Investing in energy efficiency in buildings with district heating

Cohesion Policy – Investing in energy efficiency in buildings
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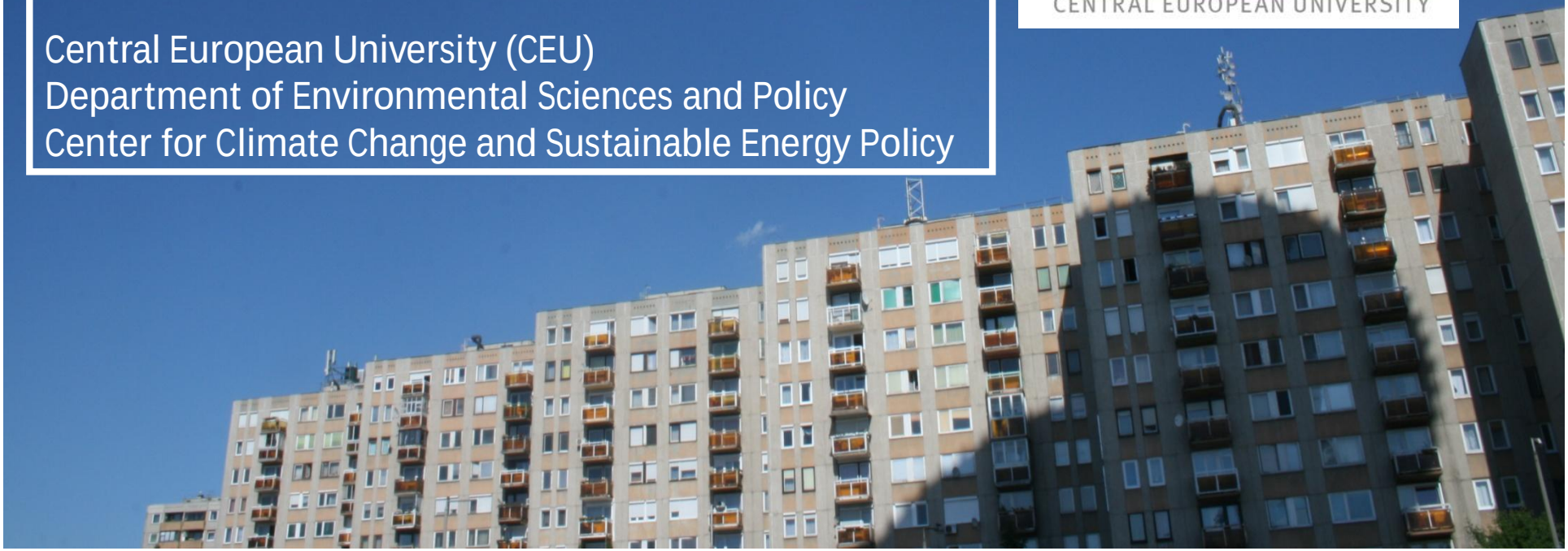
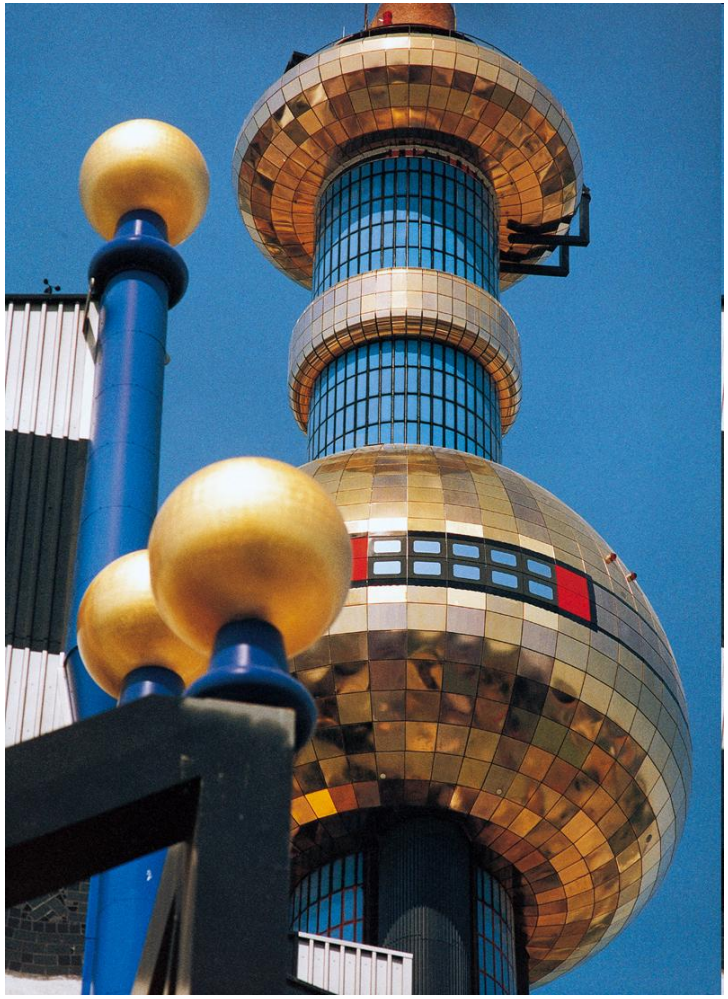


Diverging perspectives in an evolving EU

A CLEAN, EFFICIENT, CHEAP TECHNOLOGY



- Up-to-date heat production plants and distribution systems
- Cogeneration and renewables (e.g., biomass)
- Lower costs per kWh
- Lower GHG emissions
- Low-carbon solution promoted in Member States with potential (e.g., UK)

Spittelauer DH plant (Vienna) / Source: www.hundertwasser.at

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Diverging perspectives in an evolving EU

