

TAIEX INFRA 24683

*Opportunities for Climate Change mitigation  
arising from refurbishing multiple-family  
housing*

*Workshop on energy efficiency standards for buildings  
hosted by the Ukrainian National Agency for Energy and  
Resources*

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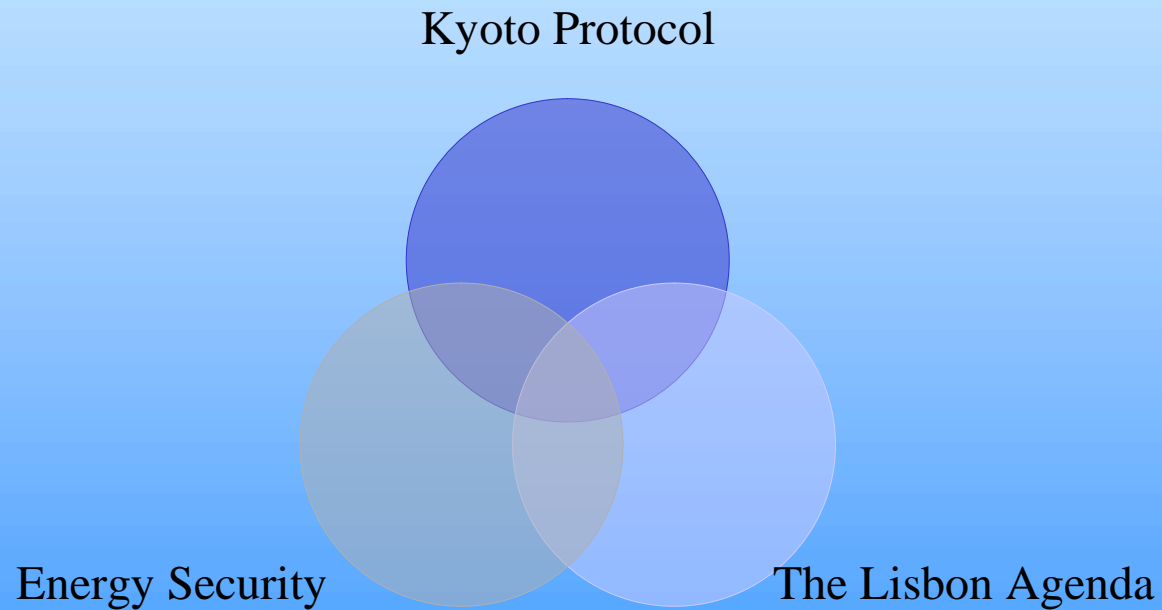
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# This Presentation

- *Why the increased attention on Energy Efficiency?*
- *The European Policy response*
- *An increased focus on buildings*
- *Challenges & opportunities*
- *Modelling GHG emission reductions from certain refurbishments*
- *Conclusions*

# Why the increased attention on Energy Efficiency?



# Why the increased attention on Energy Efficiency?

<b>Kyoto Protocol</b>	<b>Energy Security</b>	<b>Lisbon Agenda</b>
EU won't meet it	Lack of balance	Competitive landscape
Buildings energy efficiency can meet the objective	Reduce exposure to supply issues	Energy efficiency = economic efficiency

# European Policy Response

A range of interventions & breakthroughs around the energy efficiency agenda – with the EPBD leading the way

## EU Action Plan

- To achieve 20% primary energy savings by 2020
- 6 year action plan for the EC
- 10 priority areas
- Transform the internal energy market to provide EU citizens with globally the most efficient infrastructure, buildings, appliances, processes, transport & energy systems

## ESD National Action Plans

- Member states (MS) to prepare & implement national energy efficiency action plans
- Reduce energy consumption by at least 1% per year or by 9% over period to 2016
- Range of sectors – incl. buildings
- Additional outcomes to cancel out market failures & stimulate energy efficiency

# European Policy Response

- EC will review MS progress report triennially from 2007 and publicise progress
- MSs can access support from DGTREN and via Energy Efficiency Watch ([www.energy-efficiency-watch.org](http://www.energy-efficiency-watch.org)) – a networking platform for parliamentarians, national administrations and others
- EuroAce has provided (to DGTREN), for dissemination to MSs, a template for keeping track on buildings related measures that comply with the ESD ([www.euroace.org](http://www.euroace.org))

# Increased focus on buildings

- Buildings in residential, public and commercial sectors represent a very large target for energy efficiency measures
- The IEA estimates that 40% of all final energy savings (under the ESD) will need to come from buildings
- No ‘silver bullet’/single best measure, but MSs should prioritise buildings – because of the EPBD and because of cost effective savings potential (27-30% against Business As Usual) by 2020

# Increased focus on buildings

Energy savings in building sectors require a successful strategy that includes the following

