Effective Policies for Improving Energy Efficiency in Buildings

Krakow, Poland, 12-14 September 2007


Editors: Paolo Bertoldi and Bogdan Atanasiu
The mission of the JRC-IES is to provide scientific-technical support to the European Union’s policies for the protection and sustainable development of the European and global environment.

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  Ryszard ZWIERCHANOWSKI - Polish Energy Conservation Agency (KAPE), Poland

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Workshop summary

After Ispra-2003, Brussels-2004, Tallin-2005, Budapest-2006, the fifth edition of the JRC Enlargement workshop on electricity end-use efficiency and energy services was organised in Krakow, Poland between 12 and 14 of September 2007.

The overall aim of the workshop was to contribute through data gathering and expert discussions to the implementation of the new energy efficiency measures and policies in New Member States, Candidate and neighbouring countries in the building sector and to foster a real market for energy efficiency, with a particular focus on the implementation of EPBD and EE&ES Directives and the European Commission Action Plan for Energy Efficiency for achieving a 20% reduction in energy consumption by 2020. According with this aim, through the three days of the workshop the main topic of the presentations and discussing were: financing end-use efficiency, national energy efficiency Action Plans, energy services companies and developed projects, policies and programmes. The 32 presentations from the Agenda were structured in 4 sessions:

1. Financing Energy Efficiency Projects
3. ESCOS projects
4. Policies and Programmes for Appliances, Equipments and Lighting in the Building Sector

Mr. Bertoldi from DG-JRC opened the workshop introducing the recent developments of EU energy efficiency policies related to buildings and highlighted the EU targets for 2020, presenting the Action Plan for energy efficiency, the labelling Directives, the Eco-design framework Directive, the Energy performance of buildings Directive, the Energy Services Directive, and subsequently financial aspects and instruments (white certificates).

The first session of the workshop, focused on financing instruments and projects for energy efficiency, concentrated together the achievements of international financial institutions and local commercial banks, funds, ministries and investing consultants. Over the session were presented financial instruments, mechanisms and case studies of implemented projects for energy efficiency in buildings, both by International (EBRD, IFC-CEEF) and National (Unicredit, Bulgaria, Dexia, Slovak Republic, Bank Gospodarstwa Krajowego, Poland) institutions and banks. Greenmax Capital Advisors (Consultancy Company) presented an innovative mechanism and shared the experience in financing energy efficiency in buildings from NMS and CC. An interesting presentation about the Green Investment Scheme in Hungary was done by the representative of Hungarian Ministry for Environment and Water and the UNECE speaker shown the potential for financing energy efficiency in buildings through the UNECE EE 21 Project.

The second session, comprising speeches held by representatives of National States Ministries or Energy Agencies, offered a panorama of the new National Action Plans for Energy Efficiency (EENAP) in several NMS (KAPE-Poland, CEA-Czech Republic, RTU-Latvia, ARCE-Romania, JSI-Slovenia, ECH-Hungary, SIEA-Slovak Republic), showing the status, the main priorities foreseen but also indicating the main barriers in future implementation.

An evaluation of the Energy performance of Buildings Directive (EPB) implementation results in NMSs was done by the REEEP representative. The reports covers: the main findings on the impact of the 2004 Enlargement in the field of energy efficiency, the current energy efficiency policies and measures, the status of transposition of the EPBD in, challenges for the transposition and effective implementation of the EPBD and recommendations for the buildings sector.

The Rockwool International speaker presented after a very comprehensive analysis of the EENAP but also the level of harmonisation and the status of implementation for the EPB Directive in European Union, summarising in this way the second session of the workshop.

The third session of the workshop was focused on energy services companies and included presentations of the experience in five countries in developing projects on energy efficiency in buildings. After the first presentation of the Central European University representative who presented the major findings of the last ESCO market report prepared by DG_JRC, the representatives of Siemens BT-Poland, Honeywell-Poland, POE-'ESCO'-Krakow-POLAND, REC-Estonia, EL-TEC Mulej-Slovenia, Bulgarian Energy Efficiency Fund-Bulgaria and National Energy Conservation Agency-
Poland showed the main results, the market barriers and the lessons learned concerning ESCOs activities in their own country.

The fourth session of the workshop was devoted to policies and programmes for appliances, equipments and lighting in the building sector. Mr. Atanasiu of DG-JRC opened the session presented the last 2006 JRC report on Electricity Consumption and Efficiency Trends with particular attention to the NMSs, report who was also distributed through the participants during the three days of the event. GfK presentation highlight the last market trends for appliances sales on EU market in terms of energy efficiency, it is interesting to note that the appliance market in terms of energy performance is almost identical between EU-15 and EU-12 MS.

The EURIMA (European Insulation Manufacturers Association) presentation about ways to improve the energy performance of buildings ended the first part of the day offering, together with the previous presentations, a complete overview of the consumption status and the energy savings potential in European Union.

The second part of this session was dedicated to the presentations of the three initiatives of European Commission, managed by DG-JRC and supported by IEE additional projects: GreenLight (presented by KAPE-Poland representative), MotorChallenge (presented by KAPE-Poland representative) and GreenBuilding (presented by Mr. Bertoldi, EC DG-JRC).

A lot of fruitful and interesting debates started after each presentation and were continued during the general discussions organised after each session.

All the presentations can be also found and downloaded on-line on the EC DG-JRC energy efficiency site at: [http://re.jrc.ec.europa.eu/energyefficiency/](http://re.jrc.ec.europa.eu/energyefficiency/)

To the success of the workshop contributed around 60 participants from 18 European Countries, representing national ministries and local administrations, energy agencies, universities, local energy companies, International and European financing groups, commercial companies and industry associations.
Session 1:
Financing Energy Efficiency Projects

Chair: Paolo BERTOLDI, European Commission DG JRC
European Policies for End-use Efficiency

Paolo Bertoldi
European Commission DG JRC

EU Targets for Renewable Energy and Energy Savings

• Double the share of renewable energy in national gross energy consumption from 6% to 12% by 2010 and the new target adopted by the Heads of State in March 2007 of 20% by 2020.

• Increase the share of green electricity in total electricity consumption from 14% to 22% by 2010 (the RES-E Directive). This target will be met!

• Raise the share of biofuels in the transport fuel market to 5,75% by 2010. The Commission therefore proposes reinforcing the legislative framework, with a 10% minimum for the market share of biofuels in 2020.

• Reduce energy consumption by 20% by 2020.
Action Plan for Energy Efficiency

Realising the potential

October 2006

Improving energy efficiency

Realising the over 20% estimated savings potential in EU annual primary energy consumption by 2020
Action Plan: the Strategy

- mobilising the general public, policy-makers at all levels of governments and market actors

- to transform the internal energy market to provide EU citizens with the globally most energy-efficient infrastructure, buildings, appliances, processes, transport means and energy systems available

Action Plan: the saving potential

Target Energy Saving Potential: 20% by 2020

Energy efficiency potential in different sectors:

- Manufacturing industry: up to 27%
- Transportation: up to 30%
- Commercial buildings: up to 26%
- Households: up to 25%
In theory market will achieve the best result, but...

- Financial obstacles
- Insufficient regulatory action
- Lack of market for energy efficiency
- No transparent and cost-reflective prices
- Lack of information and education

Action Plan: policies and measures

I. Dynamic energy performance requirements for energy-using products, buildings and energy services
II. Improving energy transformation
III. Moving on transport
IV. Financing energy efficiency, economic incentives and energy pricing
V. Changing energy behaviour
VI. International partnerships
Improving energy efficiency in energy-using products, buildings and services

1. Appliance and equipment labelling and minimum energy performance standards

2. Building performance requirements and very low energy buildings (« passive houses »)

The EU passed a Framework Appliance Energy Labelling Directive in 1992 (92/75/EEC) followed by implementing Directives for the following appliances:

- Cold appliances (Directive 94/2/EC of 21.1.94)
- Clothes washers (Directive 95/12/EC of 23.5.95)
- Clothes dryers (Directive 95/13/EC of 23.5.95)
- Washer-dryers (Directive 96/60/EC of 23.5.95)
- Dishwashers (Directive 97/17/EC of 7.5.97)
- Household lamps (Directive 98/11/EC of 27.1.98)

Recently adopted (2nd generation): implementing directive 2003/66/EC on refrigerators and freezers (A+/A++)
Eco-Design of Energy Using Products Directive

- Framework Directive
- Focus on energy-using products over life-cycle
- Complementary with Buildings and Energy services directive

Scope

- Energy using products *covered by implementing measures* (no immediate requirements on products)
- EuP parts (if placed separately on the market and can be assessed environmentally)
- Means of transport excluded
**EuP features : Structure**

- EuP framework does not create immediate obligations for manufacturers but allows the Commission to do so through implementing Directives;

- Proposed draft implementing measures or voluntary agreements are first discussed with stakeholders in the Consultation Forum; Impact assessment precedes the submission of Commission draft measures;

- Implementing measures are adopted by the Commission assisted by a regulatory Committee;

- Stakeholders participate throughout the whole process (studies, impact assessments, preparatory discussions within the Consultation Forum);

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**Principles for setting eco-design requirements**

- assure proper and timely consultation of stakeholders;
- look for an adequate balance between the requirements envisaged, its technical/economic feasibility and appropriate adaptation deadlines and time schedules for application;
- give due consideration to self-regulation by industry;
- use mature methods, when available (e.g. least life cycle cost for energy consumption in use);
- use evidence available through other Community activities;
- Member state legislation is taken into account when preparing implementing measures;
Implementing measures

Implementing measures are proposed for products which:

- represent a significant volume of sales and trade in the internal market (indicative threshold: 200,000 units/year)
- involve a significant environmental impact and
- present a significant potential for improvement

The entire life cycle of the product will be considered

Other aspects (product performance, health & safety, impact on consumers, manufacturers' competitiveness) are taken into account
Structure of the Methodology

1. PRODUCT DEFINITION, STANDARDS & LEGISLATION

2. ECONOMICS & MARKET

3. CONSUMER ANALYSIS & LOCAL INFRASTRUCTURE

4. TECHNICAL ANALYSIS EXISTING PRODUCTS

5. DEFINITION OF BASECASE

EuP EcoReport

6. TECHNICAL ANALYSIS BEST AVAILABLE TECHNOLOGY (BAT)

7. IMPROVEMENT POTENTIAL

8. POLICY, IMPACT AND SENSITIVITY ANALYSES

Planning for the adoption of eodesign implementing measures *

<table>
<thead>
<tr>
<th>Product category</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public street lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batteries, chargers, power supplies</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Computers</td>
<td></td>
<td></td>
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<tr>
<td>Televisions</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Standby and off-mode losses</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Office lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic refrigeration, freezers</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Washing machine, dishwasher</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Boilers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water heaters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imaging equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial refrigeration, freezers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room air conditioning</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Electric motors, pumps, fans</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Domestic lighting (part I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study phase</td>
<td></td>
<td></td>
<td>May 2009</td>
</tr>
<tr>
<td>Outlining measure, impact assessment I</td>
<td></td>
<td>May 2008</td>
<td>May 2009</td>
</tr>
<tr>
<td>Drafting measure, impact assessment II</td>
<td>May 2008</td>
<td>May 2008</td>
<td>May 2009</td>
</tr>
<tr>
<td>Commission adoption phase **</td>
<td>May 2008</td>
<td>May 2008</td>
<td>May 2009</td>
</tr>
</tbody>
</table>

* Assumption: Committee and EP are immediately in favour of the draft
** Could take from 4 to 12 months depending in particular on discussions on reinforced scrutiny by EP - includes WTO notification and translations
Objectives

- Promoting the improvement of energy performance of buildings within the EU through cost-effective measures
- Convergence of building standards towards those of Member States which already have ambitious levels

Proposed measures

- Methodology for integrated buildings energy performance standards
- Application of these standards on new and existing buildings
- Certification schemes for all buildings
- Inspection & assessment of boilers/heating and cooling installations
Financing energy efficiency

- Facilitating appropriate financing of energy efficiency investments for SMEs & Energy Service Companies; private-public partnerships; clearing houses;

- Performance contracting; energy audits;

- Spurring energy efficiency in new Member States - Structural & Cohesion Funds;

- A coherent use of taxation

The Energy Services Directive: the national energy saving target

- Measured from 1.1.2008 until end of 2016.
- 9-year 9% target (1% cum annual savings).
- Indicative but carefully monitored & reported.
- Fixed amount of energy (TWh) calculated as 1% of 5-year average of unadjusted final cons.
- Credit for some “early actions” >1995.
- All measures must be verifiable and measurable or estimable. (Details Annexes I, II, III & IV.).
- Member States have to submit National Action Plans, to show how they intend to meet the target
- Commission to consider White Certificates
Calculating the Target

- Reference consumption = 5 years average
- Target savings = 9% of reference consumption

Other provisions

- Member States and suppliers to promote energy services & energy efficiency measures.
- Obligation for energy distribution and/or retail energy sales companies to provide energy services, energy audits, energy efficiency measures.
- Energy companies to help remove market barriers, and not hinder EE market development.
- Energy suppliers to provide to net-bound & domestic hot water customers: competitively priced, accurate individual meters + information on time of use.
- Billing based on actual & relative consumption & presented in understandable terms.
- Appropriate information on energy costs & previous consumption.
- Billing frequently enough to enable customer to regulate consumption.
Policies for the industrial sector

Energy management system to be adopted at EU level

Fig. 2: Tools and instruments to increase energy efficiency in industry (source: E.V.A.)

European Experience on Tradable Certificates for Energy Savings (White Certificates)
Energy Saving Quotas/Obligations

- A possible market-based policy portfolio oriented towards end-use energy efficiency could comprise energy-saving quota for some category of operators (distributors, suppliers, consumers, etc.).

- The quota is achieved by saving associated to projects.

- The savings would be verified by the regulator and certified by means of the so-called "white" certificates (tradable certificates for energy savings).

- The savings or the certificates or the quota could be traded;

Savings obligations and tradable certificates for energy savings

Four key elements of a White Certificates Scheme:

- the creation and framing of the demand (government set the overall target and its apportioning).
- the tradable instrument (certificate) and the rules for trading,
- Institutional infrastructure and processes (such as measurement and verification) to support the scheme.
- A system of sanctions in the case of non compliance
 Tradable certificates for energy savings (TCES) in Europe

- In Europe variations of this policy mix have been introduced in Italy, Great Britain, and since July 2006, also in France.

- The Netherlands and Poland currently considering the implementation of a white certificate system.

- In Flanders (Belgium) and in Ireland there are savings obligations imposed on electricity distributors without certificate trading option; saving obligations on electricity and heat distributors in Denmark.

General features of the Italian white certificate systems

- Targets in primary energy consumption on electricity and gas grid distribution companies with more than 100,000 customers; by the end of 2007 the Government is expected to set rules for distributors under this threshold;

- Targets set on an annual basis for the period 2005-2009. The mechanism is planned to deliver energy savings equivalent to 5,8 millions Tonnes of Oil Equivalent (Toe) in the five year target period.
General features of the British EEC

- EEC runs in 3-year cycles 2002-2011,

- In EEC-1 (2002-2004) all gas and electricity suppliers with 15,000 or more domestic customers had to deliver a certain quantity of ‘fuel standardized energy benefits’. Target in EEC-1: 62 fuel standardized TWh, total delivered savings: 86.8 TWh.

- In EEC-2 (2005-2007) the threshold for obligation increased to 50,000 domestic customers. The target increased to 130 TWh.

General features of the French white certificate system

- Targets (for the period 2006-2008) for energy suppliers delivering electricity, gas, domestic fuel (not for transport), cooling and heating for stationary applications;

- A threshold for the imposition of a savings target is set at 0.4 TWh/year (5,000 liters in case of domestic fuel);

- Total target of 54 TWh final energy (cumulated), individual targets in proportion to market sales in the residential and tertiary sectors;

- Excluded: EU ETS plants, fuel substitution between fossil fuels, savings resulting only from measures implemented to comply with current legislation.
**Conclusions**

- The EU is very committed to reducing CO2 emissions beyond the Kyoto obligation, **20% reduction by 2020**.
- Policy makers recognise energy efficiency as a key component of the CO2 reduction strategy together with the ETS.
- Energy Efficiency is also key for the **security of supply**.
- EU Directives for buildings, equipment and imposing **9% over 9 years** saving target to Member States are important elements.
- It is also recognised the importance of **creating a market for energy efficiency**, through white certificates and ESCOs.

**THANK YOU FOR YOUR ATTENTION**

If you have questions contact me at

paolo.bertoldi@ec.europa.eu
The EBRD and Energy Efficiency

Background:
- energy intensity of EBRD region;
- centrality of energy efficiency to transition;
- specialised energy efficiency team with ten years experience;

G8, EU policy developments; EBRD Sustainable Energy Initiative launched in 2006:
- scaling up;
- mainstreaming;
- stronger partnerships.
What does the EBRD bring to energy efficiency projects?

- Strategic focus – SEI is at the top of the Bank’s agenda;
- Investment and risk taking capacity;
- Specialised expertise – engineers, policy experts, carbon finance;
- Bankers with mainstreamed energy efficiency know-how and business objectives;
- Local presence and knowledge;
- Proven capacity to manage complex technical assistance;
- Proven capacity to manage donor funds;
- Proven capacity to combine all of the above in a single package / product.

Sustainable Energy Initiative

The SEI covers 6 components

- stand alone industrial energy efficiency;
- sustainable energy financing facilities (SEFFs);
- cleaner supply;
- renewables;
- municipal infrastructure;
- carbon finance.

SEFFs: Energy Efficiency Facility in Bulgaria, Romania and Slovakia and Ukraine. Pipeline projects in Russia, Western Balkans, the Caucasus and New Member States.
The SEFF model: what and why

EE investments make financial sense but often don’t happen due to:

- low awareness; low prioritisation;
- poor interface between technical and financial planning;
- weak supplier/installer capacity;
- lack of FI appetite for smaller projects;

The SEFF approach has four elements:

- Market Demand Study
- Targeted EBRD credit lines to PBs
- TC for marketing and awareness raising, project preparation, training and capacity building;
- Performance fees to PBs and sub-borrowers
Advantages of Model

- Relies on local private banks competing against each other;
- Strong incentives for both banks and end-borrowers;
- Built-in project preparation facility
Bulgarian Residential Energy Efficiency Credit Line

- ‘One-Stop-Shop’ integrated package of loans, grants and technical assistance
- Designed by the EBRD and the Bulgarian Government with support from Kozloduy IDSF
- Initiative launched in 2005, aiming to stimulate and accelerate EE investments in residential sector

Overview REECL

- EBRD Credit Line EUR 50 million
  - Financially intermediated by 6 local Bulgarian banks
- KIDSF Grant Support
  - Technical Assistance
  - Incentives to Sub-Borrowers and Banks (upon completion and performance-based)
- Sub-Borrowers = Individual Households
  - Grant support @ 20% of related loan amount (capped)
### Results Up-to-date

- **Number of sub-loans:** 8,360
- **Average size of sub-loans:** EUR 1,500
- **Total disbursements:** EUR 12 million
- **Electricity equiv. saved:** 54,826 MWh/y
- **CO₂ emission reduction:** 82,097 Ton/y

### Types of Investments

- **Energy efficient windows:** 52%
- **Heat pump systems:** 16%
- **Wall, roof, floor insulations:** 14%
- **Efficient gas boilers:** 10%
- **Solar water heaters:** 4%
- **Efficient biomass stoves/ boilers:** 4%
Technical Assistance

- List of eligible equipment
  - Technical specifications and
  - Minimum energy efficiency characteristics

- List of eligible suppliers

- Marketing, screening of applications, verification (desk-based and spot checks)

Outstanding Issues

- Current approach is sub-optimal as up to now loans extended only to individuals

- Households not organized in Associations (legal entities) under the Bulgarian Condominium Law

- Level of incentive @20% similar with VAT (underground economy)
**Accelerating Uptake**

- Incentivising EE in communal spaces (building envelope thermal insulation) with increased grant support
  
  i.e. 30% of the loan amount if at least 50% of the households in a block of flats apply collectively;

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**Slovakia SEFF**

- Designed by the EBRD and the Slovak Gov. with support from Bohunice IDSF (main donor EU)
- Industrial EE, RE and residential EE
- EBRD credit line = EUR 60 million
  - Rolled-out by several local banks
  - Anticipated utilisation for residential EUR 30 million
- Grant support from BIDSF
  - Technical Assistance to Sub-Borrowers and Banks
  - Performance-Based Incentives to Sub-Borrowers and Banks
Eligibility for Residential EE

- Eligible Borrowers:
  - housing associations
  - building management companies

- Level of incentives for sub-borrowers
  - 20% of the loan amount, payable upon completion and verification

- Minimum Energy Savings = 15%.

Project Description

- Complex thermal rehabilitation projects of the blocks of flats consisting in the insulation of the building envelope +
  - efficient boilers, micro-cogeneration
  - Metering and controls
  - individual heat consumption measurement systems
  - new double-glazed windows new radiators
  - urban renewable energy systems
Technical Assistance

- Simple Energy Audit (SEA) + Energy Performance Certificate (EPC)
- Assistance the sub-borrowers in making financing applications to banks
- Monitoring progress of projects financed
- Verifying implementation of sub-projects

Technical Assistance

- The SEA will review and analyse the existing situation:
  - annual energy consumption per month and energy carrier and establishment of specific consumptions per m² and per person
  - technical condition of the:
    - building envelope and existing insulation
    - heating systems, incl. boiler and network
    - electricity supply and internal distribution network
    - technical condition of the air conditioning and ventilation systems
    - technical condition of the lighting systems
The SEA will propose necessary measures and investment projects that will reduce significantly energy consumption including for each project:

- an estimation of the investment costs
- an estimation of the expected savings in terms of physical energy (kWh, Gcal, Nm3 of gas etc.)
- estimated annual savings with current prices

Technical Assistance

EE Market in Romania

- Final energy intensity (PPP) is 1.4 times > av. EU-25
- Target to decrease the final energy consumption by 1.5% per annum until 2010;
- Technical EE investment potential – EUR 3 billion
## EE Market in Romania

- EBRD Market Demand Study estimated economic potential for EE*

<table>
<thead>
<tr>
<th>Industry</th>
<th>Savings</th>
<th>Market Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>District heating</td>
<td>10-20%</td>
<td>EUR 160 mil.</td>
</tr>
<tr>
<td>Residential</td>
<td>35-50%</td>
<td>EUR 580 mil.</td>
</tr>
<tr>
<td>Transport</td>
<td>30-35%</td>
<td>EUR 225 mil.</td>
</tr>
<tr>
<td>Tertiary</td>
<td>13-20%</td>
<td>EUR 50 mil.</td>
</tr>
</tbody>
</table>

* on a 3-year horizon

## Overview

- Residential buildings: 4.8 mil. out of which 85,000 B/F
- Very high heat demand: 2 or 3 x higher than EU
- Heating & warm water supply: 37-48% of the residential energy consumption
- 78% of residential buildings: aged > 25 years
- Blocks built before 1985: 60% require extensive rehabilitation
- Estimated energy savings: min. 30%

www.ebrd.com
**Romania National Thermal Rehabilitation Programme**

- Government’s commitment to finance 67% of energy efficiency investments in Blocks
  - 34% central government financing
  - 33% municipal financing
  - 33% Block Associations (BA) (cash or loans)
- BAs often do not have a repairing and maintenance fund
- Mix of ownership – high income and low income families living in the same apartment block
- Grants are not income-sensitive
- Concerns over adequacy and long run sustainability

**Policy Dialogue**

- EBRD explores options of designing a *residential SEFF* where commercial financing will be complemented by grant funding sourced either from the
  - State budget or through
  - Green Investment Scheme.

- Advisory support to the Government on a possible re-design of the Thermal Rehabilitation Programme ->long term sustainable instrument
Truly European
Solutions in financing of
energy efficiency projects

UniCredit Bulbank

12 September 2007

Agenda

UniCredit Group at a glance

Energy efficiency

Energy efficiency – truly European solutions
UniCredit is a Truly European Bank …

**MAIN STRUCTURAL FIGURES**

- Employees\(^2\) over 134,000
- Customers: over 35 mn
- Branches\(^3\): over 7,000
- Deposits and debt securities in issue: € 475 bn
- Loans: € 430 bn
- Banking operations in 20 countries
- Global player in Asset Management: € 236 bn AuM (with coverage in 5 continents)

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**Bulgaria**

The UniCredit Group banks

In Bulgaria, UniCredit Bulbank is the local bank of UniCredit Group. It is the clear Number 1 in the country, servicing more than 1.2 million customers. The bank is the top provider of loans and is rapidly expanding on the Bulgarian mortgage market, small business and leasing.

**Figures** (as at 30 June 2006)

- position\(^1\): number 1
- market share\(^1\): 21%
- total assets: EUR 3.5 billion
- branches: 317
- customers: 1.2 million

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Further information

www.unicreditbulbank.bg

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**Country figures**

- Area: 110,912 sq. km
- Population: 7.8 million
- Capital: Sofia
- Currency: Bulgarian lev
- GDP\(^1\): EUR 21.4 bn
- per capita GDP\(^1\): EUR 2,779

---

\(^1\) figures as of 2005
**Agenda**

<table>
<thead>
<tr>
<th>UniCredit Group at a glance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficiency</td>
</tr>
<tr>
<td>Energy efficiency – truly European solutions</td>
</tr>
</tbody>
</table>

**European Energy policy and Energy efficiency**

- Goals of the European energy policy:
  - Support to growth and employment;
  - Climate change;
  - Combating the energy dependency of the EU

- Bulgarian national policy implementing the EU policy – Long-term programme of the Bulgarian Government – 2005-2015, National programme for the usage of the Renewable energy sources, etc.;

- European and national measures to reach the energy efficiency effect;
Current status of the energy sector in Bulgaria

Energy consumption* by sectors

- Industry: 38%
- Transport: 28%
- Household: 23%
- Services: 8%
- Agriculture: 3%

*Data for 2005, Ministry of economy and energy

How to achieve energy efficiency measures

- Support municipal actions to encourage energy efficiency measures in buildings, landfills, etc.
- Restructuring of the economy and the production means;
- Support companies in innovations;
- Support households to introduce energy efficiency measures;
Agenda

UniCredit Group at a glance

Energy efficiency

Energy efficiency – truly European solutions

The means: from policy to projects

UniCredit Bulbank – special expertise and products in the energy efficiency field, part of the UniCredit group experience:

- Partnership between public and private sector:
  Public finance unit – a specialized bank unit to support municipal actions in energy efficiency projects

- Special bank initiatives and products:
  European competence centre to support the initiatives of companies and individuals; support to clients in preliminary orientation of EU or national supported energy efficiency projects
Public finance - leading role in Public Sector in Bulgaria

- Experience of UniCredit Group Bulbank in financing energy projects in Public sector and PPP;
- Supporting the Municipal initiative for creation good practices in Public sector projects
- Market share of UniCredit Bulbank in Public sector financing as of June 2007 – 40% as per Bulgarian National Bank reporting.

Partnership between Public Sector entities in Bulgaria and banks – Energy Efficiency Facilities with grant elements

- Access to financing recourses and administrative capacity for utilization of direct financing from credit lines with grant elements for EEF projects

- Pros & Cons:
  + Control on quality of the project and energy saving effect
  + Grant for the Borrower, motivating execution of such projects
  + Energy savings as result
  + Cheap funds
  - Time spend for approval of the project by selected consultancy company to prove eligibility of the project
Partnership between Public Sector entities in Bulgaria and banks - Purchase of receivables

- Purchase of receivables from ESCO companies, performing ESCO projects – indirect financing;

- Pros&Cons:
  + No Procurement procedures for selection of financing institution – time saving
  + Low prices within the public sector financing market
  + Possibility Public entities to deferred payments for ESCO projects
  + Financing of ESCO companies – they do not close money in large projects and have the possibility to enter in other projects

European Competence Centre – 1/2

ECC: Part of the European family of the UniCredit Group and the network of ECCs:

- preliminary consultations to companies and municipalities on EU / national project funding possibilities;

- support to existing and potential clients of the bank for a better and timely orientation on how to obtain financial support.
European Competence Centre – 2/2

- overall solutions for their investment projects by cooperating closely with the relevant business units;
- identifying programs suitable for the customer, their combination with other bank products;
- information about external consultation companies, which can develop and/or manage the implementation of a grant aid project if the customer has expressed such interest;
- a unique integrated approach to grant access to financing, reduces investment costs, and allows a combination with other bank products.

Energy efficiency – best practices

- Industrial energy efficiency (EE) and renewable energy sources (RES) line¹;
- EUR 17 million in 21 projects provided
- Investment projects for energy efficiency in the sphere of industry and projects for renewable energy sources;
- Potential candidates - Local legal entities, corporations (holdings, consortiums) and sole-proprietor companies;
- Loan amount - up to EUR 1,5 million;
- Types of projects – EE and RES projects
- Grant paid to the final beneficiary – up to 7.5% of the loan amount for EE and up to 20% of the loan for RES projects

¹ Line utilized
**Energy efficiency – best practices**

- EBRD Energy efficiency line for individuals;
- Total amount of the line EUR 5 million;
- Loan EuroGrant to cover refurbishment under the Energy Efficiency programme;
- Loan up to BGN 10 thousand with tenor up to 7 years;
- Up to 20% grant for the final beneficiary

**Bank as the link to EU structural funds**

- Energy efficiency measures under Operating programme competitiveness: total amount of the priority 2 of the programme “Increasing efficiency of enterprises and promoting supportive business environment” - EUR 593.8 million;
- Bridge financing of the projects – implementation of the project, then the grant shall be provided to the final beneficiary when financial documents are approved by the managing authority of the programme;
- Evaluation of the financial viability of the project
- Cooperation with consulting companies
GREENHOUSE GASES TRADING SCHEME

- **CO₂ TRADING SCHEME** - Multilateral Carbon Credit Fund (MCCF), a joint initiative by EBRD and EIB
  - Investment in enterprises to produce carbon credits: projects leading to reduction of the greenhouse gases emissions (CO₂, CH₄);
  - Joint Implementation and European Trading Scheme;
  - The income generated from carbon credits traded provides additional support for the project cash-flow

Contacts

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t. +359 2 9269 552
f.: +359 2 9269 425
Thank you for your attention!
BGK was established in 1924
BGK is the only state-owned bank in Poland
BGK plays a special role in the Polish banking system - social and economic targets of the State are to a large extent achieved via the Bank. Currently the Bank administers 10 state-funded programmes and a number of governmental programs
Apart from servicing governmental projects BGK runs commercial activity, using its own Branches and Offices
The Thermorenovation Fund was established pursuant to the Law of the 18 of December 1998 (Journal of Laws - Dz.U. no. 162, item 1121, with subsequent amendments).

- The Thermorenovation Fund does not have a legal personality and it is placed in BGK.
- As the Fund has been designed as a help for investors not to finance the thermorenovation from their own resources, premium is only available as a partial pay-off of the credit. 21 commercial banks entered into the cooperation agreement with BGK.

On the 31st of May 2006 the Thermorenovation Fund spent 100 mln zł assigned for that year. In December 2006 BGK received additional 24.9 mln zł budgetary funding.

- According to the Budgetary Act for 2007 the Fund received 250 mln. zł.
- In the first half of 2007 BGK received assets in the amount of 250 mln zł as expected.
What is a thermorenovation project?

- It is an improvement resulting in reduction of an annual energy consumption used for heating of a building and water in residential buildings and houses (all the types), buildings used by municipal entities for purposes of public service,
- Connection to the centralized heat source when closing down local heat source resulting in lowering of the costs of the heat supplied for the buildings,
- Total or partial replacement of conventional energy sources with nonconventional ones, including renewable energy.

What is a thermorenovation premium?

- Thermorenovation premium is a form of state help for the investor. It is granted by Bank Gospodarstwa Krajowego in the amount of 25% of credit used for completion of the thermorenovation investment.
- Thermorenovation premium is a partial repayment of the credit taken by the investor. It means that the investor will repay only 75% of the credit himself.
- Premium could be granted only in form of the credit repayment. Investors using their own funds can not apply for it.
Who can apply for the premium?

Owners and administrators can apply for the premium excluding budgetary entities.

Premium can be granted to any type of investor without distinction of their legal status eg:

- corporate bodies (eg. housing cooperatives and commercial companies),
- local self-governments,
- private entities, including house owners,
- housing communities.

Code of practice when applying for Thermorenovation premium

- Preparing energy audit by Investor (list of auditors on web site: www.mi.gov.pl)
- Preparing credit application to the commercial bank (one of 21 cooperating banks)
- Investor signs credit agreement with the commercial bank
- Verifying energy audit by special institution hired by BGK
- Decision for approval or decline bonus made by BGK
- Investment implementation
- Investment finished
- Bonus paid by BGK (25% of total used credit amount) to the bank
## Thermorenovation Fund performance from start to 30.06.2007

<table>
<thead>
<tr>
<th>Applications verified positively</th>
<th>Rejected applications</th>
<th>Applications unverified or returned by BGK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10560</td>
<td>7427</td>
</tr>
<tr>
<td>Applications, including:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-family houses</td>
<td>582</td>
<td>447</td>
</tr>
<tr>
<td>Multi-family houses</td>
<td>8931</td>
<td>6215</td>
</tr>
<tr>
<td>Local heat sources</td>
<td>88</td>
<td>54</td>
</tr>
<tr>
<td>Heat distribution networks</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Other heat sources</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Public service buildings</td>
<td>836</td>
<td>625</td>
</tr>
<tr>
<td>Students' hostels</td>
<td>71</td>
<td>53</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BGK – PEWNY PARTNER

## Premiums granted and paid

<table>
<thead>
<tr>
<th>Investments resulting from registered and positively verified applications</th>
<th>Value in mln zł</th>
<th>Number</th>
<th>Value in mln zł</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,253,7</td>
<td>X</td>
<td>17,0</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount of credits resulting from registered and positively verified applications</th>
<th>Value in mln zł</th>
<th>Number</th>
<th>Value in mln zł</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,597,3</td>
<td>X</td>
<td>12,8</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount and number of granted premiums</th>
<th>Value in mln zł</th>
<th>Number</th>
<th>Value in mln zł</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>399,3</td>
<td>7427</td>
<td>62,6</td>
<td>1099</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amount and number of paid out premiums</th>
<th>Value in mln zł</th>
<th>Number</th>
<th>Value in mln zł</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>308,0</td>
<td>6004</td>
<td>49,7</td>
<td>828</td>
<td></td>
</tr>
</tbody>
</table>

### BGK – PEWNY PARTNER
### Crediting banks by the granted premiums on 30th of July 2007 r.

<table>
<thead>
<tr>
<th>L.p.</th>
<th>Crediting Bank</th>
<th>Applications verified positively (no.)</th>
<th>Value of granted premiums (in mln zł)</th>
<th>Share of applications (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BISE S.A.</td>
<td>2345</td>
<td>128,6</td>
<td>31,57</td>
</tr>
<tr>
<td>2.</td>
<td>BOŚ S.A.</td>
<td>2184</td>
<td>109,8</td>
<td>29,41</td>
</tr>
<tr>
<td>3.</td>
<td>PKO BP S.A.</td>
<td>1211</td>
<td>71,1</td>
<td>16,31</td>
</tr>
<tr>
<td>4.</td>
<td>BANK POCZTOWY SA</td>
<td>317</td>
<td>14,1</td>
<td>4,27</td>
</tr>
<tr>
<td>5.</td>
<td>BANK ZACHODNI WBK SA</td>
<td>280</td>
<td>14,8</td>
<td>3,77</td>
</tr>
<tr>
<td>6.</td>
<td>OTHER</td>
<td>1090</td>
<td>60,9</td>
<td>14,67</td>
</tr>
<tr>
<td>SUM</td>
<td></td>
<td>7427</td>
<td>399,3</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Crediting banks by amounts of granted premiums (01.01.2006 - 30.06.2007)

<table>
<thead>
<tr>
<th>L.p.</th>
<th>Crediting Bank</th>
<th>Applications verified positively (no.)</th>
<th>Value of granted premiums (in mln zł)</th>
<th>Share of applications (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BISE S.A.</td>
<td>1036</td>
<td>60,5</td>
<td>36,70</td>
</tr>
<tr>
<td>2.</td>
<td>PKO BP S.A.</td>
<td>926</td>
<td>53,0</td>
<td>32,80</td>
</tr>
<tr>
<td>3.</td>
<td>BOŚ S.A</td>
<td>444</td>
<td>26,6</td>
<td>15,73</td>
</tr>
<tr>
<td>4.</td>
<td>BANK POCZTOWY SA</td>
<td>132</td>
<td>7,1</td>
<td>4,68</td>
</tr>
<tr>
<td>5.</td>
<td>ING BANK ŚLĄSKI S.A.</td>
<td>57</td>
<td>4,3</td>
<td>2,02</td>
</tr>
<tr>
<td>6.</td>
<td>OTHER</td>
<td>228</td>
<td>16,5</td>
<td>8,07</td>
</tr>
<tr>
<td>SUM</td>
<td></td>
<td>2823</td>
<td>168,0</td>
<td>100%</td>
</tr>
</tbody>
</table>
General information

Thermorenovation Fund
Regional Development Department
Tel. (0 22) 52 29 430, 52 29 410,
fax (0 22) 52 29 194
e-mail: bgk@bgk.com.pl, tomasz.przeslawski@bgk.com.pl
www.bgk.com.pl
List of energy auditors:
www.bgk.com.pl
Financial Instruments to Promote Sustainable Energy and Energy Efficiency in the New EU Member States

Peter Chovanec
Dexia banka Slovensko

Effective Policies for Improving Energy Efficiency in Buildings, Krakow, September 2007

Profile of Dexia banka Slovensko

- Member of **Dexia Group**, founded in 1993
- Assets **55 billion SKK** (1,64 billion €), profit **309 million SKK** (9,2 million €)
- #1 in financing municipal sector in Slovakia (72% market share)
- Dexia Group is world leader in public finance and project finance of infrastructure, environment and renewables, rated AA+
- Dexia Group is active in new EU Member States via local subsidiaries of Dexia Kommunalkredit Bank Vienna
- Project Finance focused on **Energy**, Waste, Water Infrastructure, Transport
- Principle of „**Sustainable Development**“
- Special emphasis on **Energy Efficiency and Renewable projects**
2007 Sustainable Development Award

- Dexia banka Slovensko became Eastern Europe Sustainable Bank of the Year
- The FT Sustainable Banking Awards, created by the Financial Times and IFC and recognise banks that have shown leadership and innovation in integrating social, environmental and corporate governance objectives into their operations
- The 2007 Awards received 151 entries from more than 100 banks in 51 countries.

