	3658,735	2570,95	577,32



At the time of application each project was required to forecast yearly energy savings, the totals of which are shown below.

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The Polish Energy Conservation Agency (KAPE) estimated the energy savings caused by the Thermo modernisation Law and Fund by summing up the savings of individual projects it had verified. Assuming that KAPE verified one third of all projects under Fund, the yearly total energy savings are equal to approximately 131 ktoe.

Despite the growth of this program, we believe there is an important lesson learned from the Polish market that is applicable to others, namely the market limiting impact of prolonged subsidies. Energy efficiency has been subsidized for more than a decade in Poland, both in the housing sector through the Thermo-modernization program and to municipalities via NFOSH, EKOFUNDUZ, and now EU structural funds. These subsidies have driven the market, however the level of EE investment has corresponded exactly to the level of subsidy! Projects that are cost effective at today’s energy prices, interest rates, income levels and level of awareness are postponed as they remain in the queue to receive future subsidies. For programs in general, there should be sunset provisions for reducing subsidies as economic conditions and levels of awareness change.

**iv. Hungarian Partial Credit Guarantee Program (1997 – 2008)**

The IFC has been working on a number of programs since 1996, including the Hungary Energy Efficiency Co-financing Program (HEECP), the Hungary Energy Efficiency Co-financing Program 2 (HEECP2), and the Commercializing Energy Efficiency Finance (CEEF) Program. HEECP2 and CEEF were combined into a regional program which focuses on six countries, namely, Hungary, Czech Republic, Slovakia, Lithuania, Latvia, and Estonia.

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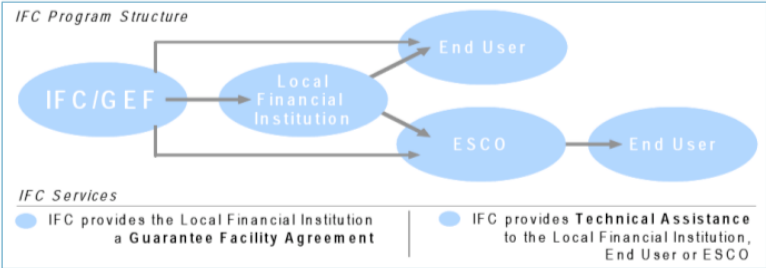
Table CS2.1. Evolution of HEECP Parameters, 1997–2006

Parameter	HEECP1 (start 1997)	HEECP2 (start 2001)	HEECP3 (merged with CEEF Program 2005)
GEF Contribution	US\$5 million, of which US\$0.75 million for TA and administration	US\$0.7 million for TA purposes	n.a.
IFC Contribution	US\$0.3 million for management and operation	US\$12 million for guarantee and US\$0.5 million for management/operations, and IFC's Trust Funds US\$350,000 for TA	n.a.
FI Contribution	Match general support funds. Self-funded loans	Match general support funds. Self-funded loans	Match general support funds. Self-funded loans
Number of participating FIs	3 (2 actively)	6 (95% of the Hungarian energy efficiency lending market)	4
Guarantee type	50%, subordinated recovery	35%, subordinated recovery	50%, pari passu
Additional guarantee product	First loss reserve portfolio product (GEF)	None	Portfolio-based (up to 5%) first loss reserve (GEF)
Max. guarantee, %	50	35	50
Max guarantee size	US\$0.5 million	US\$0.5 million	US\$2 million
Guarantee fee	1%	1%	Varies according to market
IFC:GEF ratio	0	Initially 2, up to 3	Initially 2, up to 3.58
Availability	1997–2000	2001–2004	2005–08 (linked to the life of CEEF)
Potential for streamlined decision making	Low, only for small exposures, since risk sharing is not symmetrical	Low, only for small exposures, since risk sharing is not symmetrical	High, with symmetrical risk sharing
Eligible projects	Excludes nonprivate entities	Excludes nonprivate entities	Includes municipally owned entities with independent corporate governance
Currency of guarantee	US\$	US\$	Euro

n.a. = not applicable. CEEF = Commercializing Energy Efficiency Finance.  
Source: Based on Sources quoted in note 1.

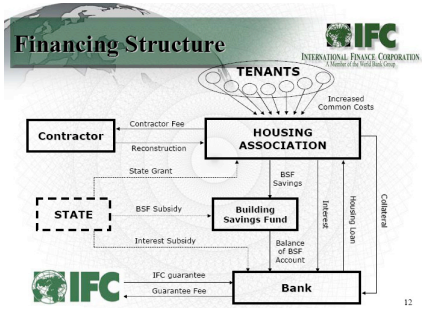
The goal of each of these programs was to promote and enhance commercial financing of energy efficiency (EE) projects by local banks and leasing companies, thereby reducing greenhouse gas emissions. The project objectives were pursued through the provision of (1) partial risk loan guarantees (2) assistance in the design and introduction of new financial products by IFC's partner financial institutions that in turn make loans for EE projects and (3) advisory services (AS) for capacity building to financial institutions, energy services companies, and project hosts. The table below shows IFC/GEF interaction with FIs (guarantees and advisory services) as well as energy services companies (ESCOs) and end-users (advisory services).

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The text below is extracted from IFC “Smart Lessons”<sup>14</sup> on Energy Efficiency including the HEECP and CEEF programs, where a substantial amount of the portfolio was placed in multi-family housing renovations in Hungary (these blockhouses are the focus of the analysis below).

Commercializing Energy Efficiency Finance (CEEF) was a regional partial credit guarantee program co-funded by IFC. By 2008 the program had issued guarantees for €93 million in commercial loans for energy efficiency transactions across multiple sectors. The Global Environment Facility (GEF), the largest funder of renewable energy in the developing world, is active in Hungary, the Czech Republic, Slovakia, Latvia, and Lithuania. A substantial part of this portfolio is committed to a multi-family housing renovation program with a Hungarian Bank under which more than 500 small “block house” renovations have been completed since February 2006. Block houses are a “different animal” from most borrowers and required development of a special loan product. To date, no defaults have been recorded.



