Buildings-related research at the Center for Climate Change and Sustainable Energy Policy

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

Felix Bubenheimer

Alan Watt

Veronika Czakó

Sergio Tirado Herrero

Center for Climate Change and Sustainable Energy Policy: mission

3CSEP is:

- ***an interdisciplinary research and educational center at Central European University (CEU) whose mission is***
  - ***to foster solutions to climate change mitigation and sustainable energy challenges***
  - ***while advancing the implementation of development agendas.***
- ***3CSEP also provides a platform for academic, outreach and educational activities at CEU in these fields.***

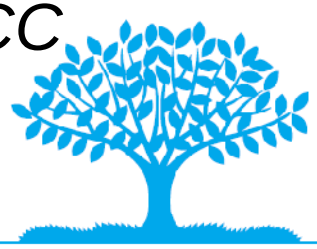
3CSEP

International involvement of 3CSEP

- contributing to the governance of international decision-making processes related to climate change and sustainable energy, including:
  - ***Intergovernmental Panel on Climate Change (IPCC):*** *Diana Ürge-Vorsatz coordinating lead author, Aleksandra Novikova lead author of Fourth Assessment Report*
  - ***Global Energy Assessment (GEA):*** *Diana Ürge-Vorsatz convening lead analyst on energy efficiency in buildings*
  - ***United Nations Scientific Expert Group on Climate Change (UN SEG)***
  - ***Sustainable Building and Construction Initiative (SBCI) of UNEP (United Nations Environment Programme)***
  - ***European Union:*** *EU-financed research projects etc.*
  - ***Further international board and advisory roles of Diana Ürge-Vorsatz***

Current research on buildings

- **Scenarios for the Global Energy Assessment:**
  Modelling of energy-efficient building scenarios until 2050 for different world regions for GEA, funded by UNEP SBCI
- **Changing Behaviour:**
  Applied social research to support change in use of energy services and energy consumption behaviour, EU project
- **Employment impacts of energy-efficient retrofits:**
  Estimating the potential net employment impacts of a large-scale building energy retrofit programme in Hungary, funded by European Climate Foundation
- ***Other research activities:***
  Costs and mitigation potential of renewables (IPCC Special Report), Energy efficiency governance (IEA), etc.



Recently completed key projects

- **Assessment of policy instruments for reducing GHG emissions from buildings:**
  policy analysis and development of a software tool for policy makers on behalf of UNEP SBCI
- **Green Investment Schemes:** maximising their benefits for climate and society, funded by Climate Strategies
- **CO_2 Mitigation Potential in Hungary:** assessments on residential and tertiary sector mitigation options and their cost-effectiveness on behalf of Hungarian government
- **Several EU-funded "Intelligent Energy – Europe" projects, together with European partners, including:**
  - ***Enerlin –*** *European efficient residential lighting initiative*
  - ***Remodece –*** *residential electricity monitoring*
  - ***EI-Tertiary*** *– more efficient electricity use in public and commercial buildings*

More details and publications on our website:

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

http://3csep.ceu.hu

Energy efficiency support programs in the residential buildings sector: the Hungarian experience

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

Veronika Czakó

PhD Candidate

16th April 2010

Build Green Central and Eastern Europe

Structure of presentation

- Residential buildings sector in HU
- EE refurbishment support programs
- Panel Program
- GIS
- Complex measures
- The way forward and key messages

3CSEP

Residential buildings sector - Hungary

Ownership structure:

- Flats typically occupied by owners
- Some private flats rented
- Social housing provided by LAs

Building types:

o “Panel buildings” - one-fifth of building stock built with industrial technology during the 60s-80s

o Multi-family brick buildings - conventional technology

o Single-family houses - conventional technology

Residential EE support programs in HU

- **Panel Program** – for whole panel buildings, since 2001, state program, largest budget

  (2001-2008 HUF 40bn = EUR 152mn)
- **Climate Friendly Home Program** - from 2009, continuation of Panel + other elements, financed by **GIS**

  (HUF 28.2bn = EUR 107mn)
- **NEP** – National EE Program for flats
- **Eco-program** – heating system modernization
- Local support programs led by local authorities

Residential EE support programs in HU

Loan schemes running parallel to support programs:

- Panel Plus
- Successful Hungary
- LTP – Home Savings Scheme - savings and preferential loan scheme, for general refurbishment, but favorable effects for EE

Why focus on panel buildings?

