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

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Structure of presentation

- Research context – cities and climate change
- EE - buildings
- EE - buildings - EIT
- Residential buildings - HU
- Refurbishment programs
- GIS – connection to carbon markets
- Complex measures
- Barriers and their removal
- Two cities – differing results
- Concluding remarks

Research context

PhD research project:

Climate change action in cities: a comparative case-study of the UK and Hungary

Research aim:

to contribute to the understanding of the relationship between national climate change policy frameworks and local government initiatives to tackle climate change.

Research context

- Unit of analysis: local authorities and their jurisdictions
- Four in-depth case studies:
  - 2 cities in the UK: Woking & Leicester
  - 2 cities in Hungary: Tatabánya & Nyíregyháza
- Case study selection criteria – front-runners:
  - Climate change strategy/action plan
  - Membership in transnational networks of sub-national governments
  - Acknowledgements, awards received
  - Sustainable energy programs, projects

Cities and climate change – "Think globally, act locally"

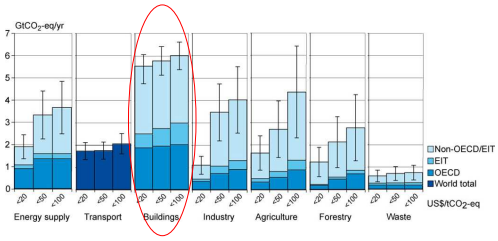
- Housing
- Urban Planning
- Economic development
- Culture
- Education
- Health
- Social services
- Local utility companies – energy, water, public transport, waste
- Environmental protection

Energy efficiency in buildings – why is it important?

- **Decarbonised energy** vs. **improved efficiency** – in the short term & with less ambitious stabilization targets EE plays a more important role
- **Buildings** - **largest low-cost potential** for EE improvement
- Negative cost potentials in the buildings sector **in economies in transition** are **larger** than those in all other sectors combined

Source: Ürge-Vorsatz, D.; Metz, B. Energy Efficiency (2009) 2:87-94

Energy efficiency in buildings – why is it important?



Source: IPCC 2007c, Fig. SPM6

Why economies in transition?

- Decades of subsidized energy prices
- Very poor building stock from the energy perspective
- Large proportion built with industrial technology
- District Heating (DH) widespread, but also in need of modernisation (both company and user side)
- Fuel poverty implications

Barriers and co-benefits

BUT:
barriers

At the same time: existence of
co-benefits

- sometimes identified, but rarely monetized
- arise **beyond** the value of **saved energy** and **reduced GHG** emissions

Barriers

- Limitations in the traditional building design process and fragmented market structure
- Misplaced incentives
- Energy subsidies, non-payment and theft
- Regulatory barriers
- Small project size, transaction costs and perceived risk
- Imperfect information
- Culture, behavior, lifestyle and the rebound effect

Levine *et al*. (2007)

Co-benefits

- Reduction in local/regional air pollution
- Improved health, quality of life and comfort
- Improved productivity
- Employment creation and new business opportunities
- Improved social welfare and poverty alleviation
- Energy security

Levine *et al*. (2007)

Residential buildings sector - Hungary

Residential buildings sector - Hungary

Ownership structure:
- Flats typically occupied by owners
- Some private flats rented
- Social housing exists, but is not widespread

Building types:

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

o Conventional technology (brick buildings) - multi-family

o Conventional technology - single-family houses

Residential buildings sector - Hungary

- Largest final energy consumer
- Source of 30% of total national CO_2 emissions
- Novikova (2008): potential for CO_2 mitigation at **negative cost** in 2025 resulting from cumulative effect of various **existing technologies** - **29% of total residential** emissions

Residential EE Programs in HU - 1

- **Panel Program** – for whole panel buildings, since 2001, state program, largest budget (2001-2008 HUF 40bn)
- **Climate Friendly Home Program** - from 2009, continuation of Panel + other elements, financed by **GIS** (HUF 28.2bn)
- **NEP** – National EE Program for flats
- **Eco-program** – heating system modernization

Residential EE Programs in HU - 2

Loan schemes running parallel to support programs:
- **Panel Plus**
- **Successful Hungary**

Other loan schemes:
- **EHA** – Energy Efficiency Credit Fund: grant from the German state. Preferential loan for EE distributed through K&H Bank
- **LTP** – Home Savings Scheme - savings and preferential loan scheme, for general refurb., but favorable effects for EE. Through Fundamenta and OTP

Residential EE Programs in HU - 3

Individual support programs of local authorities:

- **Tatabánya** – grants, interest-free loans, 1993-2004
- **Nyíregyháza** – support for DH modernisation, from 1997 onwards: NYITÁS (Opening) Program