What is meant by a “block house”?

Block houses are multi-family housing buildings located mostly in urban areas across Eastern Europe and the former Soviet states. In Hungary, a large portion of these buildings (more than 20 percent of the total housing stock) was constructed in the 1970s and 1980s using panel technologies that are by today’s standards outdated and in need of renovation. Inefficient energy use in an environment of escalating energy prices places a huge burden on the population in these buildings.

Since home ownership is predominant in the region, most of these buildings are owned by the people who live in them. In Hungary particularly, apartments are owned by tenants, and common areas of the buildings, such as the staircase, elevators, front portal, gardens, energy systems, etc., are commonly owned by the community of tenants. The Bank and IFC have spent a considerable amount of time and effort developing a viable business model to address the needs of these block houses, and the most important lesson learned is that the block house is a “different animal” when it comes to lending, so you need a special approach to do it.

What is meant by a “different animal”?

*Different purpose:* Block houses are not profit driven, and they lack financial sophistication. They exist simply to manage the expenses related to the maintenance of assets commonly owned by the tenants. They distribute these

<sup>14</sup> IFC SmartLessons – Energy Efficiency, May 2008 and May 2007.

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expenses among the tenants, and their budgets balance out to zero by the end of each year. No profits, no savings, one bank account, and no real financial records.

*Lack of collateral:* Block houses manage the expenses related to the common assets, but ownership belongs to the community of tenants. Normally, there are no financial buffers or assignable assets in the system that banks could get access to. Designing a financial scheme with recourse to tenants is not an option, since by lending at the tenants' level instead of at the condominium level, banks would lose scale and have to deal with a credit review of a much larger number of individual households.

*A problematic decision-making process:* Each decision, especially ones relating to entering into a long-term loan agreement, requires the consensus of many people. This is difficult and lengthy to arrive at. Furthermore, there is a serious mismatch between the beneficiaries of the loan (the individual tenants) and the entity that is responsible for repaying the loan (the block house).

*Lack of financial skills:* Block houses tend to have one employee only – usually a tenant who has some free time but no specific financial skills as such. The banks need to find a new language to communicate with these clients.

### Lesson 1: Existence of a Few Enabling Factors

*Aggregator with a legal format:* Tenants of the building must form some kind of legal entity that gets its mandate from them and acts on their behalf. This aggregator needs to have a legal format, and its operations need to be subject to enforceable regulations so that banks can lend to them. Without the aggregator, banks can only lend to the individual tenants, but that's not block house lending. In Hungary, tenants of multi-apartment buildings are required by law to form legal entities called "housing associations" for the management of the commonly owned assets of the building. This regulation is quite common in many other countries as well. Housing associations are similar to private companies in the sense that they can enter into all sorts of agreements and can be taken to court if they do not meet their obligations.

The aggregator concept also works in markets where regulation similar to the Hungarian model does not exist. The aggregator can simply be established by the voluntary action of the tenants, or it could be a utility or any other company that has a billing relationship with the tenants.

In countries where the enabling environment is absent, however, advisory services can help the governments develop the favorable legal framework.

*Periodic contributions from tenants to the aggregator:* There must be a financial link between the tenants and the aggregator to ensure that tenants are funding the operations of the aggregator. The aggregator must also have leverage to enforce payment of such contributions. In Hungary, tenants of apartment buildings are obliged by law to contribute financially on a monthly basis ("common cost payments") just by the fact that they own property in the building. The regulator even determines the minimal level of these contributions. And housing associations have a powerful tool in their hands to enforce payments: they have the right to originate a mortgage on the property of non-payers.

Loans to housing associations are non-recourse to tenants in Hungary. Therefore, it is the association that is accountable to the bank. The bank does not have the right to go after the tenants if there is a default. As a result, it is the association's responsibility to collect from tenants, and its right to exercise a mortgage ensures a strong common cost payment discipline.

*Demand:* One of the key drivers of the market is the demand from tenants. In Hungary almost 70 percent of the apartment buildings were built 30 to 50 years previously, back in the Soviet era, and they contain old-fashioned, inefficient technology. The increasing cost of energy is drawing attention to energy efficiency, and energy benefits are maximized if tenants act as a community and address the whole building envelope. Furthermore, by renovating the buildings, not only do the tenants benefit from better insulation and more cost-efficient energy use, but the value of their property increases and the quality of their living environment improves.

*Availability of technical solutions locally:* A wide range of relatively cheap and simple technology should be available locally, from building envelope insulation upgrades (including window replacement) to internal renovation of

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the heat distribution network (heat exchangers, pipes, radiators, etc.) and installation of heat regulation and metering devices to allow tenants to manage their consumption. Existence of well-supplied and qualified local contractors is also a must for low-cost, high-quality services.

### Lesson 2: Creative Financial Structuring

*Cash-flow based lending:* A lending scheme was implemented that required the association to put in place a valid decision of the assembly of tenants to increase their monthly common cost payment obligation to a level where on aggregate they cover the monthly instalments of the loan. This is then assigned and channelled through the bank on a monthly basis for debt service.

*IFC guarantees for collateral:* To address the lack of collateral, IFC guarantees were added to the equation. IFC's product was designed along the principle of making sure that the bank's and IFC's interests were aligned and each party was comfortable with the risks taken. Apart from the IFC guarantee, the only collateral the bank has is a drawing right on the account(s) of the block house.

*Application of available grant programs:* Being a key social issue, the housing sector will always attract government attention. This usually translates into various types of support programs. Incorporating these into the financing scheme opens the door to a larger number of clients.

The Hungarian market has many such programs which were integrated into the block house program. While some features of state grants that complemented the investment structure of the program played a significant role in the expansion of the portfolio, their availability is not a precondition to requiring similar facilities. As long as they are available, clients will always want to use them, but the structure is still viable without them. CEEF program has done many projects with grants incorporated but also many without any, thus illustrating that the financing scheme can be applied without subsidies.