Typically connected to DH, BUT:

- No individual metering for heating energy use
- No adjustable meters on the flat level
- No influence over when DH is turned on
- DH significantly more expensive than other forms of heating
- Paying year round
- General bad condition of buildings
- Social and fuel poverty implications

Residential EE support programs – Panel Program

- Whole building based
- 30% by state, 30% optionally by LA, rest paid by flat owner
- Flat owner communities – consent of 90% needed
- Main aim: to reduce energy costs
- But: no incentive included for complex measures or CO_2 emission reductions
- High and increasing transaction costs
- Uncertainty

Green Investment Scheme - GIS

- Program based mechanism
- GIS = sale of AAUs
- GIS ensures carbon revenues result in emission reductions
- Financing source for Climate Friendly Home Program (continuation and expansion of previous programs)

<u>Climate Friendly Home Program</u>:

- Requirement for CO_2 reductions included
- Additional rewards for complex refurbishments leading to CO_2 reductions

Potentially significant improvements compared to Panel Program in terms of environmental and social effects.

3CSEP

Importance of complex measures for improved EE

- Old program - more condominiums choosing single measures or simple packages
- BUT: some single measures can lead to increase in energy use
- Lock-in effect
- Complex measures more effective, but also more expensive
- New programs under GIS – requirements and incentives for complex measures

The way forward

- Expansion of funding needed for conventional buildings and individual flat owners
- Consistency in institutional structure
- Larger role needed for LAs – DH modernization, and running EE programs
- LA ownership in local energy infrastructure
- Importance of expertise and personal commitment of LA politicians and officers
- Dealing with poor communities – availability of interest free loans, grants

Key messages

- Large cost-effective EE potential in economies in transition
- Earlier EE support programs – space for improvement
- GIS key opportunity –
  - environmental integrity: ensures GHG emission and energy cost reductions
  - improved institutional structure
- Larger role for local authorities

Thank you for your attention!

Questions?

czako_veronika”at”ceu-budapest.edu

3CSEP

Perspectives on the Staccato Project

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

Alan Watt

April 16th 2010

Overview of Staccato's Objectives

- An EU FP6 project aiming to *demonstrate* sustainable energy retrofit of residential apartment blocks in 3 sites (Budapest, Sofia and Amsterdam), with certain specifications:
  - Post-war, panel type blocks
  - Large scale (100s of apartments in each block)
  - Renewable energy components as well as improved insulation
  - Ambitious energy saving targets: 50% higher savings than standard retrofits, higher than for new-build blocks

Progress to Date

- Project runs from late 2007 – early 2012
- Retrofit completed at the Budapest (Obuda) site July-December 2009
- Amsterdam site work started 2008 but seriously delayed
- Sofia site still largely at planning stage

Major Challenges

- Financing: Complex scheme with EU, national government, residents, local authorities all contributing. Delay in Obuda waiting for all financing elements to be agreed
- Residents' agreement/co-operation:
  - Bulgarian law requires near-unanimous resident agreement – has led to a shift to smaller apartment blocks than project envisaged
  - Amsterdam residents complained about contractors' behaviour, some have taken legal action
- Technical: asbestos found at Amsterdam site

CEU's role: socio-economic research

- 3 research sub-components: social, financing, policy
- Financing and policy research in second half of project, first reports due end of 2010
- Social research primarily focuses on resident surveys, assessing their attitudes and expectations (before) and satisfaction (after) the retrofit at each site
- To date, only Obuda pre-retrofit survey has been completed and analysed (summer-autumn 2009)