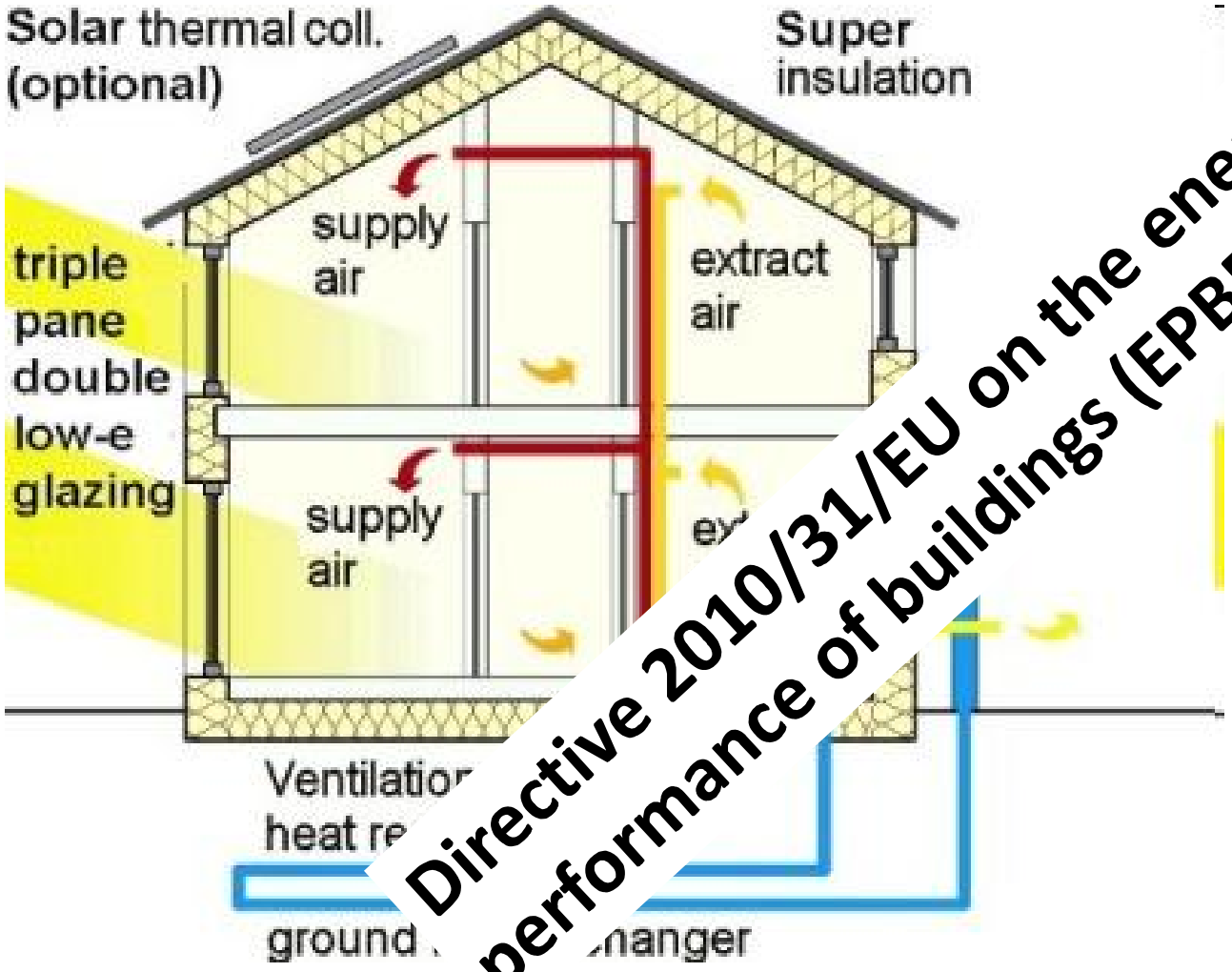
AN UNDESIRED LEGACY

- Less cogeneration, sometimes heat-only plants based on polluting fuels (e.g., coal, Poland)
- Obsolete distribution systems inefficient and building stock
- Inadequate metering
- Inflexible flat rates
- Cost burden

Coal heating plan in Wieluń (Poland) / Source: Wikipedia

Diverging perspectives in an evolving EU

AN INDUSTRY WITH AN UNCERTAIN FUTURE?



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The paper

- Aim
  - Explore key issues for successful investments
  - Raise questions about the future of the DH sector
- Scope
  - Focus on residential buildings in Central and Eastern Europe (CEE); discussion relevant to other contexts
- Research questions
  - What cost burden imposes on consumers?
  - How deep to retrofit?
  - Reasons for public sector involvement?
  - Are technical solutions enough?
  - What is the future of DH in a low-energy buildings' EU?

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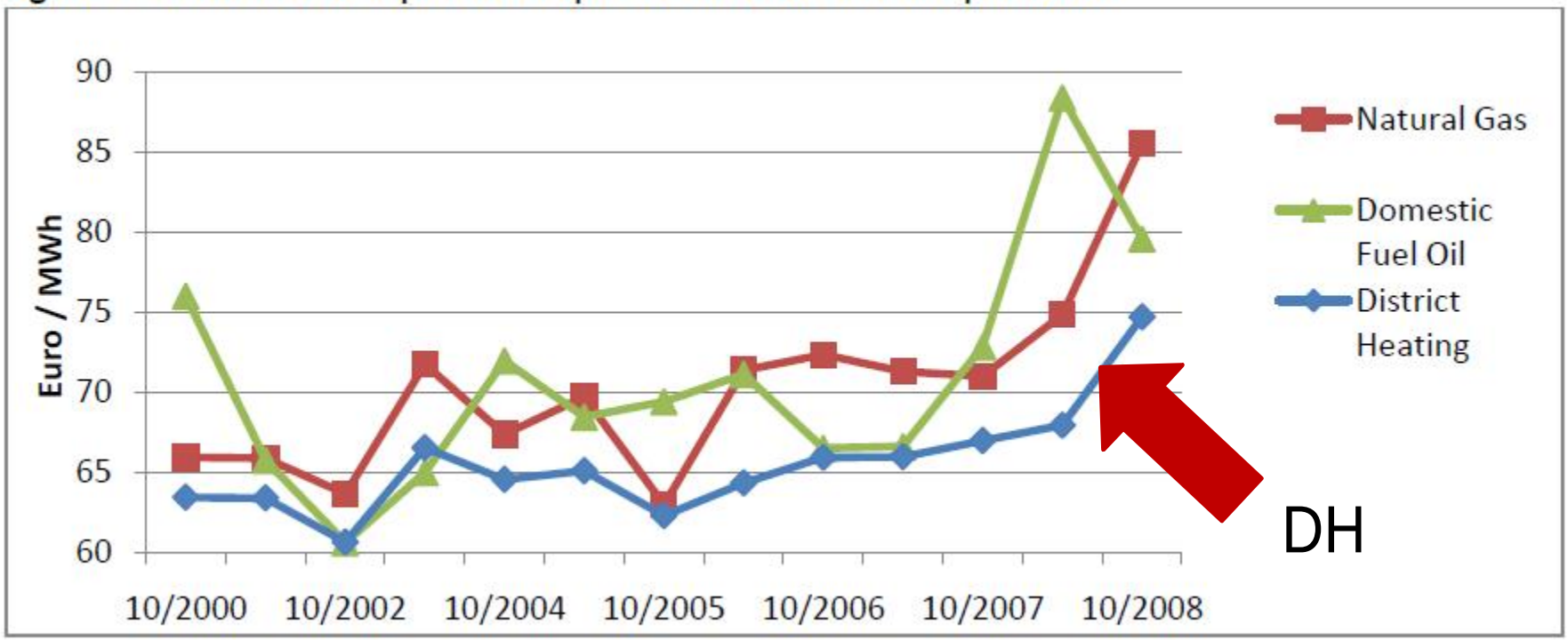
A cost burden on consumers

Per unit price of DH vs. other heat sources in Western Europe

GERMANY

Figure 3: German development of specific full costs in Euro per MWh[1]



Source: Euroheat and Power (2011)