### Lesson 3: Standardization

*Streamlining procedures:* When lending involves a large number of tiny yet similar transactions, the natural choice is to standardize and streamline your operations as much as you can. The Bank developed low transaction cost procedures based on simple checklists and predetermined boundary conditions. All transactions that meet the eligibility criteria make it into the portfolio automatically. IFC's guarantee product was designed to meet the same requirements. Underwriting is based on pre-arranged criteria and is fully delegated to the bank.

*Monitoring energy savings:* When it comes to energy efficient products, there must be a system in place to determine if the loan is financing energy efficiency or not. Such information could have considerable marketing value. However, many banks carrying energy efficiency products face challenges when it comes to monitoring energy saving due to lack of internal capacity to do so. Subcontracting is time consuming and cost-intensive and contradicts the concept of standardization. In response, the Bank requires that the block houses attach an energy audit to their credit application.

This solution is not ideal, as there will always be a trade-off between the quality of the audits and streamlining. This is quite typical for the retail type of energy efficiency programs. The better the audits, the more they slow down projects or even exclude block houses unable to bear the costs. The goal is always to find the right balance of making sure that what we call energy efficiency really is energy efficiency, without overburdening the deal with additional transaction costs.

### Lesson 4: Creative Marketing

One of the most important factors in developing block house lending into a mainstream business line was the local Hungarian Bank's creativity in designing and implementing marketing programs.

*Educate your clients:* The bank has been conducting several types of workshops, seminars, road shows, and client events in all major cities of the country. The events are aimed at not only distributing information about the product but also educating housing representatives about basic financials, explaining to them how to apply, what documentation is needed, how to manage the loan during the tenure, etc. IFC has continuously supported this effort by participating in the events and providing financial support from CEEF's advisory services budget for them.

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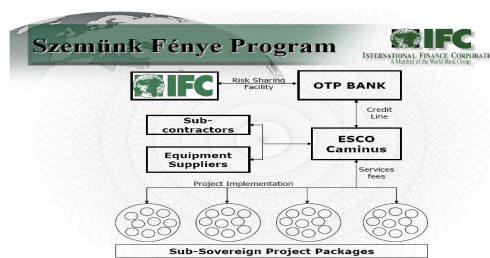
*Word spreads like wildfire:* Another quite unexpected aiding factor has been the high visibility of the renovated buildings. Word on the availability of financing spread like wildfire among tenants when they saw the renovated buildings in their areas.

Finally, the CEEF program results in Hungary (as of 2008<sup>15</sup>) were \$196m in investments, using \$96.9m in loans based on \$37.2m in guarantees across 649 projects.

CEEF	HUN	CZ	SK	LV	LT	Total
Investment	\$196m	\$72m	\$12m	\$5m	\$2m	\$287m
Loans	\$99m	\$53m	\$9m	\$4m	\$1m	\$164m
Guarantees	\$37m	\$23m	\$4m	\$1m	\$500k	\$66m
# of projects	649	24	3	4	3	683

For blockhouses in particular, \$145m in investments were made across 588 projects (predominantly in Hungary), with 40,994 apartments renovated. Total heat saved per year was 295,320 GJ and total CO2 saved per year was 30,323 tons.

An additional positive result from the HEECP / CEEF program was the extension of its risk sharing approach to other sectors. In particular, a \$250m, five-year risk sharing scheme (the Szemunk Fénye project) was set up with OTP Bank and ESCO Caminus for heating and indoor lighting upgrades of municipal institutions (schools in particular). The executing consortium was selected through centralized procurement and the IFC provided a 50% risk sharing facility to OTP bank.



As of 2008, the Szemunk Fénye program had completed \$33m in investments across 2001 projects, with no guarantee calls. Savings included lighting electricity of 9m kWh/year, heating of 40k GJ/year and 2204 tons of CO2 per year.

Lessons learned by IFC from the early years of this program include:

- The third party finance ESCO-scheme is “THE” classic EE finance model, allows cost-efficient aggregation of small scale EE transactions
- Deep pocket sponsor is not necessary if there’s strong partnership between the bank, the ESCO and equipment producers
- Standardized product, portfolio approach, streamlining and delegation of credit decision authority to the bank
- Portfolio build-up is slow, projects are slow/medium sized
- Centralized procurement and state participation is not replicable

The key impact of the IFC approach in general was the level of market transformation achieved. EE was institutionalized as a profitable business for a wide variety of banks in the region. Prior to IFC’s involvement there was little or no lending for EE, whereas now a large volume of loans is being made by banks with minimal or no

<sup>15</sup> IFC workshop presentation by Tibor Kludovacz, 3-5 June 2008.

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guarantee support. The IFC product served to reduce the “market entry risk” which was present due to an initial lack of understanding by the banks of the fundamental EE business structures. Following this, banks began to assume these risks and instead used the IFC credit support to target specific niches where true support was needed. At the same time they continued to expand their EE lending to the broader market, thus illustrating the success of the program.

**v. Czech Republic Eco Energy SME grant program (2007)<sup>16</sup>**

The program ECO-ENERGY implements Priority Axis 3 “Efficient Energy” of the Operational Program Enterprise and Innovation 2007-2013. This program aims at stimulating entrepreneurs, particularly SMEs to reduce energy demand of their production, to use primary energy sources, and to promote higher utilisation of renewable and secondary energy sources.

Target	Value
<b>Number of supported energy saving projects</b>	<b>150</b>
Number of supported RES projects	300
<b>Energy savings in enterprise sector (TJ)</b>	<b>650</b>
Electricity generation from RES (GWh)	570
Heat generation from RES (TJ)	400

On 25<sup>th</sup> April 2007 the Ministry of Industry and Trade launched time limited first call for proposals for the ECO-ENERGY program (priority 3 – energy efficiency).

There were announced 4 priorities for first call of the program ECO-ENERGY:

1. Energy Savings and utilization of secondary energy sources,
2. Production of electricity and electricity and heat from RES,
3. Heating from RES,
4. Production of pellets from RES.