Sustainable energy financing structures

- Project Finance
- Structured Finance
- Grant co-financing facilities (EU, government, UN...)
- Multilateral Financial Institution facilities
Track record of Dexia banka Slovensko

Energy Efficiency Projects closed in 2002 - 2007

- **Number of realized projects:** > 100
- **Total investment costs:** > 4,5 billion SKK (134 million €)
- **Total volume of released loans:** > 3,5 billion SKK (104 million €)

- **Focus of the projects:**
  - municipal district heating system
  - industrial energy facilities
  - usage of renewable energy sources:
    - biomass, small hydro
    - wind, geothermal, biogas – under preparation
  - public lighting
  - operation of energy facilities in public buildings

- **Partners:** IFC (World Bank), EBRD, EIB, SZRB (Slovak guarantee bank), UNDP, commercial banks, Ministry of Environment, Ministry of Economy, Slovak Energy Agency

---

Track record

Where does our experience come from?

- **Biomass**
  - switch from natural gas to wooden chips
    - Example:
      - District heating in town of 20 000 inhabitants
      - Project of construction of biomass boiler in existing boiler house
      - Minimalisation of gas consumption, use of biomass from surrounding forests
      - Decrease and stabilisation of heat price for end consumers
    - construction & operation of pellets production unit, related logistics system & combustion units
    - Example:
      - Project of association of municipalities (which is sponsor and borrower of the loan)
      - Construction of pellet production unit, logistic system and pool of small and medium scale boilers in public houses of association members (schools, hospitals, culture centres)
Track record
Where does our experience come from?

- Small hydro power plants
  - successful preparation & implementation of three hydro power plants
- Energy efficiency projects
  - municipal public lighting - number of running projects with different range
  - municipal energy facilities reconstruction & operation (schools, hospitals…)
  - industrial energy facilities reconstruction & operation
- Geothermal
  - preparation of large projects used for district heating
- Wind
  - long-term preparation of wind parks – scenarios analyzes, identification of potential projects in Slovakia

Project finance in power and renewables field
Particularities

- Renewable energy projects in Slovakia have been launched only in limited extent – (lack of professional experience)
- From technical aspects, considered technologies are known and well-proven abroad
- International know-how cannot be applied to Slovak environment
- State support is more declared than sufficiently used, (purchase prices, disconnection from the heat network, licensing, tax allowances)
- Realized projects represent only demonstration or pilot projects. Used financial structures are exceptional (100% grants…)
- Massive application requires commercial financing (bankable conditions)
Remarks on the future development of renewable projects

- future development of purchase price – relation with electricity price
- distribution companies can purchase green electricity for higher price than regulated, provided that it is cost-neutral or profitable
- positive image while selling green electricity to customers
- all purchase costs are economically justified – they should be included in the price paid by customers
- the venture capital is absent in Slovak market
- expected IRR (25-30%) of venture capital cannot be reached in regulated industry
- Renewables have to be implemented dramatically, to reach EU directive without large hydro power plants

Financing the municipal energy efficiency projects

Experience emerging from the projects

Conclusions from this field:

- Potential for use grants (European Union, national government)
- Easier bankability by using schemes involving multilateral financial institutions.
  - Dexia uses the following ones:
    - EBRD (Municipal Finance Facility)
    - EIB (Municipal Infrastructure Facility)
    - IFC (Guarantee Facility)
- Growing importance of different forms of public-private partnerships
- Off balance solutions for municipalities
Co-operation with multilateral financial institutions

- Dexia close cooperates with European Bank for Reconstruction and Development, European Investment Bank and International Finance Corporation

Municipal Finance Facility (EBRD)

- Municipal Finance Facility (MFF) is an initiative of the EBRD and the European Commission to develop and stimulate commercial bank lending to small and medium-sized municipalities and their utility companies in the new EU Member States
- MFF works through partner banks (e.g., Dexia Banka Slovensko)
- EBRD finances in the form of risk sharing by EBRD on up to 35% of the Dexia’s risk on a portfolio of loans
- Approved loans must fulfill rules and covenants set by EBRD
- Eligible purpose:
  - Water Infrastructure
  - Waste management, recycling
  - Road transport infrastructure
  - Rolling stock
  - Healthcare
  - Education
Co-operation with multilateral financial institutions
Sustainable Energy Financing Facility (EBRD)

- Purpose of the facility is encouraging energy investments in private sector companies and the residential sector in Slovakia
- Facility is done in cooperation of EBRD and Slovak government and it is supported from Bohunice Nuclear Power Plant Decommissioning Fund
- Facility works as funding of the pool of loans, where risks are borne by Dexia
- There is grant scheme for borrowers
- Eligible purpose:
  - Industrial energy efficiency
  - Renewable energy
  - Housing energy efficiency
- Facility is in negotiation process

Co-operation with multilateral financial institutions
Global Loan, Municipal Infrastructure Facility (EIB)

- Financing of small and medium scale projects carried-out by public or private promoters, which are either a small and medium sized company
- Facility works as funding of the pool of loans, where risks are borne by Dexia
- Eligible purpose:
  - Environment
  - Infrastructure
  - Development of a Knowledge-Based Economy
  - Rational use of energy
  - Health
  - Education
Co-operation with multilateral financial institutions
Guarantee Facility Agreement (IFC)

- Guarantee program to support the financing of energy efficiency projects in six Central European countries
- The program works in partnership with local financial institutions (e.g., Dexia) and provides partial guarantees to share in the credit risk of energy efficiency transactions
- Guaranteed is not more than 50% of the particular loan

Contact

Thank you for attention!

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811 06 Bratislava
tel.: +421 2 593 009 11
pchovanec@dexia.sk
www.dexia.sk
IFC CEEF Program
Commercializing Energy Efficiency Finance for the building sector

Tibor Kludovácz
IFC/CEEF Program Officer

JRC Workshop, Krakow
September 12, 2007

Topics

1) Introduction to the CEEF program
   - Program history
   - Objectives
   - Tools of the program
   - Results

2) CEEF supported project examples
   - Common area finance for block houses
   - Szemünk Fénye program
Program History

(1997) HEECP1
- Pilot phase: Hungary Energy Efficiency Co-Financing Program
- Partial credit guarantee fund financed by GEF ($5 million)

(2001) HEECP2
- IFC contributes $12 million from its own funds + supported by $4 million from GEF

(2003) Launching of CEEF
- Commercializing Energy Efficiency Finance Program
- Replication of HEECP in five countries (Czech Republic, Slovakia, Lithuania, Latvia, Estonia)
- Guarantee funding: IFC $75 million + GEF $15 million

(2005) Merger of HEECP & CEEF
- One unified regional Energy Efficiency Program (CEEF)

CEEF Program

Program Objectives:
- Mobilization of commercial funding for energy efficiency investments by way of specialized banking instruments (Guarantee Program)
- Capacity building, market development and targeted technical assistance to FIs, ESCOs and End-Users (Technical Assistance Program)
- Awareness raising and other EE marketing activities
- Up-scaling business: development of financing structures that can be replicated and offered to developing countries for large scale lending (mainstreaming)
Program instruments

Guarantee Program
– Up to 50% IFC partial credit guarantees for energy efficiency investments through selected partner FIs
– Variety of guarantee products (individual guarantees, portfolio guarantees, other specialized guarantees)

Technical Assistance (TA) Program
– Direct financial support for project development
– Sharing of international best-practice
– Awareness raising, FI trainings, marketing activities

CEEF Program

Projects in the CEEF portfolio
– Municipal Streetlighting
– Block House Renovations
– Vendor Finance programs for EE equipment sellers
– Heating and lighting upgrades for municipal institutions
– District heating retrofits
– Combined Heat- and Power Production
– Energy Efficiency loans for SMEs and industrial companies
– Renewable projects: wind power, biomass, hydro power
CEEF Program Results

CEEF Program Results:

- 14 banks joined the program since 1997;
- More than 500 guaranteed transactions have been completed in 5 countries;
- More than US$ 200 million of investment in energy efficiency was triggered by IFC guarantees;
- $250 million investment under the scope of the Szemünk Fénye Program was completed in 2006 in Hungary;

CEEF Projects

Energy Efficiency in buildings

1. Block House portfolio with Raiffeisen Bank Hungary
2. Szemünk Fénye Program with OTP Bank
Market conditions enabling lending
- Business potential, demand
- Technology is relatively easy and cheap, available locally
- Favorable legal environment (block houses have legal status, collection and mortgage laws)
- Mature banking sector, liquidity and stiff competition → financial innovation
- High political visibility resulting in state support programs
- Building Savings Funds
Key elements of success

- Strong cooperation with reputable FI partner
- Market experience, understanding of market dynamics
- Heavy marketing activity by the bank
- Standardized portfolio product
- Streamlined project origination
## CEEF Housing Portfolio

### Challenges to address in housing finance (the next phase)
- Up-scaling lending
- Maximizing energy efficiency with complex reconstructions
- Making generated energy savings part of the revenues available for debt service (ESCO Scheme)
- Development of fully commercial financing structures

## Szemünk Fénye Program

### Program Summary
- Heating and indoor lighting renovation for municipal institutions through an ESCO;
- $250 million energy efficiency investment in the next 5 years;
- Executing Consortium selected through centralized procurement procedure of MoE;
- IFC provides a 50% risk sharing facility to OTP Bank;
- Centralized project origination and monitoring.
Szemünk Fénye Program

Key elements of success
- Governamental initiative
- Strong and experienced Consortium composing of FI, ESCO, equipment suppliers and contractors
- Streamlined portfolio approach
- Innovative financial engineering for the risk sharing facility
JRC Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007

CEEF Hungary Contacts

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Financing Energy Efficiency for Low Income Blockhouses in Central Europe

Clifford J. Aron
GreenMax Capital Advisors
September 2007  Krakow, Poland

Company Description

- Financing energy and environmental infrastructure
- NYC, Minnesota, Warsaw, Prague, Belgrade, Budapest, Kiev, Barcelona
- Experience in 19 countries of CEE and CIS region since 1994
- Services:
  - Design of financial products
  - Project preparation and due diligence
  - Arranging financing
- Structured finance for over $600 million in projects
- Clients:
  - IFC, World Bank, EBRD, EU, US TDA, DIGH
  - HVB, Erste, OTP, Raiffeisen, SEB
  - Siemens, Honeywell
**Barriers to EE Finance in Blockhouses**

- Difficult to secure BH renovation loans with mortgages
- Underlying property cannot be attached
- Mortgaging individual owner’s units unrealistic + unwieldy
- In some markets still unclear legal framework
- Residents cannot afford increases to common costs
- Difficult for building to raise down payment on a loan
- May be low payment morale on common costs
- Building envelope renovation needs lead to long paybacks

**Preconditions to Commercial Financing**

- Legal Framework
  - must be some BH legal entity which can assume loan
  - governance of that legal entity must be clear
  - majority rule decision-making w/o challenges
  - BH legal entity must be able to enforce claims against residents for non-payment of common costs

- Financial
  - common cost payments level which supports investment
  - strong payment morale of residents
First Generation Programs
Summary

- ESTONIA
  - intervention with commercial banks altered approach
  - intermediary to aggregate BH loans
  - TA for project preparation

- HUNGARY
  - innovative structure for credit support
  - financial engineering to maximize impact of subsidies

- POLAND
  - financial engineering to overcome equity requirements

- LITHUANIA
  - program to demonstrate commercial financing
  - layered credit support address high risk perspective

First Generation Programs
Lessons

- Populations on Fixed Incomes are good payers; almost no defaults in all country portfolios

- Some subsidies usually needed to keep increase in common costs affordable for residents

- Some form of credit support necessary; Loan Guarantees often have limited impact on bank credit analysis BUT huge impact on reducing perceptions of “market entry risk”

- “First Loss” coverage critical in providing meaningful credit support

- Structure of “guarantee call”, order of recovery + simplicity of of credit support product all important

- Lowest income blockhouses, large high rise panel buildings remain largely un-served – cannot provide down-payments + banks not ready to take credit risk
**GreenMax-DIGH Program Concept**

- GreenMax formed partnership with Dutch International Guarantees for Housing (DIGH)
- Goal is to serve lowest income properties
- Banks need deeper credit support to serve this population
- Cash Deposit mechanism chosen
- Rated as 100% protection in bank credit analysis
- Launched in Hungary with ERSTE Bank, expanding to Bulgaria, Poland and Ukraine, other countries desirable

**GreenMax-DIGH Program Who is DIGH**

- Dutch foundation mediates financing of affordable (private and public) housing development + reconstruction projects in transitional and developing countries
- Dutch housing associations and municipalities are willing to stand surety. Historically have AAA ratings
- DIGH borrows funds from Dutch Banks on attractive terms based on these guarantees
- DIGH on-lends these funds to finance activities in target countries
GreenMax-DIGH Program Activities

- **Housing Energy Efficiency Development Agency (HEEDA)**
  - established by GreenMax + local partner
  - organize and prepare the blockhouse energy efficiency projects by providing technical and project management services

- **Housing Energy Efficiency Financing Facility (HEEFF)**
  - provide loans to Condominium Associations for investments in energy efficiency originated by a commercial bank.
  - not a separate legal entity -- a financing facility operated under agreement between the Bank, DIGH, HEEDA, and any participating IFI

GreenMax-DIGH Program HEEDA Functions

- Marketing the concept of the EE project to the CA management
- Organizing the energy audit and interpret its results for the CA
- Assisting to convince the residents to approve the investment
- Preparing the approval documents for the CA General Assembly
- Prepare the state subsidy (if applicable) and bank loan applications
- Assist the CA management to organize and contract for the construction work
GreenMax-DIGH Program

HEEDA Structure

- Local Partner
  - Identify geographic areas
  - Legal support
  - Organize energy auditing
  - Manage relations with Ministry and Municipalities

- HEEDA
  - Jointly establish and manage new enterprise
  - Prepare business plan
  - Train staff
  - Organize energy auditing
  - Identify geographic areas
  - Legal support
  - Market energy efficiency investments
  - Organize + interpret energy audits
  - Prepare approval at General Meeting
  - Applications for grants + loans

- Condominium Associations
  - Deliver grants (if funding available)

- Ministry

- Municipalities

- Commercial Bank
  - Originate + administer loans

GreenMax-DIGH Program

HEEFF Functions

- DIGH provides a Cash Deposit Fund ("CDF") to the Bank as a financial security, blocking the amount in a security deposit account residing at ERSTE.

- CDF used solely to back energy efficiency renovation loans to CAs in a loan portfolio developed jointly by HEEDA and the Bank.

- For each individual loan a “Project Cash Deposit - PCD” is allocated from the CDF.

- PCD is used:
  1) to replace the 20% owners equity normally required
  2) to cover the first 20% of losses of principal on each portfolio loan

- The CDF is funded initially at Euro 2 million by DIGH to facilitate a Euro 10 million portfolio to start.
GreenMax- DIGH Program

HEEFF Structure

IFI provides:
- Additional Credit Support
- (50% pari passu guarantee or
- Credit line with subordination features)
- Covers only 80% of loans not backed by DIGH
- HEEDA collects + pays guarantee fees

DIGH provides:
- 20% Cash Deposit
- Replaces CA equity
- Covers first 20% of loss on each loan
- BANK collects + pays interest on Cash Deposit

Condominium Associations
- 100% financing for non grant funded portion of investments
- Originates + services loans
- Loans backed by DIGH Cash Deposit and IFI

Ministry
- Deliver grants (if funding available)

Local Partner
- Coordinate establishment of HEEFF between all parties
- Negotiate eligibility + credit underwriting requirements
- Prepare Operating Agreement + CDA

Commercial Bank
- HEEDA provides loan pipeline
- Bank pays fees

HEEDA
- Project/programmes + preparation

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DIGH
www.digh.nl
Energy Efficiency 21 Programme

- World Energy Demand and CO2 emissions
- Energy Intensity in 12 EE21 countries
- Energy efficiency market potential
- The Energy Efficiency 21 Programme (EE21)
- EE21 Recent Developments
Reference Scenario:
World Primary Energy Demand (IEA 2007)

World Energy-Related CO2 Emissions (IEA 2007)

Source: http://eia.doe.gov

Energy Intensity – Energy/ GDP (PPP), 2004
Energy Efficiency market potential
Eastern Europe and Central Asia

- Reducing the energy efficiency gap by half would save 600 million tonnes of oil equivalent (Mtoe)
- The saving potential of the Russian Federation is 360-400 million tonnes of oil equivalent

---

Energy Efficiency: Lighting, An Example of Cost-Effective Savings

(IEA, 2007)

[Graph showing lighting electricity consumption from 1995 to 2030 with three scenarios: No Policies, Current Policies, and LLCC from 2008. The LLCC from 2008 scenario shows a significant reduction in lighting electricity consumption compared to the other scenarios. The graph indicates that the LLCC from 2008 scenario results in a total of 1635 TWh by 2030, which is 38.4% lower than the 'No Policies' scenario.]
Energy Efficiency 21

- Launched in 1991 - 5 three-year phases
- Enhance East-West Trade and Co-operation
- Improve Capacities and Networking
- Policy Reforms
- Financing Energy Efficiency Investments

Energy Efficiency 21

Energy Efficiency Investments

- 1999-2005
- US$ 2 million UN Foundation & Partners
- Belarus, Bulgaria, Kazakhstan, Russian Federation and Ukraine
- Energy Efficiency Market Formation
Energy Efficiency Investments

- US$ 60 million in 30 Business Plans
- Potential 530,000 tonnes / year CO2
- US$ 14.9 million financing approved in Belarus, Bulgaria, Russia, Ukraine
- Financed Projects 136,000 tonnes / year CO2
- Training, Publications, CD-Rom

PROJECT PLAN 2006-2009

General Objective

To enhance regional cooperation on energy efficiency market formation and investment project development to reduce greenhouse gas emissions in economies in transition
Objectives

- Accelerate regional networking
- Promote and finance municipal level projects
- Enhance economic, institutional and regulatory reforms

Sub-regional Projects of EE21

- Financing Energy Efficiency and Renewable Energy Investments for Climate Change Mitigation
- The Regional Network for Efficient Use of Energy and Water Resources in Southeast Europe (RENEUER)
Sub-regional Projects of EE21

- Removing Barriers to Energy Efficiency Improvements in the State Sector in Belarus
- Biomass Energy for Heating and Hot Water Supply in Belarus
- Green Labels Purchase
- Development of Coal Mine Methane Projects in Central and Eastern Europe and CIS

Project on Financing Investments

Financing Energy Efficiency Investments for Climate Change Mitigation

Long-Term Objective

*Promote an investment environment for self sustaining energy efficiency and renewable energy projects to be developed and financed to reduce greenhouse gas emissions*
Donor Institutions for an operations budget of USD 7.5 million

- United Nations Foundation
  US$ 2 million
- Fonds Français pour l’Environnement Mondial
  US$ 2.5 million
- UNEP - Global Environment Facility
  US$ 3 million

Energy efficiency for buildings with the project on Financing Investments

- Source of financing with dedicated investment funds
- Training to help establish bankable project proposals
- Institutional and policy reforms
European Clean Energy Fund – Swiss Re

- Officially launched in April 2007 under the EE21 Programme mandate
  - investment capital of € 329 million
  - Mezzanine and Equity Capital (target IRR of 15-20 % per annum)
  - 25 European Union member states
- ECEF targets clean energy projects directly related to the building sector
  - District heating
  - Electricity supply (power plants modernisation, use of cogeneration and combined-cycle)
  - Solar energy

Structure of the new Investment Fund

*Making “business as usual” through market formation in the ECE region*

**Terms of transaction:**
- Targeted capital: € 250 million
  - Public (30 %) – Private partnership (70 %)
  - Equity and mezzanine financing
- Targeted countries:
  - **EU:** Bulgaria, Romania
  - **South-Eastern Europe:** Albania, Bosnia and Herzegovina, Croatia, FYR of Macedonia, Serbia
  - **CIS:** Belarus, Kazakhstan, Moldova, Russia, Ukraine
- Targeted projects related to the building sector:
  - District heating and power plants modernisation
  - Use of renewable energies
Financing modalities of the new Investment Fund

- Financing in the private sector
  - ESCOs or other SPVs (Special Purpose Vehicles)
  - Big scale projects: ex. Fuel switching in a power plant

- Financing in the public sector
  - Work with municipalities on energy saving measures for public buildings (schools, hospitals, household, ...)
    - Building envelope
    - Heating systems
    - Hot water supply system
    - Lighting system

Training and institutional reforms promotion

- Training courses organised to help establish bankable project proposals

- Regional study on:
  - the energy efficiency situation
  - investment climate in participating countries
The project will achieve:

- Reduction of GHG emissions of 10 million tonnes a year
- Considerable energy savings
- Creation of necessary standards and reforms to make energy efficiency a usual and privately financed business
Green Investment Scheme (GIS) in Hungary

Workshop on „Effective Policies for Improving Energy Efficiency in Buildings”

12-14 September 2007, Krakow

Dr. Mónika Rábai

Content:

1. Kyoto Protocol commitments
2. EU ETS and Kyoto
3. International Emission Trading
4. Cope of GIS
5. Legal issues in Hungary
6. Aims of Hungary
7. Financing GIS projects
8. Areas for investment
9. Enhancing energy efficiency in buildings
10. Conclusions
1. Kyoto Protocol Commitments

- 5.2% GHG reduction until 2008-2012 (base year: 1990 & 1985-87)
- EU-15: 8% reduction compared to 1990
- Hungary: 6% reduction compared to 1985-87

Flexible mechanisms:
- Joint Implementation – JI – ERU
- Clean Development Mechanisms – CDM – CER
- International Emission Trading – IET – AAU
- "Sinks" – RMU

2. EU ETS and Kyoto

<table>
<thead>
<tr>
<th>EU-ETS</th>
<th>Kyoto</th>
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<tbody>
<tr>
<td>EU-15, reduction of CO₂</td>
<td>Parties 6 GHGs</td>
</tr>
<tr>
<td>NAPs</td>
<td>Common but diff. resp.</td>
</tr>
<tr>
<td>credit: EUA</td>
<td>AAU, ERU, CER</td>
</tr>
</tbody>
</table>

**Linkage**

- Linking Directive: ERUs & CERs can be used by operators from 2008 in the EU ETS to comply with their commitments
- Prohibition of double counting
- EUAs can be converted into AAUs, trading with EUAs will be the part of the IET
International Emission Trading

- Annex 1 countries can trade with their assigned amount of unit (AAU)
- Commitment period reserve
- Central-eastern-european countries have surplus AAU ("Hot air")
- Complexity of the international & european carbon market
- Political uncertainties
- Price of coal & gas (determines the fuel-change)
- Banking of AAUs
Green Investment Scheme

- Bilateral negotiations (scarcity of information)
- Preferences of buyers & sellers
- Buyers (countries, authorized companies)
- Intermediaries (brokers, banks)
- MoU, ERPA
- Technology transfer

Legal background in Hungary

- Act on implementation of Kyoto Protocol
- Management of Kyoto units by the MoEW - treasury assets
- Revenues from the sale of Kyoto units should be used:
  - for GHG emission reductions
  - Carbon capture by sinks (LULUCF)
  - Adaptation

In accordance with the National Climate Change Strategy
Government reports yearly to the Parliament on the use of revenues
Details will be regulated in Gov. Decree (under preparation)
Enter into force on January of 2008
Aims of Hungary

- Verified GHG emission reduction, selling green AAUs
- Cost-efficiency
- Long-term emission reductions
- Incremental benefits
- Additionality
- Looking for a niche - financing not available or successfully not available for an area of investment
- Max. 5% overhead

Transfer of purchase price & AAUs
Ministry of Environment & Water invite tenders
Program and project type of utilisation of revenues
Examination of tenders by Project Management Unit (outer experts)
Verification
National contact person informs regularly the buyer
Financing GIS projects

Grants through tenders

Applicants:
• natural persons,
• Companies (subsidy can not be more than 30% - EU competition law)
• Public institutions

Prefinancing

Areas for investment - priorities

• Energy efficiency in domestic sector
• Energy efficiency in public sector
• Renewables
• Transport sector - public transport
• R+D? - wish to finance, but feasibility might be problematic
• LULUCF? - climate proofing, no for energy plantations
Enhancing energy efficiency in buildings

- High potential (important CO$_2$ savings)
- Insulation, photovoltaic cells, change of windows, green roof, solar shading
- „Passive“ concepts that minimize energy demands
- Renewable-based heating systems, (transformation of district-heating, residential renewable heating – biogas, heat-pumps, geothermal energy)

Conclusions

- Hungary aims to use GIS in emission reductions (gearing up energy efficiency of buildings is a good tool)
- New legal modifications will promote energy efficiency in buildings (energetic certificate – new houses)
- Growing gas prices can induce this process
- Sustainable solutions will spread in the market…
Thank you for your attention!

rabaimo@mail.kvvm.hu
Session 2: National Action Plans for Energy Efficiency

Chair: Gianluca SAMBUCINI, UNECE
The Polish Action Plan for energy efficiency, programmes and financial instruments to promote efficiency in building refurbishments

Marta Mazurkiewicz, MSc.
The Polish Energy Conservation Agency (KAPE)

Prof. Tadeusz Skoczowski, Ph.D., El. Eng.
The Polish Energy Conservation Agency (KAPE)
Warsaw University of Technology (WUT)

Joint Research Centre Workshop
Effective Policies for Improving Energy Efficiency in Buildings
Kraków, 13 September 2007

Polish Energy Policy till 2025 – new energy strategy

Primary energy demand in Poland in 2025. Different scenarios

- Coal scenario
- Gas scenario
- Accession Treaty
- Energy Efficiency Scenario
- UE outlook

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>PEP 2025 W</th>
<th>PEP 2025 G</th>
<th>PEP 2025 T</th>
<th>PEP 2025 EF</th>
<th>EETT 2030</th>
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<tbody>
<tr>
<td>Mtoe</td>
<td>138,3</td>
<td>137</td>
<td>136,7</td>
<td>136</td>
<td>112,9</td>
</tr>
</tbody>
</table>

Source: Polish Energy Policy till 2025 & "European Energy and Transport, Trends to 2030" (EETT)
**Total primary consumption by fuels in Poland 2004**

- **Oil**: 24%
- **Coal and lignite**: 59%
- **Biomass and wastes**: 4%
- **Natural gas**: 13%

**Graph:**
- Total in Poland: 60 Mtoe

---

**Total final consumption and VA by sector in Poland 2004 and EU**

**Poland**
- **Transport**: 31% VA
- **Households**: 31%
- **Industry**: 30%
- **Agriculture**: 8%
- **Services**: 11%
- **Other sectors**: 5%

**EU**
- **Transport**: 31%
- **Households**: 28%
- **Industry**: 28%
- **Agriculture, fisheries and other sectors**: 4%
- **Services**: 11%

---

Tadeusz SKOCZKOWSKI - Polish National Energy Conservation Agency, Poland

<table>
<thead>
<tr>
<th>Source</th>
<th>GWh</th>
<th>Structure</th>
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</thead>
<tbody>
<tr>
<td>Domestic generation total</td>
<td>154 125</td>
<td>100.00</td>
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<tr>
<td>Coal power stations</td>
<td>60 070</td>
<td>42.97</td>
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<tr>
<td>Lignite power stations</td>
<td>52 196</td>
<td>33.84</td>
</tr>
<tr>
<td>Coal CHPs</td>
<td>21 660</td>
<td>14.00</td>
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<tr>
<td>Other CHPs</td>
<td>2 220</td>
<td>1.45</td>
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<tr>
<td>Hydro power station</td>
<td>3 668</td>
<td>2.35</td>
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<tr>
<td>Industrial power station</td>
<td>7 500</td>
<td>4.39</td>
</tr>
<tr>
<td>Renewables (including industrials)</td>
<td>756</td>
<td>0.49</td>
</tr>
</tbody>
</table>

97% coal
Energy intensity GDP- forecast for Poland until 2030

Source: prepared by KAPE S.A. on the ground of European Energy and Transport, Trends to 2030

New and old MSs sins

Source: Eurostat 2005

Greenhouse gas emissions of countries receiving the most EU funding (% change 1990-2004)
EU RUE policy as seen from new MS

- suffers from lack of strong political support,
- has been long soft and weak for long, not very demanding,
- not yet covering all vital sectors e.g. electrical machines,
- badly incorporated into other policies, e.g. environmental
- lack of hard legislation and fiscal incentives,
- regarded as being against energy sector interests,
- lacking financing, especially for EE investments,
- of peripheral importance (SS dominates over DS.)
- "Intelligent Energy-Europe" 2003-2007, extension 2007-2013 in the framework of competition and innovation directive (CIP)
- clear cut priorities in 6. and 7. Framework Program RTD

The Polish way. State of art

- We know we consume too much energy on GDP. Something shall urgently be done!
- We are well behind the nations which started to battle energy losses after the first oil crisis
- RUE is crucial for competitiveness of the national energy security and economy?
- Energy efficiency has not been political priority for long
- Driving force in RUE is EU legislation and pressure
- We shall be cautious not to re-invent the wheel and not to fall into the same pitfalls. We want take much from experience of others
Polish way to higher energy efficiency. Actions

- Strict and timely implementation of EU directives on RUE/RES on least cost principle arising from national conditions
- RUE/RES promotion instruments shall be based as much as possible on market incentives (green&red certificates in place, white certificates?)
- Great attention shall be paid to raising public awareness. Education at all levels
- Public authorities shall enable by different programmes to save energy to all those who want to be active in the game
- Promotion, research and demonstration activities shall be closely coupled with EU initiatives (IE-E, 7. FP RTD)
- RUE/RES investments shall be co-financed with in the EU Structural Funds

- Latest initiations in RUE
  - Mastering the Thermomodrenisation Law (1998-....)
  - Phare Sustainable Energy Poland (2003-2005)
  - Polish-Japan Energy Efficiency Center (2004-2008)

Potential of energy efficiency in Poland

- Potential of final energy reduction
- National goal for MS according to 2006/32/EC

Tadeusz SKOCZKOWSKI - Polish National Energy Conservation Agency, Poland
Energy Efficiency Action Plan

- 9% energy savings in 2016
- 2% energy savings in 2010 (intermediate aim)

Energy efficiency in buildings program main points:
- Thermomodernization fund (ongoing),
- Information campaign – energy efficiency in households (2008),
- White certificates (2009).

Scenarios and targets

- Intensive scenario
- Linear scenario
- Extensive scenario

Annual increase of energy savings:
- 0.47%
- 2%
- 7%

Annual increase of energy savings: 1.16%
### Scenarios

<table>
<thead>
<tr>
<th>Intensive</th>
<th>Linear</th>
<th>Extensive</th>
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</table>
| • aim 9% not threatened during all period  
• aim 2% realised or slightly exceeded, | • aim 9% realised,  
• aim 2% realised with effort or nearly realised,  
• accelerated realisation after 2010, | • aim 9% realised because of great effort in last 2-3 years,  
• aim 2% not realised. |
| • Intensive involvement of government,  
• Energy Efficiency Act from 01.07.2008,  
• Strong Energy Efficiency Fund,  
• Effective energy agency,  
• Effective nationwide information campaign,  
• Effective implementation of market mechanisms, i.e. white certificates | • Intensive involvement of government,  
• Energy efficiency Act since 01.07.2008  
• Not sufficient Energy Efficiency Fund,  
• Effective energy agency,  
• Effective implementation of market mechanisms, i.e. white certificates | • Moderate involvement of government,  
• Energy efficiency Act since 01.07.2009  
• Delay in energy agency appointment,  
• Insufficient Energy Efficiency Fund. |

### Action Plan Schedule

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**STRATEGIES**

- Green Book IE
- Green Book Energy Safety
- Action Plan IE
- CIP
- Kyoto Protocol
- Lisbon Strategy

**NATIONAL**

- Energy Policy
- Energy Efficiency/IE-RIS Strategies
- Energy Policy
- Climate Policy

**EUROPEAN**

- Energy Law
- Environment Law

**LOCAL SUSTAINABLE ENERGY**

**FINANCING**

- National Support Framework
- Cohesion Fund
- Investment Funds
- European Initiatives
- Norwegian Financial Mechanism
- Commercial sources
- PPP

**STRAIGHTS**

- Environment Directive
- Energy Directive
- Energy Programme RTD
- Energy Environment
- European Programmes
- CIP
- IE-E

**LAW**

- Environment
- Energy

**GOALS**

- CO2 reduction
- NOx reduction
- SO2 reduction
- Energy use reduction
- Clean fossils

**FINANCING**

- ISO 14000
- EMAP
- BAT
- Action Plan LEAPES
- EU ETS
- Technical Standards

**MEASURES**

- Technical Support Framework
- Cohesion Fund
- Investment Funds

- European Initiatives
- Norwegian Financial Mechanism
- Commercial sources
- PPP
Energy efficiency projects financing sources in Poland

International sources
- REEEP
- EBRD
- EIB
- EU ETS
- IEE
- 7 PR RTD
- EU Funds

National sources
- NFEP&WM
- RFEP&WM
- EcoFund
- Structural Funds in frame of OP
- Cohesion Fund in frame of OP
- Energy Efficiency Project GEF
- PEMP
- National Energy Efficiency Fund

EU level
- MS’s national level
- Regional level
- Local level
- End-users

Policy, legislation flow

Funding flow

World Bank
EBRD
EIB

Structural Funds (SF)
Cohesion Fund (CF)
INTERREG
Norwegian Financial Mechanism
7 FP RTD
IEE
CIP

Operational Programmes
Regional Programmes
Individual activities

National co-financing to SF and CF
Bank loans

EcoFund
Thermo-modernization Act
Private & PPP
White Certificates (2008?)
Energy Efficiency Fund (2008?)