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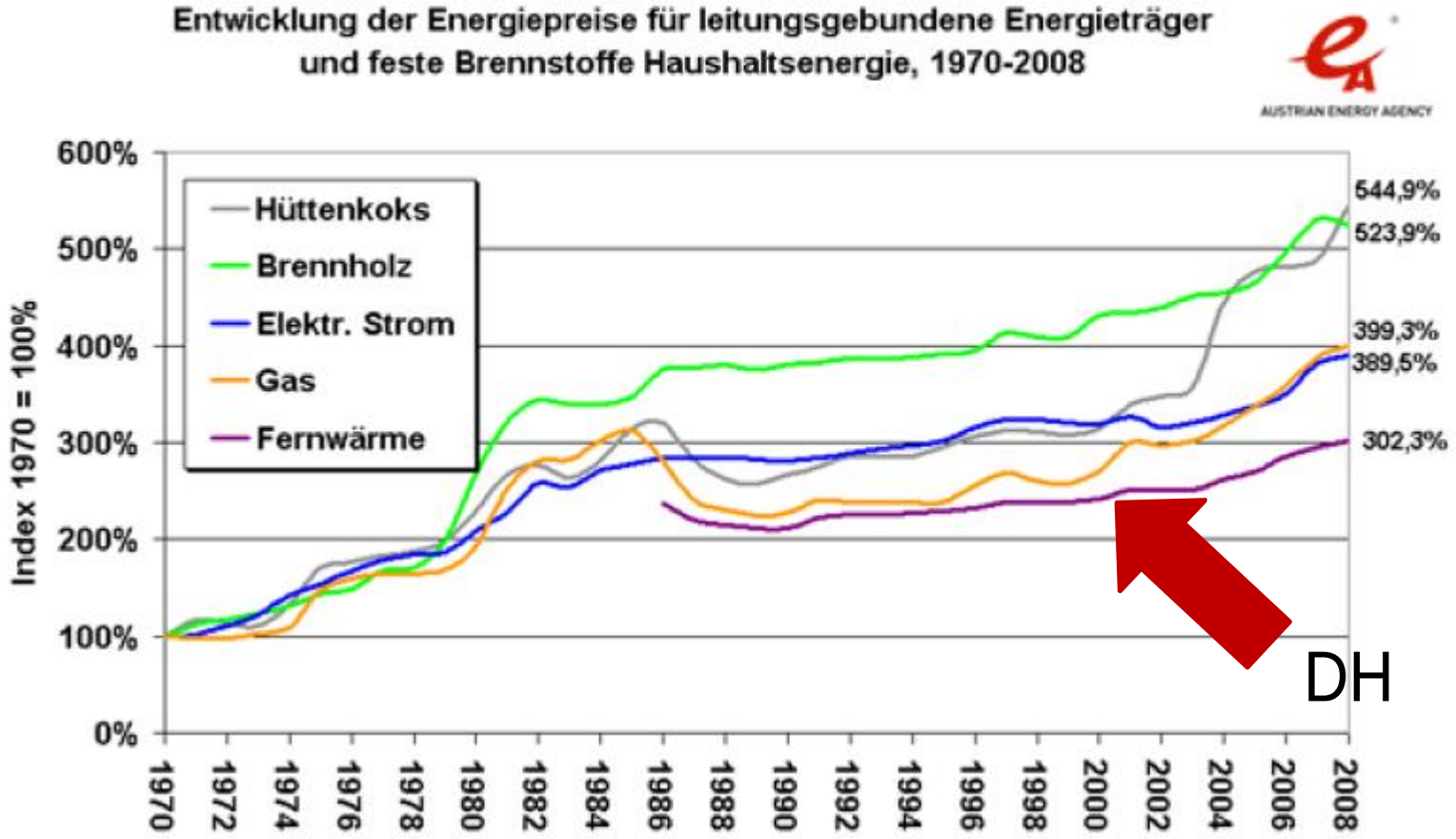
A cost burden on consumers

Per unit price of DH vs. other heat sources in Western Europe

AUSTRIA

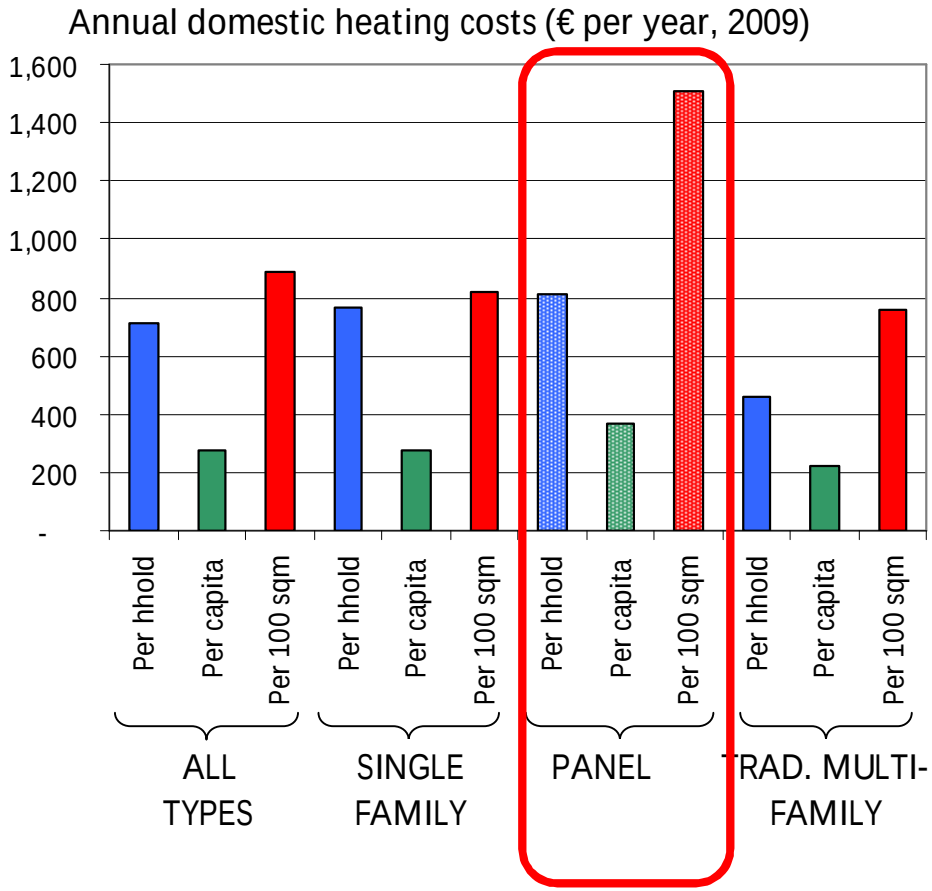
Figure 4: Energy Price Index Austria[2]

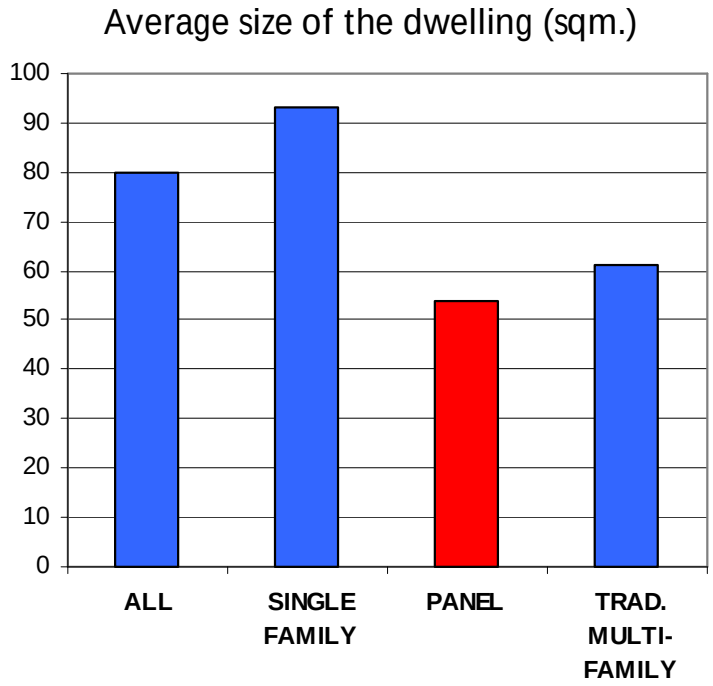


Source: Euroheat and Power (2011)