The subsidy ranges from a minimum of 0.5 mil. CZK to a maximum of 100 mil. CZK. From 15 % - 40 % of eligible cost is covered:

- 15% - pellets,
- 20% geothermal electricity,
- 30% - biomass, biogas, photovoltaic and heat from RES,
- 35% - SHPs,
- 40% - *energy savings and secondary energy sources*

Electronic registration forms were accepted from 1<sup>st</sup> June – 31<sup>st</sup> July 2007. The registration form of a project is successfully registered provided that the company is in good economic rating according to CzechInvest methodology (the balance sheet and income statement of each company is evaluated).

<sup>16</sup> Uses extracts from a case study done by SenterNovem “Description of the Financing Mechanisms of Structural and Cohesion Funds in Czech Republic – WP3”

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Type	Number of applications	Demand about investment subsidies ('000 CZK)	Total investment cost ('000 CZK)
<b>Energy savings</b>	<b>138</b>	<b>1,122,979</b>	<b>3,208,511</b>
Electricity from RES	379	8,815,867	30,064,792
Heat from RES	16	60,920	174,057
Pellet	7	28,129	187,527
Total	540	10,027,895	33,634,887

After the successful registration of the applicant, each investor has to keep files of all bills, and an energy audit and feasibility study must be included in the appendix of the energy project application.

Subsidies were allocated according to the priorities of the first call. These projects were ranked according to points gained on the basis of Eco-Energy evaluation.

- Support regional development - maximum 25 points
- The fulfillment of program targets - maximum 25 points
- Economical efficiency – real IRR before tax - maximum 25 points
- Ecological profits of projects - maximum 25 points.

It was necessary for a project to gain a minimum of 50 points from 100 to be eligible. Next the projects were evaluated in terms of the financial health of the applicant according to the methodology of CzechInvest, and by an external technical-economical review. These evaluations were presented by project managers in front of an evaluation committee, which gave recommendations to support or not to support the project to the Department of Structural Funds Implementation (Ministry of Industry and Trade). Approved investment subsidy will be allocated to the investor on the basis of fulfillment of these two conditions: testing operation of equipment and repayment of last bill by the investor. When an investment subsidy is approved, the project must be completed within 3 years.

Within the framework of the first call of the priority 1: energy savings and utilization of secondary energy sources, there were approved 67 projects from 98 registered. Ex-ante savings estimates are shown below.

Parameter	Energy saving (GJ/year)	Emission saving (CO <sub>2</sub> t/year)	Expenses ('000 CZK)	Subsidy from OPEI ('000 CZK)
<b>Total of 67 projects</b>	511 234	51 999	1 103 902	396 725

On 1<sup>st</sup> October 2008 the Ministry of Industry and Trade launched the second call for proposals for the ECO-ENERGY program (priority 3 – energy efficiency). There will be supported 2 main activities in the framework of this call of the program ECO-ENERGY:

- Utilization of the renewable and secondary energy sources.
- Efficiency increasing by energy production, transmission and consumption.

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### C) Conclusions

The programs we have selected vary in size, achievements and focus. Given the different levels of data available and analysis previously completed, it is difficult to accurately compare investment and savings amounts, so the estimates below should be viewed with this perspective. While theoretically the results could be easily extended to show cost of energy savings (ie. divide yearly investment by yearly savings), we have not done so to avoid potentially erroneous conclusions being drawn about instrument efficiency (ie. the true degree to which the funds were leveraged) or program success.

Country	Program	Tool and delivery channel	Yearly Investment	Yearly Savings (GJ and CO <sub>2</sub> ) <sup>17</sup>
France	Tax credit for energy efficiency materials and renewable energies	Tax credit applied to purchase price of equipment and materials (refunds apply if users don't pay income tax)	<b>Euro 1.9b</b> in 2007	Estimates not available
Germany	CO <sub>2</sub> reduction and building rehabilitation programs	Reduced interest rate loans available through commercial banks	<b>Euro 1.1b</b> <sup>18</sup> / yr in loans - average across 9 years  Euro 101-193m /yr cost of interest rate subsidies.	<b>4.4m GJ</b> <sup>19</sup>  300k t CO <sub>2</sub>
Poland	Thermal Modernization Fund	Reduced principal loans	<b>Euro 355m</b> <sup>20</sup> in total loans in 2007  Euro 64m in loan subsidies in 2007	<b>5.5m GJ</b> <sup>21</sup>
Hungary	Hungary Energy Efficiency Co-financing Program and Hungarian portion of CEEF.	Partial credit guarantees for loans made by commercial banks and ESCOs	<b>Euro 196m</b> <sup>22</sup> in investment, using Euro 97m in loans based on Euro 37m in guarantees across program life.	<b>0.3m GJ</b> <sup>23</sup>  30k t CO <sub>2</sub>
Czech Republic	EKO-ENERGIE Program – grants for energy savings and secondary energy sources	Yearly grant process using EU funds allocated by Czech Invest.	<b>Euro 41m</b> using Euro 15m in subsidies from OPEI (call 1 2007)	<b>0.5m GJ</b>  52k t CO <sub>2</sub>

<sup>17</sup> Vastly different calculation methodologies were likely applied for each program, which makes a direct comparison of each program difficult. Also note differences in terms of averages vs latest yearly values used.

<sup>18</sup> Euro 2.3b in final year - 2004

<sup>19</sup> Gross savings of 39.5 PJ across 9 years.

<sup>20</sup> Assume average Xrate of 0.26

<sup>21</sup> Based on yearly total savings estimate of 131ktoe

<sup>22</sup> Assuming a 1:1 USD/EUR exchange rate across the program life in Hungary.

<sup>23</sup> Total yearly heat savings (assuming vast majority of savings occurred in Hungary).

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	(priority 1).			
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Below we have described a series of explicit and inferred lessons learned.