Obuda survey: main findings (1)

- 295 completed questionnaires returned (c. 1/3 of all households at the site)
- 70% of surveyed residents dissatisfied with pre-retrofit energy costs
- Significant (80%) dissatisfaction with comfort in summer; far less (<25%) dissatisfaction with comfort in winter
- 80% considered it “very important” to save money on energy bills, and self-reported income and energy costs indicated majority in fuel poverty

Obuda survey: main findings (2)

- >60% thought the retrofit project would be *very* useful, only 1% thought it would not be useful
- 90% expected reductions in heating and hot water charges after the retrofit, with 15-20% expecting significant reductions; over 80% also believed the value of their apartment would rise
- About 60% of residents would (or already did) carry out energy efficiency renovation of their apartments individually; 40% would not have done it except as part of this block-wide project

Thank you for your attention!

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

FUEL POVERTY IN HUNGARY

Some insights form the domestic energy efficiency perspective

BUILD GREEN - Central & Eastern Europe.
Budapest. April 16th, 2010.

SERGIO TIRADO HERRERO
PhD candidate / Junior researcher
EnvSci Dept & 3CSEP @ CEU

CENTER FOR CLIMATE CHANGE AND SUSTAINABLE ENERGY POLICY
CENTRAL EUROPEAN UNIVERSITY

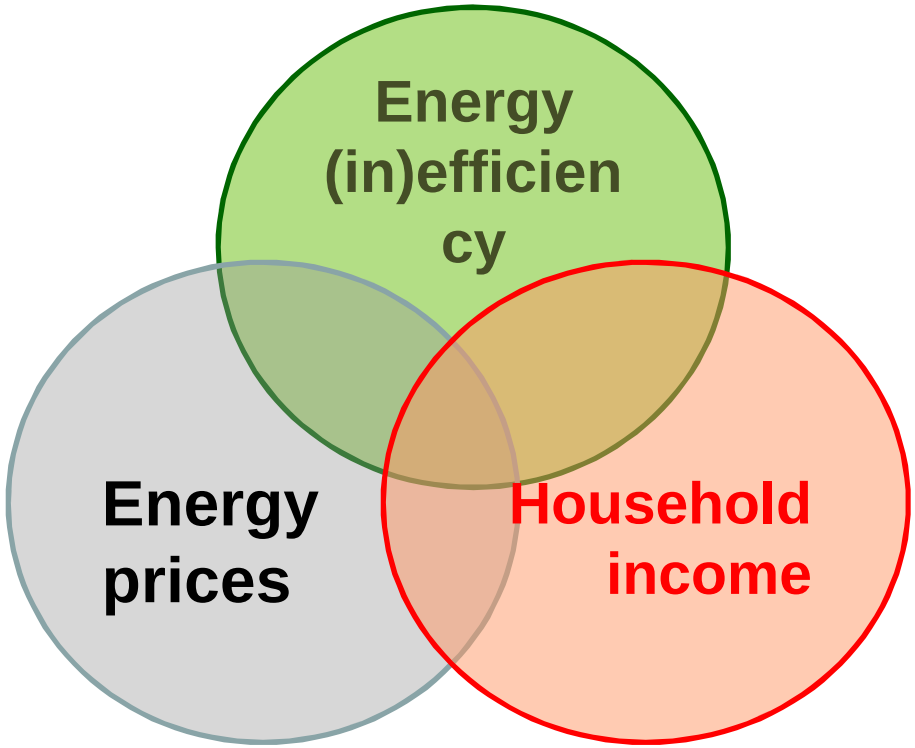
What is fuel (or energy) poverty?