World Bank Energy Efficiency Fund
EIB/EU Risk Sharing Finance Facility

End-users

2007-10-18

Tadeusz SKOCZKOWSKI - Polish National Energy Conservation Agency, Poland
One of the goals:

- Investments that will ensure a long-term energy safety in Poland through diversification of supplies, decrease of energy consumption and energy losses, and the development of renewable energy sources
- Funds: CF, EFRR, state budget, private means
Priority line X: Environment-friendly energy infrastructure

Within this priority the support will be given to the measures which increase the amount of primary energy in energy sector, decrease energy intensity of public sector and increase the production of energy from renewable energy sources (including biofuels).

Types of beneficiaries:
- enterprises
- units of local self-government and their associations,
- units of government administration,
- churches and confessional groups,
- non-governmental organisations, associations and other public institutions.

Funds sources OP I&E

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<tr>
<th>Source</th>
<th>Amount</th>
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<tr>
<td>EU</td>
<td>6,337,21</td>
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<td>State budget</td>
<td>6,616,22</td>
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<tr>
<td>Private means</td>
<td>1,920,82</td>
</tr>
</tbody>
</table>

Tadeusz SKOCZKOWSKI - Polish National Energy Conservation Agency, Poland
Activities of Priority line X

10.1 Highly efficient energy generation,
10.2 Efficient energy distribution,

**10.3 Thermomodernisation of public utility buildings,**

10.4 RES generation,
10.5 Biofuel energy generation,
10.6 RES industry development,
10.7 Power grid for RES.

National Cohesion Strategy 2007-2013

**Operational Programme Infrastructure and Environment**

**Priority line IV: Initiatives aimed at adjusting the enterprises to the requirements of environment protection**

Types of beneficiaries:
- enterprises
Funds Infrastructure and Environment Operational Programme

Priority line X - 732 mln Euro from UE
Priority line XI - 974 mln Euro from UE
Priority line IV - 200 mln Euro from UE

Share of EE/RE allocations in total EU funding in CEE countries for 2007-2013

Source: CEE Bankwatch Network and Friends of the Earth Europe
Comparison of EE/RE measures and allocations in the draft Operational Programmes of CEE countries

<table>
<thead>
<tr>
<th>Energy efficiency</th>
<th>Renewable energy</th>
<th>No. of measures</th>
<th>Allocation of EU funding (%)</th>
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</thead>
<tbody>
<tr>
<td>Lithuania</td>
<td>x</td>
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<td>Czech Republic</td>
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<td>Latvia</td>
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<td>Poland</td>
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<td>Hungary</td>
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<tr>
<td>Bulgaria</td>
<td>x</td>
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</tbody>
</table>

Source: CEE Bankwatch Network and Friends of the Earth Europe

EU funds allocation in OPs

- At least 5% of all EU funds in each member state should be allocated for EE/RE priorities
- Inclusion of the following measures should be considered in the OPs of each member state:
  - Promoting energy efficiency and renewable energies in industry and the use of waste heat in enterprises
  - Energy-efficient refurbishment of the housing sector – renovation of high-rise residential buildings and social housing with energy saving measures and systematic integration of RE technologies.
  - Energy-efficient refurbishment of public buildings (hospitals, schools, state and municipal buildings)
  - Renovation of municipal district heating systems, replacing fossil fuels with biomass, cogeneration and integration of solar and geothermal sources
  - Renovation of public lighting systems
  - Savings in the energy sector (distribution of heat and electricity)
  - Support for renewable energy investments: renovation of existing energy sources and installation of new RE systems, including biomass, wind, solar, geothermal and small hydro
  - Support for cogeneration of heat and electricity
  - Energy audits for households, training for businesses and craftsmen, networking between municipalities, awareness campaigns
- Energy-saving measures and RE technologies should be systematically integrated into other priorities and measures in the OPs – for example any investments in buildings and housing
Intelligent Energy for Europe (2003-2006)

The community’s support programme for actions in the field of energy efficiency and renewable energy sources:

- provides financial support to local, regional and national initiatives in the fields of renewable energies, energy efficiency and energy aspects of transport;

- reinforces the “renewable energies” (ALTENER) and “efficient energy” (SAVE) fields; updates the existing international action (COOPENER) and introduces a new field of action: “energy in transport” (STEER).

LIFE III - Environment

LIFE III, the Financial Instrument for the Environment, is one of the main tools of the European Union’s environmental policy:

- The specific objective of LIFE-Environment is to contribute to the development of innovative, integrated techniques and methods, as well as to the future development of Community environment policy.

- Project proposals may be presented by all legal entities established in Member States; the participation of SMEs is particularly encouraged.

- Proposals must be presented by a single applicant but the collaboration of other participants within a partnership may be foreseen.
Other Programmes

- The 7th Framework Programme for Research and Technological Development (2007-2013)
  The three key priorities for energy are:
  - Energy efficiency and renewable energies
  - Clean coal technologies
  - Nuclear waste management
- INTERREG III
  - promotes cross-border, trans-national and inter-regional co-operation;
  - financed by the ERDF:
- URBAN II
  - sustainable development of urban areas: support innovative strategies to regenerate cities and declining urban areas;
  - financed by the ERDF

Conclusions

- Energy security, environment and economic competitiveness await substantial improvements of energy efficiency
- Energy efficiency law and action plan are envisaged by government in the near future?
- Small end users are not supported by any programs or mechanism of energy efficiency improvements
- Structural funds are for the first to finance energy efficiency in Poland; insufficient funds allocated
Building sector and financing of building refurbishment

List of suggested procuration

<table>
<thead>
<tr>
<th></th>
<th>Start of Validity</th>
<th>Conclusion of Validity</th>
<th>2008 – 2010 Contribution [ TJ ]</th>
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</table>
**Graph of households (2008-2010)**

- Support of modernization housing fund
- Refurbishment of panel building „Programme PANEL“
- Subsidy from state fund for development of living - (Renovation of apartment buildings)
- Loans from Cities and municipalities for modernization of housing fund
- Education and awareness - state support for activities focused on reducing of heat consumption in households
- Energy labeling of domestic electrical appliances
- Saving electrical energy in the sphere of lighting of households

### HOUSEHOLDS (2011 – 2013)

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**HOUSEHOLDS (2014 – 2016)**

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### Graph of households (2014-2016)

- **Support of modernization housing fund**: 40%
- **Refurbishment of panel building – „Programme PANEL“**: 21%
- **Subsidy from state fund for development of living (Renovation of apartment buildings)**: 10%
- **Loans from Cities and municipalities for modernization of housing fund**: 4%
- **Education and awareness – state support for activities focused on reducing of heat consumption in households**: 3%
- **Energy labeling of domestic electrical appliances**: 22%
- **Saving electrical energy in the sphere of lighting of households**: 0%

### HOUSEHOLDS (summary)

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MUNICIPALITIES (2008 – 2010)

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<td>TERTIARY (Municipal) SECTOR</td>
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<td>TERTIARY (Municipal) SECTOR</td>
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Graph of tertiary (2008 - 2010) (municipalities)

- 51%: Supply and support of energy services by the help of EPC method in municipal sector
- 39%: Saving of electrical energy in the sphere of lighting in municipal sector and public lighting
- 10%: Implementation of agreement of „ENERGY STAR“ for office devices

MUNICIPALITIES (2011 – 2013)

<table>
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<th>TERTIARY (Municipal) SECTOR</th>
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Graph of tertiary (2011 - 2013) (municipalities)

- Supply and support of energy services by the help of EPC method in municipal sector
- Saving of electrical energy in the sphere of lighting in municipal sector and public lighting
- Implementation and agreement of "ENERGY STAR" for office devices

MUNICIPALITIES (2014 – 2016)

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Graph of tertiary (2014 - 2016) (municipalities)

- Supply and support of energy services by the help of EPC method in municipal sector
- Saving of electrical energy in the sphere of lighting in municipal sector and public lighting
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MUNICIPALITIES (summary)

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<td>TERTIARY Saving of electrical energy in the sphere of lighting in municipal sector and public lighting</td>
<td>2010</td>
<td>Open</td>
<td>1799</td>
</tr>
<tr>
<td>TERTIARY Implementation and agreement of „ENERGY STAR” for office devices</td>
<td>2009</td>
<td>Open</td>
<td>1201</td>
</tr>
</tbody>
</table>
Graph of tertiary (Total contribution) (municipalities)

- Supply and support of energy services by the help of EPC method in municipal sector (56%)
- Saving of electrical energy in the sphere of lighting in municipal sector and public lighting (37%)
- Implementation and agreement of "ENERGY STAR" for office devices (7%)

Survey of promoted Energy Performance Contracting projects

- School sector: 35 projects
- Private sector: 3 projects
- Health service: 6 projects
- Municipalities: 3 projects
- Cultural: 1 project
Survey of promoted Energy Contracting projects

- Municipalities: 1 project
- Private sector: 1 project

Energy Service Companies in Czech Republic

<table>
<thead>
<tr>
<th>Energy services Companies</th>
<th>Method (number of projects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVV Energie CZ, s. r. o., Praha</td>
<td>EPC (11)</td>
</tr>
<tr>
<td>MARTIA a.s., Ústí nad Labem</td>
<td>EPC (10)</td>
</tr>
<tr>
<td>SIEMENS, s. r. o., Praha</td>
<td>EPC (9)</td>
</tr>
<tr>
<td>Sifedisko pro úspory energie, s. r. o., Most</td>
<td>EPC (8)</td>
</tr>
<tr>
<td>ENESA, a. s., Praha</td>
<td>EPC (4)</td>
</tr>
<tr>
<td>EVČ, s. r. o., Pardubice</td>
<td>EPC (4)</td>
</tr>
<tr>
<td>TestProg, s. r. o., Trutnov</td>
<td>EPC (3)</td>
</tr>
<tr>
<td>Honeywell, spol. s r. o., Praha</td>
<td>EPC (1)</td>
</tr>
<tr>
<td>ACTHERM, spol. s r. o., Praha</td>
<td>EC (1)</td>
</tr>
<tr>
<td>KOMTERM, a. s., Praha</td>
<td>EC (1)</td>
</tr>
</tbody>
</table>
Future plans

- **Programme**: PROGRES

- **Nature**: Programme for support of enterprise in energy services

- **Launch**: 1. 12. 2007


- **Guarantor**: Ministry of Industry and Trade

- **Type of project**: EPC form (ESCO companies)

- **Credit interest**: 2.5 % pa (per annum)

- Temporarily un-limited

- **Budget**: approx. € 350 000 000 = 1 000 000 000 CZK
Thank you for your attention !!!

Michal Bubeník  michal.bubenik@ceacr.cz
The Latvian Action Plan for Energy Efficiency, programmes and financial instruments to promote efficiency building refurbishments

Dr. Dagnija Blumberga,
Institute of Energy Systems and Environment,
Riga Technical University,
Dr. Marika Rochas,
Ekodoma, Ltd

Content

❖ Actors in Energy Building Energy Efficiency field
❖ Programmes and Financial Instruments for energy efficiency in buildings
**Actors in Energy Building Energy Efficiency field**

- Ministry of Economy
  - Building Department
  - Energy Department
- Ministry of Environment
  - Department of Climate Changes and Renewable Sources
- Agencies
  - Housing Agency
  - Latvian Investment and Development Agency
- Ministry of Regional Development and Local Governments
- Ministry of Finances

**Development of Action Plan**

- Worked out by Ministry of Economy of Latvia
- Approved by Cabinet of Ministry of Latvia in June, 2007
- First discussion in Latvia will be September 20 – 21, 2007
Effective Policies for Improving Energy Efficiency in Buildings, Krakow, September 12-14, 2007

Consumption of Energy of End Users (source LAP)

Indicative Target (source LAP)
Indicative Target

Indicative target for 2016 3483 GWh
Indicative target for 2010 581 GWh

Measures for EE improvement
Housing sector

- Energy audits in buildings
- Energy efficiency improvement in block houses
- Energy efficiency improvement in public buildings
- Information of energy end users
- Legislation for energy efficiency improvement in buildings
**Measures for EE improvement. Services**

- Information campaign about lighting efficiency in offices
- Information campaign about efficiency of computers in offices
- Information campaign about labeling of electrical devices

**Measures for EE improvement. Industry**

- Information flow about efficiency of technological processes
- Improvement of energy efficiency of lighting
- Energy audits in industrial enterprises
Measures for EE improvement.
Transport
- Technical control of cars
- Improvement of efficiency of transport flow in main street in Riga
- Integration of railway in transport flow in Riga
- Changes in taxation of cars (volume and age)
- Dissemination of information about approaches and technologies to reduce energy consumption

Measures for EE improvement.
Agriculture
- SAPARD programme for structural reforms and support of countryside development
- Countryside development programme 2007 - 2013
State role

- Correction of Public Procurement Law according to Directive 2006/32/EC
- New public buildings - will be built according to BAT principles and requirements of Energy Performance Directive

Programmes for Energy Efficiency in Buildings

- Rising Awareness
  - In framework of Intelligent Energy Europe projects (Green Light; Green Label Purchase; EITertiary, CFSEP, InoFin, e4coh etc.)
  - Training courses organised by Riga Housing Agency, Ekodoma, Ltd etc

- Financial support
  - Municipal programmes
  - EU programmes
  - State programmes
Financial Instruments for Energy Efficiency in Buildings

- Loans from Commercial banks
- Municipal loans (without interest) or small grants
- EU Cohesion funds
- State grants
- Green Investment Scheme
- Third Party Financing

Third Party Financing

In Framework of IEE project InoFin

DH enterprise acts as ESCO

Advantages
- no changes in O&M of building
- repayment of loan from savings
- comfort increases
- real estate value increases
Green Investment Scheme

- Legislation is ready - Law is accepted by Cabinet of Ministers
- Operator of targeted fund - GIS agency (under discussions)
- Fields investigated:
  - Energy efficiency in buildings
  - Renewable energy sources (wind, biogas, biomas, Solar)
  - Transport
  - Street lighting

Thank you for attention

More info
www.ekodoma.lv
"The Romanian Action Plan for energy efficiency, programmes and financial instruments to promote efficiency building refurbishments"

(The Romanian EEAP) 2008-2010

DIRECTIVE 2006/32/EC on energy end-use efficiency and energy services

Energy efficiency - General targets
- security of energy supply
- competitiveness
- environment protection

Improved energy end-use efficiency
- to exploit potential cost-effective energy savings in an economically efficient way
- to reduce dependence on energy imports
- to mitigate the CO2 and other greenhouse gas emissions and thereby to prevent dangerous climate change
Enhance the cost-effective improvement of energy end-use efficiency:

- providing the necessary indicative targets as well as mechanisms, incentives and institutional, financial and legal frameworks to remove existing market barriers and imperfections that impede the efficient end use of energy;

- creating the conditions for the development and promotion of a market for energy services and for the delivery of other energy efficiency improvement measures to final consumers.

**The purpose of DIRECTIVE 2006/32/EC**

**DIRECTIVE 2006/32/EC**

**on energy end-use efficiency and energy services**

**Article 4 – Energy savings targets**

The overall national indicative energy savings target of 9% for the ninth year of application of this Directive, to be reached by way of energy services and other energy efficiency improvement measures. Member States shall take cost-effective, practicable and reasonable measures designed to contribute towards achieving this target.

**Article 14 – Delivery terms**

The National Energy Efficiency Action Plan (NEEAP)- deadline:
- a first EEAP not later than 30 June 2007;
- a second EEAP not later than 30 June 2011;
- a third EEAP not later than 30 June 2014.
The National Energy Efficiency Action Plan (NEEAP)

Immediate Target - describing a framework of policies and measures regarding the intensity of process for realising some energy savings considering the present energy saving potential.

NEEAP sets energy efficiency measures that have to be launched the next years for implementing assumed energy savings.

NEEAP Strategy - is intended to mobilise the general public and policy-makers at all levels of government, together with market actors, and to transform the internal energy market in a way that provides EU citizens with the globally most energy-efficient infrastructure, buildings, appliances, processes, transport means and energy systems - encourages citizens to use energy in the most rational manner possible.

The National Energy Efficiency Action Plan (NEEAP) comprehend targeted sectoral and horizontal measures, as follow:

- the setting of dynamic energy performance requirements for a wide range of products, buildings and services
- instruments for the energy transformation sector to improve the efficiency of both new and existing generating capacity and to reduce transmission and distribution losses.
- financing tools and economic incentives targeting all sectors, implemented in full compliance with the appliable State aid rules
- increased awareness and behavioural change
- innovation and technology
The National Energy Efficiency Action Plan (NEEAP)

Measures of energy efficiency improvement included in the first NEEAP as follow:

- Settlement
- Information and legislative measures
- Voluntary Agreement and Cooperation tools (Industrial Campaign, Long Term Agreement)
- Energy Services for energy savings (Third Party Financing, Energy Performance Contract)
- Financial tools (Incentives, Taxe exception for building authorisation for thermal refurbishment works, Cofinance of works)
- Energy efficiency mechanism (Energy efficiency Found)


Priority Actions

- Appliance and equipment labelling and minimum energy performance standards
- Building performance requirements and very low energy buildings (“passive houses”)
- Making power generation and distribution more efficient
- Achieving fuel efficiency of cars
- Facilitating appropriate financing of energy efficiency investments for small and medium enterprises and Energy Service Companies
- Spurring energy efficiency in the new Member States
- A coherent use of taxation
- Raising energy efficiency awareness
- Energy efficiency in built-up areas
- Foster energy efficiency worldwide

PROPOSED MEASURES

1. Dynamic energy performance requirements for products, buildings and services
2. Improving energy transformation
3. Moving on transport
4. Financing energy efficiency, economic incentives and energy pricing
5. Changing energy behaviour
6. International partnerships

Energy saving target for Romania

<table>
<thead>
<tr>
<th>Description</th>
<th>[thousand toe]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average on 2001-2005</td>
<td>20,840</td>
</tr>
<tr>
<td>9% energy saving till 2016</td>
<td>1,876*</td>
</tr>
<tr>
<td>Energy saving target adopted by Romania till 2016</td>
<td>3,800**</td>
</tr>
<tr>
<td>Intermediate target for 2010</td>
<td>946***</td>
</tr>
</tbody>
</table>

* Minimum value in accordance with Directive 2006/32/EC
** 13.5 % from the medium consumption during 2001 – 2005 respectively 1.5 % annual
*** 4.5 % from the medium consumption during 2001 – 2005 respectively 1.5 % annual
Energy efficiency improvement measures in residential and tertiary sector

- Thermal insulation and ventilation for multilevel buildings raised during 1950-1990
- Energy efficiency improvement for heating / cooling systems in individual dwellings
- Promoting high efficiency cogeneration
- Improvement of public lighting system
- Promoting energetic efficiency household appliances and lamp use
- Promoting ESCO development
- RES use

12 - 14 September 2007  "Effective Policies for Improving Energy Efficiency in Buildings"

Thermal insulation and ventilation for multi-storeyed buildings raised during 1950-1990

**Actions for supporting energy efficiency measures**
- thermal insulation of outside walls;
- thermal insulation of roofs;
- insulation of pipes from thermic basement;
- windows replacement.

Ordinance 174/2002, and the related Law 211/2003 relating to the establishment of special measures for the thermal rehabilitation of multi-storeyed buildings:
- 34 % state budget
- 33 % local budget
- 33 % budget of owners associations

- In 2005, 23 buildings were included and was made energetic audit and were realised projects for thermal refurbishments actions.
- In 2006, 614 buildings were included and was made energetic audit.
- In 2007 will be realised projects for thermal refurbishments actions.

12 - 14 September 2007  "Effective Policies for Improving Energy Efficiency in Buildings"
Ongoing actions for measure’s implementing

- For **new buildings**, starting **2007**, Energy Performance Certificate will be emitted.
- For **present buildings** that will be sold or rented, starting **2010**, Energy Performance Certificate will be emitted.

**Managing Authority: MDLPL, INCERC.**

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Actions for supporting energy efficiency measures

- Control actions at introduction on the market for air-conditioning and boilers for heating and hot water.
- Consumption establishment for individual dwellings.
- Promoting campaigns for RES and energy efficiency household appliances use.

Ongoing actions for measure’s implementing

- Continuation of ARCE control actions at introduction on the market for air-conditioning and ISCIR for new boilers for hot water that functioning with liquid or gas fuel (G.D no. 574/2005, GD no. 187/2005).
- International cooperation - Energy Intelligent Europe- REMODECE- (measurement electricity consumption in 100 individual dwellings) - deadline: 2008.

**Managing Authority: ARCE, ISCIR.**
Actions for supporting energy efficiency measures

- Through G.D no. 219/2007 were transposed in Romanian legislation the provisions of Directive 2004/8/CE regarding promotion of cogeneration based on thermal energy demand on energy intern market.
- Bonus supporting scheme adopting and implementing for promoting high efficiency cogeneration.

Ongoing actions for measure’s implementing


Managing Authority: MEF, MIRA, ANRE

Actions for supporting energy efficiency household appliances and lamp use

- National legislation that takes over acquis.
- ARCE and ANPC Control actions at introduction on the market for householder appliances.
- Information Campagnes for householder.
- In 2006 -Regional Project: UNDP-GEF regarding implementation of energy efficient standards and labeling in the candidate countries UE *.

Ongoing actions for measure’s implementing

- Promoting and supporting incandescent lamps replacement by energetic efficient lamps and appliances for obtaining consumption reduction.
- During 2008-2010:
  - Promoting G.D. for supporting refrigeration appliances, washing machines and air-conditioning replacement, through state budget (50 Euro bonus for acquiring A/A+ appliances ) - deadline: 2009.

Managing Authority: MEF, ARCE
Promoting ESCO development

**Actions for supporting energy efficiency measures**

- To apply Energy Performance Contract for implementing energy efficiency measures and for guaranteeing energy savings by ESCO.
- ARCE campaigns of promoting ESCO development in Romania (seminaries for applying energy efficiency legislation in municipalities, companies from industrial sector during 2003-2006).

**Ongoing actions for measure’s implementing**

**In 2007:** Realising one MEF study from research-development Programm regarding introduction ways in Romania of Directive 32/2006/CE measures that states as:
- Analysing supporting ways for energy efficiency raise Programmes (white certificates, ESCO, Energy Performance Contract).
- Performance Contract realising as supporting mechanism for ESCO-s.
- Identifying and removing barriers existing in Romania regarding ESCO-s.

PHARE study on the point of starting regarding financial incentives mechanisms development for energy efficiency - deadline: 2008.

**During 2008-2010:** Legislative framework elaboration for ESCO-s development.

**Managing Authority:** MEF, ARCE

---

**RES use**

**Actions for supporting energy efficiency measures**

- Informational Champagnes during 2003-2006 (ARCE).
- The National program for the reduction of energy costs for the population, by increasing energy efficiency and using renewable sources of energy- in 2006 and 2007.

**Ongoing actions for measure’s implementing**

**During 2008 - 2010:**
- A G.D will be initiated for promoting investments Programmes designed to RES use for electricity and thermal energy production, aiming energy efficiency raise – deadline 2008.
- Structural founds use for RES projects.

**Managing Authority:** MEF, ARCE

---
THANK YOU FOR YOUR ATTENTION!

12 -14 September 2007  "Effective Policies for Improving Energy Efficiency in Buildings"
Requirements of ESD Directive and the Hungarian Energy Efficiency Action Plan

dr. László Elek
Energy Centre
Lecture at JRC-IES-meeting
The Energy Service Directive 2006/32/EC

- To promote cost-effective EE in EU Member States through obligations and the removal of institutional, financial and legal barriers
- To promote the development of a sustainable market for EE and energy services
- To introduce an exemplary role of public sector in the EEAP
- To organise the market for Energy services
  - Stakeholders should provide aggregate statistics to the final consumers
  - To remove obstacles of energy services
  - Requirements for the promotion of competitively priced energy services, energy audits or contribution funds
  - Voluntary agreements or market oriented schemes such as white certificates are suggested

The Scope of ESD Directive

- Covers all energy end-use suppliers (distributors and retailers of electricity, natural gas, district heating, transport fuels etc.)
- Covers all end-use sectors
  - Household
  - Tertiary
  - Non-energy intensive industries
  - Transport
  - Agriculture
    - Emissions trading sector excluded
The target of ESD Directive

- 9-year 9% indicative target (1% cumulative annual savings) measured from 1.1.2008 until 31.12.2016.
- Fixed amount of energy (PJ) as 1% of 5-year average of unadjusted final consumption
- Credit for some „early actions” >1995. But effects must be measurable after 2008.
- All measures must be verifiable and measurable or estimable (See Annexes I, II, III, IV.)

Cumulative savings for Hungary for ESD Directive

Cumulative savings for ESD Directive

Laszlo ELEK - Energy Centre Hungary, Hungary

JRC Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007
Public Sector Obligations

• The Public Sector in Member States will be obliged to:
  • Fulfil an exemplary role
  • Publish energy efficiency guidelines as assessment criteria in tendering for public contracts
  • Select two mandatory measures from list in Annex VI, requiring energy efficient public procurement, energy audits and energy performance contracting

Obligation on Energy Suppliers

• Member States and suppliers to promote energy services & energy efficiency measures
• Obligation for energy distribution and/or retail energy sales companies to choose between:
  – Energy services, energy audits, energy efficiency measures or contribute to an energy efficiency fund
  – Voluntary agreements and/or market oriented schemes
• Energy companies to help remove market barriers and not hinder EE market development
Availability of Information

- Member States to make sure that information about ESD Directive is widely distributed to relevant market actors
- Member States to establish appropriate conditions for providing information to final customers
- The Commission to facilitate best practice exchange and dissemination

Distribution tariffs

- Schemes and tariffs with a social aim may be permitted
Energy audits

• Member States to ensure the wide availability of high quality independent energy audit schemes
• To be carried out is an independent manner

Metering

• Energy suppliers to provide to electricity, natural gas, DH and domestic hot water customers, when technically possible and cost-effective: competitively priced individual meters that accurately reflect consumption
• With meter replacement, such meters shall always be provided, unless technically impossible or not cost-effective
• When a new connection is made as a result of a new building or a major renovation, such meters shall always be provided
Major pillars of Hungarian EEAP I.

- Running EE-actions
  - Modernisation of pre-fabricated panels
  - Modernisation of dwellings with traditional technologies
  - Energy Efficiency Revolving Fund for the investments of business sector (soft loan)
  - Environmental friendly energy management (EIOP) (financial assistance)
  - Billing based on metering in DH
  - „Apple of our eyes” modernisation program for EE of public education
  - EE advisory network for household sector
  - Weight tax on cars

Major pillars of Hungarian EEAP II.

- EE-actions with legal measures
  - Obligatory employment of energy experts for large consumers
  - Obligatory energy reporting for large consumers
  - To set up EE-guidelines for public procurements
  - To set up minimum efficiency standards for office equipment
  - Energy labelling for electric water-heaters and gas water-heaters
  - Voluntary agreement with energy intensive sub sectors for reduction of energy consumption
Major pillars of Hungarian EEAP III.

• EE-measures with subsidies (financial assistance)
  – Energy certificate for buildings
  – Periodic mandatory inspection of household boilers
  – Subsidies for buying energy efficient refrigerators and freezers
  – Subsidies for buying energy efficient CFL-lamps
  – Better financial conditions for ESCO-s with tax reduction
  – State subsidies for energy audits in industry
  – Elaboration of EE-training materials for primary schools

Stressed measures of EEAP I.

• Environment and Energy Operative Programme (2007-2013)
  – Public institutions
  – Municipality institutions
  – Small and medium enterprises of industry
    • General Subsidy Rate 10-50% (12-17% for modernisation of heating, 8-12% for modernisation of lighting)
    • Subsidised activities
      – Reduction of energy consumption in public and municipality buildings
      – Modernisation of lighting systems in public and municipality buildings
      – Additional thermal insulation, replacement of windows and doors for public and municipality buildings
      – Change of boilers for public and municipality buildings
      – To build regulation for heating systems
Stressed measures of EEAP II.

- Third party financing within EEOP (successor of “Apple of our Eyes” for public education institutions)
  - For public and municipality institutions
  - An ESCO-company will be involved for financing
    - Additional thermal insulation
    - Replacement of windows and doors
    - To build regulation for heating
    - To change of boilers
    - To regulate of boilers
- Modernisation of lighting

Stressed measures of EEAP III.

- Modernisation of pre-fabricated panels
  - The Hungarian insulation standards have not been reached the EU-requirements
  - A lot of dwelling is needed heating reconstruction, window or door replacement and additional thermal insulation
  - Objective of this grant: additional thermal insulation of building envelope, replacement of windows and doors, modernisation of heating systems for pre-fabricated panels
  - Max. share of grant 33% of total costs
- Billing based on metering in District Heating
  - Based on the DH Law (18/1998) the DH-companies must have established the conditions for metering at each heat centre
  - The flat rate bill settlement were excluded from the law
  - The new objective is set up: establishing of metering per heat receiving stations
Stressed measures of EEAP IV.

- Energy certificate for buildings
  - It will be introduced an energy data sheet for buildings, which contains the major EE-characteristics of the building
  - The owner of the building gets energy information about EE-characteristics of the building based on this certificate
  - The Energy Certificate influences the price of the building
  - The most efficient buildings can be sold easier
- Periodic inspection of household boilers
  - To filter the boilers under minimum EE-standards with controlling of boilers over 5 years
  - The filtered boilers should be changed with a credit from the Boiler Fund

Stressed measures of EEAP V.

- Voluntary agreements
  - the government makes an agreement with major energy consuming groups for following energy efficient practice
  - Agreements can be made
    - With energy intensive branches
    - With producers of energy using appliances
  - The objective of the agreement can be
    - The reduction of energy consumption
    - To develop more efficient appliances with better EE-indicators
  - The voluntary agreements are able to influence the energy consumption of important energy consuming groups
Selected graphs on Hungarian HH-sector

Stock of family houses and stock of dwellings in buildings with more than 4 dwellings (perm. occupied)
Average area of dwellings

Unit consumption of households per dwelling (without clim. corr.)
The share of natural gas within household final consumption (1990-2004)

- **1990**
  - Natural gas: 25.0%
  - Electric: 12.5%
  - Other: 62.5%

- **2004**
  - Natural gas: 59.5%
  - Electric: 15.8%
  - Other: 24.7%

Unit consumption of electricity of households per dwelling

- **1990**
  - 2400 kWh/dwelling

- **1991**
  - 2500 kWh/dwelling

- **1992**
  - 2600 kWh/dwelling

- **1993**
  - 2700 kWh/dwelling

- **1994**
  - 2800 kWh/dwelling

- **1995**
  - 2900 kWh/dwelling

- **1996**
  - 3000 kWh/dwelling

- **1997**
  - 2600 kWh/dwelling

- **1998**
  - 2800 kWh/dwelling

- **1999**
  - 3000 kWh/dwelling

- **2000**
  - 3200 kWh/dwelling

- **2001**
  - 3400 kWh/dwelling

- **2002**
  - 3600 kWh/dwelling

- **2003**
  - 3800 kWh/dwelling

- **2004**
  - 4000 kWh/dwelling
ODEX-index of households

Thank You for Your Attention!

laszlo.elek@energycentre.hu
The Slovak Action Plan for Energy Efficiency, Promotion Programmes and Instruments

Dipl. Ing Jan Rousek, PhD,
Dr. Ing. Kvetoslava Šoltésová, CSc.

CONTENTS

Introduction
I Analysis of the current state of energy intensity
II Conception of energy efficiency
III Existing support mechanisms – selection
IV Energy efficiency in buildings
INTRODUCTION

In January 2006 Slovak Government approved Energy Policy for Slovakia, on July 4th 2007 Conception of Energy Efficiency of the Slovak Republic resulting from the energy policy document was presented by the Ministry of Economy of the Slovak Republic and approved by the Government.

Main implementation tool of the Energy Efficiency Conception will be Action Plans for Energy Efficiency

Action Plan 1 will cover the years 2008 – 2010 and should be approved by the Government in October 2007, Action Plan 2 and Action Plan 3 will cover the years 2011 – 2013 and 2014 – 2017 respectively.

Analysis of the current state of energy intensity
EU 27 comparison

Energy intensity in EU

### Analysis of the current state of energy intensity

**Development of energy intensity indicators**

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2003</th>
<th>2005</th>
<th>Average 2001 - 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP (€p. 2000)</td>
<td>10° SKK</td>
<td>971 681</td>
<td>1 035 762</td>
<td>1 177 892</td>
</tr>
<tr>
<td>Year on year development</td>
<td></td>
<td>100 %</td>
<td>4,2 %</td>
<td>6,0 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,3 %</td>
</tr>
<tr>
<td>Gross inland consumption</td>
<td>TJ p.a.</td>
<td>791 707</td>
<td>795 584</td>
<td>802 156</td>
</tr>
<tr>
<td>Year on year development</td>
<td></td>
<td>100 %</td>
<td>+0,6 %</td>
<td>+2,5 %</td>
</tr>
<tr>
<td>Final consumption</td>
<td>TJ p.a.</td>
<td>435 192</td>
<td>400 383</td>
<td>410 103</td>
</tr>
<tr>
<td>Year on year development</td>
<td></td>
<td></td>
<td>+8,1 %</td>
<td>+6,2 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-1,4 %</td>
</tr>
</tbody>
</table>

**Analysis of the current state of energy intensity**

**Final energy consumption**

**Final Consumption Structure by Sectors (2005)**

- Industry & Construction: 34%
- Transport: 18%
- Households: 26%
- Agriculture: 4%
- Commercial & Service: 18%
Analysis of the current state of energy intensity

Final energy consumption

Final consumption structure in households (2005)

Energy efficiency conception

The aim and significance of the conception

• Energy efficiency = basic priority of the Energy Policy of the Slovak Republic, approved by the Slovak Government in January 2006

• Main goals of the conception:
  • Gradual reduction of energy intensity down to the EU level,
  • Providing motivation environment for energy efficient behaviour of population and energy market partners,
  • Promotion of sustainable energy solutions and introduction of new innovations and energy efficient technologies in all economy sectors.
Energy efficiency conception
The aim and significance of the conception

- Conception task: the help to solve such problems that are not solved by the internal energy market
  - Inventory of the current knowledge of energy conservation potentials in individual sectors of the Slovak economy
  - Identification of barriers
  - Suggested strategic aims and priorities
  - Definition of energy conservation measures
  - Timing of gradual steps to achieve defined aims
  - Provision of the implementation of suggested measures and their monitoring.