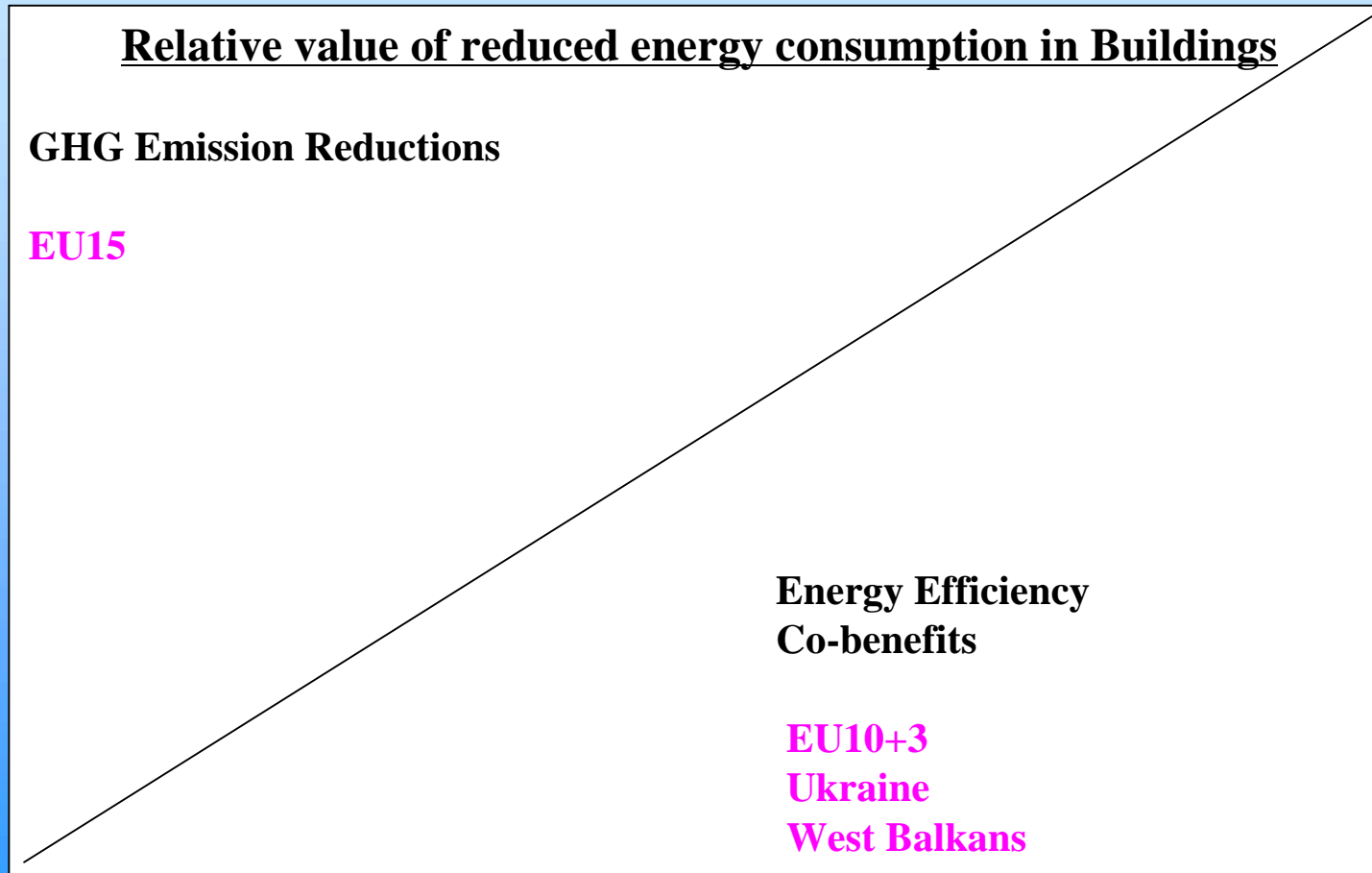
Typical Approaches	Example - areas of potential improvements
Residential & Tertiary sector energy efficiency measures	Heating, Cooling, Insulation, Ventilation, Hot water, Lighting, Appliances, general Building fabric
Cross – sectoral measures	Building standards & norms; energy labelling schemes; metering & informative billing; training & education
Horizontal measures	Regulation, taxes, incentives, focused information campaigns

# Increased focus on buildings

Indicator	EPBD	Extended >200sqm	Extended All buildings
CO2 emissions [mt/a] - reduction	15-18	25 - 31	55 - 62
Profit in 2010 [mill. Euro/a]	154	210	371

Applies to EU8 only (excludes Cyprus, Malta, Bulgaria, Romania & Turkey)  
 Employment growth: Extra 230,000 Jobs  
 Profit data based on 2002 prices – so the potential is considerable  
 RMI: Implementing electricity savings alone = < 2 euro cents/kWh; *any* supply-side measure will cost > 5 euro cents/kWh+;  
 Ecofys data: EU8: Energy savings potential in high-rise = up to 70% with annualized investment of 2 euro/sqm & simple payback of 8-11 years (EuroAce – Structural Funds for Buildings, April06)