Reference	Definition
Boardman (1991, p. 201, in Morrison and Shortt, 2008)	"Inability to obtain adequate energy services for 10% of a household income"
Healy and Clinch (2002, p. 331), after Lewis (1982)	"Inability to heat the home adequately because of low household income and energy inefficient housing"
Buzar (2007, p. 225)	"A household is considered energy-poor if the amount of warmth in its home does not allow for participating in the 'lifestyles, customs and activities which define membership of society'"
European fuel Poverty and Energy Efficiency (EPEE) project (2009, p.4)	"A household's difficulty, sometimes even inability, to adequately heat its dwelling, at a fair price"

- Inability to **afford enough energy services** for satisfying the **household's basic needs**

3CSEP

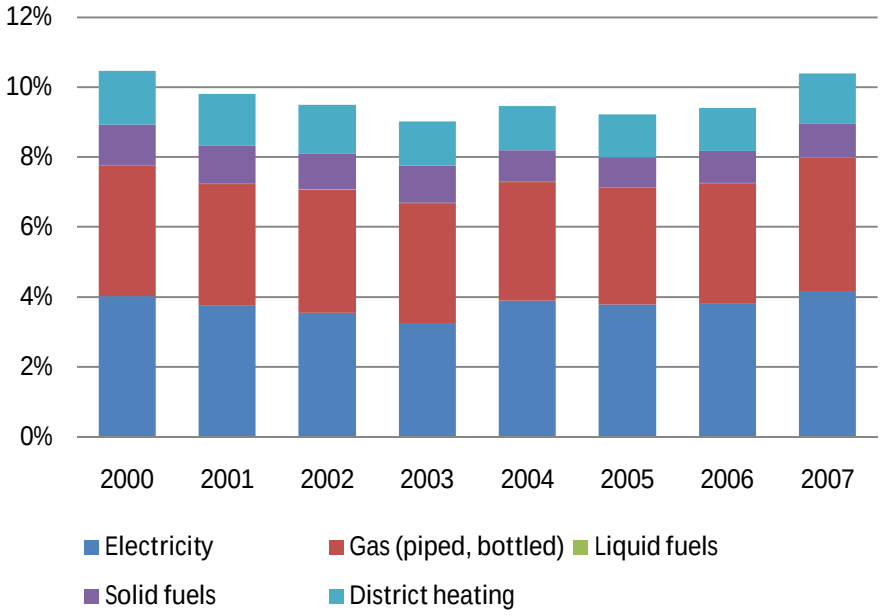
What is fuel poverty made of?



- Fuel poverty is “perhaps the **strongest adverse social impact** resulting from the **inefficient consumption of energy** in the domestic sector”
(Healy and Clinch, 2002, p. 329)

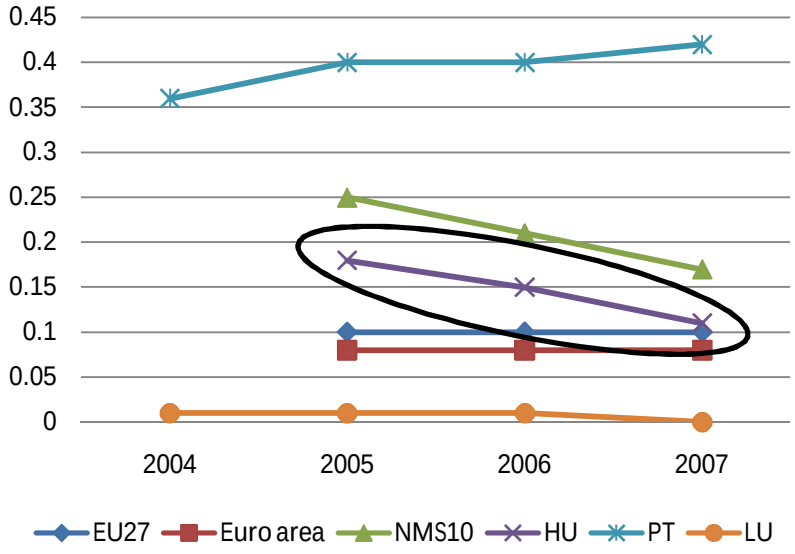
How (bad) is the situation in Hungary?