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
- Local political perspective – winning votes connected to heating costs

Residential EE Programs – Panel Program

- Engaging private flat owners
- 30% by state, 30% optionally by LA, rest paid by flat owner
- Flat owner communities – consent of 90% needed
- No incentive included for complex measures or CO_2 emission reductions
- Panel Plus Loan Program – success, but available money not enough
- High and increasing transaction costs
- Uncertainty

Green Investment Scheme - GIS

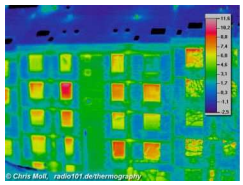
- **Program based** mechanism connected to **carbon markets**
- Financing source for Climate Friendly Home Program (partly the continuation of PP)
- From the sale of "hot air" emissions quotas

Climate Friendly Home Program:

- 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.

Why are complex measures important?



Importance of complex measures for improved EE

Implemented refurbishment measures	Number of buildings	Change in heating energy consumption	
		Minimum	Maximum
Facade heat insulation	8	2%	-14%
Facade and roof heat and water insulation	2	-7%	-10%
Facade heat insulation, stairway windows changed	1	-19%	
Facade heat insulation, flat windows changed	2	-1%	-2%
Facade heat insulation, stairway windows changed, flat windows changed, heating system modernisation	1	-42%	
Facade heat insulation, flat windows changed, heating system modernisation	1	-31%	
Stairway and flat windows changed, roof heat and water insulation	2	-18%	-18%
Flat windows changed, roof heat and water insulation	2	-3%	-4%
Flat windows changed	8	3%	-10%
Heating system modernisation	13	-17%	-46%

Energy efficiency measures and resulting changes in heating energy use (implemented in Tatabánya 2004 – 2008, as part of the Panel Program). Source: Tatabánya Economic Development Organisation

Barriers and possibilities for their removal

Local, contextual barriers

- High proportion of socially disadvantaged → grants, pref. loans
- Lack of expertise, motivation, sufficient human resource within LA → officers, politicians with relevant expertise; involve local NGOs
- Dilapidated DH infrastructure → LA ownership of DH company, and modernization

National level and program design related barriers 1

- Global economic crises, financial difficulties of the state → GIS, but with additionality
- Various programs ran by different entities, institutional uncertainty → rationalization through GIS office
- High demand for support money, overriding supply, especially for the smaller programs → GIS
- Complex measures not popular → incentive through GIS

National level and program design related barriers 2

- Financial difficulties of program participants → up-front payments better, include transaction costs, means tested grants; preferential loans
- Program application requires complex skills → larger role for LAs
- 90% consent required in PP and CFH → lower % with incentive for higher cooperation could help include more condominiums
- Some may lose after refurbishment → use flat rates per square meter

Tatabánya and Nyíregyháza – two cities, two different results in residential EE improvement

Two cities – differing results

	Flats	Panel flats	Applied for PP	thousand HUF/flat	mn HUF from PP 2001-2004	mn HUF from PP 2005	mn HUF from PP 2006	Total mn HUF from PP 2001-2006
Nyíregyháza	44,000	16,000	5,400	274	1,021	391	65	1477
Tatabánya	29,000	18,000	2,500	73	11	78	95	184

Source: Ministry of Local Government, Housing Office

Nyíregyháza – larger city: more flats

Tatabánya – larger proportion and overall more panel flats

In Nyíregyháza many Panel Program applications from early on, overall more then 7X more state support received.

Two cities – differing results

Nyíregyháza – success factors:

- City-wide DH modernization (NYITÁS) preceding Panel Program
- Leadership and expertise within LA
- LA owns DH company
- Awareness raising, information
- LA support for PP
- General good experience with refurbishment programs - citizens willing to participate

Two cities – differing results

Tatabánya – barriers abound:

- EE programs by LA, but small scale and discontinued
- DH company only recently getting in majority LA ownership
- Need for widespread DH modernization
- LA support for PP
- But: PP did not have a strong base to start from

Concluding remarks 1

- Including **poor communities** – availability of interest free loans, grants
- Larger role needed for **LAs** – DH modernization, running EE programs, support applications
- Ownership of local DH company
- Importance of **expertise** and **personal commitment** of LA politicians and officers

Concluding remarks 2

- Importance of **complex measures** – but pay attention to details to avoid resentment – use flat-rates per square meter
- More funding needed also for **conventional buildings** and **individual flat owners**
- Consistency in **institutional structure**
- **GIS is key opportunity**

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Thank you for your attention!

Questions?

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