# Increased focus on buildings



# The size of the challenge [Billion Euros]

Country	EPBD	Extended > 200 sqm	Extended All Buildings
CEEC4 <small>CZ; SK; HU; SL</small>	19	33	70
Poland	26	46	93
Baltic States	4	8	18
<b>TOTAL</b>	<b>49</b>	<b>87</b>	<b>181</b>
<ul style="list-style-type: none"><li>•High-Rise refurbishment alone is 25 bn Euro</li><li>•Doesn't yet include Romania &amp; Bulgaria</li></ul>			

# Overcoming Barriers

- EPBD will make a difference – but not enough; only likely to deliver 9% of technical potential
- Variable implementation across member states
- Evolution for EU15;  
*Revolution* for EU10 + 3
- **Modelling Denmark?**
- Political will
- Resources
- Integrated responsibility
- High-profile
- Strong energy efficiency lobby
- Good data
- Incentives

# Some Challenges

- Situation is especially acute in central and eastern Europe & for high-rise multiple family dwellings
- Based on experience of Czech Republic, Slovakia and Poland – all of which have years of experience in financially supporting refurbishment, *it would take 40 years to fulfil refurbishment requirements with the current levels of funding*

# Some Challenges

- Key hurdle is funding small-scale (refurbishment) projects (<10 million Euro) – where transaction costs are high & relative value is low
- Not always easy to evaluate the costs & benefits of energy efficiency measures in existing building stock
- Energy tariffs below cost recovery and absence of responsive financing agencies holds back investments
- Look to insert energy efficiency requirements in existing subsidy schemes (social housing; energy tariffs)

# Some Challenges

- For 2007-13, Structural Funds are available for refurbishment of multi-family dwellings & public buildings
- Will prioritize integrated urban development – policy led programmes to address physical deterioration and social exclusion
- Seeks to keep energy efficiency on agenda for next 30-50 years
- Safeguards against speculative gains from improved real estate prices (following refurbishment)

# Structural Funds allocations 2007-2013

<b>Factor</b>	<b>Convergence</b>	<b>Regional Competitiveness</b>	<b>Territorial cooperation</b>
% share	82	16	2
Value [bn Euro] EU10 +	126.28	24.64	3.08
Total = 308 bn: - 154 bn Euros for EU10+; Split between Education, SME capacity, getting people to work, efficient, secure & sustainable energy			

# Opportunities & Benefits

Selected Policy packages for Residential Building Sector			
Residential Buildings	New Buildings	Existing Buildings	Source: Better buildings through energy efficiency: A roadmap for Europe (EURIMA 2007)
Owner-occupied			
Private Rental			
Social Rental			
Preferential Loans for high energy performance; energy audits & organisational support	Mandatory performance evaluation with regulatory benefits for above standard performance	Energy upgrading requirements with energy audits & organisational support	Tax credits for installing energy saving products (landlords) with energy audits & organisational support

# Opportunities & Benefits

Technical/Financial	Environmental	Employment	Comfort/Wellbeing
<p>Distribution network investment deferral</p> <p>Generation capacity investment deferral</p> <p>Increased system reliability</p> <p>Resource conservation and reduced fuel requirements</p> <p>Reduced price variability</p>	<p>CO2 reduction – esp. by reducing baseload (often the most polluting form of fossil fuel generation)</p> <p>Air quality improvements</p>	<p>The result of each million euros of total expenditure (both government and private) invested is 8 – 14 additional person years of employment</p> <p>Majority of job creation in the residential sector is manual labour</p>	<p>Housing quality is linked to residents' physical and mental health &amp; wellbeing</p> <p>WHO survey of housing and health in panel block buildings shows that bad air quality (associated with poor ventilation and temperature controls) is linked with a range of health problems</p>
<p>Source: High-Rise: Changing the View; EuroAce</p>			

# Modelling GHG emission reductions

- Caleb completed an assessment of thermal insulation potentials arising from refurbishment activities in Central & eastern Europe (2006)
- A private sector commission that also resulted in a heat loss model for the Region
- From this model, we can calculate CO<sub>2</sub> emission reductions from refurbishment interventions in a variety of building types, including high-rise multiple-family buildings
- Able to map a number of variables, such as building types, dimensions, fittings, roof types, air changes, thermal conductivity and from this generate heat loss and emissions data

# Modelling GHG emission reductions

- The model allows us to evaluate the emission reduction potential of applying spray-foam insulation to roofs, cellars and cellar ceilings
- Advantages of spray-foam application is that it causes minimal disturbance to occupiers, while offering cost-effective improvements to the building's fabric

# Modelling GHG emission reductions

## Example outputs from model assuming 75% market penetration & 15 year spray-foam application cycle

Country	CO2 emissions 1998 in 000 tonnes (Earthrends/WRI)	CO2 emissions saved in 000t*	% of national emissions 1998
Poland	321,724	1,108	0.34
Slovakia	38,065	114	0.30
Hungary	58,653	130	0.22
Czech Republic	118,322	217	0.18

GHG emission savings from a single measure that improves average energy performance of high-rise multi-family building by 6%

\* Annual savings at completion of Programme

# Conclusions

- *(to follow)*

# Thank You!

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