EXPENDITURE APPROACH



9.7% of **households net income** spent on **energy** (2000-2007)

SELF-REPORTED APPROACH



14.7% of the population declared to be **unable to keep their homes adequately warm** (2005-2007)

- **Excess winter mortality**: **5,600** EWDs per year
  - Possibly 1,400-2,400 EWD fuel-poverty related

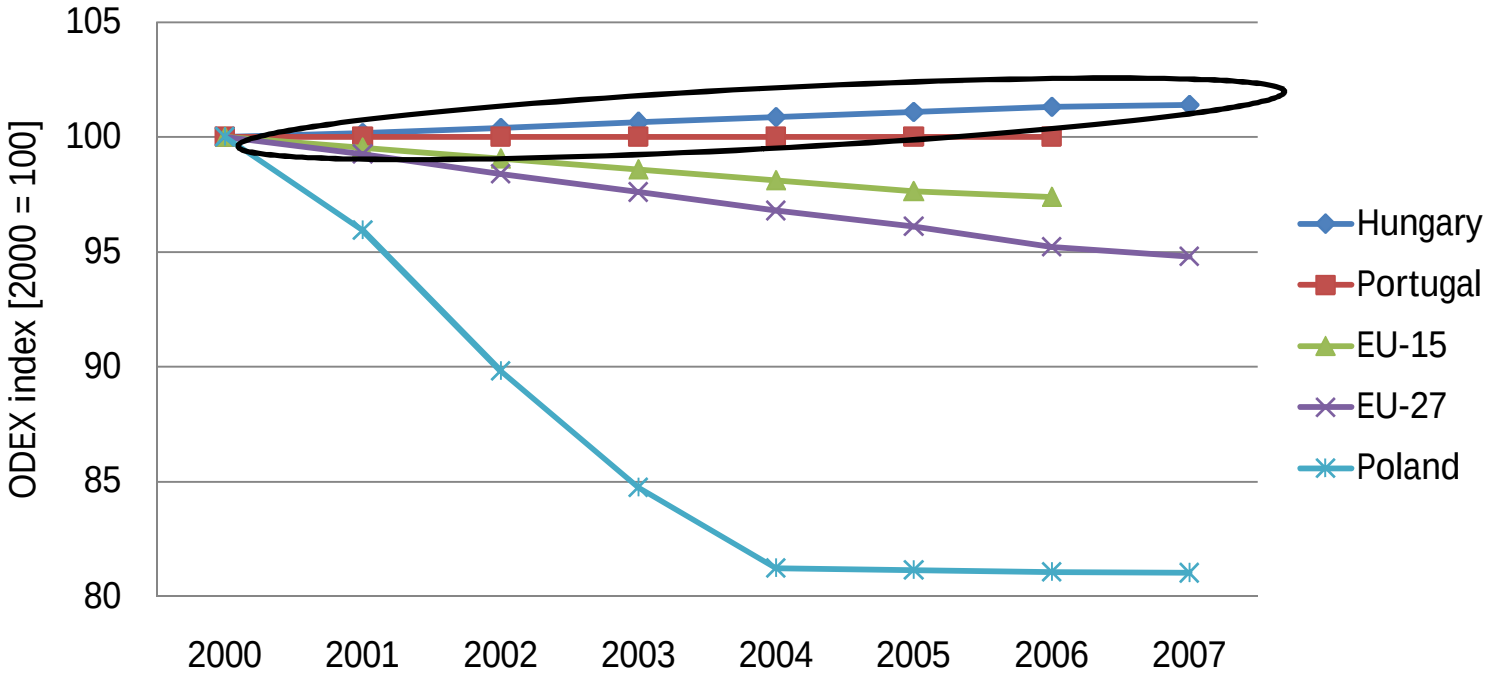
3CSEP

Who are the most affected?