Energy efficiency conception
The scope and starting point of the conception

- One of the obligations as EU member country is the approximation of legislation

- Obligations in the sphere of energy efficiency arise also from our membership in other international institutions, such as Energy Charter, OECD, IEA

- Further obligations result from various international treaties and agreements for instance in the environmental field (Kyoto Protocol).
Energy efficiency conception
The scope and starting point of the conception

Conception promotes the implementation of the EU Directives and other documents related with energy efficiency into practical life:

Energy efficiency conception
The scope and starting point of the conception


Decree 625/2006 sets details of the building performance calculation, defines the contents of energy certificate of the building and energy label. Energy certificates & energy labels obligatory as of 1st January 2008.
## Energy efficiency conception
### Conception aims and priorities

- **Basic goals for Slovakia in the sphere of GHG emissions resulting from international contracts and agreements:**
  - Reducing GHG emissions in the period 2008 – 2012 by 8% comparing to the year 1990 (Kyoto Protocol)
  - Ensuring further 5% reduction of GHG emissions (starting point for the second target period)
  - Achieving the control over the GHG emission development so that the increase trend could be gradually mitigated and stabilising towards 2015 could be achieved
  - Providing new strategy for GHG emission reduction well in advance.

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<table>
<thead>
<tr>
<th>Energy efficiency conception</th>
<th>Conception aims and priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic goal defined by</strong></td>
<td><strong>to achieve annual savings in</strong></td>
</tr>
<tr>
<td>Energy efficiency conception</td>
<td><strong>final energy consumption of 4,135 TJ p.a., on average</strong></td>
</tr>
</tbody>
</table>

This value is identical with the indicative aim resulting from the Directive 2006/32/EC on energy end-use efficiency and energy services for the period 2008 – 2017, i.e., to achieve within 9 years 9% savings in final energy consumption, taking into account the time period of the last 5 years/data for the years 2001 – 2005/.
**Energy efficiency conception**

**Conception aims and priorities**

General measures aiming at the increase of energy efficiency in Slovakia:

- Preparing the set of legislative and institutional steps providing the environment suitable for the implementation of energy efficiency measures in various sectors of the national economy,
- Providing necessary co-ordination of activities aiming at the improvement of energy efficiency within the framework of central, regional and local administration,
- Design of promotional programmes defining priorities and measures supporting energy efficiency,

- Preparing energy conceptions for the regions oriented at the energy efficiency and monitoring their implementation,
- **Information campaign** oriented at the increase of energy awareness of consumers (energy efficiency, energy consumption & costs, availability and reliability of energy efficient technologies and resulting savings, financing possibilities etc.,
- Support for the introduction of efficient energy consumption standards.
Existing support mechanisms
Structural funds 2007-2013

<table>
<thead>
<tr>
<th>Operation programme</th>
<th>Responsible</th>
<th>Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Regional operational programme</td>
<td>M. of Construction &amp; Regional Development</td>
<td>ERDF</td>
</tr>
<tr>
<td>2. Environment</td>
<td>M. Of Environment</td>
<td>ERDF, KF</td>
</tr>
<tr>
<td>3. Transport</td>
<td>M.of Transport, Posts &amp; Telecommunication</td>
<td>ERDF, KF</td>
</tr>
<tr>
<td>4. Information</td>
<td>SR Gov. Office</td>
<td>ERDF</td>
</tr>
<tr>
<td>5. R &amp; D</td>
<td>M. of Education</td>
<td>ERDF</td>
</tr>
<tr>
<td>6. Competitiveness &amp; economic growth</td>
<td>Ministry of Economy (Slovak Innovation &amp; Energy Agency)</td>
<td>ERDF</td>
</tr>
<tr>
<td>7. Health care</td>
<td>M. Of Health Care</td>
<td>ERDF</td>
</tr>
<tr>
<td>8. Employment &amp; social inclusion</td>
<td>MPSVR SR</td>
<td>ESF</td>
</tr>
<tr>
<td>9. Education</td>
<td>M. of Education</td>
<td>ESF</td>
</tr>
<tr>
<td>10. Technical support</td>
<td>M. of Construction &amp; Regional Development</td>
<td>ERDF</td>
</tr>
<tr>
<td>11. Bratislava region</td>
<td>M. of Construction &amp; Regional Development</td>
<td>ERDF</td>
</tr>
</tbody>
</table>

Operational programmes 1 and 6 are closely linked with the energy efficiency promotion:

1. **Regional operational programme** – support accessible and high-quality civic and public infrastructure and improvement of transport infrastructure, infrastructure of settlements and tourism infrastructure. In compliance with Regulation (EC) No 1080/2006 On the European Regional Development Fund and its Article 7 expenditure on housing belongs to the eligible expenditure in new Member States (acceded to the EU on ar after 1st May 2004). Under priority line 4 of this programme – Communities’ Refurbishment energy efficiency improvement of buildings is covered. (sent for approval to the EC in July 2007)

6. **Competitiveness & economic growth** – increasing energy efficiency both at energy production and energy consumption as well, introduction of advanced technologies and wider utilisation of renewable energy sources (measure 1.4 of Operational Programme 6).
Existing support mechanisms
International programmes/mechanisms/funds

- Intelligent Energy – Europe
- Financial Mechanism of European Economic Area and Financial Mechanism of the Kingdom of Norway,
- Swiss Financial Mechanism
- Promotion of Environmental Protection Abroad (Austria),
- United Nations Development Programme,
- European Investment Bank,
- European Bank for Reconstruction & Development

Energy Efficiency in Buildings
Housing situation in Slovakia

Number of flats in Slovakia in 2005

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In one family houses</td>
<td>863 525</td>
<td></td>
</tr>
<tr>
<td>In residential buildings</td>
<td>851 457</td>
<td></td>
</tr>
</tbody>
</table>

Heat consumption estimate for dwellings (related to building standards)

<table>
<thead>
<tr>
<th></th>
<th>ČSN 73 0540</th>
<th>STN 73 0540</th>
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</thead>
<tbody>
<tr>
<td>Valid from</td>
<td>1964 *</td>
<td>1984</td>
</tr>
<tr>
<td>GJ/dw.year</td>
<td>43,2</td>
<td>33,5</td>
</tr>
<tr>
<td></td>
<td>26,3</td>
<td>22,0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16,6</td>
</tr>
</tbody>
</table>

Energy Efficiency in Buildings

Housing situation in Slovakia

Residential buildings by years of construction

- 10% unidentified
- 5% before 1900
- 5% 1951-1965
- 0% 1966-1985
- 4% 1986-1990
- 21% 1991-2001
- 55% 1990-1950

Residential sector in Slovakia
- second largest in energy consumption
- DH in 92% of residential (multi family) houses
- presents the biggest opportunity for energy efficiency measures

Some measures already implemented (thanks to legislation)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring of heat input</td>
<td>88%</td>
</tr>
<tr>
<td>Hydraulic balancing of heat delivery</td>
<td>57%</td>
</tr>
<tr>
<td>Heat regulating valves</td>
<td>55%</td>
</tr>
</tbody>
</table>

Jan ROUSEK - Slovak Innovation and Energy Agency, Slovak Republic
**Energy Efficiency in Buildings**

**Housing situation in Slovakia**

Additional thermal isolation of residential buildings by regions (2004)

- BB: 29%
- BA: 5%
- KE: 19%
- NR: 4%
- PO: 20%
- TR: 8%
- TN: 6%
- ZA: 9%

**Energy Efficiency in Buildings**

**Financial support of building refurbishments**

**History:**

Programme of energy conservation in residential buildings and flats:

a) additional thermal insulation - throughout 1992 – 1997 540 million SKK (56 % of costs) covered by the state budget (after 1997 until now support is granted by the State Fund for the Promotion of Housing)

b) installation of measurements & control plus refurbishment of heating installations – throughout 1993 – 1999 234 million SKK (26 % of costs) covered by the state budget

**Recent**

State Fund for the Promotion of Housing granted in 2006 693,5 million SKK, for 2007 is planned 950 million SKK, (soft credit granted by the Fund)
Energy Efficiency in Buildings

Demand for financial support of building refurbishments

Analysis of financial intensity of the housing stock refurbishment:

<table>
<thead>
<tr>
<th>Refurbishment activity</th>
<th>Building age</th>
<th>Mill. SKK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair and maintenance costs for flats</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 – 10</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>11 – 20</td>
<td>29.818</td>
</tr>
<tr>
<td></td>
<td>21 – 30</td>
<td>148.788</td>
</tr>
<tr>
<td></td>
<td>31 – 40</td>
<td>102.543</td>
</tr>
<tr>
<td></td>
<td>41 – 60</td>
<td>66.584</td>
</tr>
<tr>
<td>Repair costs for expected faults</td>
<td></td>
<td>24.652</td>
</tr>
<tr>
<td>Repair costs for identified faults</td>
<td></td>
<td>23.599</td>
</tr>
<tr>
<td>Costs for additional thermal insulation</td>
<td></td>
<td>33.328</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>429.343</td>
</tr>
</tbody>
</table>

Source: Report on the state and demand for financial resources for housing stock refurbishment in the years 2007 - 2013 [M. of Construction & Regional Devel., 2005]

Energy Efficiency in Buildings

Expected financing resources

Revitalising housing stock within the period of 2007 – 2013 at the cost of over 400 billion SKK is unreal, still it provides some idea on how demanding this task will be.

Currently, following resources are available for the next years till 2013:

a) Public funds in the form of subsidies to remove system faults (800 mill. SKK) and credits from the State Fund for the Promotion of Housing (3 billion SKK)

b) Means from the individual funds for repairs & maintenance (some 40 billion SKK)

c) Credits granted by mortgage banks, building & loans associations and banks in general (some 24 billion SKK)

d) Support from the Regional Operational Programme of Structural Funds 2007 – 2013 (?)
Thank you for your attention!

Dipl. Ing. Jan Rousek, PhD
jan.rousek@siea.gov.sk,
Dr. Ing. Kvetoslava Šoltésová, CSc.,
kvetoslava.soltesova@seabb.sk
THE SLOVENIAN ACTION PLAN FOR ENERGY EFFICIENCY AND FINANCIAL INSTRUMENTS TO PROMOTE EFFICIENCY
BUILDING REFURBISHMENT

JRC Workshop: Effective Policies for Improving Energy Efficiency in Buildings
Krakow, September 12-14, 2007

Tomaž Fatur M.Sc.
Jožef Stefan Institute – Energy Efficiency Centre, Jamova 39, Ljubljana

Outline

National Energy Efficiency Action Plan
- Presentation of draft Slovene NEEAP
- Structure of NEEAP according to the Directive 2006/32/ES
- Structure also according to the Template for a National Energy Efficiency Action Plan 2007
- NEEAP final document expected in September 2007
- NEEAP to be approved by the Government of Slovenia

Buildings
- Transposition of Building Directive to Slovene legislation
- Financial instruments for building refurbishment
**Structure of NEEAP**

- **Strategic Framework**
- Baseline (reference) calculation
- Target savings for period 2008 do 2016
- Intermediate target savings for period 2008 do 2010
- Sectoral instruments for energy efficiency improvements (target savings based on calculation sheets):
  - Households
  - Commercial
  - Industry
  - Transport
- Horizontal and intersectoral instruments
- Early actions (from 1995)
- Public sector instruments
- Availability of data
- Financial structure and resources

**Strategic Framework (1/2)**

- National energy programme (adopted in 2004) with targets for 2010 compared to 2004:
  - Industry and commercial 10%
  - Buildings 10%
  - Public sector 15%
  - Transport 10%
- Common EU energy and climate policy:
  - 20% RES in PE
  - 10% biofuels
  - 20% energy 2020
  - 20% reduction of GHG emissions
  - Development of energy technologies
- Strategy of development for Slovenia to improve competitiveness, knowledge, efficient state, sustainable development (Lisbon strategy)
- National development projects 2007-2023 (incl. Sustainable Energy Programme and Hydrogen Economy)
Strategic Framework (2/2)

- National development programme 2007-2013 (part of Sustainable Energy)
  - Sustainable energy focuses to 3 main issues: energy efficient building refurbishment and low energy houses in public sector, electricity savings in all sectors, modern local energy supply systems (RES and CHP)
  - basis for investments using EU funds
  - Action plan on environmental and transport infrastructure
  - EU cohesion fund selected for financing, but only part of the programme can be financed through EU cohesion funds due to its nature
  - Potential use of funds only for projects in public interest

- National Climate Policy
  - National environmental protection programme
  - Action plan on reduction of GHG emissions
  - Biomass action plan
  - NEC (SO2, NOx, NH3, particles?)

- Slovenia's commitments to Kyoto and RES

- Energy Efficiency Programmes are unfortunately still on paper only

Energy Intensity

[Graph showing energy intensity by country for the years 1995, 2000, and 2004]
CO2 Emissions

TREND 

SHARE [%] 

Emission trend [1986=100%]

- Transport
- Services and HH
- Energy
- Industry
- Total

Strategic Framework (2/2)

Over-delivery (-) or shortfall (+) of respective emission target in percentage points relative to base-year emissions

With existing domestic measures
With measures and carbon sinks
With additional domestic measures

Estonia - 52.0
Lithuania - 42.5
Latvia - 40.6
Hungary - 22.8
Czech Republic - 12.4
Slovakia - 16.4
Poland - 6.1
Slovenia - 2.0

Tomaz FATUR - Jozef Stefan Institute, Slovenia
National energy efficiency target for 2010 & 2016

- Statistic period 2001 – 2005
- Average final energy consumption 47.039 GWh (without ETS, incl. Army facilities)
- Public Costs – cca 500 M€ in period 2008-2016

<table>
<thead>
<tr>
<th>5-years average – final energy consumption for ETS only (w/o ETS)</th>
<th>47.039 GWh</th>
<th>savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target energy savings 2016 (9% or more)</td>
<td>4.233 GWh</td>
<td>9 %</td>
</tr>
<tr>
<td>Intermediate energy savings 2010</td>
<td>941 GWh</td>
<td>2 %</td>
</tr>
</tbody>
</table>
### Slovenia NEEAP measures and expected results

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Name</th>
<th>Savings 2016</th>
<th>Savings 2010</th>
<th>Public funding 2008-2016</th>
<th>CO2 emission reduction 2016</th>
<th>GWh</th>
<th>GWh</th>
<th>mio EUR</th>
<th>kt CO2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GWh</td>
<td>GWh</td>
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<tr>
<td><strong>HOUSEHOLDS</strong></td>
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<td></td>
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<tr>
<td>1</td>
<td>Financing EE building refurbishment and sustainable houses</td>
<td>297.5</td>
<td>66.1</td>
<td>35.1</td>
<td>78.5</td>
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<tr>
<td>2</td>
<td>Financing EE heating systems</td>
<td>89.2</td>
<td>19.8</td>
<td>39.4</td>
<td>77.8</td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
<td>Financing electricity savings</td>
<td>529.4</td>
<td>117.6</td>
<td>34.8</td>
<td>136.5</td>
<td></td>
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<tr>
<td>4</td>
<td>Low income households EE scheme</td>
<td>29.0</td>
<td>6.4</td>
<td>21.0</td>
<td>9.5</td>
<td></td>
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<tr>
<td></td>
<td><strong>TOTAL (1-4)</strong></td>
<td><strong>945.1</strong></td>
<td><strong>210.0</strong></td>
<td><strong>130.3</strong></td>
<td><strong>302.4</strong></td>
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<td><strong>SERVICES</strong></td>
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<td>5</td>
<td>Financing EE building refurbishment and sustainable houses</td>
<td>81.8</td>
<td>18.2</td>
<td>43.1</td>
<td>20.4</td>
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<td>6</td>
<td>Financing EE heating systems</td>
<td>61.9</td>
<td>13.8</td>
<td>18.3</td>
<td>23.8</td>
<td></td>
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<tr>
<td>7</td>
<td>Financing electricity EE</td>
<td>566.5</td>
<td>125.9</td>
<td>16.9</td>
<td>126.0</td>
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<tr>
<td>8</td>
<td><strong>Green public procurement</strong></td>
<td>(*)</td>
<td></td>
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<td></td>
<td><strong>TOTAL (5-8)</strong></td>
<td><strong>710.3</strong></td>
<td><strong>157.8</strong></td>
<td><strong>78.2</strong></td>
<td><strong>170.2</strong></td>
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<tr>
<td><strong>INDUSTRY</strong></td>
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<tr>
<td>9</td>
<td>Financing electricity EE (ECO)</td>
<td>627.0</td>
<td>139.3</td>
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<td>150.5</td>
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<td>10</td>
<td>Financing electricity EE (SLO)</td>
<td>295.4</td>
<td>65.6</td>
<td>4.1</td>
<td>70.9</td>
<td></td>
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<tr>
<td>11</td>
<td>Financing Energy Auditing</td>
<td>922.4</td>
<td>206.0</td>
<td>12.9</td>
<td>221.4</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>TOTAL (9-11)</strong></td>
<td><strong>922.4</strong></td>
<td><strong>206.0</strong></td>
<td><strong>12.9</strong></td>
<td><strong>221.4</strong></td>
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<td><strong>TRANSPORT</strong></td>
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<tr>
<td>12</td>
<td>Promotion and competitiveness of public transport</td>
<td>191.4</td>
<td>42.5</td>
<td>10.0</td>
<td>51.7</td>
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<td>Promotion of sustainable transit transport</td>
<td>190.9</td>
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<td>14</td>
<td>Private car efficiency improvement</td>
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<td>172.8</td>
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<td>250.2</td>
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<td>Bicycle paths and cycling promotion</td>
<td>38.0</td>
<td>8.4</td>
<td>5.5</td>
<td>10.3</td>
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<tr>
<td></td>
<td><strong>TOTAL (12-15)</strong></td>
<td><strong>752.6</strong></td>
<td><strong>167.2</strong></td>
<td><strong>35.5</strong></td>
<td><strong>203.2</strong></td>
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<td><strong>HORIZONTAL MEASURES</strong></td>
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<td>Energy labelling and minimum standards</td>
<td>262.5</td>
<td>58.3</td>
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<tr>
<td>18</td>
<td>Energy billing based on real energy consumption</td>
<td>(*)</td>
<td></td>
<td></td>
<td>27.0</td>
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<td></td>
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<tr>
<td>19</td>
<td>Information, educatio, promotion and demonstration projects</td>
<td>(*)</td>
<td></td>
<td></td>
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<td>20</td>
<td>Building energy certificate</td>
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<td>21</td>
<td>Energy consultancy for households</td>
<td>(*)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>22</td>
<td><strong>CO2 emission tax</strong></td>
<td>(*)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>23</td>
<td><strong>Energy excise tax</strong></td>
<td>(*)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>24</td>
<td>Feed-in tariffs</td>
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<tr>
<td>25</td>
<td>CO2 emission tax reduction</td>
<td>32.4</td>
<td>7.2</td>
<td>1.0</td>
<td>9</td>
<td></td>
<td></td>
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<tr>
<td>26</td>
<td>New financial instruments</td>
<td>(*)</td>
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<td></td>
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<tr>
<td>27a</td>
<td>Demand side programmes of energy distributors</td>
<td>289.0</td>
<td>64.2</td>
<td>15.9</td>
<td>87</td>
<td></td>
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<td>27b</td>
<td>DSM households</td>
<td>189.7</td>
<td>42.2</td>
<td>10.4</td>
<td>57</td>
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<tr>
<td>27c</td>
<td>DSM services and SMEs</td>
<td>99.3</td>
<td>22.1</td>
<td>5.5</td>
<td>30</td>
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<tr>
<td>28</td>
<td>Consumers information on energy costs, billing, EE technologies etc.</td>
<td>902.9</td>
<td>200.6</td>
<td>43.9</td>
<td>254.1</td>
<td></td>
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<tr>
<td></td>
<td><strong>TOTAL (16-28)</strong></td>
<td><strong>902.9</strong></td>
<td><strong>200.6</strong></td>
<td><strong>43.9</strong></td>
<td><strong>254.1</strong></td>
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**National energy efficiency target for 2010 & 2016**

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Name</th>
<th>Savings 2016</th>
<th>Savings 2010</th>
<th>Public funding 2008-2016</th>
<th>CO2 emission reduction 2016</th>
<th>GWh</th>
<th>GWh</th>
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<td>GWh</td>
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<td>16</td>
<td>Building Energy Performance legislation</td>
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<td>17</td>
<td>Energy labelling and minimum standards</td>
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<td>58.3</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>18</td>
<td>Energy billing based on real energy consumption</td>
<td>(*)</td>
<td></td>
<td></td>
<td>27.0</td>
<td></td>
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<tr>
<td>19</td>
<td>Information, educatio, promotion and demonstration projects</td>
<td>(*)</td>
<td></td>
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<td>20</td>
<td>Building energy certificate</td>
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<td>21</td>
<td>Energy consultancy for households</td>
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<tr>
<td>22</td>
<td><strong>CO2 emission tax</strong></td>
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<td>23</td>
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<td>Demand side programmes of energy distributors</td>
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<td>27b</td>
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</tr>
</tbody>
</table>

(*) N.A.
Households – Financing EE building refurbishment and sustainable houses

- Target building stock: built before 1980 without thermal insulation
- Target group: building owners, building managers, investors
- Energy efficiency measures:
  - Building envelope – thermal insulation 20% over national standard
  - Attic insulation – thermal insulation 20% over national standard
  - Windows – thermal characteristics 10% over national standard
  - Low energy houses – new houses with energy consumption 40% lower than national standard (50,000 m² pa)
  - Passive houses – 15 kWh/m² (10,000 m² pa)
- Effectiveness:
  - 650,000 m² of building stock renovation per year (envelope, attic, windows)
  - 60,000 m² low energy and passive houses
  - 15% subsidy planned (average costs per m²)
  - Savings cca 8% of target savings
- Instrument already in place, but substantial increase planned
- Financial construction in preparation, planned sources: CO2 tax, EU Cohesion funds (public), EU structural funds (?), electricity network charges
- Responsibility: Ministry of Environment, Ecofund, Regional Government (not established yet)
- Horizontal measures too: building regulation, energy certificate, billing, information, excise tax, CO2 tax, energy consulting, EE promotion

Households – Financing EE heating systems

- Target building stock: improvements in heating systems
- Target group: building owners, building managers, investors
- Energy efficiency measures:
  - High efficiency boilers
  - High efficiency biomass boilers
  - Heating system optimization – thermostatic valves, regulation, hydraulic optimization, billing according to real heat consumption, thermal substation in DH systems
  - Warm water solar heating
  - Heat pumps
- Effectiveness:
  - 3,500 boilers in single- and 90 in multi-dwelling buildings per year (20-40% subsidy)
  - Heating optimization in 3,000/300 buildings (10-20% subsidy)
  - 10,000 m² thermal solar per year (20% subsidy)
  - 500 heat pumps per year (30% subsidy)
  - Savings cca 150 GWh
- Instrument already in place, but substantial increase planned
- Financial construction in preparation, planned sources: CO2 tax, EU Cohesion funds (public), EU structural funds (?), electricity network charges
- Responsibility: Ministry of Environment, Ecofund, Regional Government (not established yet)
- Horizontal measures too: building regulation, energy certificate, billing, information, excise tax, CO2 tax, energy consulting, EE promotion
Early Actions and Public Sector Specific Measures

- **Early actions** include activities from 1995 onwards
- Overview of energy efficiency results was minor disappointment
- Only some 0.5% can be claimed on early actions
- Early action will not be included within planned 9% energy saving target
- Activities include:
  - Financial instruments (revolving fund, Ecofund, subventions)
  - Promotional activities
  - Demonstration projects
  - Legislation
- **Public sector measures**
  - Financial instruments
  - Green public procurement
  - Building Energy Performance
  - Billing based on actual consumption
  - Taxes, Feed-in tariffs
  - Energy Services / ESCO
  - DSM
  - Information

Information and consultancy

- Leaflets, brochures, bulletin, web pages
- Seminars for landlords, engineering and installation personell
- Free advice for households
- Energy auditing of multi-dwelling buildings
Existing subsidy for building renovation investments

- Billing based on actual demand: up to 30% of investment
- Heating system regulation (thermostatic valves and hydraulic optimization of heating systems): up to 30% of investment
- Thermal insulation, windows etc.: up to 30% of investment
- Yearly tenders, financial source: budget
- EcoFund subsidies for energy efficiency, DH, RES (and also hybrid cars), both private, commercial and public investors
- Planned sources: electricity network charges (for energy efficiency), CO2 tax (transfer to regional governments – not established yet), EU Cohesion funds (public), EU structural funds (?)

Building regulation (according to Building Directive)

- Building directive not yet transposed into Slovene legislation
- Transposed into Environmental Law (building energy certificate, boiler inspection, HVAC inspection)
- Existing legislation on thermal insulation, inspection of boilers, HVAC equipment
- Complicated legislation on energy consumption calculation
- Energy Law - changes:
  - Feasibility study on alternative energy supply for buildings
  - Energy certificates of buildings (mandatory public buildings!)
  - HVAC inspection
  - Certified experts for building energy certificate
- Law on Building Construction - changes:
  - Regulation on building energy efficiency (draft)
    - Methodology for energy efficiency calculation
    - Minimum standards for energy efficiency
- All necessary changes expected in 2007!
Implementation of EU Policies and Measures for Improving Energy Efficiency in Buildings

Randall Bowie and Susanne Dyrbøl
Rockwool International A/S

Outline of presentation

- Background – Energy Efficiency of buildings
- EU legislation – highlights of implementation
  - EPBD
  - ESD NEEAP’s
  - EU Action plan on Energy Efficiency
- Conclusions
Energy efficiency of buildings - status

- 33% of all energy in Europe is used for transport
- 26% of all energy in Europe is used by industry
- 41% of all energy in Europe is used by buildings

- 2/3 of energy consumption in buildings is used for heating and cooling.
- 80% of energy consumption is used in small buildings < 1000 m²

Why focus on energy efficiency of buildings?

- Only approx. 1-2% new buildings constructed per year
- In order to achieve significant savings within the building sector, focus has to be on improving existing buildings
Energy Efficiency in Buildings - 3 EU waves

**NEW BUILDINGS**
  - Calculation Methodology
  - Improved requirements for new Buildings
  - Renovation Requirements
  - Performance Certification
  - Regular Inspection

**EXISTING BUILDINGS**
- Energy Services Directive
  - 9% improvement in EE
  - Requirements within Public Procurement
  - New role for Energy Suppliers
  - Co-financing of EE in Buildings
  - Metering & Billing

**BOTH TYPES**
- Action Plan on Energy Efficiency
  - Minus 20% in EE
  - Requirements within Public Procurement
  - New role for Energy Suppliers
  - Co-financing of EE in Buildings
  - Metering & Billing

**EPBD – Strengthening of building codes**

<table>
<thead>
<tr>
<th>Member State</th>
<th>Strengthening in energy consumption new buildings – introduced with EPBD implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium*</td>
<td>18%</td>
</tr>
<tr>
<td>Only Flanders</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>25-30%</td>
</tr>
<tr>
<td>France</td>
<td>15%</td>
</tr>
<tr>
<td>Hungary</td>
<td>approx 30%</td>
</tr>
<tr>
<td>Italy</td>
<td>15-20%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>20% (residential, requirement epc = 0.8)</td>
</tr>
<tr>
<td></td>
<td>Non-residential will follow</td>
</tr>
<tr>
<td>Norway</td>
<td>20-25% (from August 2009)</td>
</tr>
<tr>
<td>Spain</td>
<td>20%</td>
</tr>
<tr>
<td>Sweden</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>(only when direct electric heating is used)</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>20% residential</td>
</tr>
<tr>
<td></td>
<td>27% non-residential</td>
</tr>
</tbody>
</table>
### NEEAP’s status of deliverables /1

<table>
<thead>
<tr>
<th>Member State</th>
<th>Status of NEEAP and/or related communications (as of 11092007)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>√</td>
</tr>
<tr>
<td>Belgium</td>
<td>Delayed until 7th September</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Unspecified delay</td>
</tr>
<tr>
<td>Cyprus</td>
<td>√</td>
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<td>Czech Republic</td>
<td>Unspecified delay</td>
</tr>
<tr>
<td>Denmark</td>
<td>√</td>
</tr>
<tr>
<td>Estonia</td>
<td>√</td>
</tr>
<tr>
<td>Finland</td>
<td>√</td>
</tr>
<tr>
<td>France</td>
<td>Draft plan delivered. The plan will be revised after the French 'Grenelle de l’environnement' has been agreed during Autumn 2007</td>
</tr>
<tr>
<td>Germany</td>
<td>Delayed until Autumn</td>
</tr>
<tr>
<td>Greece</td>
<td>√</td>
</tr>
<tr>
<td>Hungary</td>
<td>Draft plan delivered</td>
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<td>Ireland</td>
<td>Unspecified delay</td>
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### NEEAP’s status of deliverables /2

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<tr>
<td>Latvia</td>
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<tr>
<td>Lithuania</td>
<td>√</td>
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<tr>
<td>Luxembourg</td>
<td>Unspecified delay</td>
</tr>
<tr>
<td>Malta</td>
<td>Unspecified delay</td>
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<tr>
<td>Netherlands</td>
<td>A draft plan has been delivered and a final plan will be submitted before October 2007.</td>
</tr>
<tr>
<td>Poland</td>
<td>√</td>
</tr>
<tr>
<td>Portugal</td>
<td>Delayed until September</td>
</tr>
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<td>Romania</td>
<td>√</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Unspecified delay</td>
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<td>Slovenia</td>
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</tr>
<tr>
<td>Spain</td>
<td>√</td>
</tr>
<tr>
<td>Sweden</td>
<td>Delayed until October</td>
</tr>
<tr>
<td>United Kingdom</td>
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### Announced savings target in NEEAPs /1

<table>
<thead>
<tr>
<th>Member State</th>
<th>Yearly savings target announced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1%, but the goal for 2020 is to be in line with the March 2007 Merkel target (-20%)</td>
<td>1/3 of the plan is about buildings but it doesn’t give much impression of a plan. Contains a long list of measures without prioritising</td>
</tr>
<tr>
<td>The Czech Republic</td>
<td>1% expected</td>
<td>Plan not submitted</td>
</tr>
<tr>
<td>Cyprus</td>
<td>1.1% target (expect to save 2%)</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>1.15% - 1.4%</td>
<td>The 1.15% is based on existing legislation. From 2010 the yearly target will be 1.4% (transmission losses will be included in new target!). The new agreement will be finalised Autumn 2007</td>
</tr>
<tr>
<td>Finland</td>
<td>1%</td>
<td>Based on existing measures – up till 2016 the plan only specifies savings corresponding to 6.4% meaning that savings equal to 2.6% still need to be decided</td>
</tr>
</tbody>
</table>

### Announced savings target in NEEAPs /2

<table>
<thead>
<tr>
<th>Member State</th>
<th>Yearly savings target announced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>much more than 1.2% is expected</td>
<td>Draft plan delivered. 1.2% corresponds to existing decree. The plan will be revised after the French Climate plan has been agreed during Autumn 2007. The “Grenelle de l’environnement” will go out for public consultation mid October and will likely be ambitious for existing buildings</td>
</tr>
<tr>
<td>Germany</td>
<td>3%</td>
<td>Announced publicly but plan not delivered</td>
</tr>
<tr>
<td>Hungary</td>
<td>1%</td>
<td>Draft plan submitted (the plan was out for public debate until 10th August)</td>
</tr>
<tr>
<td>Italy</td>
<td>1%</td>
<td>Appears to be a draft plan. A list of measures mentioned but no specific action decided</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1%</td>
<td>Vague plan without any concrete measures mentioned</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2% as intermediate target (2010) and 1% as 2016 target</td>
<td>A draft plan has been delivered and a final plan will be submitted before October 2007</td>
</tr>
</tbody>
</table>
### Announced savings target in NEEAPs /3

<table>
<thead>
<tr>
<th>Member State</th>
<th>Yearly savings target announced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>1%</td>
<td>Vague plan even if detailed – initiatives are mostly statements of intent rather than actual plans</td>
</tr>
<tr>
<td>Romania</td>
<td>1.5%</td>
<td>Letter of intend to submit the NEEAP later</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1% expected)</td>
<td>A detailed and ambitious plan but covers only the period up to 2012. The plan covers mainly transport and buildings with a remarkably high focus on reducing energy for indoor lighting. There is a special scheme for public buildings where the aim is to save 9% energy in public buildings by 2012 and 20% by 2016. Both new and existing buildings will be targeted</td>
</tr>
<tr>
<td>Spain</td>
<td>2%</td>
<td>A very ambitious and detailed plan which build on both new and existing measures</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Target set out in the plan is 1% per year but the plan aims to deliver 2% per year</td>
<td></td>
</tr>
</tbody>
</table>

### Energy Efficiency in Buildings – the goals

- At least -20% in consumption by 2020
- All new Buildings from 2015 should be passive houses without the need for heating or cooling equipment
- Significantly lower threshold for performance requirements for renovation
- Member States to ensure financing for recommended highly cost-effective investments from building certification
- Public sector requirements to demonstrate new, energy-efficient technologies
MS strategy towards Passive Houses

<table>
<thead>
<tr>
<th>Member State</th>
<th>Further political announced strengthening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Passive house requirement from 2020</td>
</tr>
<tr>
<td>Denmark</td>
<td>Additional 25-30% in 2010 and 2015</td>
</tr>
<tr>
<td></td>
<td>Passive house requirement from 2015/2020</td>
</tr>
<tr>
<td>France</td>
<td>Additional 15% in 2010 and 2015 (in discussion now Passive House requirement for non-residential from 2011 and Houses to be energy-producing from 2020)</td>
</tr>
<tr>
<td>Germany</td>
<td>30% strengthening scheduled for 2008 and additional 30% for 2012 Passive house requirement from 2015</td>
</tr>
</tbody>
</table>
| Netherlands      | Only residential  
|                  | Epc = 0.6 in 2011 and  
|                  | Epc = 0.4 in 2015  
|                  | Non-residential will follow |
| United Kingdom   | Additional 25% in 2010 and by 44% in 2013 (equal to passive house requirements) from 2016 all new homes must be zero carbon buildings In 2008 consult on the next set of changes to part L Passive house requirement from 2013 and zero-carbon houses from 2016 |

Conclusions

- On 11th September 15 MS had submitted their Energy Efficiency Action Plans – 5 MS had notified a delay and from 7 MS no official information has been received
- Many Member States have submitted preliminary Plans which will be revised later in the year – varying quality
- Inspiring development - we see a “competition” amongst old MS to deliver the most ambitious Plan (e.g. DE, F and UK)
- Yearly savings target stated from 1% and up to 3%!
- Many MS have built Plans on existing policies and measures (acceptable)
- Many new MS appear to be having more difficulty preparing their Plans than old MS
- It is likely that a dialogue will be necessary between some MS and Commission to develop acceptable Plans
- Important now to secure that Plans are transferred to real savings
The impact of 2004 Enlargement of the EU in the field of energy efficiency

EPBD in New Member States: status and challenges

Silvia Rezessy,
Renewable Energy and Energy Efficiency Partnership (REEEP)

REEEP
– Renewable Energy and Energy Efficiency Partnership

• REEEP is a global Type II partnership launched by the UK government at the WSSD and backed by more than 200 national governments (36 as partners) businesses, development banks and NGOs.

• In the Gleneagles Communiqué, the G8 countries pledged to promote energy efficient buildings by encouraging the work of existing partnerships such as REEEP in outreach to developing countries.

• REEEP has established a performance indicator which requires that at least one-third of EE projects funded by REEEP should address EE in buildings.
Background and source of information for the presentation

- Study on the impact of the 2004 Enlargement of the European Union in the area of energy;
- Prepared for the European Commission, Directorate General Energy and Transport;
- Prepared by Mercados Energy Markets International, The Regional Centre For Energy Policy Research (REKK, to whom the presenter was affiliated in the EE part of the study) and E-Bridge Consulting;

Structure of the presentation

- Main findings of the report on the impact of the 2004 Enlargement of the EU in the field of energy efficiency;
- EE policies and measures in NMSs;
- Status of transposition of the EPBD in NMSs;
- Challenges for the transposition and effective implementation of the EPBD;
- Recommendations for the buildings sector;
Main findings (1)

- The period between mid-90s and Accession was characterised by a **rapid decrease in energy intensities** in NMSs. Final energy intensity cleared from the impact of structural changes declined by approximately **30% between 1996 and 2004** on the average in the post-communist NMSs (faster in NMSs than the EU-15 average).