<b>Program</b>	<b>Explicit lessons</b>	<b>Implications and discussion</b>
KfW CO2 program	<p>Success factors included:</p> <ul style="list-style-type: none"> <li>• well targeted information and awareness program</li> <li>• broad reach through partner banks</li> <li>• compatibility with other incentive programs allowing most investment costs to be covered by reduced rate loans.</li> </ul> <p>The participation of KfW in the program at the federal level allowed for a transparent and standardized approach and the defined “menu” of available options allowed the end-users to clearly see the link between EE and the level of incentive provided. Also, standardized templates meant that the majority of applicants actually received a loan.</p> <p>Note that even though these programs didn’t achieve the energy savings targets originally forecast, they are considered a great success and have continued to grow. KfW has effectively built a brand within Germany in relation to energy efficient housing.</p>	<p>Since the end of the CO2 programs in 2005 the KfW approach has continued to evolve, with support (grants, loans and repayment bonuses) now being provided based on combinations of measures to achieve specific kWh/year levels (100%, 70%, 55%) in relation to the new building standard (based on German Energy Conservation Ordinance).</p> <p>In terms of lessons for other countries, it is important to note that the early programs (ie. with defined, standardized options) did a lot of work in educating the market (both households and partner banks). For a country with less history in EE programs, it is probably not possible to directly copy the current German programs (targeting measures that drive specific kWh/year household consumption levels) without going through some of the earlier steps in terms of market education and development.</p> <p>However, we note that the German goal of supporting integrated measures that lead to building level savings should be the ultimate goal of all programs.</p>
French tax credits	<p>By using tax credits the French government was able to quickly deploy a program with low transaction costs and large reach in terms of technologies and end-users.</p> <p>Early results showed that windows (without the corresponding wall/roof insulation to ensure energy savings) were receiving an excessive share of funding, however this was endeavoured to be corrected by adjusting the tax credit mix (a tax credit system allows annual revisions to credit levels and technical product performance thresholds to take place relatively easily). Also, in 2009 the installation costs for thermal insulation of walls, floors, roofs and ceilings were also covered by the tax credit.</p> <p>However, by linking the incentive to the</p>	<p>As with all programs, the French system is subject to a “free rider effect”, that is, where households who would have done renovations regardless receive a tax credit. It is difficult to quantify the magnitude of this effect (past programs in Holland showed a 50% impact), however over time the Government can tune the incentive levels and eligibility measures accordingly to gain greater leverage from funding provided.</p> <p>The key risk with the tax credit system for individual measures is that it is harder to guarantee that end-users are implementing integrated packages of measures (windows and insulation and heating system), and thus may not be getting achievable levels of savings. This is being partly addressed through the introduction of additional lending products that complement</p>

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	<p>individual measure rather than a package of measures it is still less clear whether energy savings targets were reached.</p>	<p>the tax credit system and previously stated goals to move towards more overall savings or consumption based metrics (such as kWh / m2 with reference to a standard, as used by KfW).</p>
<p>Polish T mod program</p>	<p>This program (and supporting law) targeted one of the largest and most inefficient users of energy in Poland – high rise apartment or ‘panel’ buildings.</p> <p>Despite being introduced following an earlier pilot program, the Polish T-mod program had a slow start (as with many other programs), mainly due to the fact that subsidies were only applied at the end of the loan life (plus the unattractiveness of the high level of interest rates on offer at the time). As interest rates dropped and administrative procedures were updated (especially payment timing), this program grew rapidly.</p> <p>Finally, despite being applicable for individual building owners, the level of administration required to apply (ie. energy audits) meant that few individual home owners participated.</p>	<p>With many types of programs the level of administrative burden provides a good guide to which sort of customers will be able to apply. Also, with higher start-up burden, it will always take time to streamline processes and get enough supporting infrastructure such as auditors up to speed.</p> <p>In general, the impact of interest rates is a common problem for lending based tools, as program success relies on borrowing in general being attractive (ie. grants/ rebates will be more attractive in high interest rate environments).</p> <p>Designing an administration procedure based on best practice in other countries, but that directly meet the needs of the local environment, will be a key goal of any new program. Without this, it will be easy to ‘lose’ several years at the start of a program, thus making it difficult to achieve 2020 savings targets.</p> <p>Finally, it must be recognized that subsidy programs can both kick-start and limit market development. Without a decline in subsidy over time market growth will stall, as projects eligible for subsidies will continue to wait in the queue until they are awarded, rather than move ahead with what is an already attractive project.</p>
<p>Hungarian partial credit guarantees</p>	<p><i>Market enabling factors must be in place:</i> Outdated building stock, market prices for energy, favourable legal environment for product, technology is readily available, mature banking sector competing on innovation, state and EU support programs.</p> <p><i>Standardization is critical:</i> Streamlined loan procedures and EE assessment procedures. Delegate procedures to the bank. Trade-off exists in terms of gathering good energy savings data vs. having scalable product.</p> <p><i>Financing alone is not enough:</i> Guarantee alone is not enough and need close relationship with FI and provide advisory services.</p>	<p>A credit guarantee is a useful instrument to promote growth in new sectors, and the principles learned from blocks of flats can be applied to encourage banks to move into other sectors.</p> <p>In general, this approach is complementary with other lending support mechanisms (ie. interest rate reductions or grants/rebates) and could form a useful part of an early fund structure for countries with undeveloped EE markets.</p> <p>The level of support and timing of withdrawal of guarantees (and thus, the leverage of government funding) will depend on the banking environment within each country.</p> <p>Market enabling factors must be in place. The</p>