- **Lower income** population
- **Pensioners / Elders**
  - Most **EWDs** are people over 60 years old
  - **Switch off heating** instead of delaying payments
- **Households** connected to **district heating** (DH)
  - Large fixed costs, inability to get disconnected
- **Rural poor**
  - Impact of increased **firewood prices** related to biomass use in renewable power generation
  - **Roma population**: electricity theft and illegal firewood collection

What is the role of the residential stock?

EVOLUTION of the ODEX ENERGY EFFICIENCY INDEX for HOUSEHOLDS (2000 = 100)



Source: ODYSSEE database

3CSEP

What have been the solutions so far?

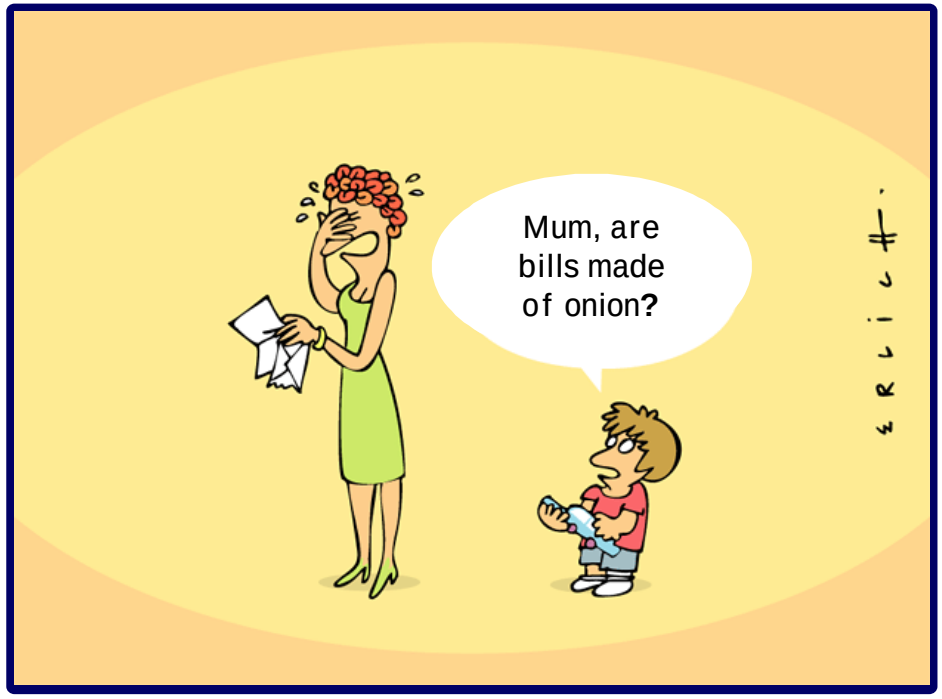
- **Support** to **households** and **consumers**
  - DH and gas price support schemes
  - Poorly targeted,wrong signal to consumers, money saved is not invested in energy efficiency
- **Residential energy efficiency** programmes
  - ***Panel*** and ***Öko*** programmes
  - Sub-optimal retrofitting ***locks in*** the energy savings' potential of the building stock
- **Energy security** enhancing projects
  - 'Nabucco' pipeline / Strategic gas reservoirs
  - Supply-expansion solution, effects on long-term **energy (gas) prices**

Is there a way out?

…the **most sustainable way to eradicate fuel poverty** is to ***fuel-poverty* proof the housing stock**, which means that a dwelling will be **sufficiently energy efficient** that **regardless of who occupies the property** , there is a **low probability** that they will be in **fuel poverty**."

(DTI, 2006, p. 31)

3CSEP



CENTER FOR CLIMATE CHANGE AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

THANK YOU!

Further enquiries:
tirado-herrero_sergio@ceu-budapest.edu
3csep@ceu.hu

3CSEP