- However adjusted energy intensities in NMSs **still remain above EU-15 average** for many NMSs and in general higher than can be expected for their level of economic development, however since mid-90s energy intensities have been falling.

- This indicates that there is still a considerable need for further efficiency improvements and for **scaling up the ambitions and commitment of NMSs in the energy efficiency field.**

---

Final energy intensity at constant structure (climate corrected) in NMSs, 1996-2004 (1996=100) source: Enerdata
Main findings (2)

- **General economic drivers** and indirect policy impacts associated with the Accession process have had a greater effect on the improvement in energy intensities than the impact of the transposition of the energy efficiency *acquis*.

- These drivers include rising energy prices, growing economic output and economic cooperation with EU-15 countries bringing higher added-value branches, the shutdown and/or modernisation of inefficient Soviet-era technologies and processes, and competitive pressures in an ever-globalising world.

- Given the looseness of many national efforts in the field of energy efficiency, the existing loopholes in implementing the energy efficiency *acquis* also due to institutional weaknesses and the ‘mechanical’ transposition, the energy efficiency *acquis* had some effect on energy intensity decrease in NMSs, but they are not likely to have been a major direct driver in the indicated significant improvement in energy intensities.

Main findings (3)

- NMSs have focused policy efforts on transposing European directives, but shown less commitment to actual implementation, proper enforcement, and pro-active energy efficiency related policy-making beyond the *acquis* largely due to very limited institutional capacity and still low priority on national policy agendas of energy efficiency measures;

- In 2007-2013 NMSs plan to channel to sustainable energy only a very minor fraction of EU funds, amounting to 2-3% on average which falls short of scale of the action needed to realise the EU’s strategic energy objectives (best performers LT, CZ and SK);

- Energy efficiency institutions are a weak point in NMSs, marked by inadequate coverage of efficiency related tasks by institutional structures and insufficient staffing. Limited or no background policy research on economic saving potentials, limited stakeholder consultation for working with the private sector.
Good practices of policies and measures for EE...

- Separate EE laws: CZ (proposal in LV, planned for PL);
- EE targets (relative, rarely in absolute terms) in secondary legislation (before ESD) in almost all NMS;
- Preferential loan schemes and subsidy programs for EE;
- Mandatory environmental provisions in public procurement in CZ, voluntary in HU, LV, PL, SK, SI;
- Provisions for energy audits – mandatory for large users in CZ, pre-condition for state-subsidy in PL;
- Carbon or GHG tax in EE and SI, from 2008 in CZ;

...not without difficulties

- Progress on targets rarely monitored, targets not taken seriously, numerous and confusing targets;
- Financing schemes rarely based on results achieved (savings) or integrated with other policy tools;
- No or very limited R and D funds for EE, even less for policy research;
- No or only ‘soft’ involvement of energy suppliers in energy service provision, no past of DSM;
- No practice of VAs;
- Information campaigns and public awareness raising sporadic, lack of continuity (‘start-and-stop’) and integration with other policy tools;
- Numerous transitional agreements under the Energy Tax Directive, GHG taxation very rare.
Legal transposition of the EPBD in NMSs

- Legal context and implementing bodies (next slide);
- As of end of June 2007 reasoned opinions sent to 8 of the 10 NMS (2004);

<table>
<thead>
<tr>
<th>Country</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CY</td>
<td>Energy Performance Building Regulation (EPBR) is under preparation</td>
</tr>
<tr>
<td>CZ</td>
<td>An executive decree to the Energy Management Act</td>
</tr>
<tr>
<td>EE</td>
<td>Act transposing the EPBD and amending 5 different legal acts promulgated in September 2006. Article 8 – text prepared since 2005, no order yet (uncertain whether certification should be a pre-condition for real estate ownership)</td>
</tr>
<tr>
<td>HU</td>
<td>Articles 3, 4, 5 and 6 – Ministerial Order TNM 7/2006 in force since September 2006. Article 8 – text prepared since 2005, no order yet (uncertain whether certification should be a pre-condition for real estate ownership)</td>
</tr>
<tr>
<td>LV</td>
<td>Draft Building Energy Efficiency Law (intentions to promulgate in 2007)</td>
</tr>
<tr>
<td>LT</td>
<td>Additional article in the Law on Construction (art. 2, 4, 5, 6, 7), Law amending the Law on Energy (art. 8 and 9), Acts of “Technical provisions of construction”</td>
</tr>
<tr>
<td>PL</td>
<td>In Dec. 2006 a new version of the draft Act on buildings and apartments energy assessment system and inspection of installations within a scope of energy efficiency. Amendments to the Thermodenaturisation Act, Act about Real-Estate Economy, and Building Code were developed in 2006.</td>
</tr>
<tr>
<td>SI</td>
<td>Building Construction Act (art. 3, 4, 5, 6, 7)</td>
</tr>
</tbody>
</table>

Silvia REZESSY - REEEP
Implementation of the main themes of the EPBD

**Calculation procedures**: some NMSs have already adopted the calculation procedures and have the software in place (HU and LT), while other have the procedure in pending legislation (PL and SK), or have it under development with a specified date of implementation (EE, LV and SI).

**Certification of buildings**: LT introduced certification for new buildings from 2007 and SK introduced certification for small residential buildings. Certification first in new buildings and then (or at the same time in some cases) in existing buildings. Most countries plan introducing certification for new buildings from 2008 and for existing buildings from 2009: thus certification for all buildings from 2009.

**Inspection of boilers** and esp. of air conditioning systems is the area where a lot of complexities occur. Some countries plan to introduce inspections from 2008 (SK, LT, EE), most envisage boiler and air conditioning inspections from 2009.

**In most countries requirements for independent experts** have been defined and training materials are under preparation (with training institutions already appointed in LT, for example).
Major challenges with the EPBD

- Split and unclear implementation responsibilities;
- Lack of public awareness of the positive effects of building certification;
- No integrated and comprehensive programs that would facilitate the implementation of the provisions of the EPBD;
- Administrative hurdles, such as lack of staff and contrary interests among implementing institutions;
- The variety of approaches among MSs hinders the exchange of experiences

Recommendations for effective implementation of the EPBD

1. Communicating the PRIVATE economic benefits of building refurbishment and of building certification among developers, architects, construction businesses, homeowners and tenants;

2. Introducing financial incentives in the scope of the EPBD implementation regime for both low-energy construction (e.g., preferential loan and/or mortgage schemes, tax incentives) and for building refurbishment;

3. Introducing schemes for the provision of tailored advice to building owners about measures to take in their property and streamlining practical assistance in implementing these.
Recommendations for effective implementation of the EPBD (2)

- **Education and training**, including professional development training to disseminate recent developments. Basic educational curricula of all professionals and trades related to the construction sector should include mandatory coverage of major energy-efficiency options such as passive solar construction.

- Free access to professional development in the field to provide training in cutting-edge energy efficiency construction know-how and technologies should be facilitated in all related trades and professions;

THANK YOU FOR YOUR ATTENTION

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Back-up slides

Source of data: Enerdata database, calculations of the author (unless indicated otherwise)

Final energy intensity adjusted for industry, economic structure and climate (PPP, 2000): years 1996-2004
Average annual changes in final energy intensity (actual and at constant structure), the impact of structural change, 1995-2004

Efficiency of electricity and of electricity and heat production from conventional thermal plants, source: EEA 2006
<table>
<thead>
<tr>
<th>Policies and measures in NMSs</th>
<th>CY</th>
<th>CZ</th>
<th>EE</th>
<th>HU</th>
<th>LV</th>
<th>LT</th>
<th>MT</th>
<th>PL</th>
<th>SK</th>
<th>SI</th>
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<tr>
<td>Separate Energy Efficiency Law</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
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<td>Yes (R)</td>
<td>Yes (R, I, P)</td>
<td>Yes (R)</td>
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<tr>
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<td>Mandatory for large energy users</td>
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<td>Energy taxation (transitional arrangements under the Energy Tax Directive)</td>
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<td>Transitional provisions based on the EU Acquis</td>
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<td>Yes</td>
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<td>Information campaigns, awareness raising for EE</td>
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<td>Yes</td>
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<td>15% VAT</td>
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</tbody>
</table>

Silvia REZESSY - REEEP
Session 3: ESCOs projects

Chair: Randall Bowie, Rockwool International
Latest Developments of Energy Service Companies across Europe:
A European ESCO Update

Experiences from New Member States and other Eastern European countries

Benigna Boza-Kiss
Central European University

dr. Paolo Bertoldi
European Commission, Joint Research Center

Silvia Rezessy
CEU; REEEP

ESCO market research and development activities at the Joint Research Center

- Monitoring of the market development
- Update reports
- ESCO database
- ESCO projects database
DG JRC is monitoring the ESCO market.

ESCO status report 2005
Our first report gave all the basic info about ESCOs, reviewed EU markets.

The report is available on the web: re.jrc.ec.europa.eu/energyefficiency/index.htm

ESCO Update Report 2007
The report will be available shortly at the same site.

In the last few years Europe has seen a continued and increasing interest in the provision of energy services driven by electricity and gas market restructuring, the push for sustainability, the threat of climate change, new policy tools, legislation and other factors.

In general, ESCOs are on the rise in the Eastern and Southern part of Europe, but mostly still lagging behind Western Europe. Additional driving factors typical of the region have been recently: energy price restructuring, price increase, international and governmental funds, energy efficiency programmes, changes in legislation and the remaining and only slowly diminishing high energy intensity, bad state of establishments.

However, there is still a huge gap between potential and realized projects in this region. There is a very different level of development of the ESCO industry (in terms of e.g. types of services, size and turnover of ESCOs, number of ESCOs) in the various European countries.
Regional frontrunners

Hungary
- ESCO industry dates back to the early 90s;
- Approx. 30 ESCOs, 5-6 cover 80% of market;
- Market size estimated at least €150-200 Mln;
- Early start with public lighting, more recently heating and hot water projects in the spot, with trends towards AC, water and steam supply, RES;
- Public sector has been the main client, industrial clients are getting more and more attention (on-site co- and tri-generation), and some upheaval and following evaporation of residential sector;
- Commercial financing is NOT a problem, banks eager to lend to ESCOs;
- “Cherry picking” possibilities drying up, stagnation and redirection at the market.

Czech Republic
- Market development slow till 2001 (Law on Energy Management); rapid boom currently
- Around 15 ESCOs, number growing;
- Market potential of about €100-150 Mln;
- Most interest in projects related to heat delivery, piping, pipes insulation, boilers replacement, fuel switching
- Healthcare sector has been the market starter; DH, educational buildings, state property; high interest in military property;
- Banks are interested in lending; multinational ESCOs use corporate financing; recently chauffage (energy delivery contracting) getting more common;
- Project bundling is common, medium-sized towns are very active in this.

Other CEE countries

Slovakia
- First ESCO-type company: 1992; limited success at the beginning, real starting point: 2003;
- 32 ESCOs providing energy services;
- Most ESCOs are PPP (joint ventures with municipalities);
- Clients: municipal buildings, schools, banks, hospitals; outsourcing (industry, tertiary) more and more popular;
- Building renovation, DH and public lighting;

Poland
- Limited success of the market, < 5 companies, foreign subsidiaries;
- Volume of contracts is estimated at €10 Mln in recent years;
- Focus on DH in public buildings (schools, military buildings, prisons) and housing cooperatives; some street lighting, insulation and complex retrofitting;
- Failures during the last 15 years hindered development, investors and clients still search for common interest: off-balance solutions to be implemented partially by clients.

Slovenia
- First ESCO contract in 2001 (pool of 1.4 buildings) – procedure and standard doc’s developed;
- Public and industrial sector.
The Baltic states

Lithuania
- As of 2006 there are 6 ESCO-type companies, mainly subsidiaries of foreign large companies;
- Market size estimate: €125 Mln for residential and public segment, and further €50 Mln in industry;
- Typical clients: municipalities;
- Typical projects: heat production and supply side energy management in the DH sector, incl. modernization of boilers and fuel switch;

Latvia
- 2 ESCOs, around 40 companies provide energy delivery contracting;
- Typical clients: municipalities;
- Typical projects: public lighting, boiler refurbishment;

Estonia
- Around 20 companies offering energy services, only 2 ESCOs offering EPC;
- Some ESCO-type projects realized in the public sector: public lighting, control and automation systems. Investments to start up in the residential sector was reported in 2006.

Cyprus and Malta

Cyprus
- no ESCO;
- RES is priority; potential of RES (solar) is huge;
- EE improvements could result 20-25% demand decrease; CHP opportunities;
- Gov'tal commitment: Grant Scheme For Energy Conservation; Promotion of the Utilization of RES; Action Plan for Energy Conservation in Buildings.

Malta
- no ESCO, some companies selling building management systems;
- no coordination, but EE has been getting more and more attention;
- best technological opportunities: water heating, HVAC of buildings, resistance heating to substitute heat pumps.
New EU Members 2007

Romania
- 2 companies, stable for the last years, but projects are very scarce;
- ESCOs estimate market potential at €1-1.5 Bln.;
- Most interested client-sphere is the public sector; some projects in industry: combustion systems/improvements, CHP;
- Commercial banks are very much interested in ESCO projects, international financing institutions are present; local FIs’ offerings are more competitive;
- Financing is a problem not due to lack of interest or capital, but as a result of accounting and legal barriers. Until off-balance sheet solutions are found ESCO projects seem to be strictly limited;
- ESCO concept is misunderstood by clients.

Bulgaria
- 2 ESCOs;
- Large number of companies (~100) offering energy auditing and certification;
- Primary area: municipal sector (schools, public buildings), small heating plants;
- A municipal network for energy efficiency (EcoEnergia);
- Various funding opportunities available: Bulgarian Energy Efficiency Fund (revolving fund, GEF/IBRD, government), USAID partial guarantee scheme, etc.

Croatia
- 1 state-owned ESCO (with enabling features), some other interest;
- Estimated market potential: €400Mln;
- Investments and interest on a rise;
- So far ~10 projects completed: public lighting, and lighting and heating system improvements in educational buildings; 40 projects in preparatory or implementation phase;
- Financing is non-problematic: international aid and loans (GEF funds, World Bank loan), local banks, ESCO own equity;
- Activity until now for the development of the ESCO concept: capacity building, searching financial opportunities, consumer demand building;
- Raising consciousness and awareness of the concept is most important.

Macedonia
- Macedonia Sustainable Energy Project, planned from spring 2007
- ESCOs will focus on public buildings (schools, hospitals);
- Financing support from IBRD, GEF, SE Financing Facility in the form of debt finance and guarantee.

Other European countries (1)

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Other European countries (2)

Ukraine
- First ESCO (public) established in 1998 by EBRD and TACIS; first private company in 2004;
- Today 3 significant companies, others are consultancies, engineering companies;
- Market interest is increasing;
- 1999-2005: 19 projects, ~ € 16Mln investment;
- Local financial sector is not yet open for EE, but IFIs are active (Other 20M USD EBRD loan is scheduled for 2006-2012);
- CHP, refrigeration, heating, steam, hot-water boiler modernization;
- General payback time 2-5 yrs;
- But ESCOs have very limited access to capital, not enough own capital, banks have high interest rates and are not readily involved in projects; lack of liberalized market; price structure; scarce information and awareness;
- Potential to extend in scope, in geographical area (neighboring countries).

Russia
- ESCOs have a relatively long history: start in 1996, today few dozen companies;
- Targets: boiler automation, bio-fuel pre-furnace installation, economizers, DH, automation of centralized compressed air production facilities;
- Payback time is normally max. 6-7 years;
- Financial and technical assistance from IFIs;
- Financing is problematic: ESCOs dont have the own funding, while high interest rates hinder profitability, lack of appropriate guarantees;
- Administrative burden, changing circumstances, varying political support, „low energy price“, wasting attitude;
- While the potential is huge – one of the highest energy intensity in the world (3-5 times of Western countries);
- This has hardly improved in spite of the pronounced efforts for energy savings in the legislation since 1990s.

Other European countries (3)

Belorussia
- Similar situation to Russia and Ukraine: high energy intensity, strong control of energy system and prices;
- One ESCO (2005), so far only one project (~10 Mln investment);
- CHP in an industrial site;
- In the future: boilers, controls, HVAC, steam distribution, electric load management (industry);

Turkey
- No ESCOs by 2006;
- Barrier 1: lack of support on the political level (EE law in Parliament for 2 years);
- Barrier 2: long term purchase agreement for gas and oil;
- Need for ESCOs is not evident to potential customers.
Summary of NMSs and other European developments

- Very different level of development of the ESCO industry
  - in Hungary and the Czech Republic ESCOs are well established and active;
  - in Latvia, Croatia, Slovenia and Ukraine the concept is still getting off the ground;
  - Slovakia and Lithuania are in-between;
  - no ESCOs in Cyprus, Malta and Turkey;
  - in Estonia, Poland the universal ESCO does not work, need for adjustment.
- Focus on supply-side projects (heating systems) – economies of scale;
- Most common clients are municipalities, public buildings do kick-start the market;
- In many immature markets predominant energy delivery contracting;
- Financing is not a problem, but access to financing.

Barriers, obstacles

Typical barriers include:
- Low awareness, lack of information and skepticism – mentioned in ALL countries as one of the most important impediments;
- Misunderstanding the concept;
- Balance-sheet problems, accounting rules;
- Rules for public procurement non-supportive;
- Competing support schemes;
- Legal and regulatory frameworks (esp. in public sector),
- Lack of motivation and commitment, election-cycle based thinking;
- Lack of data to construct baselines;
- In-house knowledge discredits ESCO guarantees.
Major past and future drivers

Success factors until now:
- Bad state of buildings;
- “low hanging fruits”, such as public lighting;
- Early privatization of banking and/or energy sector;
- Building on local institutional framework, involving local banks;
- Capacity building, dissemination (in banks, among clients etc.).

Success factors expected for future development:
- Openness of banking sector;
- International support schemes;
- Obligatory audits;
- Model documents, procedures;
- Legal and regulatory background (e.g. public procurement is supportive in Czech Republic);
- Non-competing, but complementing support schemes (Hungary: Panel Program).

We welcome comments, corrections, more information!
We would like to thank the almost 100 experts providing information.

More information about the new 2007 update and the European ESCO database can be obtained from

Paolo Bertoldi: Paolo.Bertoldi@ec.europa.eu
http://re.jrc.ec.europa.eu/energyefficiency/

or contact Benigna Boza-Kiss at kissb@ceu.hu

THANK YOU FOR YOUR ATTENTION!
Responsibility & Risk in Performance Contracting Projects

12-14 Sept. 2007 Kraków, Poland

Energy & Environmental Solutions

- Business pressures around Energy Resources and Buildings
- Why high performance buildings
Business pressures

- Reliable energy supplies
- Improved business results
- Modernization
- Corporate responsibility
- Laws, directives, initiatives
- Greenhouse gas (GHG) reduction

Modernization and Optimization of:
- Building Management System
- Heating
- Water
- Ventilation
- Air-Conditioning
- Lighting
- Cooling
- Operation
Customized Energy Solutions Projects
Performance Contracting – Financial Model

Cost optimization measures are financed by the guaranteed savings.

Customized Energy Solutions Projects
Performance Contracting – Process

Building Owner/Operator

Letter of understanding
Letter of intent
Contract closure
Cooperation

Preliminary study
Detailed study
Implementation
Energy-saving guarantee

Siemens Building Technologies
Performance Contracting vs standard processes

Performance Assurance Phase – Energy Saving Guarantee

Energy savings in PLN in 2004, Bochnia Project
### Responsibilities and Risk Table

<table>
<thead>
<tr>
<th>PFC phase</th>
<th>Responsibility</th>
<th>Risk</th>
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<td>Preliminary Analysis</td>
<td>Technical concept</td>
<td>PFC project decision based on general information</td>
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<td>Financial projection</td>
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<td>Detailed Analysis</td>
<td>Technical solution</td>
<td>Energy Analysis of buildings and system correctness</td>
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<td>Financial arrangement</td>
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<td>Contract Pattern</td>
<td>Detailed formal description, Energy Saving Guarantee</td>
<td>Refurbishment, retrofit. service, maintenance, finance in long term</td>
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<td>Implementation</td>
<td>Top quality realization which enables energy savings promised</td>
<td>Time and cost slippage</td>
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<td>Performance Assurance/Energy Saving Guarantee</td>
<td>Systems operation and energy consumption control in long term</td>
<td>Changes in buildings, systems and user’s behaviour</td>
</tr>
</tbody>
</table>

### How to ensure responsible attitude and limit the risk?

1. Strong company with solid financial base  
2. PFC Department with dedicated team  
3. Reliable and experienced project team with:  
   - Salesmen  
   - Engineers  
   - Finance Dept. support  
   - Legal Dept. support  
   - Project Managers  
   - Servicemen  
   - Performance Assurance Engineer  
4. “Four-eyes” rule and “go/no go” company procedures  
5. “Technical Review” executive document for every project
Energy & Environmental Solutions
Mission

We help our customers improve their buildings' energy costs, reliability and performance and have a positive effect on the environment.
DEVELOPMENT OF THE ESCO INDUSTRY AND PROJECTS IN POLAND

ISO 9001:2000

ACTIVITY OF POE ESCO SP. Z O.O. VS. BARRIERS AND OPPORTUNITIES WITH RESPECT TO THE “ESCO” MARKET DEVELOPMENT IN POLAND

Janusz Mazur
President of the Management Board
POE ESCO sp. z.o.o. /Ltd/
in Krakow

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POE ESCO SP. Z O.O. PRESENTATION
– Milestones

16.09.1991 Signing of a credit contract with the World Bank for the implementation of the "Modernisation and restructuring of the Heating System in Krakow"

29.06.1998 Resolution No. 78/17/MPEC/98 by the General Meeting of Shareholders of MPEC S.A. – approval for the launching of operations by ESCO based on the credit granted by the World Bank.

15.07.1999 Resolution No. 24 by the Management Board of MPEC S.A. – approval of the Business Plan by ESCO.

July 1999 The Pilot Project Dr Judym Primary School No. 97

10.11.1999 Resolution No. 155/30/MPEC/99 approval by the General Meeting of the Shareholders of MPEC S.A. to establish an independent business entity in order to run ESCO operations.

8.03.2000 Signing of the Deed of Incorporation of the limited liability corporation under the name “Energy Saving Company ESCO”

1.04.2000 Initiation of operations by POE ESCO Sp. z o.o.

16.04.2002 Signing of a loan contract between the International Bank for Reconstruction and Development (the World Bank) and MPEC S.A. Part of the credit is to be allocated for the execution of the ESCO projects by POE ESCO Sp. z o.o.

16.09.2004 The first thermal modernisation that was implemented was from Oct.-Dec. 2004: 7th Secondary Comprehensive School on Skarbinskiego Street.

08.08.2005 Signing of a grant contract with the GEF (Global Environmental Facility)
**SCOPE OF ACTIVITIES**

- Esco and TPF projects
- Execution of the technical documentation of sanitary installations (HVAC)
- Consulting activity and performance of energy audits
- Selling energy saving devices

**LOCATION AND CAPABILITY**

Krakow (Cracow), address: os. Handlowe 9

Own premises, nearly 340 m²

14 employees (hired as per contracts of employment)

- 6 designers (HVAC)
- 2 energy auditors
- 8 AutoCAD designing posts
- Measuring and research instrumentation
**FINANCING**

Credit line from the **World Bank** – amount outstanding ca. USD 2 million

Credit line from **Deutsche Bank PBC Polska S.A.** – amount outstanding ca. PLN 3 million

Credit line from **Nordea Bank Polska S.A.** – amount outstanding ca. PLN 1.5 million

Energy Saving Project **GEF Grant** (TF-054104) – USD 2 spent

Credits are guaranteed by MPEC S.A. in Krakow (owner of 100% of all POE ESCO shares)

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**TYPES OF PROJECTS, AS EXECUTED**

- Esco and TPF projects
- Execution of the technical documentation of sanitary installations (HVAC)
- Consulting activity and performance of energy audits
ESCO PROJECTS

The Company executed 5 ESCO (Energy Performance Contacts) projects in public buildings in Krakow and the Town of Brzesko. The scope of the project included 26 school buildings. The Aggregate value of the work ca. 5 million Euro. Discharge and energy management – 10 years.

ESCO saving guarantee works executed in the years 2004-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Windows</th>
<th>Roofs</th>
<th>Heating outlets</th>
<th>Thermal insulation</th>
<th>Energy savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Square metre</td>
<td>Square metre</td>
<td>Square metre</td>
<td>(executed or planned)</td>
<td>GJ/year</td>
</tr>
<tr>
<td>2004</td>
<td>719</td>
<td>1,750</td>
<td>186</td>
<td>45</td>
<td>723</td>
</tr>
<tr>
<td>2005</td>
<td>7,129</td>
<td>15,922</td>
<td>3,102</td>
<td>5,793</td>
<td>10,417</td>
</tr>
<tr>
<td>2006</td>
<td>6,583</td>
<td>12,758</td>
<td>2,125</td>
<td>7,997</td>
<td>8,711</td>
</tr>
<tr>
<td>TOTAL</td>
<td>14,431</td>
<td>30,430</td>
<td>5,413</td>
<td>13,835</td>
<td>19,851</td>
</tr>
</tbody>
</table>

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PROJECTS IN PREPARATION OR CURRENTLY UNDER CONSTRUCTION

Thermal modernisation of 6 school buildings in the Commune of Krakow

Thermal modernisation of the Tram Service Station of the Municipal Public Transport Company in Krakow

Thermal modernisation of the Health Care Centre in Wieliczka

Aggregate value of the projects: over 2.5 million Euro

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THIRD PARTY FINANCE PROJECTS
SCOPE OF THE TPF PROJECTS

Heating networks and heat exchanger stations

Environmentally-friendly boiler rooms

Residential buildings

Investment outlay discharge period 3-6 years

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TPF
HEATING NETWORKS AND
HEAT EXCHANGER STATIONS

The Heating Energy Company in Chrzanow – construction of 11 pcs. of modern heat exchanger stations with an aggregate power over 3,000 kW

ESOX S.A. (a heating company in Radlin) – construction of 6 pcs. of modern heat exchanger stations with an aggregate power of 11,000 kW

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**TPF ENVIRONMENTALLY-FRIENDLY BOILER ROOMS**

Steam boiler for TI Safri (meat processing company), power 3,200 kW

Steam boiler for Vistula S.A. (garment manufacturer) in Krakow, power 1,100 kW

High temperature water boiler for Porcelana Słaska, power 1,470 kW

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**TPF RESIDENTIAL BUILDINGS**

Insulation of walls

Modernization of internal district heating installation

New installation of hot domestic water and liquidation of gas heaters

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**MAIN BARRIERS FOR "ESCO" PROJECTS IN POLAND**

**Market barriers**

**Formal and legal barriers**

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**MARKET BARRIERS**

Limited publicity of ESCO undertakings

Expectations by decision-makers (mayors, district authorities, presidents of companies) with respect to appealing (50-80%) the contribution of co-financing of projected investment undertakings with European Union funds.

Accessibility of thermal modernisation bonus

Rather disadvantageous ratio of energy carrier price to building materials and services price

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ISO 9001:2000

FORMAL AND LEGAL BARRIERS

Complicated decision-making and financial system within public enterprises

Lack of possibilities, or limitations, thereof, of "retaining" the savings attained by esco customers

Lack of direct legislation with respect to the esco scope of activity.

MAIN SUCCESS FACTORS CONCERNING "ESCO" UNDERTAKINGS IN POLAND

ESCO should be the subject of much publicity by the authorities. A few ESCO companies have been unable to create an effective market in this respect

ESCO programmes should be included in acts and ordinances concerning the financing of public enterprises

ESCO is a peculiar form of leasing, and as such, should be clearly defined in the law.

It is necessary to launch a comprehensive grant programme that will create the market, just as is seen in other countries

It is necessary to persuade regional environmental funds to lead them to co-finance under the ESCO programmes.
THANK YOU FOR YOUR ATTENTION

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Energy Performance Contracting in Poland - Viewpoints

Teresa Zatorska
September, 2007

Agenda

- Honeywell Overview
- Energy Performance Contracting Overview
- Challenges for Energy Performance Contracting in Poland
- Examples of executed projects in health, education, municipalities, army sectors
Honeywell Worldwide

Honeywell's Experience in Performance Contracting

- Over 30 years experience
- The first Performance Contract Agreement in 1982
- In North America over $3B in savings over 4,300+ projects
- Strong experience in Commercial, Education, Government, Healthcare and Industrial sectors
- Major projects in EMEA in automotive, commercial, education, government, healthcare, manufacturing & tobacco sectors
- Over $100M projects completed in EMEA
- Some projects in EMEA:
  - Ford Valencia (ESP)
  - Harry Wintermanns (Be)
  - The Atrium Hospital, Heerlen (NL)
  - Sint Vincentius Hospital, Antwerpen (Be)
  - Gwent Hospital (UK)
  - Samsonite (Be)
  - US Army (Ge)
Why Energy Performance Contracting

Aging HVAC
Deteriorating mechanical equipment

Environmental Quality Issues
Non compliance with regulation

Degrading Building Envelope
Occupant discomfort

Decreasing Building Efficiencies

Increasing Pressure on Facility Management

Physical Asset Deterioration
Capital investment required

Increasing Environmental Req.
Company ‘green’ image

Increasing Energy Costs
Ongoing pressure on energy savings

Typical EPC Measures

Cogeneration
Free cooling on chilled water system
Ventilation and air quality improvements

Lighting systems
Demand side management
Infrastructure improvements

Heat recovery system
Security
Complex boiler plant optimization

Honeywell control retrofit
Energy Management System

Longer term projects can result in additional opportunity to enhance results

Design technical solutions based on energy & operational savings opportunities
EPC Funding

A WAY OF USING YOUR BUDGET MORE EFFICIENTLY!

€

<table>
<thead>
<tr>
<th>Time</th>
<th>Current</th>
<th>During ESPC</th>
<th>After ESPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy and O&amp;M Costs</td>
<td>Energy and O&amp;M Costs</td>
<td>Energy and O&amp;M Costs</td>
<td></td>
</tr>
<tr>
<td>Savings Fund EPC</td>
<td>Savings Continue</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Challenges

• Technical Dimension
  – Technology is available/ challenge is financial not technical
  – Urgent need for comprehensive metering, data collecting and analyzing/ technology available
  – Standardization of requirements needed to be set
  – Accountability/ Meaningful Consequences have to be achieved

Technology is Readily Available
Challenges

• **Financial**
  - From the financial point of view budget neutral
  - Projects paid through savings
  - Financial means available on the market (yesterday presentations)
  - Creates jobs & local economic opportunities
  - Flexible contract terms (3-25 years)
  - Guaranteed performance
    - measurement and verification
  - EPC financing treated as long term financing in municipalities budgets, limits municipalities' long term credit worthiness – not clear situation is a barrier for EPC

**Clear interpretation of EPC budgeting is needed**

• **Administrative**
  - Performance responsibility of EPC’s
  - Legislative
    - EPC Procurement Process perceived by decision makers as very sophisticated - a barrier for EPC
    - EPC Contracts perceived by decision makers and their lawyers as very sophisticated as well (detailed analyses, design, construction works, guaranteed savings, energy & maintenance services in one contract) - a barrier for EPC
    - Long term nature of EPC perceived as highly risky for decision makers (from political point of view) – a barrier for EPC

**Complexity of Legal Solutions is needed**
Challenges

- **Cultural**
  - Public Awareness
    - No Governmental Support for EPC projects so far / high political risks for decision makers – is a barrier for EPC
    - Long term nature of EPC perceived as highly risky for decision makers (from political point of view) – a barrier for EPC

- **Incentives**
  - No incentives to confirm real energy savings achieved by traditional construction works contracts, no responsibility for results is a barrier for EPC

Information Campaign is needed

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Barriers vs. Solutions - Viewpoints

- **Financial**
  - Clear Interpretation of EPC budgeting for public entities

- **Administrative**
  - Complexity of legal solutions is needed
    - Streamlined Procurement Process
    - Standardization of Terms of Reference available for all public entities
    - Standardization of EPC contracts available for all public entities

EPC - efficient tool for Energy Efficiency Projects
Barriers vs. Solutions – Viewpoints cont.

• Cultural
  – Information Campaign is needed on
    • Positive perception of EPC contracts by State Administration (NEEAP)
    • Streamlined Procurement Process
    • Standardization of Procurement Process
    • Standardization of Terms of Reference and their general accessibility (e.g. on websites)
      – No Governmental Support for EPC projects so far/ high political risks for decision makers – is a barrier for EPC
      – Long term nature of EPC perceived as highly risky for decision makers (from political point of view) – a barrier for EPC
  – Incentives
    – No incentives to confirm real energy savings achieved by traditional construction works contracts, no responsibility for results is a barrier for EPC

Benefits

• Improved Productivity/Quality of Life
• Reduce Energy Dependency
• Create Jobs/ Economic Opportunities
• Save Money

EPC – a tool to achieve economic scale of energy consumption decrease
### EPC Examples

#### Royal Gwent Hospital – UK

- **The Customer**
  - Part of Gwent Healthcare NHS Trust
  - Covers 800 beds
- **The Challenge**
  - Aged infrastructure
  - CO₂ reduction
- **Honeywell’s Solution**
  - 15 year PFI scheme
  - CHP, 3 new steam boilers, lighting retrofit, and water conservation measures
- **The Benefits**
  - €1.1M annual savings
  - NHS’s Best Practice Award for Energy Efficiency 2004
  - CO₂ and particulate emissions significantly reduced

*The award recognises the facility management changes we have made at our Royal Gwent and Neville Hall hospitals and marks another milestone in our partnership with Honeywell. It confirms that we are making innovative progress towards environmental improvement.*

Wayne Churches, Energy Manager at Gwent Healthcare Trust
Atrium Heerlen Hospital, Netherlands

- The Customer
  - Part of GOZL organization
  - Covers 880 beds and 10 operating rooms
- The Challenge
  - Save energy costs
- Honeywell’s Solution (2001-2006)
  - Optimizing the operation of the boiler plant
  - “Free cooling” – implementation
  - Heat recovery from a steam installation
  - Installation of CHP
  - Investment value – € 2.9 M
- The Benefits
  - € 350,000 savings yearly

Mr. Dumont says: “The Honeywell solution enables me to ‘see’ the different facets of my utility production. It gives me a complete picture – the information I need to make better decisions, and to make them more quickly. This ability to respond to changing external conditions takes internal FM productivity to a higher level.”