A cost burden on consumers

Actual DH costs in Central and Eastern Europe





HUNGARY

Source: Household Energy Use survey (2009) – KSH and Energy Centre

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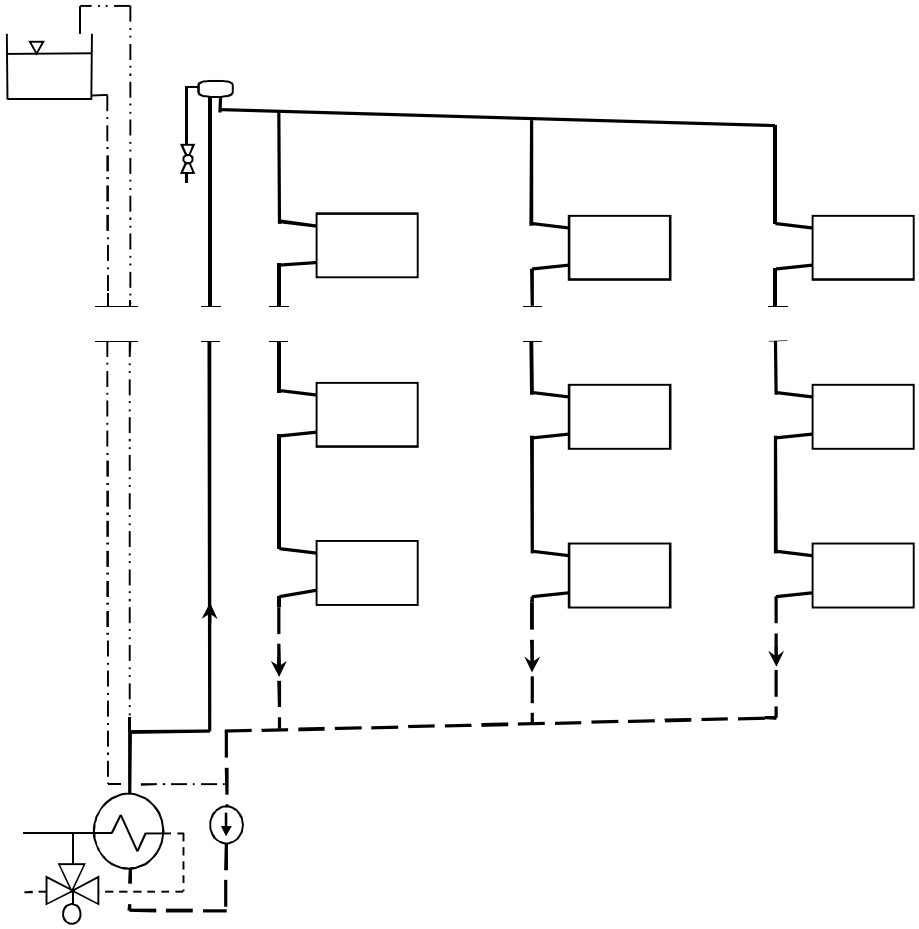
The inherited legacy

VERTICAL LOOP – ONE PIPE SYSTEM



Source: Sigmond (2009)

- Lack of individual metering nor temperature control
- Inability to disconnect individual apartments
- No fuel poverty-related health impacts, i.e., excess winter mortality and morbidity

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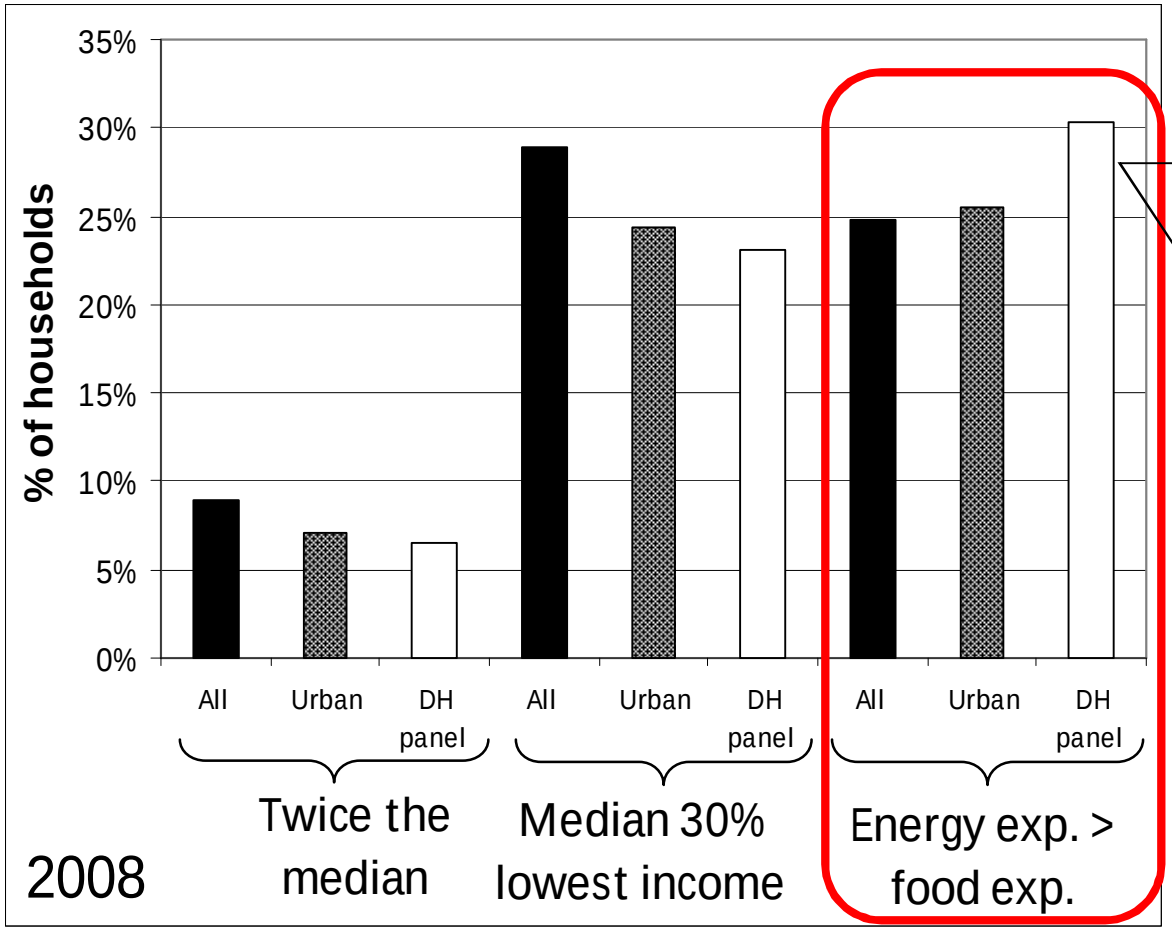
A *hidden* fuel poverty type

Effects on welfare

Decreased consumption of other domestic goods and services



30% of the Hungarian households living in panel buildings spend more on energy than on food and non-alc. beverages

Source: Tirado Herrero and Urge-Vosatz (2011)