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	<p><i>Creative marketing approach:</i> EE is not necessarily the main driver for borrowers, so heavy marketing activity is required.</p> <p><i>It takes time:</i> Long development period and long portfolio build-up. Grant programs increase pipeline but can also distort the market.</p>	<p>Hungarian program was replicated in five other countries as part of the IFC CEEF, with varying degrees of success in each.</p>
Czech SME grants	<p>The Eco-Energy program targeted 150 but only approved 67 projects. Interestingly, it appears that each project will save more than originally forecast as predicted savings were in line with original targets. Presumably, there was not sufficient awareness of the grant program to achieve enough applications so that once filters were applied there were still sufficient projects remaining.</p> <p>SME grants were only awarded to those companies who displayed sufficient economic presence and who met a range of other project criteria. With such restrictions, it is necessary to get a wide number of applications to ensure sufficient volume of projects. Such awareness is likely to build over time.</p>	<p>Often programs that try to target too many sectors to increase volume face the opposite effect. If the marketing or awareness message is too diluted, certain technologies or sectors will dominate with limited interest from others. For example, funds that cover both EE in buildings and RE developers often find that RE may receive more attention.</p> <p>In the next call for this funding mechanism there appears less focus on building level energy savings, which makes it hard to build upon previous awareness generated and achieve deeper building level savings.</p>

Drawing from the programs described above and based on our experience with other markets, we offer the following as a preliminary set of principles for the design of the new NEEFs, to be further considered and developed during the second phase of this study:

- 1) **The impact of current market enabling conditions on the NEEF strategy and start-up growth phase should be explicitly addressed.** These include:
  - a) *Existence and planned implementation of supporting regulations, standards and legislation.* Without these frameworks in place and visible, alongside agencies able to support or enforce them, the NEEF will be limited in the sectors it can target. Any mismatches between NEEF goals and the timing of implementation of these market enablers will manifest in slowed fund deployment. Financing tools, whatever they may be, will have no uptake if the pre-conditions are not in place to facilitate investment in the targeted sectors.
 

As some examples of this consider that: i) building savings targets relative to standards only make sense if these are being enforced; ii) multifamily block house apartment buildings can only be upgraded if appropriate legal frameworks are in place to facilitate investment in these properties, and iii) municipalities can only utilize ESCO services if the appropriate procurement and budgetary rules are enacted.
  - b) *Analysis of current and forecast energy prices.* The business case for energy efficiency is often hampered by the existence of below market rate electricity prices or market distorting cross-subsidies between sectors. NEEF growth expectations need to take into account current pricing levels and be consistent with expected changes to pricing structure over time.

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- c) *Availability of appropriately priced technology, energy professionals (eg. energy auditors) and skilled tradesmen.* Significant TA is often needed to boost supporting infrastructure while new markets are developed.
  - d) *Description of existing financing options.* An understanding of players, available term, interest rate and customer segments, with an assessment of how NEEF will interact with them is essential to ensure that the NEEF is designed to complement, rather than compete with, existing sources.
- 2) The implementing agency and delivery channels should be structured to maximize the chances for widespread deployment of funds.**
- a) In general, new programs take time to develop which means that, where available, *NEEFs may best build upon existing programs and organizations within the country* rather than import a completely different funding template or organizational model from another country. Often it is tempting to think that a brand new public or quasi-public organization will overcome entrenched interests that have focused (or limited) the growth of current programs. However, in our experience what often happens is that the new entity proves to be equally bureaucratic and quickly develops its own set of entrenched interests which also limit broader growth. Therefore, before significant resource is allocated to institution building, we recommend that clear analysis be conducted demonstrating why providing existing entities with clear goals and more influence, resources or tools is not an appropriate strategy.
  - b) Whether each NEEF is solely a source of funding or will manage and deploy funds itself is a question for respective governments, however converting energy efficiency finance into a ‘mainstream’ activity requires the use of mainstream channels. *Developing completely new distribution channels is an ambitious goal at best*, as there is little evidence that players such as commercial banks, utilities and equipment vendors won’t fully support EE initiatives if provided with some level of funding support.
  - c) The existence of *competing or complementary goals between the NEEF and other ongoing programs should be explicitly described.* For each segment, a clearly responsible authority, transparent funding mechanism and a long term program commitment are required to achieve program success.
- 3) The administration burden placed on fund recipients should be tailored to the segment targeted.**
- a) For most of the programs assessed the level of savings measurements were not particularly rigorous (especially ex-post), which is likely due to a cost benefit trade-off amongst program designers (or due to political considerations in some). Especially when accessing the household sector, *the costs of very accurately measuring energy savings do not offset the benefits of more detailed assessments or administrative procedures.* Typically this is addressed by defining lists of eligible product types for smaller projects, while only requiring more costly upfront analysis in the case of larger commercial premises or blocks of flats.
  - b) *Standardization of supporting tools* (eg. building modelling, energy auditing, product guidelines) for smaller projects is the key to widespread deployment. Simply taking existing standards and applying them (eg. energy audit standards for large enterprises and applying them to the residential sector) will not produce cost effective results.
  - c) NEEF design should *explicitly comment on the trade-off between savings accuracy and all program goals*, and monitor this assumption over time. In the past, the impact of “free-riders” on a program has not typically been assessed due to the complexity in making accurate calculations. The same applies where energy savings goals are mixed with political objectives including regional infrastructure development, upgrading social housing or boosting employment.