EHSAL, Belgium

- The Customer
  - A prestigious High School in Brussels
- The Challenge
  - Reduce energy consumption / bills
  - Improve comfort
- Honeywell’s Solution
  - Renovation: new controllers, new electrical panels and hydraulic modifications
  - Honeywell Enterprise Buildings Integrator (EBI)
- The Benefits
  - 58 Ton CO₂ reduction a year (= 2.941 trees)
  - € 23,000 yearly savings

Says Dumont: “The Honeywell solution enables me to ‘see’ the different facets of my utility production. It gives me a complete picture – the information I need to make better decisions, and to make them more quickly. This ability to respond to changing external conditions takes internal FM productivity to a higher level.”
**Fort Bragg, USA**

- **The Situation**
  - 5,400 buildings comprising 2.8 million climate controlled sq.m.
  - Energy spend of $36 million USD annually

- **The Challenge**
  - Uncontrolled consumption of resources
  - Antiquated infrastructure, lack of controls & declining budgets

- **Honeywell's Solution**
  - Comprehensive Integrated Energy Management Solution
    - Reduce demand through energy efficiency measures
    - Optimize supply side by minimizing tariffs, reducing peaks & cogen
    - Implement an ‘energy cockpit’ to monitor, manage and control all facilities in real time

- **The Benefits**
  - 25% annual energy savings
  - $70 million USD in improvements
  - Significant emission reductions & improved quality of life for inhabitants

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**U.S. Army - Germany**

- **The Opportunity**
  - Optimize 225 buildings in five locations throughout Germany

- **The Challenge**
  - Antiquated facilities & lack of resources
  - Achieve U.S. Federal energy reduction mandates & reduce CO2 emission’s

- **Honeywell’s Solution**
  - Implement/upgrade Energy Management Control System
  - HVAC: cooling towers, VFD’s, heat recovery & balance air distribution
  - Boiler optimization & connection to district heating
  - Chiller optimization & free cooling
  - Replace inoperable pumps, sensors, fans, valves, actuators etc
  - Install meters
  - Lighting: retrofit, controls & occupancy sensors
  - Water Conservation

- **The Benefits**
  - Investment value € 8.3 million
  - Savings to date >€10M with a reduction in CO2 to date of 40,000 tons
**Honeywell**

**Botkyrka Municipality, Sweden**

**The Customer**
- Municipality of 76,000 inhabitants

**The Challenge**
- Investment financed by savings
- Electricity and heat consumption decrease

**Honeywell’s Solution**
- Implementation of installation controlling system
- Energy optimizing services

**The Benefits**
- Investment value €215,000 financed by
- Savings (February 2005 - January 2006)
  - Electricity – 30%
  - Heat – 32%

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**Energy Management Services**
Honeywell Building Solutions
phone no. (22) 60 60 904
mobile 0 502 196 678
e-mail: teresa.zatorska@honeywell.com

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**Teresa ZATORSKA - Honeywell Building Solutions, Poland**
From Energy audit to real savings.

Aare Vabamägi, REC Estonia, partner for Union of Estonian Flat owners Associations.

RESHAPE

Retrofitting Social Housing and Active Preparing for EPBD

EC-contract: EIE/05/045/SI2.419851
Topics

• Theoretical possible savings (TTU model)
• Examples
  – Data from Energy audits
  – Saving measures implemented
• Economy

Possible savings on 5 store 60 flats dwelling

(Tredex)

Tallinn Technical University Heat and Ventilation department has been modelling the typical 5 store 60 flats dwelling and results are:

• **External walls insulation** (U-value 1,03 to 0,26 W/(m²×C))
  heat losses reduction **24%**.

• **Roof insulation** (U-value 0,9 to 0,25 W/(m²×C))
  heat losses reduction **10%**.

• **Windows replacing** (U-value 2,7 to 1,4-ni W/(m²×C)),
  losses reduction **12%**.

• Total possible saving **44% of heat.** Ventilation at the same level.

**Precondition** – ideally regulated heating system.
Heating system

• Without possibility to regulate heating system – mostly for destroying thermal bridges.

Walls insulation

• Without possibility to regulate heating system – mostly for destroying thermal bridges.
Regulation on end users level.

Examples

Explanation of living area and specific heat measures.
**Explanation**

- **Living area** definition has been used for consumed heat data comparison.

**Explanation**

- **Specific heat** – space heat only, corrected with weather data – space heat data have been corrected with long term average degree days, internal temperature has been used on $+18$ C level.
Examples from energy audits (1).

- 81% - not real saving potential, external walls insulation, windows replacement, regulation.

Examples from energy audits (2).

- 86% - not real saving potential, external walls insulation, windows replacement, regulation.
Examples from energy audits (3).

- All recommended works in audit would give 96% savings, resulted with “Passive house”, heat balance shows that house should be frozen.

Examples from implemented energy saving measures (1).

- Roof and end walls insulated on 2004, windows partly replaced, heating system balanced and regulated from thermal sub-station from 2005.
- Savings 9%
- Regulation on end users level still missing.
Examples from implemented energy saving measures (2).
17. floors 64. flats.

- 4 side walls insulated 2005, heating system balanced.
- Savings 18%
- Can be realistic that regulation on end users level can lead to the heat consumption 140 kWh/living area annually.

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Examples from implemented energy saving measures (3).
5 floors 80 flats.

- External walls insulation and windows replacement until 2004, pipes insulation in basement, heating system balancing and sub-station automatisation afterwards.
- Savings 29%
Examples from implemented energy saving measures (4).

5 floors 75 flats.

- All external walls insulated, basement and staircases windows replaced until 2005.
- Afterwords heating system regulated from sub-station.
- Savings 14 %

Examples from implemented energy saving measures (5).

4 floors 56 flats.

- Total external walls insulation on 2004, after windows replacement on 2005 consumption rised (luck of ventilation or indoor temperature regulation with windows?)
Examples from implemented energy saving measures (6).

- All external walls insulated and windows with ventilation system replaced on 2001,
- heating system renovated until the end users level (thermoregulator) on 2002,
- 2003 heat allocation system was installed (saving motivation!).
- Savings 45%

Conclusions based on examples

- Energy audits quality demand to be controlled.
- True heating system regulation and automatization is possible to realize major part of potential savings.
- The work princip and how to use Thermoregulator should be clear for every end user.
Economical view.

- **SPBP** on saved energy cost by external walls insulation based on examples are between 12 – 25 year.
- Heat regulation equipment (sub-stations, regulators etc) pays back on shorter time.
- To save 1 MWh heat in previous examples has been invested about 1280 EUR. On the level of heat price 38 EUR/MWh this pays back about 30 years.

Thank you for attention!

Energy auditor: Aare Vabamägi
aareva@estpak.ee
An example of a Successful Project for Reducing Energy Consumption in Buildings

Blaženka Pospiš Perpar

Effective Policies for Improving Energy Efficiency in Buildings, Krakow, 12-14 September 2007

Content

1. Presentation of the El-tec Mulej company
2. Energy management and our activities
3. Project of performance contracting
4. Conclusions
Mission and slogan

We contribute to lowering energy consumption and help to preserve the environment.

energija zelene prihodnosti
energy of the green future

Our vision

To become the leading provider of integrated solutions in the South-East Europe in the fields of:
- district heating systems;
- water supply systems;
- efficient lighting;
- energy management.

Directed towards development and future, we are constantly improving the existing systems, developing high-quality products and services, incorporating the latest scientific achievements to meet the needs of the customers and to ensure mutual satisfaction and benefits.
October 18, 2007 EL-TEC Mulej, d.o.o. 5

Plates of operation

Places of business operation

- Slovenia, Serbia, Bosnia and Herzegovina, Croatia,

Business information:

- Revenues: € 5.35 million
- Employees: 34
- Two daughter companies: in Serbia El-tec Mulej Niš in Croatia: Energoglobal

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October 18, 2007 EL-TEC Mulej, d.o.o.

October 18, 2007 EL-TEC Mulej, d.o.o. 6

District heating systems

We offer integrated solutions in the field of economic construction planning, renovation and management of production sources, distribution and consumption of heating and cooling.

- ELTEC Danfoss Aqua Multi
- ELTEC Danfoss HKY
- ELTEC TP-05 and Danfoss ELC 300 S
- ELTEC SCADA
- ELTEC TERMIS

October 18, 2007 EL-TEC Mulej, d.o.o.
Water supply systems

We offer integrated solutions in the field of economic planning of construction, renovation and management of production sources, distribution and consumption of drinking water.

- ELTEC Danfoss Water Systems
- ELTEC AQUIS

Efficient lighting

We offer integrated solutions in the field of economic planning of construction, renovation and management of lighting systems for:

- Production plants
- Sports facilities
- Public lighting
- Other types of buildings and facilities
Energy management

We offer integrated solutions in the field of energy management:

- The goal of the building owner is to ensure optimal consumption of energy: **Achieve the biggest comfort with the lowest costs**

- Modern energy management: **Continuous optimization of energy and water consumption**

Energy management objectives

**EM stands for a continuous optimization of energy and water consumption, which can be achieved by:**

- Optimal planning and choice of energy equipment
- Professional installation of energy equipment
- Maintenance of energy equipment
- Control and supervision of results

**EM objectives:**

- Reducing costs / reducing energy (water) consumption
- Reducing the harmful effects to the environment
Energy management

Building owners as energy managers:

- Not knowing the energy problematic;
- Implementing individual phases (maintenance, control of invoices);
- Decentralized, everyone is responsible only for his share;
- No possibility for analysis, every improvement seems too expensive.

El-tec Mulej Bled services are multi-faceted:

- Energy audit;
- Finding solutions for savings;
- Evaluation of the investment needed to implement measures required to save energy and water, professional and optimal choice of equipment;
- Calculation of the repayment period, IRR, …;
- Maintenance and supervision;
- Constant monitoring of consumption.
Energy management

EMPHASIS:

- Integrated solutions, projects for determining energy efficiency;
- Implementation of “turn-key basis” projects;
- Taking over the risk (payment dependant on the effects).

Presentation of a successful project

PROJECT OF ENERGY PERFORMANCE CONTRACTING

- Municipality of Kranj, 53,000 inhabitants;
- Public tender in 2001 for a group of 14 buildings;
- Help of state institutions (tender, agreement…);

- The contract was signed in October 2001
BASIC AGREEMENT

MAIN SERVICE OF THE CONTRACTOR – guaranteed savings

- Reference period: 1 Januar 1999 to 31 December 1999
- Date of implementing the main service: 1 September 2002
- Termination of agreement: 31 August 2017
- Financing from the contractor: repayments dependant on the achieved savings
- The measures in the first year only on nine objects

Energy consumption cost basis:
- Heating: € 319,745
- Electricity: € 187,032
- TOTAL: € 506,777

Ensured savings:
- Heating: € 48,393
- Electricity: € 9,120
- TOTAL: € 57,513
BASIC MEASURES

- Replacing worn-out heating equipment (boilers, pumps, …);
- Isolation on installations;
- Modernization or implementation of regulation for internal central heating installations;
- Hydraulic balancing;
- Implementing remote control;
- Modernizing lighting.

Mutual responsibilities

CONTRACTOR’S OBLIGATIONS

- To ensure energy savings ⇒ maintenance of all measures;
- To provide access to system database;
- To issue an adjustment (settlement) three months after the end of the financial period.
BASIC AGREEMENT – mutual responsibilities

OBLIGATIONS OF THE CLIENT – cooperation
The client must:

- Ensure that settings and installations, which were implemented on the energy saving devices by the contractor, are not changed in any way
- Inform the contractor in writing of any changes in the use of buildings at least two months prior to such change(s) taking place

FEATURES OF PAST FINANCIAL PERIODS

- Changes of use in several buildings:
  increasing usable building space, cooperation in the planning and implementation of heating systems;
- Heating and air-ventilation issue
  non-functioning of air-conditioning systems, improvements of standards;
Savings achieved in every building, except one where we put in the operation air-conditioning system and thus achieved the previously prescribed, but non-attained standard;

Two buildings required special attention, otherwise no savings could be achieved;

Other buildings provided greater savings than expected;

Savings from 15% to 50%;

The biggest savings were achieved in the 2006/2007 period, when the value of the DD achieved only 72% of reference value;
RESULTS

Savings in five financial periods

CONCLUSIONS

- Good practice examples are a good encouragement for others and also for us (other projects);
- There are many such projects in industry, few in municipalities, none in building sector;
CONCLUSIONS

Energy management is still developing in Slovenia, there are many opportunities, but also many barriers:

- Lack of knowledge about this kind of projects;
- Public procurement procedure is complicated for performance contracting;
- Financing.

www.el-tec-mulej.com
Market snapshot

- Public and private buildings with gross living area larger than 1000 sq.m. are subject to an obligatory energy audit by a certified auditing company (Energy Efficiency Act 2003, amended 2006).
- Municipalities have restrictions on the amount debt can raise (20% of revenues).
- Limited government support for EE in Buildings (A & B certificates).
  - Certificate A – property tax exemption for 10 years
  - Certificate B – property tax exemption for 5 years
- Public procurement act has to be complied with, when selecting both project developer and financing institution
- “Real savings” vs. “Normalized savings”
Market snapshot – households

- Urgent need for investments, but reluctance of households to act together;
- No tradition in forming apartment blocks associations or condominiums;
- Lack of adequate legislation to regulate the matter;
- Huge potential for energy savings;
- Many people = many problems;
- “Real savings” vs. “Normalized savings”

Market snapshot – supply side

- Mainstream commercial bank lending
- Energy efficiency dedicated lending
  - EBRD BEERECL – through commercial banks; spiced up with a grant component from Kozloduy International Decommissioning Support Fund (KIDSF);
  - EBRD credit line for households; spiced up with 20% grant component, (capped);
  - EIB – municipal lending via commercial banks + up to 5% grant component;
  - EIB – upcoming energy efficiency credit line with grant component similar to the EBRD line;
- Bulgarian Energy Efficiency Fund
  - Direct lending or co-financing
  - Partial credit guarantees or portfolio guarantees
Market snapshot – intermediaries
- Many equipment providers
- Engineering companies
- Many certified energy auditing companies
  - Energy audits of buildings – 110 certified companies
  - Energy audits of industry – about 38 certified companies
- Very few ESCOs
  - Typical and “quasi” ESCO (total about 25-30).
- Bulgarian Energy Efficiency Fund

What is BEEF?
BEEF is a revolving mechanism for development and financing of commercially viable projects and for the necessary capacity building.
- Established with the provisions of the Energy Efficiency Act;
- Initial capitalization – approx. EUR 12 million;
- Donations from the Bulgarian Government,
- the World Bank (Global Environment Facility),
- the Government of Austria, Enemona AD, DZI Bank, “Lukoil” AD
- and other donors;
- Objective: Financing or guaranteeing projects targeting Energy Efficiency improvements.
**Principles**
- Public-Private Partnership;
- Independently managed, autonomous legal entity;
- Ability to Self-finance its operations;
- Transparency in administration of financial resources;
- Providing equal opportunities for all applicants for project financing;
- Significant GHG reduction.

**Partnerships with commercial banks and other institutions**
- Commercial banks
  - framework agreements for co-financing
  - Advanced negotiations for engineering a designated credit line for EE projects in multifamily apartment blocks.
- UNDP and the government of Bulgaria
  - Trilateral agreement with UNDP and the Ministry of Regional Development
EE in buildings – barriers/solutions

Institutional barriers
- High financial risk
- Poverty
- Lack of collateral

Many people = many problems

Operating risks – real vs. normalized savings
Financial risk – receivables are of poor quality
Many counterparties

Bankable project

Technical assistance

Banks

ESCo

EE potential

BgEEF

Bulgarian Energy Efficiency Fund

Bulgarian Energy Efficiency Fund direct financing

- Target: housing associations, public buildings
- Cheaper
- High risk tolerance
- Smaller projects
- Technical assistance
- Fast processing

Project PCGs

- Target: ESCOs, public buildings, housing ass.
- Up to 80% cover
- 0.5% to 1.5% pa
- Technical assistance

Portfolio PCGs

- Target: ESCOs, retail banking for EE projects in residential buildings
- Up to 5% first loss cover on a portfolio basis
- Very high risk tolerance
- Low guarantee fees
- Technical assistance

Eligibility criteria

- Energy efficiency investment projects of companies, municipalities and physical persons;
- Volume of investment BGN 30 000 – BGN 3 000 000;
- Equity contribution of project developer – at least 10%;
- Duration – up to 5 years;
Eligibility criteria

- At least 50% of the project’s economic benefits must come from measurable energy savings;
- The project must introduce proven energy saving technology;
- The contribution of the project developer have to be:
  - at least 10% in case of co-financing schedule /BgEEF + Commercial bank/
  - 25% in case of one-source financing /BgEEF only/;
  - According to the rules of the commercial bank in case of PCGs
- The project has to have a payback time of up to 5 years;

Types of projects:

- Investments in improved EE in industrial processes, including Purchase of equipment, machines and tools; Training; Technical assistance, etc.
- Rehabilitation of buildings
- Improvements to the heat source and distribution system
- Fuel Switch projects
- Heating insulation
- Reconstruction of the heat source and the distribution system;
- Improvements to mechanical heating ventilation and air conditioning
- Rehabilitation of municipal facilities (e.g. street lighting)
- Small cogeneration systems
Track record of BgEEF:

- Nearly two years of operations (since January 2006).
- 58 registered projects. Total amount of the pipeline EUR 13mln.
- Approved number of projects – 33 (another 23 being evaluated)
- Approved projects for EUR 7 mln.
- Expected number of projects by the end of 2007 – 45.
- Expected amount of approved projects by the end of 2007 – EUR 7 to 8 mln.
- The vast majority of projects is in buildings – hospitals, schools, universities, kindergartens

Portfolio guarantee

Each household repays separately to the bank

BANK

Financing each household separately with EUR 2500

CONSTRUCTION COMPANY

Project implementation

BEEF

BEEF approves the projects technical parameters

apt 1
apt 2
apt 3

Multi-flat apartment building

Portfolio: EUR 10 000 000
Guarantee: EUR 500 000 (5% of portfolio)
Maturity: 5 years

The state provides up to 50-55% subsidy (with UNDP programme) for the pilot and it is expected to provide 30% subsidy thereafter.
BEEF guarantees the first 5% losses of the portfolio
Projects

MUNICIPAL HOSPITAL LUKOVIT

- Project Cost – EUR 40 000
- Pay-back Period – 1.6 years
- Applied Energy Saving Measures:
  - New natural gas-fueled automated heating system;
  - Fuel switching from naphta to natural gas;
  - New circulating pumps for the heating system;
  - Elimination of 32 electrical hot water boilers and the transition to centralized hot water supply.
- Estimated Savings of Electricity – 975 000 kWh (65 000 kWh/p.a.)
- Estimated Savings of Heat Energy – 4 275 000 kWh (285 000 kWh/p.a.)
- Estimated Savings of Emissions in CO2 Equivalent – 5 072,9 t (338,2 t/p.a.)

MUNICIPAL HOUSING FUND - DOBRICH

- Project Cost – EUR 300 000
- Pay-back Period – 4.7 years
- Applied Energy Saving Measures:
  - Replacement of windows with a new 3-chamber PVC frame and glass package;
  - Insulation of external walls.
- Estimated Savings of Electricity – 4 734 450 kWh (315 630 kWh/p.a.)
- Estimated Savings of Emissions in CO2 Equivalent – 10 940,0 t (729,3 t/p.a.)
Projects

MUNICIPAL ADMINISTRATION AND COMMUNITY CENTER "N. VAPTSAROV"

- Project Cost – EUR 130 000
- Pay-back Period – 4,3 years
- Applied Energy Saving Measures:
  - Replacement of the existing wood and metal window frames with PVC double glazed glass package;
  - Thermal insulation of outside walls;
  - Insulation of floor above unheated basement floor;
  - Fuel switching: new boilers burning wood briquettes;
  - Reconstruction of the heating installation.
- Estimated Savings of Energy – 3 153 990 kWh (315 399 kWh/p.a.)
- Estimated Savings of Emissions in CO2 Equivalent – 14 271,1 t (1 427,1 t/p.a.)

MUNICIPALITY OF DVE MOGILI

- Project Cost – EUR 50 000
- Pay-back Period – 4,6 years
- Applied Energy Saving Measures:
  - Replacement of window frames with PVC profile and glass package;
  - Thermal insulation of external walls.
- Estimated Savings of Heat Energy – 1 911 830 kWh (191 183 kWh/p.a.)
- Estimated Savings of Emissions in CO2 Equivalent – 687,1 t (68,7 t/p.a.)
MEDICAL UNIVERSITY PLOVDIV

- Project Cost – EUR 75 000
- Pay-back Period – 5,0 years
- Applied Energy Saving Measures:
  - Thermal insulation
  - Replacement of windows
  - Reconstruction and upgrade of the heating system;
  - Reconstruction of the hot water supply system.
- Estimated Savings of Heat Energy – 3 681 270 kWh (245 418 kWh/p.a.)
- Estimated Savings of Emissions in CO2 Equivalent – 1 300,9 t (86,7 t/p.a.)

FIVE KINDERGARDENS IN KARLOVO (ESCO)

- Borrower – “Enemona” AA (ESCO)
- Project Cost – EUR 400 000
- Pay-back Period – 4,0 years
Contacts:
Ivan Gerginov – Executive director
“Kuzman Shapkarev” str. № 4
Sofia 1000, Bulgaria
tel: +359 (2) 81 000 80
fax: +359 (2) 81 000 05
e-mail: info@bgeef.com
Web: www.bgeef.com
Good practices in energy efficiency measures in buildings different types

(multi-family, public, entrepreneurs)

Andrzej Rajkiewicz, Aleksander Panek
Narodowa Agencja Poszanowania Energii S.A. (NAPE)
Ul. Filtrowa 1
00-611 Warszawa, Poland
Tel. (+48 22 825 19 77), 825 52 85 arajkiewicz@nape.pl

NAPE – National Energy Conservation Agency

- Founded 10/1994
- Owned: 72.6% to Energy Conservation Foundation, 27.4% to employees and private persons
- President: Aleksander Panek, Vice-Presidents Andrzej Rajkiewicz, Andrzej Wiszniewski
- 14 full-time employed, 40 temporary staff
- Revenue 2006: app. 900 T€
- Main activities: energy auditing of all types of buildings and energy sources, training, publications, software, political papers, legal issues concerning implementation of EU directives related to energy efficiency and performance in buildings, energy saving consulting for different types of clients
NAPE – relation to housing sector

- is backed by the Technical University of Warsaw
- provides expertise on energy efficient refurbishment of buildings for central and local government, housing associations and other owners of building stock
- develops refurbishment schemes that integrate building envelope, heating and ventilating technology and energy supply
- develops scheme of EPBD implementation (which was ready in mid 2005)

NAPE – performance

- Over 2000 energy audits of buildings different types (15% of the market)
- Over 2000 trained energy auditors
- Over 50 projects performed in international cooperation on EE refurbishment of buildings, promotion of cogeneration, RES, financing energy efficiency
- Co-author of country-wide system to support energy efficient retrofitting of buildings adopted by Polish Parliament 1998
- Initiator and leader of preparation introduction of EU EPBD in Poland
- Initiator and supporting member of Energy Auditors Association – ZAE (600 members - auditors)
- Initiator and supporting member of Association ‘Energy and Environment Protection’ – SAPE (8 members – regional energy efficiency agencies)
Facts about the (social) residential housing stock

- Number of inhabitants 38.2 million
- Number of dwellings 12,596 million in total
- Average number of inhabitants per dwelling 3.03
- Number of social dwellings in narrow terms (for vulnerable families) 30,000
- Number of social dwellings in wider terms app. 7 million in 0.6 million buildings (40% co-operatives, 40% HOAs, remaining part municipalities, private owners, enterprises, state)
- Disposable income app. 1800 euro/household
- Total housing expenditures in average 18.6%, where for heat 6%
- Non payable bills 5-10% of tenants

Existing residential building stock in Poland (2002)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>rural area</td>
<td>total</td>
<td>4 772 728</td>
<td>413 255</td>
<td>828 167</td>
<td>1 367 542</td>
<td>676 498</td>
<td>763 461</td>
</tr>
<tr>
<td>urban area</td>
<td>1 780 594</td>
<td>176 411</td>
<td>331 041</td>
<td>425 199</td>
<td>236 578</td>
<td>296 650</td>
<td>266 202</td>
</tr>
<tr>
<td></td>
<td>46 513</td>
<td>40 438</td>
<td>56 841</td>
<td>65 859</td>
<td>72 744</td>
<td>78 268</td>
<td>84 768</td>
</tr>
<tr>
<td>rural area</td>
<td>2 992 134</td>
<td>236 844</td>
<td>497 126</td>
<td>942 343</td>
<td>439 920</td>
<td>463 811</td>
<td>58 944</td>
</tr>
</tbody>
</table>

85%
Ownership structure of dwellings in Poland

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>47%</td>
</tr>
<tr>
<td>Co-operatives</td>
<td>10%</td>
</tr>
<tr>
<td>Private in HOAs</td>
<td>11%</td>
</tr>
<tr>
<td>Municipal</td>
<td>27%</td>
</tr>
<tr>
<td>Enterprises</td>
<td>3%</td>
</tr>
<tr>
<td>Others</td>
<td>1%</td>
</tr>
<tr>
<td>TBS</td>
<td>1%</td>
</tr>
</tbody>
</table>

Total: 12,776,100


Average heat consumption for heating in kWh/m² usable area depending on period of construction of buildings:

- Do 1985: 240-380
- Od 1998: 50-100

WG aktualnych wymagań

NIEMCY Szwecja

Poland Germany Sweden

Andrzej RAJKIEWICZ - National Energy Conservation Agency, Poland

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To overcome the deficits, the bonus system was 1998 introduced (Thermofund)

- the minimum calculated energy savings after refurbishment should exceed for complex measures 25%/a (in average in Poland for housing stock it is app. 40%/y)
- the monthly rate of repayment of the loan should not exceed the monthly calculated energy savings over 10 years (calculation period)
- the loan can be obtained up to 80% of total refurbishment cost
- the bonus from the state budget is given to the bank, which finances the refurbishment in given building, in amount 25% of the loan (bonus for reduction of the capital) just after accomplishment of the measures identified in energy audit of the building
- the fundamental document necessary for obtaining the state support is the energy audit, which scope and form are regulated by the Ordinance of Ministry of Infrastructure from 15.01.2002; the energy audit gives the technical assumptions for the refurbishment and estimates the cost of measures and their effectiveness, as well as calculates the monthly rate of repayment of the loan, required own sources and the amount of the loan
- the energy audits are subject of verification their compliance with Law by the national Bank Gospodarstwa Krajowego

State policy towards reduction of energy consumption of buildings

Thermomodernisation Act from 18 December 1998

<table>
<thead>
<tr>
<th>Thermomodernisation project</th>
<th>Type of savings</th>
<th>Savings achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>modernization of heating system in building, exclusively</td>
<td>reduction of annual energy demand</td>
<td>at least 10%</td>
</tr>
<tr>
<td>comprehensive modernization</td>
<td>reduction of annual energy demand</td>
<td>at least 25% or at least 15% when the heating system was modernized during 1985-2001</td>
</tr>
<tr>
<td>modernization of local heat source and district heating networks</td>
<td>reduction of annual energy losses</td>
<td>at least 20%</td>
</tr>
<tr>
<td>connection to district heating network due to liquidation of local sources</td>
<td>reduction of annual heat costs</td>
<td>at least 20%</td>
</tr>
<tr>
<td>conversion of conventional energy sources into renewable (unconventional) ones</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Utilisation of Polish Thermofund

Number of applications for grant – total 8346

Utilisation of the Fund by categories of buildings (by the end of 2006)

HOA buildings 3300
Perception of the system

Intermediary results of assessment:
- the Polish scheme was constructed as an instrument dedicated especially to residential multifamily buildings. It was assumed that during the 10 years of activity of the system (starting 1999) approximately 50,000 buildings with 2,500,000 apartments will be retrofitted with utilization of the scheme. Until now, approximately 10% of these goals was achieved. The reasons for delay are:
  - in the initial period till 2001 the calculation period for repayment of loans from savings (in energy audits) was 7 years. Starting 2002, this period equals to 10 years. This modification of law made the meeting of criteria of obtaining the bonus more attractive.
  - the scheme was not assisted until 2002 by active awareness campaign - implementation of “Friendly Home” campaign is one of reasons the increased the number of applicants
  - low social acceptance for financing own investments by loans due to high interest rates (from 30% in 1999 to 8% in 2006); now over 10,000,000 loans have been given to individual households for consumer goods

Recommendations

- Since the state system is proven, affordable by tenants and transparent it is necessary to extend the budget of the Thermofund and to combine it with the environmental funds and/or with EU structural funds 2007-2013
- To introduce innovative financing, which can support creation of own equity (20% of investment sum) for the loan, which lack is most important barrier in achieving creditworthiness of HOAs
Conclusions

- Estimation of needed subsidy under existing system says about 630,000,000 EURO when the goals of the system (set up 1998) have to be achieved. It means 157,000,500 euro/yearly during next 4 years. The plan for next year is 64,102,000 euro.

- There is still opened question, how to finance the retrofitting of remaining part of housing stock constructed 1945-1988 e.g. app 567,931 buildings with 7,046,746 dwellings.

- The estimated value of retrofitting measures is app. 50 billion euro, while with existing system it is possible to cover 1 billion euro/year.

Current state policy – changes in Law

- Changes in criteria for subsidising the EE measures in buildings:
  - Reduction of the bonus from 25% to 20% of the loan
  - Canceling the requirement of 20% own sources
  - No matching with EU cost refunding

- Introduction of additional bonus in amount of up to 20% of investment sum and up to 30% of the loan for buildings constructed before 1961

- Introduction of special bonus (related to the value of building) for buildings, which were privately owned, but there was minimum one municipal dwelling.
Good practice in multi-family building

Example of performed project (2003)

Building constructed 1963, construction material - panels, number of apartments 48, 2400 sqm space

List of implemented measures:

• Insulation of walls 13 cm
• Refurbishment of skylights
• Insulation of roof 12 cm
• Modernization of heating installation
Example of performed project

- Cost of measures 95 000 euro

**40 euro/m² = 1980 euro/dwelling**

- Yearly heat cost savings 9 500 euro
- Yearly heat consumption savings 41.7%
- Own sources collected 20 000 euro
- Loan 75 000 euro
- Bonus from the state 25% = 18 750 euro
- Installment 56 250 euro + interest

Conditions and results

- Renovation charge raised to 1 euro/sqm/month e.g. 2000 euro/month during 1 year before project
- Monthly rate of installment and interest to be repaid 775 euro/month (during 10 years)
- Tenants have reduced the private income tax through renovation tax regulation
- The heat comfort is better
- The market value of the flat raised by 10%
- The heat cost reduced by 0.45 euro/sqm/month e.g. 25 euro/month/apartment
Good practice in public building

TULIPAN Office Building

To be constructed in Warsaw

Scope of pre-designed EE measures

- Pre-heating and pre-cooling of ventilation air by an underground tunnel
- Tri-generation gas turbine for producing electricity, heat and cold – in combination with traditional gas heating boilers
- Cold storage system - Cristopia
- Heat recovery elements
- PV system
- Architectural solutions for maximizing daylights access
- Sensor steered light system
- Thermal insulation
- Rain water management
- Energy balance of proposed energy conservation measures
## ECONOMY OF MEASURES

<table>
<thead>
<tr>
<th></th>
<th>Base line</th>
<th>Heat recovery unit</th>
<th>Plus underground tunnel</th>
<th>Plus trigeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional investments cost [th. €]</td>
<td>0,0</td>
<td>0,0</td>
<td>27,7</td>
<td>192,1</td>
</tr>
<tr>
<td>Additional maintenance costs [th. €/year]</td>
<td>0,0</td>
<td>0,0</td>
<td>0,0</td>
<td>10,5</td>
</tr>
<tr>
<td>Total energy costs [th. €/year]</td>
<td>137,0</td>
<td>122,1</td>
<td>117,3</td>
<td>81,4</td>
</tr>
<tr>
<td>Total maintenance and energy [th. €/year]</td>
<td>137,0</td>
<td>122,1</td>
<td>117,3</td>
<td>91,9</td>
</tr>
<tr>
<td>Savings [th. €/year]</td>
<td>5,0</td>
<td>14,9</td>
<td>4,8</td>
<td>30,2</td>
</tr>
<tr>
<td>SPTB</td>
<td>x</td>
<td>x</td>
<td>5,7</td>
<td>6,4</td>
</tr>
<tr>
<td>IRR</td>
<td></td>
<td></td>
<td>15,4%</td>
<td>13,3%</td>
</tr>
</tbody>
</table>

### Status
- The investor resigned on implementation despite of available subsidy from EC (35% of cost of additional measures)
- Reason: currently the rent of office spaces in Poland does not depend on the energy performance of buildings
Financing issues

- There is well working financing scheme for refurbishment of residential and public non-profit buildings
- There are some opportunities to support the EE measures in buildings from EU Structural funds during 2007-2013
EU Structural Funds for EE refurbishment measures in residential buildings

Use of EFRE Funds for Housing is regulated in Article 7 (REGULATION (EC) No 1080/2006 of 5 July 2006 on the ERDF)

2. Expenditure on housing shall be eligible only for those Member States that acceded to the European Union on or after 1 May 2004 and in the following circumstances:

(a) expenditure shall be programmed within the framework of an integrated urban development operation or priority axis for areas experiencing or threatened by physical deterioration and social exclusion;

(b) the allocation to housing expenditure shall be either a maximum of 3% of the ERDF allocation to the operational programmes concerned or 2% of the total ERDF allocation;

(c) expenditure shall be limited to:

— multi-family housing, or
— buildings owned by public authorities or non-profit operators for use as housing designated for low-income households or people with special needs.

Rules for the implementation (REGULATION (EC) No 1828/2006 of 8 December 2006)

Eligibility of expenditure on housing (Article 47, Interventions in the field of housing)

1. The areas selected for housing operations referred to in point (a) of Article 7(2) of Regulation (EC) No 1080/2006 shall comply with at least three of the following criteria, two of which must fall within those listed under points (a) to (h):

Andrzej RAJKIEWICZ - National Energy Conservation Agency, Poland
EU Structural Funds for EE refurbishment measures in residential buildings

Rules of implementation:
(a) a high level of poverty and exclusion;
(b) a high level of long-term unemployment;
(c) precarious demographic trends;
(d) a low level of education, significant skills deficiencies and high dropout rates from school;
(e) a high level of criminality and delinquency;
(f) a particularly rundown environment;
(g) a low level of economic activity;
(h) a high number of immigrants, ethnic and minority groups, or refugees;

(i) a comparatively low level of housing value;
(j) a low level of energy performance in buildings.

The values for the criteria set out in the first subparagraph shall be collected by each Member State concerned at national level.

The benchmarking values for each criterion shall be determined in partnership between the Commission and each Member State.
EU Structural Funds for EE refurbishment measures in residential buildings

2. Only the following interventions shall be eligible under point (c) of Article 7 (2) of Regulation (EC) No 1080/2006:

(a) renovation of the common parts of multi-family residential buildings, as follows:
   (i) refurbishment of the following main structural parts of the building: roof, façade, windows and doors on the façade, staircase, inside and outside corridors, entrances and their exteriors, elevator;
   (ii) technical installations of the building;
   (iii) energy-efficiency actions.

(b) delivery of modern social housing of good quality through renovation and change of use of existing buildings owned by public authorities or non-profit operators.
New financial instrument available: JESSICA

- Joint European Support for Sustainable Investment in City Areas

This is a Joint initiative of the EU Commission, the EIB and the Council of Europe.

The aim is promoting sustainable investment in urban areas.

The instrument provides a possibility to allocate part of structural funds to create **urban development funds**, which can finance the measures in buildings by soft loans, equity or guarantees.

**EU Structural Funds for EE refurbishment measures in residential buildings**

**EU Structural Funds for EE refurbishment measures in urban areas**

*Source: EIB*
Interest in implementation of JESSICA

- 2 Polish regions – Wielkopolska, Mazowsze
- Latvia
- Slovakia
- ???