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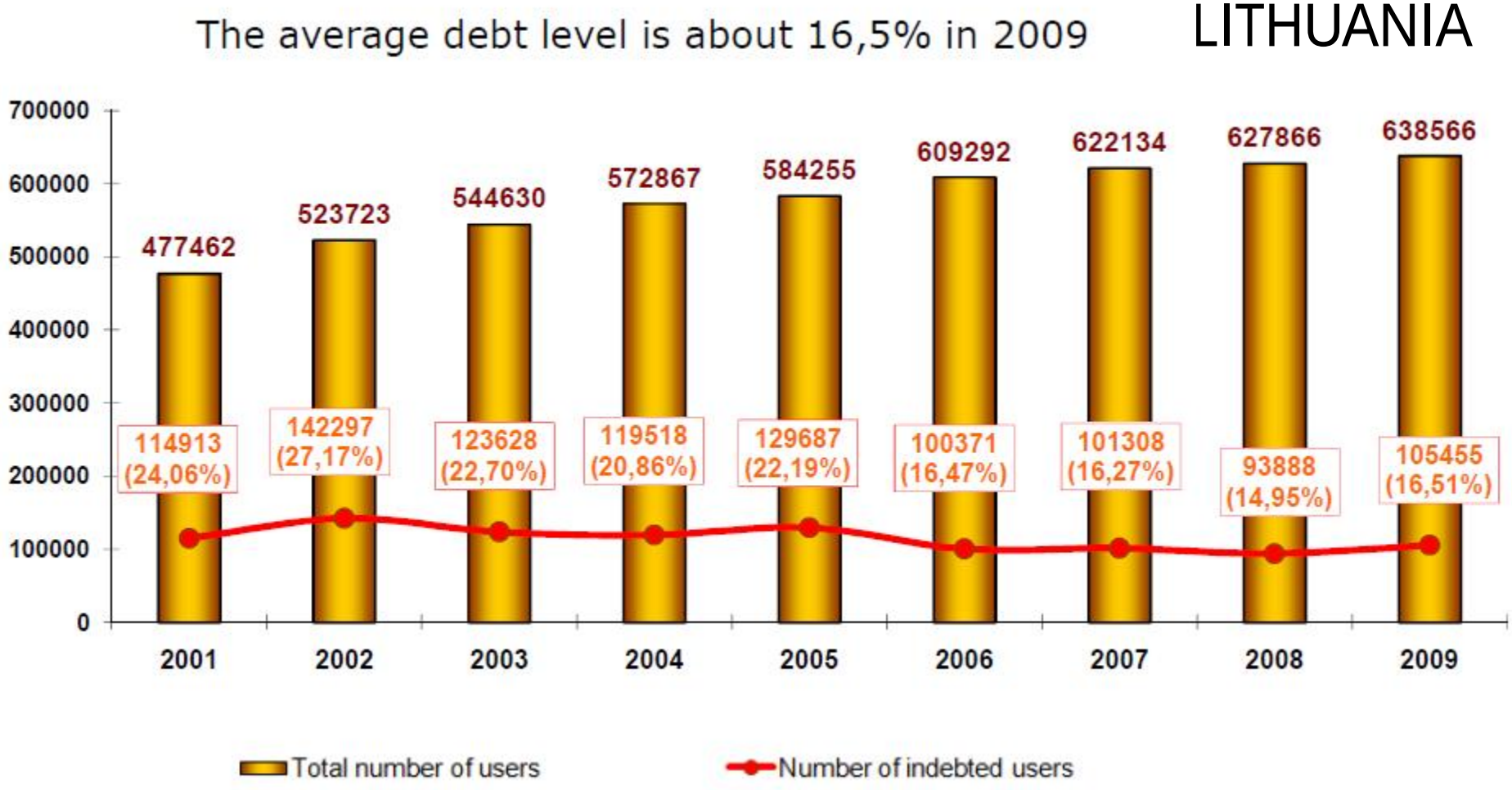
A *hidden* fuel poverty type



condition for IMF lending

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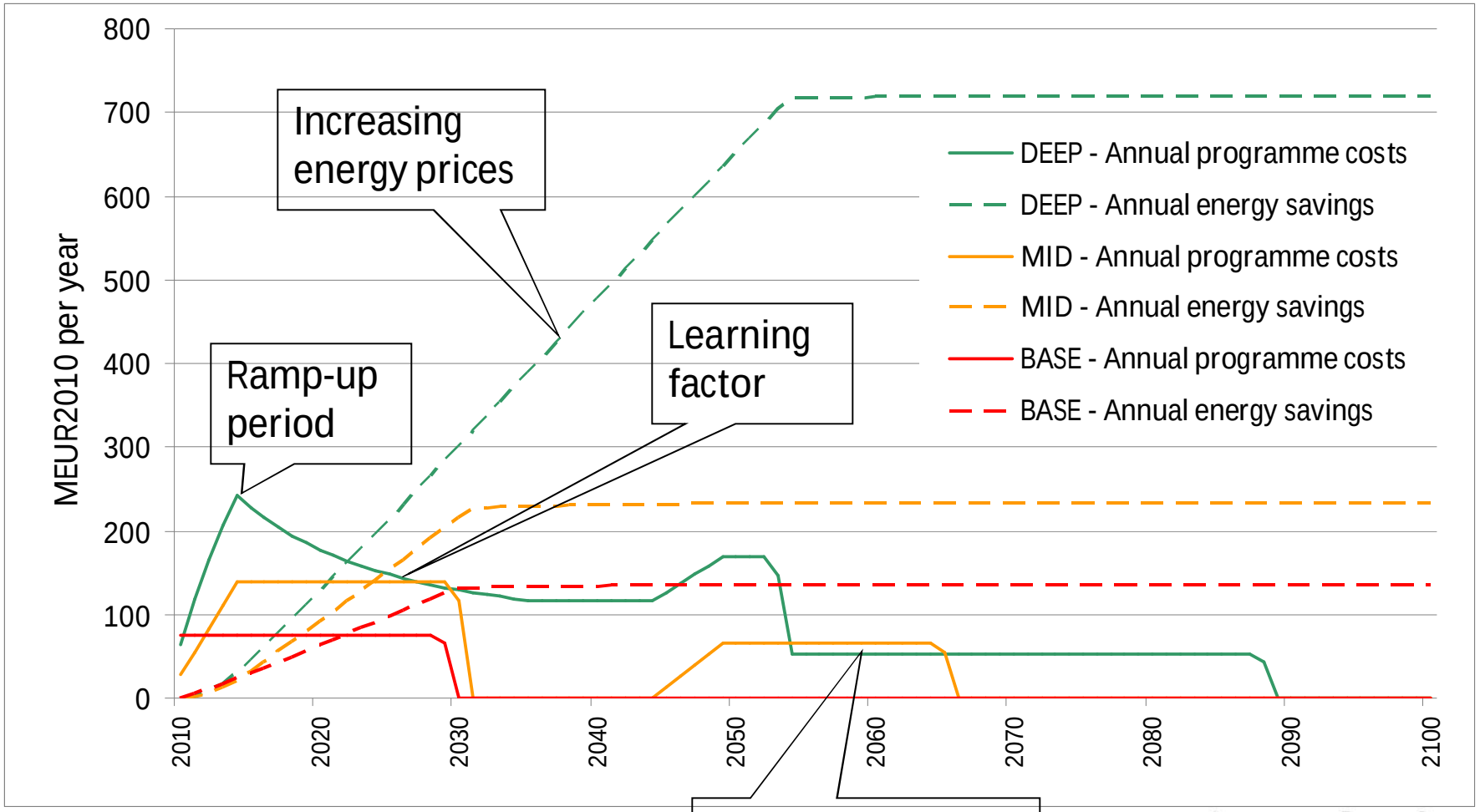
How deep to go?