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- 4) **The level of incentive must be tailored to local market conditions, however should be clearly linked with supporting long term growth on a commercial basis.**
- a) *All subsidy needs to be defined by constantly updated analysis of real market needs* – or else the market will be distorted and less, rather than more, investment occurs. There should be clear and transparent guidelines and sunset provisions. Market stability is required so that equipment manufacturers and supporting contract and service organizations can build their business in a sustainable fashion, without the ‘boom-bust’ issues that have plagued some renewable energy markets. To provide transparency, average subsidy level can be assessed at the user level or, although imperfect, also on a societal basis.
    - i) At the user level the NEEF can set income or payback guidelines, however this will require a huge administrative operation to review eligibility.
    - ii) Alternatively, the NEEF can set societal guidelines based on average energy prices, average household incomes, or average paybacks to determine annual subsidy levels or when subsidies should be phased out.
  - b) *Similarly, the funding mechanism should be designed to evolve with market need.*
    - i) Guarantee funds in emerging markets should reduce coverage over time and eventually be withdrawn as lending becomes a mainstream activity. The path and thresholds for this to occur should be made clear upfront.
    - ii) Tax credits designed to spur the provision of cost effective materials should also have a clearly defined life. Once a threshold is reached (ideally certain volumes produced to achieve scale manufacturing even as subsidies have been significantly reduced over time) then follow-on financial products (such as subsidized loans for integrated measures) should be in place to avoid a steep fall in demand.
- 5) **The type of incentive should be consistent with the goal of supporting integrated projects that provide deep savings.**
- a) There is no singular, “right”, funding mechanism, and *a number of financial and fiscal incentive structures are possible* provided that the programs are focussed on a target segment and aligned with market enabling conditions.
    - i) Each country is starting from a different experience base, economic position and cultural perspective. Moving straight to the advanced integration level of the KfW German program example is not possible for all.
    - ii) Guarantee funds and/or higher levels of grants can initially help define the EE market in emerging market sectors.
    - iii) Tax credits are less attractive where tax is regularly avoided, upfront loan subsidies are more attractive where savings levels are low and the attractiveness of interest rate discounts varies depending on the level of price stability already existing in the market.
  - b) *HOWEVER, country level savings targets will only be confidently met if the NEEF is designed so that the financial tools ultimately support integrated and comprehensive measures.* The incentives used should therefore converge over time across countries, and the NEEF design should lay out how this evolution is expected to occur.
    - i) Tax credits help promote the sale (and provide manufacturers with scale to reduce costs) of particular technologies while subsidized loans help end-users avoid capital cost incurred “cash-flow” impacts.
    - ii) Longer term, the NEEF should structure each tool so that integrated measures are encouraged and the incentive type used changes to support this. A tax credit or loan for new energy efficient windows will create very little energy savings unless the wall and roof insulation and heating/cooling system are also efficient.
  - c) A useful approach employed in a number of countries is to *apply differential subsidy levels depending on project scope*, that is, bigger incentives to those projects that put in place integrated measures where energy savings are deeper or more certain. To achieve savings goals these incentives should apply regardless of

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recipient economic position. To date the most effective way to achieve this is to offer interest rate subsidized long term loans.

- d) Finally, over time the NEEF plan should *show a path as to how the integrated projects perform relative to the relevant building performance standards*, consistent with EU policy.

Notwithstanding the above five points, we offer the following final observations. Many EE initiatives have been attempted over the last forty years across the world, and there are countless more reports that describe the massive potential and compelling economics for EE projects. There is a lot of experience and institutional capability to build on, however the reasons preventing widespread project deployment are still not completely clear. For example:

- Lack of money or financing options?
- Too much reliance on subsidies?
- Not enough education?
- Ingrained cultural complacency?
- Structural or institutional barriers?
- Inability to clearly explain the business case and benefits?
- Poorly chosen delivery mechanisms?

In our opinion, the problem is a bit of all of the above...., and the real answers differ sector by sector, country by country. However, we can make a series of generalizations that should be considered in the context of NEEF business planning:

1. Only a small percentage of populations in each end user segment (industrial, commercial, household) ever take EE investment decisions based on an altruistic desire to save energy. Probably all investments thusly motivated have already been done.
2. Only a slightly larger percentage of populations in each end user segment take EE investment decisions motivated purely by straightforward economics. Only the most heavily energy intensive of industries and institutional users have energy costs as a high enough portion of overall expenses that they are sufficiently motivated to prioritize such investments in and of themselves. Most of those investments have probably already been made... except in emerging economies where delivery of expertise and finance may still be lacking.
3. The vast majority of EE investment occurs only at the point of decisions related to broader production, maintenance, performance, comfort and equipment replacement issues. Households add insulation because they want greater comfort, consumers replace their refrigerator when it stops performing well or when new refrigerators come on the market with more attractive consumer features, manufacturers think about EE investments in the context of installing new production lines, commercial building operators think about providing automation services that will help them attract tenants. Therefore, in our opinion, the key to achieving the type of huge ramp ups in market penetration is “mainstreaming” EE decisions so that they become a consideration in all decisions about building and equipment upgrades that are taken within normal business and household investment cycles. For 40 years policymakers have been trying to find the golden key to EE creativity that will unlock supposed huge pent up consumer and business investment demand once decision-makers finally “see the light” that such investments are in their best interest. In our view the key is to channel both educational and financial resources through existing market mechanisms – commercial lenders and leasing companies, engineers and architects, vendors and contractors, DIY stores etc. which consumers and businesses already look to when making their normal cycle building improvement investment decisions.
4. Often subsidy is essential – sometimes it’s a curse. It is evident that in emerging economies where household incomes are low the cost of amortizing EE investments in residential buildings, particularly in the blockhouse sector, is not affordable without some level of subsidy. We see this very clearly for example in Ukraine, the West Balkans and the former CIS. The danger with subsidy though is that it is the best political largesse ever

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created and thus difficult to make go away when not needed. That wouldn't be so terrible (there are arguably far worse ways to waste taxpayer money) if it didn't lead to unwanted market constraints. Once programs become institutionalized and define the market for EE investments, then the amount of investment that occurs this year is constrained precisely by the amount of subsidy available each year. When the subsidy runs out investment is postponed by anyone left waiting in the queue. If you are mayor of a small town, far better to re-apply next year or the year after, or wait even four years so you can bring home the "bacon" rather than invest today (using funds that politically are seen as "taking away" from other initiatives) and get your money back in savings in 12 months.

5. Sometimes barriers to EE are just confoundingly country culture specific and there is no way around it. For example, various versions of the ESCO model have been very successful in some countries and abject failures in others. There are no simple answers, you have to examine different prevailing trends, customs and industry organization in each country to assess chances for program success.

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### IV. REFERENCES

We reviewed a large number of reports and documents, of which a selection of the most relevant background data sources are described below. Note that the MURE database was the starting point for the bulk of our research, augmented with country specific reports and presentations as described below.