EU Structural Funds for financing EE refurbishment measures in public buildings (non-profit)

- Projects value > 5 000 000 euro: under the OP Infrastructure and Environment
  - Energy audit required
  - Readiness for implementation 30%
  - Heat demand reduction 30%
  - Cost of unit heat savings 30%
  - Utilisation of RES 5%
  - Utilisation of CHP 5%

- Project's value <5 000 000 euro in Regional Operational Programmes (in Poland 16 regions)
  - Energy audit can be required
EU Structural Funds for financing EE refurbishment measures in entrepreneurs buildings (manufacturing, commerce, service)

- Project’s value 2 000 000-28 000 000 euro: under the OP Innovative economy
- Project’s value <2 000 000 euro in Regional Operational Programs (in Poland 16 regions)

- Only as part of modernization plan of the company, which is aimed to raise competitiveness and to introduce the innovations
- Energy audit can be required

Nationwide educational program “Friendly Home”
Promotion of energy savings in buildings in Poland

National Energy Conservation Agency
Association of Energy Auditors
Scope of the program

- Designing buildings
- Modernization
- Exploitation
- Certification

Voluntary industry driven with government patronage

Target groups

- Private investors
- Corporate investors (housing coops., owners associations, housing managers, etc.)
- Local authorities officers
- Professionals
- Media
Activities

- Publications:
  - Brochures
  - Posters
  - Leaflets
  - Seminars
- Taking part in professional fairs
- Communication platform www.domprzyjazny.pl

Organization and Partners

- Patronage and supervision – Ministry of Construction
- Professional backup – National Energy Conservation Agency, Building Research Institute, Association of Energy Auditors, Technical Universities
- Organizational matters – external PR enterprise
- Financing:
  - Distribution framework agreement with Poczta Polska – National Post Company,
  - Project by project:
    - Banks
    - Associations of construction materials and equipment producers,
Projects completed

- Brochures:
  - Low energy house – 100,000
  - Thermomodernisation of buildings – 400,000
  - One - layer wall houses – 100,000
  - Multi - layer wall houses – 100,000
  - Building superstructures and modernization of multifamily houses – 100,000
  - Building superstructures and modernization of detached houses – 100,000
  - Thermomodernisation and upgrading of public houses – 50,000
  - Modernisation of heat supply systems in buildings – 60,000

Each brochure is accompanied by poster 5 -10 thousand
Projects completed (cont.)

• Leaflets:
  • Energy-saving apartment usage – 2.5 million
  • New system of buildings energy certification – 60,000
  • Seminars for the representatives of local authorities, building owners and administrators held in 5 cities, each attended by approximately 120 people.
  • The program’s presence on several fairs.

Projects ongoing

• Brochure:
  • Co-financing retrofitting of buildings by EU Structural Funds
Internet communication platform

www.domprzyjazny.org
Workshop

Effective Policies for Improving Energy Efficiency in Buildings
Krakow, Poland

Improving Energy Efficiency in Buildings: Evaluation of a Pilot Project in Residential Buildings applying PPU solutions
Enrique Grosser Lagos
Budapest, 12. September, 2007

Overview on the Present
Main restraints of Energy Efficiency Policies in Buildings at present

From 2000, there have been several government programmes to encourage improving energy efficiency in residential buildings, in the framework of which over 75,000 flats in prefabricated residential buildings were modernised with public support (state and/or municipal) between 2000 and 2006.

Control tests in prefabricated buildings modernised between 2000–2006 found that though there were some energy savings and improvement in the technical conditions of the buildings, a number of negative circumstances made the effectiveness and expediency of the programmes questionable.

- **A lack of complexity**: the planned technical interventions usually offered only partial solutions (e.g., thermal insulation of walls, replacement of doors and windows without heat control) and were often ill-considered (heat bridges, mould growth);

- **A low rate of return**: the relatively low unit cost of investment (€1000–2000/flat) results in extremely long periods of return.

- **Encouraged high costs**: Government programmes made the amount of support relative to costs, setting no condition on the efficiency of energy savings.

- **High level of subvention intensity**: till 67 % of the total investment costs

- **Shortcomings in quality**: owner-occupiers' wish to minimise costs was realised to the detriment of the quality of materials and workmanship. Contractors and suppliers assumed little responsibility for the quality of their products, renewal and installation works.
Realized projects evaluated: 2700 modernised flats in prefabricated buildings with district heating

<table>
<thead>
<tr>
<th>Type of technical interventions (planned in doors temperature: 22°C)</th>
<th>Energy Saving %</th>
<th>Average in doors temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A separate heating centre by block of flats, regulation of heating and measurement of consumption by flat, complete replacement of doors and windows</td>
<td>14 %</td>
<td>22°C</td>
</tr>
<tr>
<td>A common heating centre for several blocks of flats, no regulation of heating neither measurement of consumption by flat, partial replacement of doors and/or windows or thermal insulation of walls</td>
<td>0 %</td>
<td>25°C</td>
</tr>
<tr>
<td>A common heating centre for several blocks of flats, no regulation of heating neither measurement of consumption by flat, partial replacement of doors and windows or thermal insulation of walls</td>
<td>5 %</td>
<td>24°C</td>
</tr>
<tr>
<td>A separate heating centre by block of flats, regulation of heating and measurement of consumption by flat, complete replacement of doors and windows and thermal insulation</td>
<td>30 %</td>
<td>22°C</td>
</tr>
</tbody>
</table>

Looking for a new approach in order to improve effectiveness

- Establishment of a partnership of all those interested in energy saving, i.e. a Private-Public User Partnership (PPU).
- Management and Operation by an Energy Efficiency Company (EFCO)
- Application of complex and high quality technical solutions
- Guarantees of quality by manufacturers, contractors and installers
- Optimal operation on a risk basis
Pilot project

The Project

- 10-story prefabricated buildings built in 1974-76
- 4 buildings, 768 dwellings
- Range of flats size: 37-74m²
- 1962 owners/tenants
- high heating-energy loses 45%
- an investment of € 4.2 million
- Renewal Average costs: €5,500 per flat

Average annual heat consumption: 40,751 GJ/year; 53.1 GJ/year/flat
Spending on heat energy: €690/year/apartment
Pillars of EFCO based Pilot Project

1. Technological solutions for improving energy efficiency
2. Legal Framework of contracting
3. Structure of financing
4. Optimal Operation
5. Communication

Technological Solution and Investment Costs (4.2 millió €)

- Heating center
- Radiator
- Ventilation
- Heating regulation
- Hot water network
- Insulation
- High insulated Windows
**Energy Balance**

Energy Saving Potential: 16,200 GJ/Year  
Guaranteed 12,200 GJ/Year  
(30 %)

- 16.00%
- 15.00%
- 6.00%
- 3.00%

**System of contracting**

- **Contract on support**: concluded by the local government (LG) or the state (CG) with the community of owner-occupiers (U)
- **Principal contractor's contract**: concluded between EFCO and the community of owner-occupiers, a ten years’ guarantee of quality
- **Contract on operation**: concluded between EFCO and the community of owner-occupiers for a period of ten years
- **Credit agreement**: concluded between EFCO and the community of owner-occupiers as debtors and a bank (B) or savings bank (SB) as creditor, on the basis of the bank guarantee by the International Finance Corporation (IFC)
- **District heating contract**: concluded on the required amount of heat and services between EFCO and the community of owner-occupiers on the one hand and the provider (DHCO) on the other.

A major problem is that the law on district heating does not allow heating plants to conclude contracts directly with EFCOs, only with owners or occupiers of flats.
A specific feature: the Local Government will pay the support in 32 equal installments during a period of 8 years.
Shema of Finance

1. 10% of the owners pay in cash
2. The rest of the owners take a loan to finance:
   • their own part and the one guaranteed by ESCO as well a
   • to pre-finance the support granted by the local government
3. Loan: a combination of (interest granted) loan and Housing Saving Bank System. The most favorable on the market.
4. Repayment period: 86 + 5 months
5. The share of joint expenses to be paid by owners will be increased to pay off the loan.

The Repayment of the loan

The EFCO grants the condominium a credit equivalent to the value of the guaranteed energy savings, which it will deduct from its account receivable. The local government will pay the support in 32 equal installments during a period of 96 months. The remaining amount will be paid by owners as a part of joint expenses.
Guarantees

Loan collaterals

1. User: IFC bank guarantee

2. EFCO:
   + Security deposit: retention of contractor’s fee
   + Pledge on principal

Additional guarantees:
   + Guarantee of quality
   + Liability insurance
   + Property damage insurance

Targeted Operation cash flow

<table>
<thead>
<tr>
<th>Years</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFt</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
</tr>
</tbody>
</table>

- service fee
- bank paid
- fall in fees
Preliminary Evaluation

Preliminary results

- The PPU-EFCO scheme is de facto functioning, and financial institutions and contractors are prepared for its introduction in a general way.
- The successful pre-financing of municipal support with deferred payment in the framework of the financial model has a favorable influence on the local governments’ disposition to grant supports.
- Developing various forms of direct support for PPU-EFCOs is worth considering. The tendering and public purchase procedures of the “Panel Program” caused a significant delay in the implementation of the project.
- The increase of energy prices and the introduction of the energy certificate improve the chances of risk-based implementation and financing of energy-saving.
Between October 2006 and August 2007 the decrease of heat consumption exceeded the originally projected 30%. The total annual energy savings resulting from heating and water heating was 47%. Approximately 7-8% of this is a consequence of the more advantageous climatic conditions as compared to the projections.

The realized cash-flow from energy savings was higher than expected because the energy prices during the period in question increased significantly. The annual income from energy savings is twice of the planned amount.
PERSPECTIVES

(Targets of Energy Efficiency in Buildings could become realistics)

Energy-Saving Potential by improving the Energy Efficiency of buildings in Hungary
= 5% of Energy Final Use in 10 years
Expected Improving of the Quality of Air

Decisive participation of the market forces
Thank You for Your Attention!

Enrique Grosser Lagos
Hunesco Ltd.
Session 4: Policies and Programmes for Appliances, Equipments and Lighting in the Building Sector

Chair: Dagnija BLUMBERGA, Riga Technical University, Latvia

Bogdan Atanasiu and Paolo Bertoldi
European Commission DG JRC

Summary

- Residential electricity consumption
  - Overview
  - Appliances
  - Electronics (TVs)
  - Lighting
- Tertiary electricity consumption
  - Lighting
  - Other end-use equipments
- Conclusions: Potential savings till yr. 2015
Residential Energy Consumption

- The gas consumption of the residential sector has continued to grow in the period 1999 to 2004 in the EU-25 from 4721 PJ to 5399 PJ with an increase of 14%, while the yearly growth rate in the period 2003-2004 has been 2.2%.

- Total electricity consumption for the residential sector for the EU-25 has grown by 10.8% in the period 1999-2004, from 690 TWh in year 1999 to 765 TWh in year 2004 and by 1.8% in the period 2003-2004.

Increasing electricity demand in households

- Higher penetration of "traditional" appliances (e.g. dishwashers, tumble dryers, air-conditioners, personal computers, which are all still far away from saturation levels); introduction of new appliances and devices, mainly consumer electronics and information and communication technology (ICT) equipment (Set Top boxes, DVD players, broadband equipment, cordless telephones, etc.) many with standby losses.

- Increased use of "traditional" equipment: more hours of TV watching, more hours of use of personal computer (driven by some tele-working, and increased used of internet), more washing and use of hot water.

- Increased number of double or triple appliances, mainly TVs and refrigerators-freezers.

- More single family houses, each with some basic appliances, and larger houses and apartments. This results in more lighting, more heating and cooling, and last but not least, older population demanding higher indoor temperatures and all-day heating in winter and cooling in summer, and spending more time at home.
Electricity consumption by sector

Residential Electricity Consumption

EU-15

EU NMS-12

EU25 – Final consumption

Final Electricity Consumption - EU25 by sector

Final Energy Consumption - EU25 by sector

Bogdan ATANASIU - European Commission DG-JRC

Breakdown in EU NMS-12 (2004)

Residential Electricity Consumption

Bogdan ATANASIU - European Commission DG-JRC
### Breakdown of residential electricity consumption in EU-15 [TWh]

<table>
<thead>
<tr>
<th>Category</th>
<th>Consumption [TWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerators and freezers</td>
<td>102</td>
</tr>
<tr>
<td>Washing machines</td>
<td>26</td>
</tr>
<tr>
<td>Dishwashers</td>
<td>14</td>
</tr>
<tr>
<td>Driers</td>
<td>13</td>
</tr>
<tr>
<td>Room air-conditioners</td>
<td>7</td>
</tr>
<tr>
<td>Electric storage water heater</td>
<td>65</td>
</tr>
<tr>
<td>Electric ovens</td>
<td>15</td>
</tr>
<tr>
<td>Electric hobs</td>
<td>37</td>
</tr>
<tr>
<td>Consumer electronics and other equipment stand-by</td>
<td>45</td>
</tr>
<tr>
<td>Lighting</td>
<td>85</td>
</tr>
<tr>
<td>TV-on mode</td>
<td>20</td>
</tr>
<tr>
<td>Office equipment</td>
<td>10</td>
</tr>
<tr>
<td>Residential electric heating</td>
<td>150</td>
</tr>
<tr>
<td>Central heating circulation pumps</td>
<td>30</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>85</td>
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</table>

### Breakdown of residential electricity consumption in NMS12+Hr [TWh]

<table>
<thead>
<tr>
<th>Category</th>
<th>Consumption [TWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating &amp; cooling</td>
<td>8,61</td>
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<tr>
<td>Lighting</td>
<td>17,32</td>
</tr>
<tr>
<td>Refrigerators/freezers</td>
<td>19,36</td>
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<tr>
<td>Washing machines</td>
<td>9,08</td>
</tr>
<tr>
<td>Cooking/dishwasher</td>
<td>8,90</td>
</tr>
<tr>
<td>Hot water</td>
<td>6,06</td>
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<tr>
<td>Consumer Electronics and stand-by</td>
<td>11,36</td>
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<tr>
<td>Miscellaneous</td>
<td>5,84</td>
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<tr>
<td>Total</td>
<td>86,53</td>
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</table>
EU Residential Sector Electricity Consumption

<table>
<thead>
<tr>
<th></th>
<th>Residential [TWh]</th>
<th></th>
<th>JRC survey</th>
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<tbody>
<tr>
<td></td>
<td>Eurostat data</td>
<td>2004 vs. 2003 [%]</td>
<td>2004</td>
</tr>
<tr>
<td></td>
<td>2003</td>
<td>2004</td>
<td></td>
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<tr>
<td>EU-25</td>
<td>754,67</td>
<td>767,85</td>
<td>1,75</td>
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<tr>
<td>EU-15</td>
<td>692,17</td>
<td>704,57</td>
<td>1,79</td>
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<tr>
<td>NMS-10</td>
<td>62,50</td>
<td>63,29</td>
<td>1,26</td>
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<tr>
<td>NMS-12</td>
<td>80,05</td>
<td>80,10</td>
<td>0,06</td>
</tr>
<tr>
<td>EU-27</td>
<td>772,22</td>
<td>784,67</td>
<td>1,61</td>
</tr>
</tbody>
</table>

Cold Appliances

- The major European policy measures already in place are the mandatory energy labelling (Directive 94/2/EC), including the Amended Directive of 2003 (2003/66/EC) to introduce the A+ and A++ classes [EU 2003], The MEPS Directive (coming into force in 1999) and the CECED unilateral agreement.

- The CECED unilateral agreement. Participating manufacturers have stopped producing for, and importing in, the Community Market electric compressor based household refrigerating appliances having an energy efficiency index 75 (corresponding to energy label class C) and above (except for chest freezers), and for electric compressor based chest freezers having an energy efficiency index 90 (corresponding to energy label class D) and above, by 31st December 2004. The agreement also includes a "fleet target": Each participant will reduce its own production - weighted average energy efficiency index- to a value of 55 for production and importation into the EU market by the year 2006.
Evolution of the EEI (new model sale weighted average) for cold appliances – EEI 55 + A class

Sales of refrigerators in 2004 by energy class
The major European policy measures in place are the mandatory energy labelling Directive (95/12/EC amended by Directive 96/89/EC) and the CECED Unilateral commitment. The goal of the 2nd CECED commitment is a reduction of the fleet energy consumption. The commitment calls for achieving a European production weighted average of 0.20 kWh/kg for the year 2008. In addition at the latest by 31 December 2003 the participant manufacturers have stopped production and import in the Community Market domestic washing machines, which belong to energy efficiency class D.

The share of A class appliances was already above 50% in 2002, in 2005 in some Member States (Germany, the Netherlands, and Belgium) there is a large penetration of A+ appliances (not defined in the labelling Directive but agreed among CECED manufacturers), and the combination of A and A+ in these markets is approaching the 100% market.

The most remarkable market change from 2002 for washing machines has happened in the UK due to the Energy Efficiency Commitment (about 800000 washing machines have been subsidised each year under EEC).

It is also interesting noting that the class B is almost disappeared from the market, but there is an increased share of not labelled appliances. Class A appliances are seen by consumers as a high quality product (most of A class appliances are AAA, associating to the low energy consumption, high spin speed and good washing performances).
Dishwashers

- The major European policy measures already in place are the mandatory energy labelling (Directive 97/17/EC amended by Directive 1999/9/EC) [EU 1999] and also the CECED Unilateral Commitment [CEC 2004], which is now expired.
- Remarkable progress in energy efficiency of new models took between 2002 and 2005 in all EU-15 countries, especially in the UK and Italy. Very impressive also is the high A class market share in some of the New Member States.
- The sales of dishwashers by energy class follow a similar pattern to the one of the washing machines, with the class A already above the 50% threshold. The lowest share of sales of A class appliances in 2005 was in Spain 69% (still up from 31% in 2002), with the highest share 94% in Belgium.
EU-15 Dishwasher energy efficiency index progress, in kWh/cycle

Sales of dishwashers in 2004 by energy class
Sales of dishwashers: 2004 vs. 2005 by energy class

Cooking Appliances

- Electric ovens represent 97% of the ovens sales in the EU-15 in 2005, with similar trends in the 10 New Member States.

- For free standing cookers the share of electric one is 34.5% and for gas ones is about 44%; interesting to notice also that for hobs the share in sales among electric and gas is 58.4% electric and 37.4% gas models, with almost 100% electric hobs in Germany and Sweden, and almost 100% gas hobs in Italy.

- Total electricity consumption for electric cooking is estimated to be 52 TWh (around 37 TWh electric hobs and 15 TWh electric ovens).

- There is a mandatory energy label (Directive 2002/40/EC) only for electric ovens, which covers also the electric ovens in free standing cookers. The impact of the energy labelling is starting to be visible on the market.
Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007

Sales of electric ovens in 2004 by energy class

Televisions (1)

Annual sales of TVs (thou. units)  Increased penetration of TVs in Households
Residential Electricity Consumption

Televisions (2)

Increased average number of minutes of viewing per day

Residential Electricity Consumption

Analog CRT TVs:
Results of the EICTA Voluntary Agreement

[Bogdan ATANASIU - European Commission DG-JRC]
Energy Consumption of Residential lighting

- Lighting in the residential sector has been reported to consume **86 TWh** per year in the EU-15 in year 1995 in the DELight Study (Environmental Change Unit, Oxford University). The DELight study predicted an increase of residential lighting consumption to **97 TWh** by 2010.

- More recently the European Climate Change Programme (EECP) and the 2004 JRC Status Report calculated the following lighting consumption in the EU-15:
  - **85 TWh** growing to **94 TWh** by 2010, without additional and new policies and programme introduced.

- Waide (IEA) calculated **79 TWh** in 2005 for the OECD Europe.

- We calculated for year 2004, **79 TWh** for the EU-15 and **96 TWh** for the EU-27.
### Residential Electricity Consumption

#### Table: Residential Electricity Consumption

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of Hshlds (millions)</th>
<th>Residential Electricity Cons. [TWh]</th>
<th>Lighting Cons. [TWh]</th>
<th>Lighting Cons. in Total Residential Electricity Cons. [%]</th>
<th>Average Cons. Lighting/HH [kWh]</th>
<th>HH with CFLs [%] (Including HH without CFLs)</th>
<th>Lighting Points/HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>3.08</td>
<td>15</td>
<td>1,1</td>
<td>7.3</td>
<td>357.14</td>
<td>70</td>
<td>4</td>
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<tr>
<td>BE</td>
<td>3.90</td>
<td>18.20</td>
<td>2.23</td>
<td>12.23</td>
<td>343.22</td>
<td>70</td>
<td>2.50</td>
</tr>
<tr>
<td>DK</td>
<td>2.31</td>
<td>9.71</td>
<td>1.36</td>
<td>14.00</td>
<td>589.00</td>
<td>65</td>
<td>4.90</td>
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<td>FR</td>
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<td>6.5</td>
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<td>EI</td>
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<td>7.33</td>
<td>1.32</td>
<td>18</td>
<td>920</td>
<td>38</td>
<td>1.5</td>
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<td>IT</td>
<td>22.50</td>
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<td>524</td>
<td>60</td>
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<td>4.20</td>
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<td>11</td>
<td>18</td>
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<td>872</td>
<td>55</td>
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<td>UK</td>
<td>22.80</td>
<td>111.88</td>
<td>17.9</td>
<td>16</td>
<td>785</td>
<td>50</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Diagram: Lighting Points per Household

#### Diagram: Households with CFLs
Summary of the Lighting Findings

- Member States the lighting consumption as share of the total residential electricity consumption ranges between 8% and 23% (excluding residential electricity consumption due water and space heating are).

- The average consumption per household, which ranges from 337 kWh (Germany) to 920 kWh (Ireland) pa. [in DELight average household lighting electricity use ranges from 240 kWh pa to 920 kWh]. This consumption reflects the size (square meters) of the household, the burning hours, and the penetration of efficient lamps (explaining the very low consumption in Germany and high consumption in Ireland). The data for Greece is still under investigation, as the specific household lighting consumption is very high (but similar to the one of Cyprus and Malta). The lowest in New MS is in Slovakia, 240 kWh.

- The average number of CFLs per household ranges in EU-15 from 1 in Finland and Greece to 6.5 in Germany, where several promotion campaigns took place [in DELight the highest was NL with 2.7 followed by Germany with 2.1].

- In the new Member States the number of CFLs per household is substantially lower than in the EU-15 Member States, with the exception of the Czech Republic.
Tertiary Sector Building Energy Consumption

- Total electricity consumption for the tertiary sector for the EU-25 was 628 TWh in year 1999 and 726 TWh in year 2004. The electricity in the tertiary sector has grown by 15.6% in the period 1999-2004 and by 2.0% in the period 2003-2004.

- The gas consumption in the tertiary sector has continued to grow in the period 1999 to 2004 in the EU-25 from 2070 PJ to 2362 PJ with an increase of 14%, while the yearly growth rate in the period 2003-2004 has been 1.9%.

- For the tertiary sector (in this report it is the public sector, education, healthcare, services and commerce there is much less data available for individual electricity end-uses than for the residential sector, and only a few sources attempted to divide the total electricity consumption among the different end-uses.

- This is also known as the 'commercial sector' and represent non-residential buildings in the service sector. Most of the statistics and researchers do not specify whether the buildings belonging to the industrial sector companies (i.e. car manufacturer headquarters, office buildings etc.) are included.

EU-15 Breakdown of the Tertiary Sector Consumption
Lighting (1)

- Lighting is by far the major end-use category in tertiary sector consumption, responsible for about 175 TWh or 26% of total electricity consumption in the tertiary sector.

- The T8 lamp now dominates the linear fluorescent market. The existing mix of lamps is still two-thirds halogen phosphate lamps with the remaining third being three-band phosphor lamps which are currently increasing their market share year by year.

- The new technology, T5 which has a higher efficiency and is designed to be fed only by electronic ballasts has small market penetration, though slightly increasing overtime.

- About 207 millions are new installed lamps in 2004 [CEL2005], which tends to be of higher efficiency compared to already install lamps.

Lighting (2)

- There is a voluntary classification scheme for the combination of lamp ballasts introduced in the year 1998 by the lighting equipment manufacturers' trade association, CELMA.

- The classifications scheme together with the minimum efficiency requirements for ballasts (Directive 2000/55/EC), which came into effect in 2002, have resulted in a gradual market transformation.

- The Directive foresees two gradual steps for phasing out low and medium efficiency ballasts. The first steps took place in year 2002 and phased out low efficiency magnetic ballasts (class D). The second steps took place in November 2005 and phased out Class C ballast representing the largest shared of the market.
Other end-use equipment

- **Air-conditioners** in non residential buildings are estimated to consume about 70 to 80 TWh of electricity. Eurovent established classification for full load Energy Efficiency Ratio of each type of chillers. The classification follows the A to G approach used in the European Energy Label.

- Another important share of electricity is consumed by fans for **ventilation systems** (including fans), which results in about 94 TWh. For the time being there are no existing European polices to improve efficiency of ventilation systems.

- A similarly important sector in term of consumption is **commercial refrigeration**. Estimate for the total European consumption range from 70 to 100 TWh per year. The specific refrigeration products covered by commercial refrigeration equipment are: process chillers, refrigerated display and service cabinets, cellar cooling, ice making machines (non domestic), walk-in cold stores, refrigerated vending machines, refrigeration compressors, air-cooled condensing units, heat exchangers (process/industrial applications).

- For **office equipment** there are no much data available on the total energy consumption. According to the Ecodeign study in 2005 there where 44 Million desktop computers installed in non residential applications, and another 36,5 million laptops, and about 44 million monitors, of which 45% were flat panel. In 2003 a rapid penetration of LCD screens occurred, ad was sustained in 2004 and 2005, which should have led to a decrease of the total monitor consumption. It is assumed by the authors that office equipment (ICT equipment) is responsible for about 60 to 80 TWh per year in the tertiary sector. More research is needed to arrive at a more precise evaluation. In the residential sector ICT is responsible for about 10 to 20 TWh.
### Potential electricity savings by year 2015 (JRC Est.)

<table>
<thead>
<tr>
<th></th>
<th>Electricity Consumption 2005 [TWh/year]</th>
<th>Realistic Saving Potential by 2015 compared to BaU Scenario [TWh/year]</th>
<th>Ambitious Saving Potential by 2015 compared to BaU Scenario [TWh/year]</th>
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</thead>
<tbody>
<tr>
<td>DESWH</td>
<td>65</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Office Equipment</td>
<td>60</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Standby</td>
<td>44</td>
<td>20</td>
<td>30</td>
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<tr>
<td>Residential Lighting</td>
<td>95</td>
<td>16</td>
<td>44</td>
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<tr>
<td>Main Domestic appliances</td>
<td>165</td>
<td>44</td>
<td>60</td>
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<tr>
<td>Electric motor systems</td>
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<td>Commercial lighting</td>
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<tr>
<td>Total</td>
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<td>189</td>
<td>446</td>
</tr>
</tbody>
</table>

---

**Thank you!**

bogdan.atanasiu@ec.europa.eu
paolo.bertoldi@ec.europa.eu

Data shown in this report refer to sell out at the retailer level.

GfK is auditing continuously the sell out of shops in all western and eastern European countries.

Our information are the tool used by the industry to take strategic and tactic decisions on the market.
COUNTRIES

Central EU
- Croatia (HR)
- Slovenia (SI)
- Czech Republic (CZ)
- Slovakia (SK)
- Poland (PL)
- Hungary (HU)
- Romania (RO)
- Bulgaria (BG)

Baltics
- Estonia (EE)
- Lithuania (LT)
- Latvia (LV)

East EU
- Russia (RU)
- Ukraine (UA)

APPLIANCES object of the report

- Washing Machines
- Tumble Dryers
- Dishwashers
- Refrigerators
- Freezers
- Free Standing Cookers
- Built In Ovens
- Hobs
- Hoods

FOCUS ON
### Estimation of Total MDA Market in 2006

<table>
<thead>
<tr>
<th></th>
<th>Sales Th. Units</th>
<th>Sales Mio Euro</th>
<th>Households (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West (10 countries)</strong></td>
<td>55,585,6</td>
<td>23,998,4</td>
<td>149,097</td>
</tr>
<tr>
<td><strong>CEE (8 countries)</strong></td>
<td>8,473,6</td>
<td>2,534,4</td>
<td>36,825</td>
</tr>
<tr>
<td><strong>Russia + Ukraine</strong></td>
<td>8,252,1</td>
<td>2,737,9</td>
<td>68,563</td>
</tr>
</tbody>
</table>

10 Ctrs West: AT, BE, DE, ES, FR, GB, IT, NL, PT, SE
8 Ctrs CEE: BG, CZ, SK, HU, HR, PL, RO, SI

### Year 2006

#### Importance of single product categories

<table>
<thead>
<tr>
<th></th>
<th>WEST</th>
<th>CEE</th>
<th>Russia + Ukraine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Washing Machines</strong></td>
<td>22,4</td>
<td>29,3</td>
<td>37,7</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>22,3</td>
<td>30,4</td>
<td>32,0</td>
</tr>
<tr>
<td><strong>Cooking</strong></td>
<td>31,4</td>
<td>30,8</td>
<td>26,7</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>23,9</td>
<td>9,5</td>
<td>3,6</td>
</tr>
</tbody>
</table>

Cooking: FS Cookers, BI Ovens, Hobs, Hoods
Others: Dishwashers, Freezers, Tumble Dryers
WASHING MACHINES
CENTRAL EASTERN EUROPEAN COUNTRIES
Year 2006- first half 2007

Size of the market, importance of countries
Washing Machines

No. HOUSEHOLDS:

- Ukraine: 17.6 Mio
- Russia: 51.0 Mio
- Poland: 35.5
- Romania: 15.3
- Czech Republic: 12.5
- Hungary: 9.8
- Slovak Republic: 8.2
- Latvia: 7.4
- Lithuania: 5.2
- Slovenia: 4.2
- Estonia: 3.7
- Bulgaria: 3.4
- Serbia: 2.7

Sales Th. Units in 2006

- Ukraine: 816,1 Ths
- Russia: 2,292,1 Ths
- Poland: 380,0
- Romania: 153,0
- Czech Republic: 125,0
- Hungary: 98,0
- Slovak Republic: 82,0
- Latvia: 74,0
- Lithuania: 52,0
- Slovenia: 42,0
- Slovenia: 37,0
- Bulgaria: 34,0
- Serbia: 27,0

Matilde SOREGAROLI - GfK, Italy
### GfK Panelmarket Europe

**Jan-June 07 vs 06**

<table>
<thead>
<tr>
<th>Country</th>
<th>Central EU</th>
<th>Baltics</th>
<th>East EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL</td>
<td>+20.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RO</td>
<td>+3.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CZ</td>
<td>-3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HU</td>
<td>+3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BG</td>
<td>-20.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SK</td>
<td>+15.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>+14.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>-1.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Baltics</th>
<th>East EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT</td>
<td>+0.5</td>
<td>-1.0</td>
</tr>
<tr>
<td>LV</td>
<td>-50.1</td>
<td>-9.1</td>
</tr>
<tr>
<td>EE</td>
<td>-54.9</td>
<td></td>
</tr>
<tr>
<td>UA</td>
<td>-1.0</td>
<td></td>
</tr>
<tr>
<td>RU</td>
<td>-9.1</td>
<td></td>
</tr>
</tbody>
</table>

---

### WASHING MACHINES

#### FRONT LOADING

![Front Loading Washing Machine](image1.png)

#### TOP LOADING

![Top Loading Washing Machine](image2.png)
Matilde SOREGAROLI - GfK, Italy
### MDA Sales Units % Year 2006

#### SPIN SPEED – Round per minutes

**Washing Machines Fullauto. Front**

<table>
<thead>
<tr>
<th>Region</th>
<th>&lt; 600 RPM</th>
<th>600 &lt; 800 RPM</th>
<th>800 &lt; 1000 RPM</th>
<th>1000&lt;1200 RPM</th>
<th>&gt;1200 RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10 Ctr. West</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Ths. Units</td>
<td>10,140.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8 Center EU</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Ths. Units</td>
<td>17,17.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RU+UA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Ths. Units</td>
<td>2450.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Matilde SOREGAROLI - GfK, Italy

JRC Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007
JRC Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007

### Importance of Energy Consumption Classes

<table>
<thead>
<tr>
<th>Energy Consumption Class</th>
<th>DE</th>
<th>ES</th>
<th>FR</th>
<th>GB</th>
<th>IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>45.3</td>
<td>38.2</td>
<td>28.3</td>
<td>24.7</td>
<td>29.0</td>
</tr>
<tr>
<td>A</td>
<td>54.5</td>
<td>48.3</td>
<td>64.0</td>
<td>72.2</td>
<td>61.3</td>
</tr>
<tr>
<td>B</td>
<td>6.1</td>
<td>6.6</td>
<td>4.8</td>
<td>6.2</td>
<td>3.1</td>
</tr>
<tr>
<td>C</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Others</td>
<td>0.8</td>
<td>2.1</td>
<td>4.8</td>
<td>6.1</td>
<td>5.4</td>
</tr>
</tbody>
</table>

**Full Automatic Front Loading**

### Latest Evolution of Energy Consumption Classes

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan-Jun 06</th>
<th>Jan-Jul 06</th>
<th>Feb-Aug 06</th>
<th>Mar-Aug 06</th>
<th>Apr-Aug 06</th>
<th>May-Aug 06</th>
<th>Jun-Aug 06</th>
<th>Jul-Aug 06</th>
<th>Aug-Sep 06</th>
<th>Sep-Oct 06</th>
<th>Oct-Nov 06</th>
<th>Nov-Dec 06</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>45.3</td>
<td>37.4</td>
<td>42.0</td>
<td>45.5</td>
<td>44.0</td>
<td>48.7</td>
<td>53.3</td>
<td>54.9</td>
<td>55.9</td>
<td>54.0</td>
<td>54.0</td>
<td></td>
</tr>
<tr>
<td>WM</td>
<td>54.5</td>
<td>62.1</td>
<td>57.6</td>
<td>54.3</td>
<td>55.9</td>
<td>51.3</td>
<td>46.6</td>
<td>45.0</td>
<td>44.0</td>
<td>45.9</td>
<td>45.9</td>
<td></td>
</tr>
</tbody>
</table>

**Full Automatic Front Loading - DE**

Matilde SOREGAROLI - GfK, Italy
### FULL AUTOMATIC FRONTLOADING - RO

**Latest evolution of energy consumption classes**

<table>
<thead>
<tr>
<th>Year 2006</th>
<th>J-F 06</th>
<th>M-A</th>
<th>M-J</th>
<th>J-A</th>
<th>S-O</th>
<th>N-D</th>
<th>J-F 07</th>
<th>M-A</th>
<th>M-J</th>
</tr>
</thead>
<tbody>
<tr>
<td>WM RO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Units %</td>
<td>A+</td>
<td>A</td>
<td>B</td>
<td>Others</td>
<td>64.9</td>
<td>70.6</td>
<td>69.0</td>
<td>74.2</td>
<td>64.3</td>
</tr>
</tbody>
</table>

### FULL AUTOMATIC FRONTLOADING - CZ

**Latest evolution of energy consumption classes**

<table>
<thead>
<tr>
<th>Year 2006</th>
<th>J-F 06</th>
<th>M-A</th>
<th>M-J</th>
<th>J-A</th>
<th>S-O</th>
<th>N-D</th>
<th>J-F 07</th>
<th>M-A</th>
<th>M-J</th>
</tr>
</thead>
<tbody>
<tr>
<td>WM CZ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Units %</td>
<td>A+</td>
<td>A</td>
<td>B</td>
<td>Others</td>
<td>32.6</td>
<td>24.2</td>
<td>28.4</td>
<td>31.5</td>
<td>32.8</td>
</tr>
</tbody>
</table>

**Matilde SOREGAROLI - GfK, Italy**
Matilde SOREGAROLI - GfK, Italy
### Washing Machines Fullauto. Front

<table>
<thead>
<tr>
<th>MDA</th>
<th>Price EUR</th>
<th>Average price per segment</th>
<th>Year 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>321</td>
</tr>
<tr>
<td>A+</td>
<td></td>
<td></td>
<td>345</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td>315</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td>241</td>
</tr>
</tbody>
</table>

### Refrigerators

**Central Eastern European Countries**

Year 2006 - first half 2007
### Percentage of families buying a Refrigerator

**Total year 2006**

<table>
<thead>
<tr>
<th>Country</th>
<th>GB</th>
<th>IT</th>
<th>DE</th>
<th>RU</th>
<th>UA</th>
<th>CZ</th>
<th>RO</th>
<th>PL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>10.7</td>
<td>9.3</td>
<td>8.7</td>
<td>3.8</td>
<td>4.1</td>
<td>8.2</td>
<td>6.1</td>
<td>6.6</td>
</tr>
</tbody>
</table>

#### CENTRAL EASTERN EUROPEAN COUNTRIES

**REFRIGERATORS**

- **1 Door**
- **2 DR Freezer Bottom**
- **2 DR Freezer Top**
### MDA Sales Units % JAN06-DEC06

<table>
<thead>
<tr>
<th>Region</th>
<th>Frostfree</th>
<th>Non Frostfree</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR06</td>
<td>90</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>EUR07</td>
<td>90,5</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>PL</td>
<td>92,9</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>HU</td>
<td>7,3</td>
<td>46,3</td>
<td>53,5</td>
</tr>
<tr>
<td>CZ</td>
<td>6,8</td>
<td>46,3</td>
<td>53,5</td>
</tr>
<tr>
<td>SK</td>
<td>19,2</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>RO</td>
<td>23,4</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>BG</td>
<td>11,4</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>SI</td>
<td>14,1</td>
<td>53,5</td>
<td>46,3</td>
</tr>
<tr>
<td>HR</td>
<td>14,1</td>
<td>53,5</td>
<td>46,3</td>
</tr>
</tbody>
</table>

### GfK Panelmarket Europe JAN06-DEC06

<table>
<thead>
<tr>
<th>Region</th>
<th>Energy Class A++</th>
<th>Energy Class A+</th>
<th>Energy Class A</th>
<th>Energy Class B</th>
<th>Energy Class C</th>
<th>Energy Class D</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUR06</td>
<td>13,4</td>
<td>5,47</td>
<td>7,77</td>
<td>17,7</td>
<td>17,7</td>
<td>2,3</td>
<td>65,3</td>
</tr>
<tr>
<td>EUR07</td>
<td>16,2</td>
<td>5,47</td>
<td>7,77</td>
<td>17,7</td>
<td>17,7</td>
<td>2,3</td>
<td>67,4</td>
</tr>
<tr>
<td>RU+UA</td>
<td>38,3</td>
<td>5,47</td>
<td>7,77</td>
<td>17,7</td>
<td>17,7</td>
<td>2,3</td>
<td>45,8</td>
</tr>
</tbody>
</table>
### MDA Sales Units %
#### GfK Panelmarket Europe
#### Cooling

<table>
<thead>
<tr>
<th>Country</th>
<th>JAN06-DEC06</th>
<th>MAY07-JUN07</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL</td>
<td>21.3</td>
<td>26.4</td>
</tr>
<tr>
<td>RO</td>
<td>26.2</td>
<td>28.7</td>
</tr>
<tr>
<td>CZ</td>
<td>21.9</td>
<td>21.5</td>
</tr>
<tr>
<td>HU</td>
<td>7.1</td>
<td>7.2</td>
</tr>
<tr>
<td>3 Ctr. Baltic</td>
<td>20.7</td>
<td>20.9</td>
</tr>
<tr>
<td>UA</td>
<td>5.6</td>
<td>5.6</td>
</tr>
<tr>
<td>RU</td>
<td>3.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Energy Class A + | Energy Class A | Energy Class B | Energy Class C | Energy Class D | Others

### MDA Sales Units %
#### GfK Panelmarket Europe RU+UA
#### 2006+ Running 2006-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>RU</th>
<th>UA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>38.3</td>
<td>45.8</td>
</tr>
<tr>
<td>2007</td>
<td>5.3</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Energy Class A + | Energy Class A | Energy Class B | Energy Class C | Energy Class D | Others

© by GfK MS, www.gfkms.com - Italy - SDA-MDA Department.
Latest trends in MDA markets show that the consumer is more and more taking care about the environment choosing better performing appliances when buying a new fridge or washing machine.