Deep and mid retrofits of prefab panel buildings in Hungary



Private costs vs. benefits

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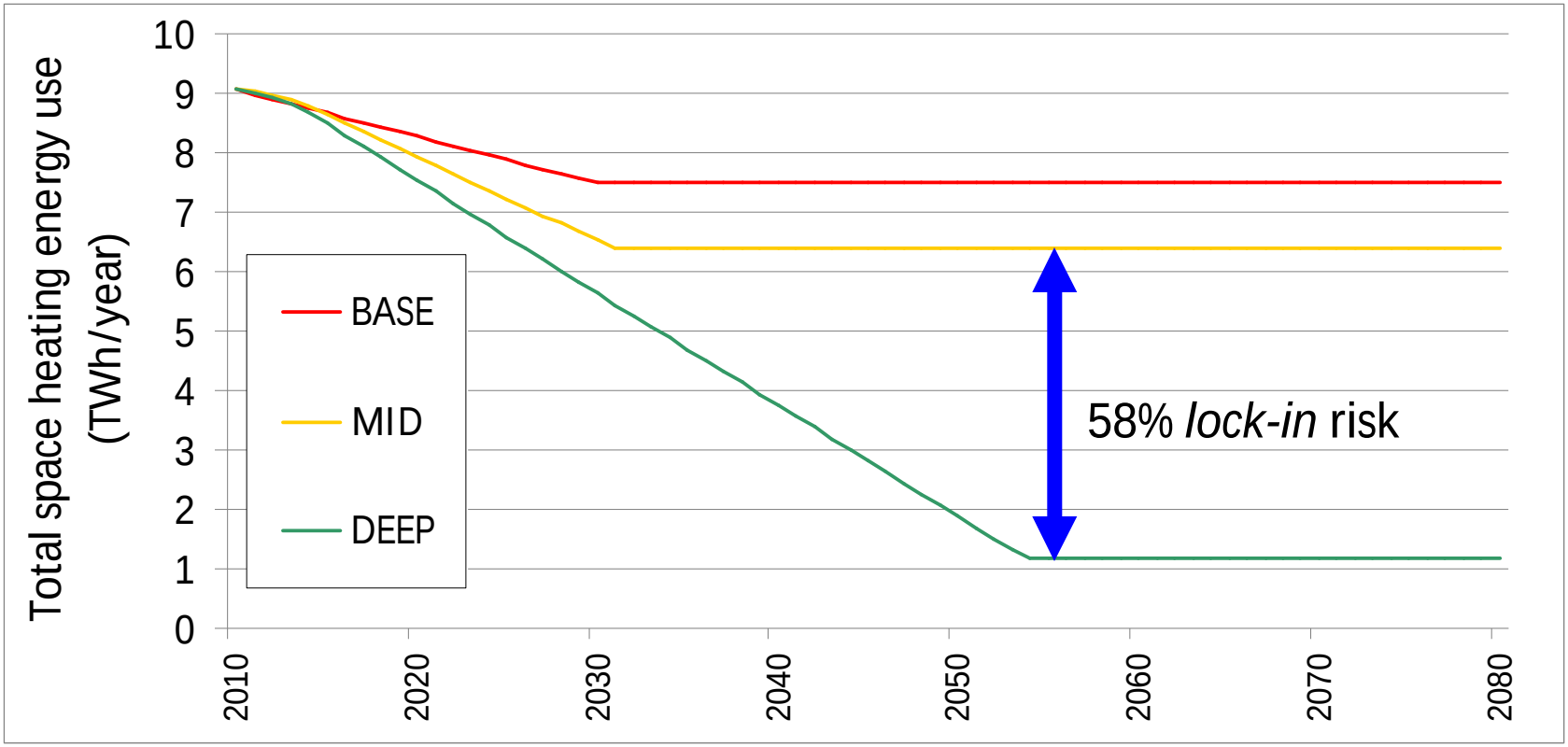
Additional argument for deep retrofits

The *lock-in* risk



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Arguments for public sector involvement

- Barriers to energy efficiency investments
  - Shared ownership of buildings with DH
  - Transaction costs
- Social benefits of ener. efficiency investments
  - Avoided GHG emissions (CO_2, CH_4 and N_2O)
    - Social (external) cost of carbon: IPCC (2007)
  - Avoided non-GHG emissions (NO_x, SO_x, PM)
    - External cost of emission of pollutants: NewExt project

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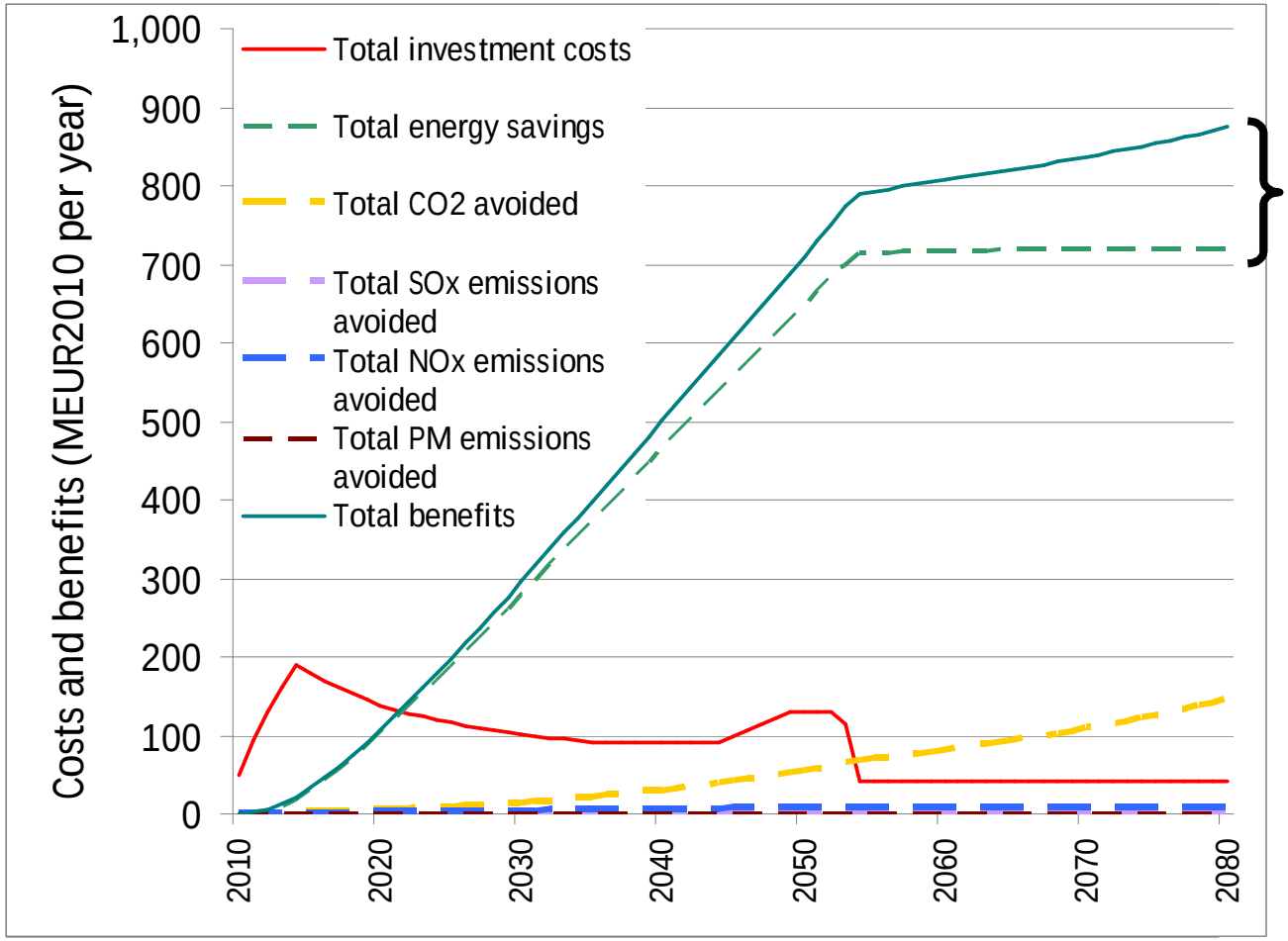
Social cost-benefit analysis