Focus	Source	Description
EE policy in the EU	MURE database <a href="http://www.mure2.com">www.mure2.com</a>	Database of important energy efficiency measures implemented in the EU, including descriptions and estimated impact.
Climate change policies and measures	IEA database <a href="http://www.iea.org/textbase/pm/index_clim.html">http://www.iea.org/textbase/pm/index_clim.html</a>	Database of energy-related policies and measures taken or planned to reduce greenhouse gas emissions, including financial and incentive policies and the building sector as a target.
EE policy in the EU	ADEME report (2008) – Energy efficiency in the European Union: Overview of policies and good practices	Report describing EE in general including some relevant case studies of financing programs.
EE policy in the EU	AID-EE report (2007) – Success and failure in energy efficiency policies: Ex-post evaluation of 20 instruments to improve energy efficiency across Europe	Assessment of impact of 20 different EE policies (including several financial incentives).
Financial and fiscal incentive programs in Europe	EuroAce working paper (2009) – Current financial and fiscal incentive programmes for sustainable energy in buildings from across Europe	Overview of new and ongoing financing programs in all EU countries (typically these descriptions don't include results due to a lack of operating history).
Climate change policy instruments in buildings	UNEP report (2007) – Assessment of policy instruments for reducing greenhouse gas emissions from buildings	Assessment (based on work done for IPCC) of best policy instruments to reduce greenhouse gas emissions from buildings.

#### Databases

- MURE (Mesures d'Utilisation Rationnelle de l'Energie) database. [www.mure2.com](http://www.mure2.com)
- IEA energy efficiency policies and measures database. <http://www.iea.org/textbase/pm/?mode=pm>

#### General Reading

- ADEME report – Energy efficiency in the European Union: overview of policies and good practices, 2008.
- ADEME report – Evaluation of Energy Efficiency in the EU15: Indicators and measures, 2007.

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- AID-EE report – Success and failure in energy efficiency policies: ex-post evaluation of 20 instruments to improve energy efficiency across Europe, Ecofys, March 2007.
- AID-EE report – From theory based policy evaluation to smart policy design, Ecofys, April 2007.
- Council of European Energy Regulators report – Status review of renewable and energy efficiency support schemes in EU, December 2008.
- BASE report – Public finance mechanisms to increase investment in energy efficiency: A report for policymakers and public finance agencies, 2006.
- EC DG-TREN report – Study on the energy savings potentials in EU member states, candidate countries and EEA countries: Final report, March 2009.
- Eurima report – Better buildings through energy efficiency: A roadmap for Europe, 2006.
- EuroACE report – Investing in building energy efficiency in the enlarged European Union, Klickenberg Consultants, 2006.
- EuroACE report – Towards energy efficient buildings in Europe, Rod Janssen, June 2004.
- EuroACE report – Working paper: current financial and fiscal incentive programmes for sustainable energy in buildings from across Europe, Association for the Conservation of Energy, September 2009.
- EUFORES brochure – Promoting energy efficiency in Europe: Insights, experience and lessons learnt from the national energy efficiency action plans, Energy Efficiency Watch, 2009.
- Intelligent Energy Europe report – Financing energy efficiency and renewable energy projects: Best practice manual, 2007.
- JRC EC report – Electricity consumption and efficiency trends in European Union: Status report, 2009.
- MURE report – Guidelines for the description of measures in the MURE Measure Database, Fraunhofer IFI, June 2005.
- MURE presentation – What is MURE and why MURE, 2004.
- Swedish Energy Agency report – Evaluation and monitoring for the EU directive on energy end-use efficiency and energy services: Assessment of existing evaluation practice and experience, April 2008.
- United Nations Environment Program report – Assessment of policy instruments for reducing greenhouse gas emissions from buildings, Central Eastern University, 2007.
- United Nations Environment Program Finance Initiative report – Energy efficiency and the finance sector, Kirsty Hamilton, January 2009.

### **Country Specific Source Material**

#### **France**

- ADEME presentation – Policy and measures in the building sector, Stephane Pouffary, December 2009.
- ADEME report (MURE) – Energy efficiency trends, policies and measures in France (1990 – 2007), September 2009

#### **Germany**

- AID-EE report – Evaluation of KfW Soft Loans for Building Modernisation, Katarina Korytarova, May 2006.
- KfW presentation – Product Development Housing Programmes, Gudrun Gumb, June 2009
- IDAE report (MURE) – Energy efficiency policies and measures in Spain, September 2009

#### **Italy**

- AEEG presentation – Distributor obligations and white certificates in Italy, Marcella Pavan, April 2009.
- ENEA report (MURE) – Energy efficiency policies and measures in Italy, September 2009

#### **Spain**

- ENEA report (MURE) – Energy efficiency policies and measures in Italy, September 2009

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### **Czech Republic**

- SenterNovem case study – Description of the financing mechanisms of structural and cohesions funds in the Czech Republic.
- Seven presentation – Energy saving measures in buildings and combinations in realization and financing, Vladimir Sochor, July 2009.
- CzechInvest website – Eco Energy calls I and II.

### **Estonia**

- Kredex presentation – Revolving fund with EU structural funds for energy efficiency in multi-apartment buildings in Estonia, Mirja Adler, September 2009.

### **Hungary**

- IFC SmartLessons – Lending to a Different Animal: Energy Efficiency Renovation of Multi-Family Housing Buildings in Hungary, Tibor Kludovacz, May 2008.
- IFC SmartLessons – Lessons in Promoting Energy Efficiency, Eluma Obibuaku, May 2007.
- IFC Report – Financing Energy Efficiency: Lessons from Brazil, China, India, and Beyond, 2008.
- IFC presentation – CEEF in the Building Sector, Tibor Kludovacz, June 2008.

### **Lithuania**

- BKA presentation – Financing housing renovation in Lithuania, Valius Serbenta, February 2006.
- Housing and Urban Development Agency presentation – Modernization of multifamily buildings in Lithuania, Valius Serbenta, February 2008.
- Ministry of Economy – Energy Efficiency Action Plan, December 2008.

### **Poland**

- NFOSiGW brochure – The national fund for environmental protection and water management.

### **Romania**

- World Bank report - Financing Energy Efficiency, Lessons from Brazil, China, India, and Beyond, 2008.