This process is faster in the washing machines than in cooling.

Is the price a driver to be considered to speed up the evolution?
1. Who is Eurima?

Ecofys VII study
U-Values for Better Energy Performance of Buildings

Presentation
“Effective Policies for Improving Energy Efficiency in Buildings”
12-14 September 2007, Krakow, Poland
Eurima is the European Insulation Manufacturers Association and represents the interests of all major mineral wool producers throughout Europe, including companies such as Knauf Insulation, Rockwool, Saint Gobain-Isover, Ursa Insulation, Paroc.

Members of Eurima operate in Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

In manufacturing mineral wool, members of Eurima help to achieve important social and environmental goals: saving energy, minimising pollution, combating noise, reducing the risk of fire and creating European jobs.

Eurima represents 20,000 employees in Europe and the installation of mineral wool keeps many more Europeans at work.
What is the role of Eurima?

- Eurima does scientific research on energy efficiency in buildings to contribute to the European debate on behalf of the members.
- Eurima is active at EU level to advocate the benefits of energy efficiency in buildings and make it work!
- Eurima also works with national associations in most European countries.

2. The energy efficiency potential in buildings in Europe
Trias Energetica

"the most sustainable energy is saved energy"

3rd: efficient use of fossil energy sources

2nd: use renewable energy sources

1st: minimise energy loss

Supporting the development of a low carbon economy in Europe

- EU unlikely to meet Kyoto objectives
  - No action
  - Global Warming: Action
  - Buildings alone have the potential to reach Kyoto objectives

- Increasing dependence on foreign energy sources
  - No action
  - Security of Energy Supply: Action
  - Reducing energy demand in buildings can help limit our exposure to supply issues

- EU Lisbon objectives not achieved
  - No action
  - Competitiveness: Action
  - Improving energy efficiency improves economic development
ECOFYS reports - quantifying the potential in the building sector

Key figures from Ecofys reports

- 40% - Energy consumption by buildings in Europe.
- 460 million tonnes - Potential CO2 savings in the building sector in Europe.
- 3.3 million barrels of oil - Equivalent of what Europe’s buildings consume due to a lack of energy efficiency.
- 270 billion € - Cost due to a lack of basic energy efficiency measures in buildings.
- 560,000 - Job potential from an active strategy to deploy energy efficiency in buildings.
- 10% only - The energy saving potential tapped by the current EPBD
3. Ecofys VII
setting up a new landscape

Starting point...

EPBD
whole building energy performance

National or regional whole building requirements

U-values
either as design criteria or component requirement

Economic optimum
Environnemental goals

Henryk KWAPISH - Saint-Gobain Poland / EURIMA
New recommendations for all buildings in Europe

- Recommended U-values based on cost effectiveness and climate protection.

New recommendations to respond to heating and cooling demands

- Heating demand
- Cooling demand
- HDD climate map
- CDD climate map
Rationales

Rising challenges

Rising energy prices

Rising climate change effects
Much more needs to be saved in the building sector.

85%

Potential in buildings that needs to be tapped by 2050 to achieve climate change objectives.

Time is not on our side.

The building stock in 2050, which has to deliver the 85% CO₂ reduction, includes the buildings that we start to renovate now!

There is an urgent need for regulation in the renovation!
Defining and Positioning U-values in Ecofys VII

Background

1. Climate conditions:
   heating and cooling degree days maps in Europe

2. Insulation for heating and cooling
   - Climate zones
   - Construction type
   - Building components
   - Other important factors
Building component and insulation

U-value optimum for heating and cooling demand

- Criteria: cost effectiveness
  - Energy price: WEO 2006 - Peak Price
  - Investment costs
  - Interest rate
  - Energy mix
- Criteria: Post Kyoto target

U-value optimum for heating and cooling demand

- 100 cities
- Investments versus annual running costs
  - Interest rate Service lifetime 30 years
- Impact factors
  - Energy prices: WEO 2006 (IEA scenario) & Peak Price (US$70 fixed);
    fuel mix, incremental costs for 1cm insulation/component
- Group starting points for cost analysing
  1. Scandinavia
  2. Moderate zone EU15 + Switzerland
  3. Warm zone EU15
  4. New EU8+2+Balkan countries
Savings in heating and cooling

The principle of cost effectiveness
Defining cost optimum U-values

Positioning cost optimum U-values

Source: Better Buildings through Energy Efficiency
A Roadmap for Europe

Minimum performance for all new buildings
Reasonable achievable with good design and building practice
Maximum level that can be achieved in the current context

EXISTING HOUSING STOCK

Present NEW BUILDING REQUIREMENTS

U-value

Examples

Henryk KWAPISH - Saint-Gobain Poland / EURIMA
Current recommendations are far below what is necessary

- Comparison with existing U-values requirements in EU 27 confirms how much cash is being wasted.
- National and regional standards are far below what is necessary.
- We invite member states to analyze U-value requirements

**Recommended U-values - Wall**

WEO 2006 - wall
Appraisal of current insulation recommendations by Ecofys VII
Results on cost-effectiveness and climate protection are almost identical

Optimum U-values recommendation

Cost optimum = Climate ready recommendations

Example: U-values roof

Present U-values

U-values based on WEO2006 price

U-values based on peak-price
U-values: cost effectiveness and climate

- The recommendations are based on cost efficiency and climate targets.

- Results should be understood as the minimum recommendations from EU.

- It is the responsibility of each country to optimize the implementation taking into account other factors:
  ✓ regional climate conditions, heated floor/wall, condensation risks, etc.

Post-Scriptum...
Support measures are also crucial

- **Upfront financing** is key (e.g. EU Structural Funds).

- Any policy packages have to include a good set of organisational support measures.

THANK YOU!

Henryk KWAPISH - Saint-Gobain Poland / EURIMA
The **GREENLIGHT** Programme

One simple decision... One amazing set of benefits for your organisation

---

Summary

- Electricity consumption in Europe
- Green Light Programme and its principles
- New Green Light project – results
- Examples
  - Shopping Centre
  - Building stairs
  - Storehouse lighting system
Lighting in EU 27
non-residential sector

- ~ 26% of total electricity consumption in tertiary sector (726 TWh in 2004)
- ~ 175 TWh/yr in office buildings, commercial sector, depots, industry office buildings
- ~ 68 TWh/yr in street and road lighting infrastructure
- Electronic ballasts reached 31% only of market share in 2004 (52% magnetic ballasts class EE1 C/D)
- Low penetration of control systems
- High energy-saving potential ~ 40%

GREENLIGHT programme

- This is actually on-going voluntary programme in EU 27
- It started in EU15 in Feb 2000,
- From Jan 2006 continuation in NMS as a NEW GREENLIGHT EIE-05-192 project,
- Objectives:
  - to reduce the energy consumption from indoor or outdoor lighting throughout Europe,
  - to increase level of traffic safety for public
  - to improve the quality of working conditions
  - to achieve environmental (reducing GHG emissions and limiting the global warming) and economical benefits ... save money!!!
**Details of the GreenLight commitment** – PARTNERS (407)

**Existing spaces**

- Upgrade at least 50% of the spaces owned or on long term leases where the investment is profitable*.

- Or alternatively reduce the total aggregate lighting electricity consumption of the spaces owned or on long term leases by at least 30%

**GreenLight**

**New spaces**

- All new installations shall be chosen so that no alternative installation exists that would:
  - (1) maintain or improve the lighting quality provided by the chosen installation and
  - (2) consume less electricity and
  - (3) represent a supplementary investment that would pass the profitability test
GreenLight

In addition

- Complete the upgrades within 5 years of joining the programme
- Send progress report every year
- Appoint a Corporate Manager responsible for assuring the Programme execution

GreenLight ENDORSERS (182)

- to promote the GreenLight Programme and its goals;
- to supply the Commission up-to-date information on their products, technologies and services relevant for the GreenLight Programme;
- to educate their clients on the benefits of energy-efficient lighting practices and on the GreenLight Programme;
- to lay out a specific plan for promoting the GreenLight Programme;
- to appoint a responsible person.
They are MAIN ENDORSERS (9)

- create a GreenLight Programme area in their facilities;
- create a display area in at least five large airports or train stations throughout the European Union;
- help to upgrade and to create a visible GreenLight Programme area at a famous site;
- display endorsement of the GreenLight Programme in all the European advertising for products and services in the lighting area;
- enrol five potential clients in the GreenLight Programme in a year.

Gain recognition as an environmental leader fighting global warming

Recognition by European Commission:

- Plaques on buildings
- Exclusive use of the GreenLight logo
- Inclusion in the Partnership Catalogue
- Participation in the GreenLight Awards
- EU 27-wide advertising campaigns
Strong support from 26 Energy Agencies

Consortium of the New GreenLight Project

- 9 partners from NBS – Czech Republic - coordinator, Bulgaria, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia (represented by SEVEN – Cz.R.) and France,
- 101 planned partners – achieved 42
- 53 planned endorsers – achieved 25
- Municipal and public organizations
- Leaflets, brochures, seminars, conferences, articles etc.
- Individual negotiations with potential partner organisations
- Energy savings based on reports ~ 7.5 GWh/y

Ryszard ZWIERCHANOWSKI - Polish National Energy Conservation Agency, Poland

JRC Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007
At the network of delicatessen shops:

**Krakow**

1. Halogen lamps H111 60W – 192 pcs
2. Electronic transformer 105VA – 192 pcs.
3. Installed power – 11.52 kW
4. Electricity consumption – 766 kWh/y

**Gdynia**

1. Halogen lamps H111 60W – 561 pcs
2. Electronic transformer 105VA – 561 pcs.
3. Installed power – 33.66 kW
4. Electricity consumption – 143 411 kWh/y

Energy savings: 30.9 MWh/y – 62.08%

Energy savings: 103.8 MWh/y – 71.42%

Increase customer satisfaction

Increase customer satisfaction
**Become more efficient**

Before

1. Lighting points – 55 IL (5x40W/ floor),
2. Installed power 2.2 kW,
3. Average lighting time – 8h/day,
4. Energy consumption – 6336 kWh/y,
5. Electric energy costs 2 534 PLN/y (€666)
6. Service costs ~ 1000 PLN/y

After

1. Lighting points – 33 CFL (3x18W)
2. Installed power – 0.6 kW
3. Average lighting time – 2h/day (testing)
4. El. energy consumption – 428 kWh/y
5. El. Energy costs – 171 PLN/y (€45)
6. No service costs per year

---

**Become more safety**

1. 11 floor building - 356 000 buildings in PL, 7 mil HH
2. 60 – 70% still with old type lighting system
3. 250 000 x 3000 kWh/y = 0.75 TWh/y
**Storehouses and depots lighting system**

Example of energy saving possibilities of trade network store-house with installed 108 incandescent lamps 430W operating 24h/day.

Energy consumption per day:

\[
108 \times 24 \times 430 = 1114.56 \text{kWh}
\]
Energy consumption with the system (as a result of tests only 42 lamps are shining 8 h): 42 x 8 x 430 = 144,48kWh

Energy savings:
100% - (144,48/1114,56) x 100% = 100% - 13% = 87%

Economic benefits per year:
(1114,56-144,48)x0,2PLNx365 days = 70815PLN = € 18635,-
Be Part of a European Movement

Ask for a complete registration form with programme details:
The Polish National Energy Conservation Agency
ul. Mokotowska 35
00-560 Warszawa
Tel: 0-22 626 00 10
Fax: 0-22 626 0011
rzwierchanowski@kape.gov.pl
WWW.EU-GREENLIGHT.ORG

Ryszard ZWIERCHANOWSKI - Polish National Energy Conservation Agency, Poland
Background to MCP and 4EM-MCP

The EU Policies and Programmes for Energy Efficient Motor Driven Systems could save in Europe 200 billion kWh of electricity consumption and reduce by 100 million tonnes the greenhouse gases emission (as for EU-15).

According to the ECCP research, motor systems are responsible for:
- 69% of the total electricity consumption in industry
- 38% of the total electricity consumption in the tertiary sector
- 30% of total EU electricity consumption in the European Union.

The EU Directive points out (among other) the electric motors as products which have been identified by the ECCP as offering a high potential for cost-effective reduction of greenhouse gas emissions.
What is the existing position of EE Motors?

Total motor sales in the scope of Voluntary Agreement of CEMEP. The diagram columns refer to the EU-15.

Source: Inception Report: Analysis of existing technical and market information, University of Coimbra, 2006

Volume of EE motors sales in the EU New Member Countries is still very small

Why MCP?

The goal of substantially improving end-use energy efficiency is a key component of the EU energy and environmental policies, shared by all EU Member States.

Master EU initiatives related to MCP: SAVE Programme and its continuation "Intelligent Energy for Europe".

The Motor Challenge Programme is one of the actions, aimed specifically at industrial use of electricity in Motor Driven Systems.

It is an EC voluntary programme through which industrial companies are aided in improving the energy efficiency of their Motor Driven Systems. Any enterprise or organisation planning to contribute to the Motor Challenge Programme objectives can participate.
What and where is MCP?

The European Motor Challenge Programme

- DEXA MCP Programme
- 4EM MCP Programme
- In Poland: PEMP Programme

4EM-MCP Leaders and Participants

The ‘Old EU’ Partners:
- Portugal – ISR-University of Coimbra
- Italy – ECD

‘Core’ Participants:
- Poland – PCPC, FEWE
- Romania - ENERO
- Bulgaria – ESD, BSREC, EEA
- Hungary - SC

Newly Invited Participants:
- Czech Republic - SEVEN
- Slovakia - ECB
- Latvia - ECODOMA
- Estonia - ESB

The 4EM-MCP Participants
How does the MCP work?

The European Motor Challenge Programme
The European Commission

Partners
Companies that use Motor Driven Systems
- Users of EMDS
- Producers of motors
- Producers of equipment with EMDS
- Distributors, suppliers

Endorsers
Entities introducing and promoting the MCP objectives
- Big producers’ management
- Consulting companies
- Design offices
- Research institutions
- Co-financing institutions

EMDS – Electric Motor Driven Systems

What is the expected outcome? (1- the EU)

The results of the 4EM-MCP initiative will be: greater awareness of energy savings and greater knowledge about the MCP, easier access to energy savings for small and medium enterprises in New Member and Candidate Countries, report with statistical information on the market penetration of energy efficient electric motor systems and pilot industry interventions.

Energy saving by the use of energy saving motors in Europe
Source: Inception Report: Analysis of existing technical and market information, University of Coimbra, 2006
What is the expected outcome? (2 - Poland)

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>Use of electricity, GWh</th>
<th>Electric drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>mining of hard and brown coal</td>
<td>6 118</td>
<td>4 894</td>
</tr>
<tr>
<td>other mining</td>
<td>1 393</td>
<td>697</td>
</tr>
<tr>
<td>metallurgy</td>
<td>10 952</td>
<td>7 119</td>
</tr>
<tr>
<td>chemical</td>
<td>7 446</td>
<td>6 552</td>
</tr>
<tr>
<td>non-metallic minerals</td>
<td>3 451</td>
<td>2 657</td>
</tr>
<tr>
<td>paper, pulp and print</td>
<td>3 179</td>
<td>2 066</td>
</tr>
<tr>
<td>constructions</td>
<td>510</td>
<td>240</td>
</tr>
<tr>
<td>textiles</td>
<td>957</td>
<td>488</td>
</tr>
<tr>
<td>furniture and other</td>
<td>699</td>
<td>419</td>
</tr>
<tr>
<td>water supply and sewage treatment</td>
<td>1 655</td>
<td>1 324</td>
</tr>
<tr>
<td>waste recovery</td>
<td>129</td>
<td>71</td>
</tr>
<tr>
<td>other industrial sectors</td>
<td>15 282</td>
<td>7 947</td>
</tr>
<tr>
<td>power sector</td>
<td>20 092</td>
<td>17 681</td>
</tr>
<tr>
<td>Sub-total</td>
<td>71 863</td>
<td>52 156</td>
</tr>
</tbody>
</table>

What is the expected outcome? (3 – Poland, ctd.)

Available improvement in motor efficiencies

A very conservative approach:
Total energy savings potential = 2,3 TWh/year,
of which ~1,5 TWh/year
in the industrial sector
In reality – more, because the actual
efficiency of motors is lower than
the Standardised
**Tools for the MCP and Partnership**

Tools:
- Electrical Distribution Module
- Management Policies Module
- Fan Systems Module
- Compressed Air Systems Module
- Pumping systems Module
- Refrigeration systems Module
- Drives Module

The Toolset Modules are available through the MCP, 4EM-MCP, DEXA MCP, PEM, and other specific websites addressing the MCP.

**Attending the MCP by an Enterprise:**

1. Inventory and assessment of operating electric drives.
3. Approval of the Action Plan by the EC.
4. Implementing the Action Plan and yearly Reports to EC.
5. Prolongation of the Partner status.

**Synergy and Feedback with the PEMP Programme (GEF)**

The main objective of the PEMP Programme is mitigation of GHG emission in Poland in relation to power production. The project way to achieve this objective is to improve efficiency of electric drives.

Michal PYKA - FEWE, Poland

Michal PYKA - FEWE, Poland

JRC Workshop on "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007
Offered by PEMP:

Demonstration Projects:
• Pilot implementations in the industry sectors,
• Presentation of technical and economic benefits,
• Dissemination of experience, raising awareness.

Activities of the PEMP Centre:
• Dissemination of knowledge on EE motor systems,
• Providing trainings, seminars, educational activity,
• Supporting potential investors in project defining and acquiring finance

Rebate (Financial Incentives) Programme:
• Addresses energy efficient low voltage motors up to 160 kW,
• Grant to the producer for made and sold EE motor,
• Opportunity to the users to buy EE motor at price for standard motor
• Transformation of the motor market structure.

THANK YOU FOR YOUR ATTENTION!
The End
Introduction to Voluntary Programmes

- **Energy efficiency** is a key component of any organisation to reduce environmental impact, and increase competitiveness through a reduction of energy costs;
- **Voluntary programmes** based on shared goals between the public administration and organisation have proven to work (e.g. US Energy Star programme);
- **Benefits** for the programme participants are: access to information, (technical) support for their energy efficiency actions, dissemination of their achievements, awards;
- **Benefits** for the **public administration**: achievement of energy saving by deploying market forces and information, without strong intervention as in the case of regulation, shared goals with private sector;
Objectives of the GreenBuilding Programme

• GBP is designed and will be operated in order to contribute to the EU objective to **reduce energy demand in buildings**.

• GBP main goal is to **stimulate “additional” cost-effective** energy efficiency and renewable energies projects in **non-residential** buildings to establish a markets for energy efficiency by the realisation of economically viable investments in energy efficiency.

• GBP will help and facilitate the implementation of the new **Directive on Energy Performance of Buildings** (EPB Directive) by promoting and disseminating its requirements.

• The objective of the GBP is to help overcome **most of the barriers** to energy efficiency and renewables in buildings - in particular the **lack of interest and information, technical capabilities and access to finance**.

• GBP will also **complement the EPB Directive** by stimulating energy efficiency measures in **existing** buildings, in particular by stimulating energy efficiency in **smaller refurbishments** (compared to what required by the EPB Directive) and/or by stimulating only energy efficiency projects (without building refurbishment, for example for office equipment, lighting, HVAC) and by introducing mandatory energy management in building (not cover by the EPB Directive).

• GBP will create a set of **resources and building examples** to facilitate the technical developments associated with the EPB Directive.
HOW?

by providing information and technical support, including information about:

• energy management and energy audit;
• building and system upgrades;
• M&V;
• ESCOs and financial opportunities;

to companies wanting to commit to adopting energy-efficient measures (both equipment/building upgrading and energy management practices) in buildings and by providing public recognition for their efforts and results.

Which Owner may become GB Partner?

- for existing buildings at least 25 % less consumption
- for new buildings at least 25 % below national requirements
Areas of Action in GreenBuilding

Electricity loads:
- Lighting;
- Office Equipment;
- Electric Appliances (refrigeration, washing, cooking);
- Distribution Transformers and UPSs;
- Lift and elevators;
- Heat pumps;
- Air-conditioning and Ventilation;

Other fuels:
- Heating, water heating and steam (boilers);
- co and tri-generation;
- Building shell (insulation, windows);
- Passive cooling, heating and natural ventilation;
- Renewable Energies (solar, biomass, etc.);

GreenBuilding Modules

HVAC  Lighting  Co-generation

Management Policies

Distribution transformers  Office equipment  Renewables

Commercial Appliances
Contents of the Modules

1. Guide on how to do the energy audit for the relevant systems:
2. Typical technical information on efficiency improvements for the equipment/system concerned, including:
   - System Design (size, topology, etc.);
   - Equipment Selection (including alternatives system/equipment);
   - Equipment and system control;
   - System Operation and Maintenance;
3. Tips on how to formulate a Action Plan and how to report

How to become GreenBuilding Partner

- energy audit of the building; collection of the relevant data
- action plan for the modernisation of the building
- Reporting about success of the measures.
- Participation is free of cost.
Key principles of the GB Programme

- The "Management Policies" Module is required by all participants and is supposed to aid them in making energy efficiency an element of management priorities at every step of the life cycle of a building.
  - Results of DoE energy management programmes showed that up to 80% of the savings could be attributed to the energy efficient practices of staff and the operations and maintenance staff.
  - Examples include continuous and preventive maintenance, building commissioning, equipment purchasing policies (e.g. LCC), continuous monitoring of energy consumption.

Benefits for participants in the GBP

- Direct financial benefits by saving money and in most cases improving working conditions.
- Indirect benefits resulting from the growing attention of consumers and investors.
- Possibility to link the project to national CO2 emission reduction programme or other (Green/White certificates).
- Information resources.
- Public recognition/endorserment.
Benefits of joining GreenLight

1. Gain recognition as a leader fighting global warming
2. Improve occupants' health and productivity
3. Increase customer satisfaction
4. Become more competitive
5. Increase customer satisfaction
6. Become more competitive

GreenBuilding National Contact Points in 13 countries

- CREVER
- ADENE
- ADEME
- POLIMI
- CRES
- Cenergie
- DATEX
- Dena Berlin Energie Ag
- Institut Josef Stefan
- CREVER
- POLIMI
- CRES
Programme Summary

- 2-year pilot phase (2005-2006) of the European GreenBuilding Programme
- supported by the European Commission
- trigger investments in energy efficiency of non-residential buildings
- Consortium: 13 organisations from 10 EU member states plus Croatia

52 European GB Partners (selection)
29 European GreenBuilding Endorsers (selection).
Experiences with GreenBuilding

Added value by GreenBuilding as seen by participants

- Encouragement to address energy efficiency measures
- Additional aspect in decision-making process
- Element in PR strategies
- Marketing support
- Instrument of staff motivation
- European context

Participating Buildings

broad variety of different types of non-residential buildings.

- Commercial facilities, hotels, hospitals: 25%
- sport facilities: 8%
- education facilities: 6%
- office and administration buildings: 56%
- Airport, church, prison, police station: 5%
Participating Buildings

- The majority of the buildings belong to
  - 65% private institutions
  - 35% public bodies

- 73% modernisations of existing buildings
- 27% new buildings

Measures applied

A variety of technical fields were addressed by the GreenBuilding Partners.

The following lists the most frequently applied measures:
Savings achieved

52 GreenBuilding Partners (February 2007) each year
• ~90,000 MWh primary energy savings
• ~22,000 tons of CO₂ emissions

Assuming a lifetime of 20 years, these savings will accumulate to
- ~1.8 TWh primary energy
- ~435,000 tons of CO₂.

• Average primary energy savings of 33% through GreenBuilding
• Number of GreenBuilding Partners is continuously growing

GreenBuilding Partner – City of Nuremberg

• Day-care centre Philipp-Körber-Weg 2
• Refurbishment of a former administration and cantina building of the Nuremberg
• measures (2004): building envelope, heating and lighting
• Primary heating energy consumption - 80%
• Primary energy demand after refurbishment: 32% below requirements German energy savings ordinance for new buildings (EnEV)
GreenBuilding-Partner KfW:
Revitalisierung KfW Haupthaus.
GreenBuilding Partner – KfW-Bankengruppe

- Modernisation of the “KfW-Haupthaus”
- The office building was constructed in 1968
- September 2006 completion of renovation measures
  - ventilation
  - heating and cooling
  - lighting
  - the building envelope
- Primary energy demand after refurbishment 130 kWh/m²a Reduction of 46%
  35% better than a new building
**Aquapark Bohinj** (Slovenia)

<table>
<thead>
<tr>
<th>Main measures</th>
<th>Year of construction</th>
<th>Description</th>
<th>Energy Savings MWh/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste water heat recovery</td>
<td>2004</td>
<td>Heating of sanitary and fresh water with system of reservoirs, heat exchangers and heat pumps (COP&gt;10).</td>
<td>52</td>
</tr>
<tr>
<td>Waste air heat recovery</td>
<td>2004</td>
<td>Three air conditioning system with variable speed drive electric motors and waste heat recuperation over 70%.</td>
<td>169</td>
</tr>
<tr>
<td>Heating</td>
<td>2007</td>
<td>Switch to main heat supply with ground source heat pump; heating system: 100 kW of heating power.</td>
<td>262</td>
</tr>
</tbody>
</table>

**Expected standard design primary energy demand:**

- Overall primary demand: 1,415.5 MWh
- Specific energy demand: 472 kWh/m²

**Actual primary energy demand (2005):**

- Electricity: 282.3 MWh/yr
- LPG gas: 615.5 MWh/yr
- Overall primary demand: 897.8 MWh/yr
- Specific energy demand: 299 kWh/m²
- CO₂ emission: 280.9 t
- Energy consumption reduction: 517.7 MWh (46%)

---

**Menerga** (Slovenia)

*Low energy intelligent office building with an active concrete construction, air conditioning and exploitation of geothermal energy*

The energy system of an office business building is presented, where at minimal energy consumption, optimal working conditions are achieved. The investment costs are in the same range as the investment costs for building a traditional building.
**Menerga (Slovenia)**

**Thermal activation of the concrete construction**

The basis of an energy saving building is a very efficient insulation. The building is in average insulated with a 16 centimeter layer of insulation and all thermal bridges are eliminated. Basically the temperature of the building in winter and as well in summer is maintained by maintaining a suitable temperature of the building's concrete construction. At the lowest outside temperatures in winter, room temperatures around 20°C are achieved with water temperature in the concrete construction thermal activation system around 22-23°C. In summer the room temperatures never exceed over 26°C because of the combination of water temperature in concrete construction and cool inlet air temperature (inlet air temperature around 19°C).

---

**Robert-Murjahn-Institute (RMI) (Turkey)**

- **Conservation of energy:** In order to minimize the heating and cooling demand of the building, 8 cm thick carbon filled expanded polystyrene insulation boards, which is about twice the requirements of the corresponding national standard is installed.

- **Use of renewable energy source:** A ground source heat pump system (GSHP) is installed in order to provide the energy for heating and cooling of the building. A vertical closed loop system with 22 double-U bore-holes, each 100 m deep, use the earth’s constant temperature as a heat sink in the summer and a heat source in the winter. Twenty-seven heat pump units are used to distribute heated or cooled air throughout the building. The efficiency of the heat pump system will be monitored using sensors and a data acquisition system.

- **Increase the input of natural light into the building:** The building comprises two skylights with a total area of 190 m², which is about one forth of the base area.
### Robert-Murjahn-Institute (RMI) (Turkey)

**Existing Design with GSHP’s and 8 cm insulation**

<table>
<thead>
<tr>
<th>Season</th>
<th>Electricity Power (kW)</th>
<th>Operational Hours (h)</th>
<th>Energy Demand (kWh)</th>
<th>Energy Cost (€/yr)</th>
<th>Total Energy Demand (kWh)</th>
<th>Total Energy Cost (€/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>64.47</td>
<td>1000</td>
<td>62410</td>
<td>498</td>
<td>114294</td>
<td>9144</td>
</tr>
<tr>
<td>Summer</td>
<td>64.78</td>
<td>820</td>
<td>51824</td>
<td>4148</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conventional Design with Fuel Oil Heating and A/C Cooling and 4 cm insulation**

<table>
<thead>
<tr>
<th>Season</th>
<th>Electricity Power (kW)</th>
<th>Operational Hours (h)</th>
<th>Oil Demand (kg)</th>
<th>Energy Demand (kWh)</th>
<th>Oil Cost (€/yr)</th>
<th>Energy Cost (€/yr)</th>
<th>Total Energy Cost (€/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>19.65</td>
<td>1000</td>
<td>15191</td>
<td>19850</td>
<td>13021</td>
<td>14933</td>
<td>20124</td>
</tr>
<tr>
<td>Summer</td>
<td>90.40</td>
<td>800</td>
<td>-</td>
<td>71520</td>
<td>-</td>
<td>5722</td>
<td></td>
</tr>
</tbody>
</table>

### Terme snovik – Kamnik d.o.o. (SI)

---

Paolo BERTOLDI - European Commission DG JRC, IES
• In January 2002 a covered thermal riviera with the overall area of 2.700 m² was built.

• In July 2003 a new outdoor entertainment pool complex with a total water area of 500 m² was built. The central building was insulated in accordance with the rules from 1998 and waste air heat recovery of the ventilation system was already included. As the building owner wanted to additionally lower operation costs for the heating of the indoor and outdoor pools, heat pumps, Biomass heating boiler (500 kW) to replace 90% usage of LPG for heating, and a system of solar collectors were installed. Thus 70.000 l LPG (45% ) for the needs of the central unit operation with an indoor and outdoor pool are saved annually.

The Millennium Tower I building is equipped with a "Forced Interactive Wall". Thanks to this technology we are able to decrease our electric-ity needs by 39-44%, decrease our gas needs by 12-30%, and indirectly decrease carbon pro-duction. With central coolers, with water-cooling chillers,. Specified cooling machine capacity factor: COP min. 4.4. The chillers supply the entire building. Regulated cooling circles are built. The general office coolers will be the so called inductive cooling beams.
Conclusions

• The European GreenLight (GL), Motor Challenge (MCP) and GreenBuilding (GBP) programmes require that participating companies adopt an Energy Management plan and an Energy Policy, which reflects the company values. Energy Management is closely linked to Energy audits as often said “you cannot manage what you don’t know you’ve got”. These programmes also support and promote “good” Energy Managers.

Other important & positive outcomes

• GBP promote performance contracting and the ESCOs industry.
• Promote the role of the Energy managers as a professional figure.
• Create awareness for important practices such as M&V, energy audit, continuous maintenance, commissioning, “Green” procurements, Life Cycle Costing.
Thank you

For more information look at:


or

contact

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Abstract
This book contains the Proceedings of the JRC Workshop on Scientific Technical Reference System on Renewable Energy & Use Efficiency: "Effective Policies for Improving Energy Efficiency in Buildings", Krakow, Poland, 12-14 September 2007. The overall aim of the workshop was to contribute to the implementation of the new energy efficiency measures and policies in New Member States, Candidate Countries and Neighbouring countries in the building sector and to foster a real market for energy efficiency, with a particular focus on the implementation of Directives and the European Commission Action Plan for Energy Efficiency for achieving a 20% reduction in energy consumption by 2020. To the success of the workshop contributed around 60 participants from 18 European Countries, representing national ministries and local administrations, energy agencies and energy services companies, universities, local energy companies, International, European and national financing groups and banks, commercial companies and industry associations. The presentations from these Proceedings covered instruments and solutions for financing energy efficiency, multilateral and local banks experience, the use of the carbon market and particular flexible mechanisms, National energy efficiency Action Plans, ESCO projects, status of electricity consumption in enlarged EU, European Commission initiatives (GreenLight, GreenBuilding and Motor Challenge programmes).
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