Difference between energy saving benefits and external benefits

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Additional co-benefits

- Net employment creation
  - In HU and PL, tens to hundreds of thousands additional employments have been forecasted for deep retrofits (Tirado Herrero et al., 2011)
- Reduced energy dependency
- Fiscal effects
  - Increased government revenues (i.e., income tax and VAT) and reduced unemp. & social expenses
- Increased market value of properties
  - +12% premium for A-labeled properties in Holland (Brounen and Kok, 2010)

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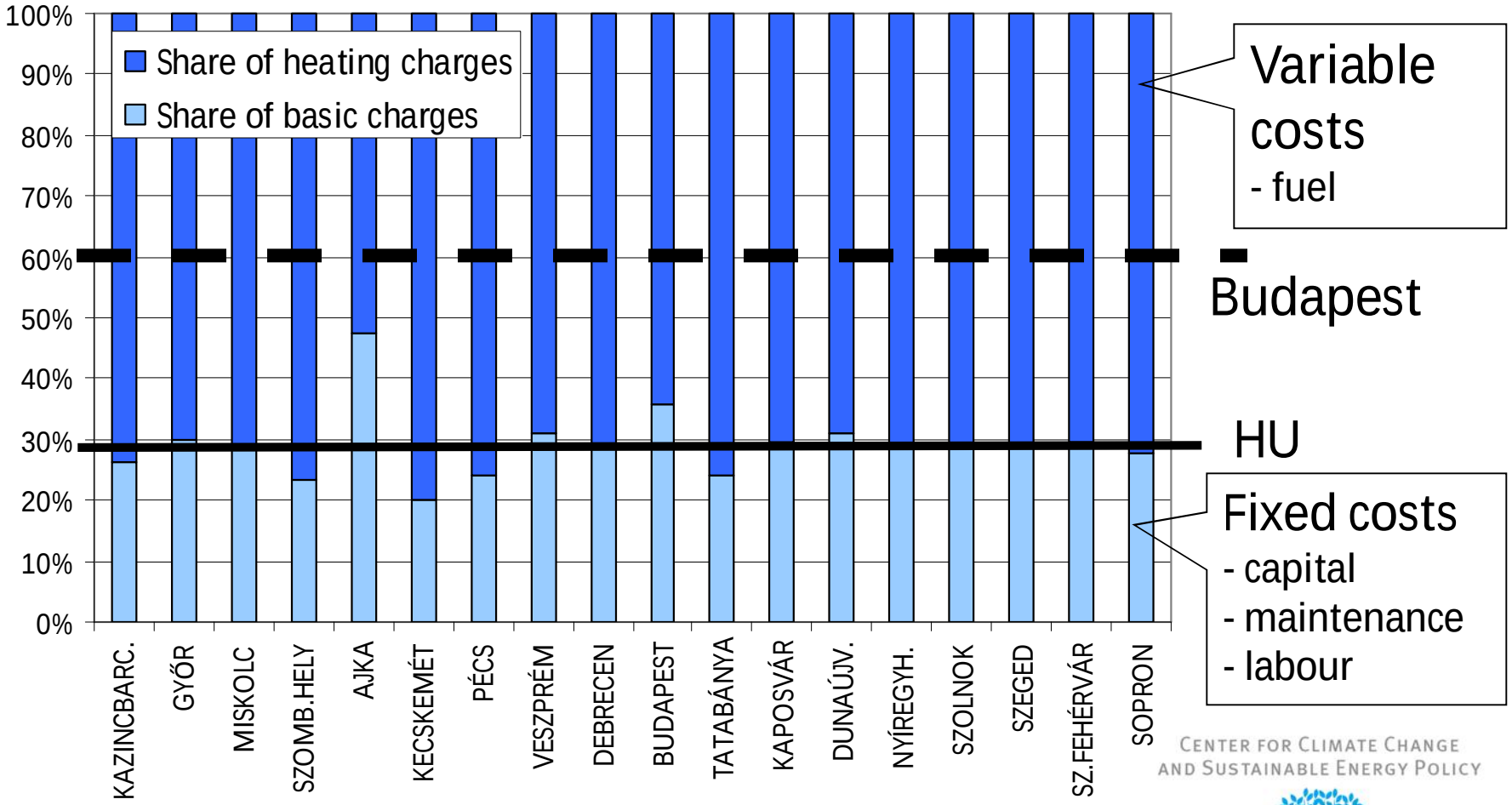
Are technical solutions enough?

Large fixed costs and structure of DH tariffs



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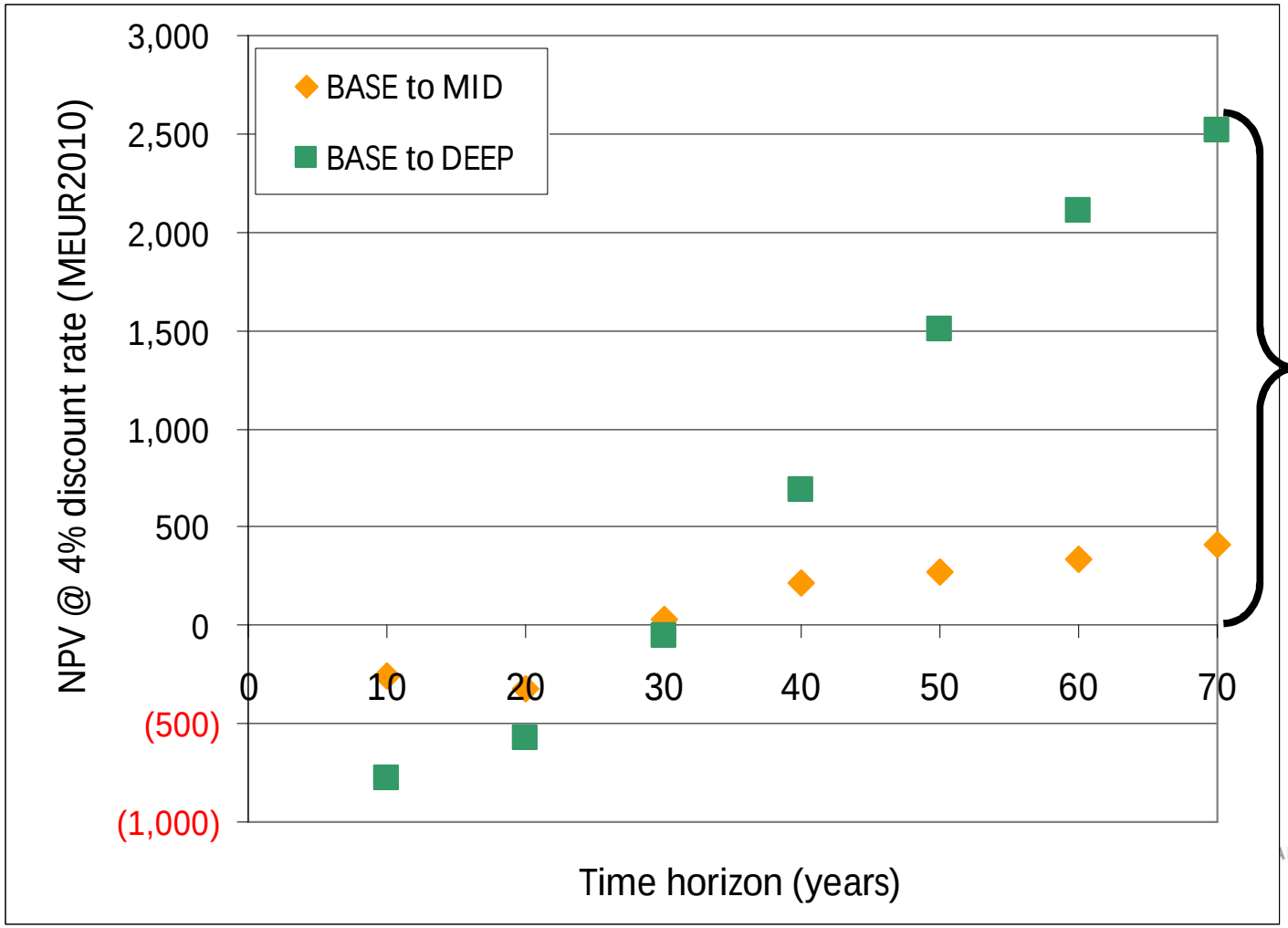

Large positive NPV from 2040 onwards

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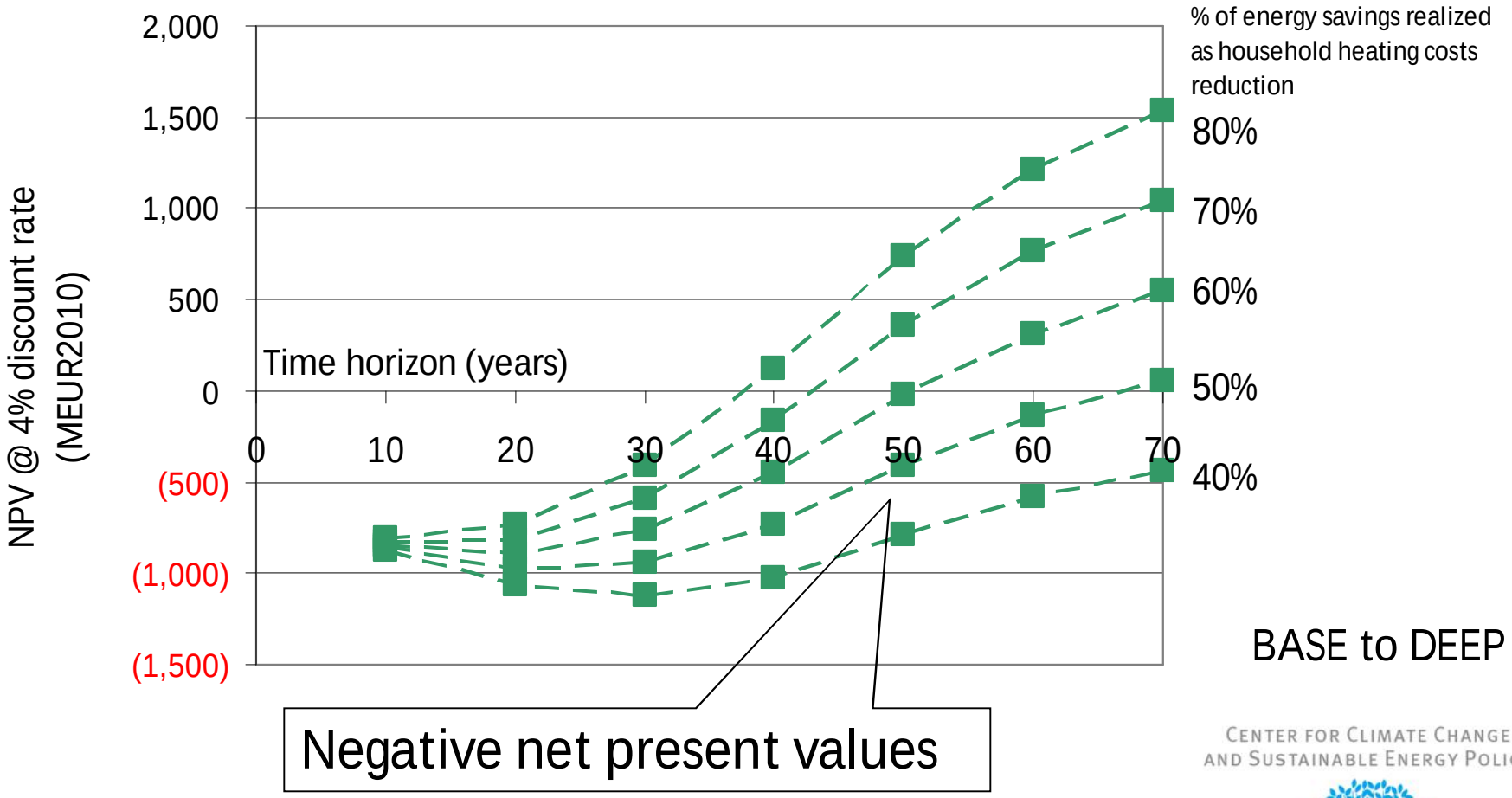

BASE to DEEP

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Are technical solutions enough?

Improving the conditions under which DH is served

- Individual meter-based billing
  - Incentive to save energy at household level
  - Conventional fuel poverty effects, i.e., inadequate thermal comfort levels
- Competition between heat sources
  - Lower prices
  - Household's right to disconnect and switch
- Independent, capable regulators

Source: OECD/IEA (2004); Tirado Herrero and Urge-Vosatz (2011)

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The future role of DH
in a low energy buildings' EU

- (?) Economic viability of the DH sector when low or nearly zero energy buildings become the norm
  - Fixed costs and obligation to remain connected
- Denmark
  - "Some of the houses being built today are so well insulated and energy efficient that it is not worth connecting them to district heat" (DAE, 2005)
- Norway
  - The obligation to remain connected to DH networks is a barrier to low-energy residential buildings (Thyholt and Hestnes, 2008)

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Conclusions

- Cost burden (in CEE Member States)
- Deep retrofit of buildings with DH
  - Maximizes energy and carbon savings, co-benefits
- Sub-sector specific obstacles
  - Fixed costs, rigid tariff system
- Improved conditions for DH provision
  - Individual billing, competition, right to disconnect
- Uncertain future of the DH sector
  - Economic and labour implications
    - EXIT STRATEGY for the DH industry

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THANK YOU!

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