Apropos climate change!
ENERGY EFFICIENCY IN BUILDINGS

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

Sergio Tirado Herrero

PhD candidate /Junior researcher

35th Annual Conference of the Association for Teacher Education in Europe. Budapest, August 26-30, 2010.

About 3CSEP@CEU

Center for Climate and Sustainable Energy Policy

- 3CSEP is an **interdisciplinary** research and educational center at **Central European University** (CEU) whose mission is
  - to foster solutions to climate change and sustainable energy challenges
  - while advancing the implementation of development agendas.
- **Platform** for academic, outreach and educational activities at CEU in these fields
- **Prof. Diana Ürge-Vorsatz**
  - Lead author of **IPCC** WGIII (mitigation)
  - Involved in int'l. initiatives: UN SEG on climate change, SBCI, etc.

3CSEP

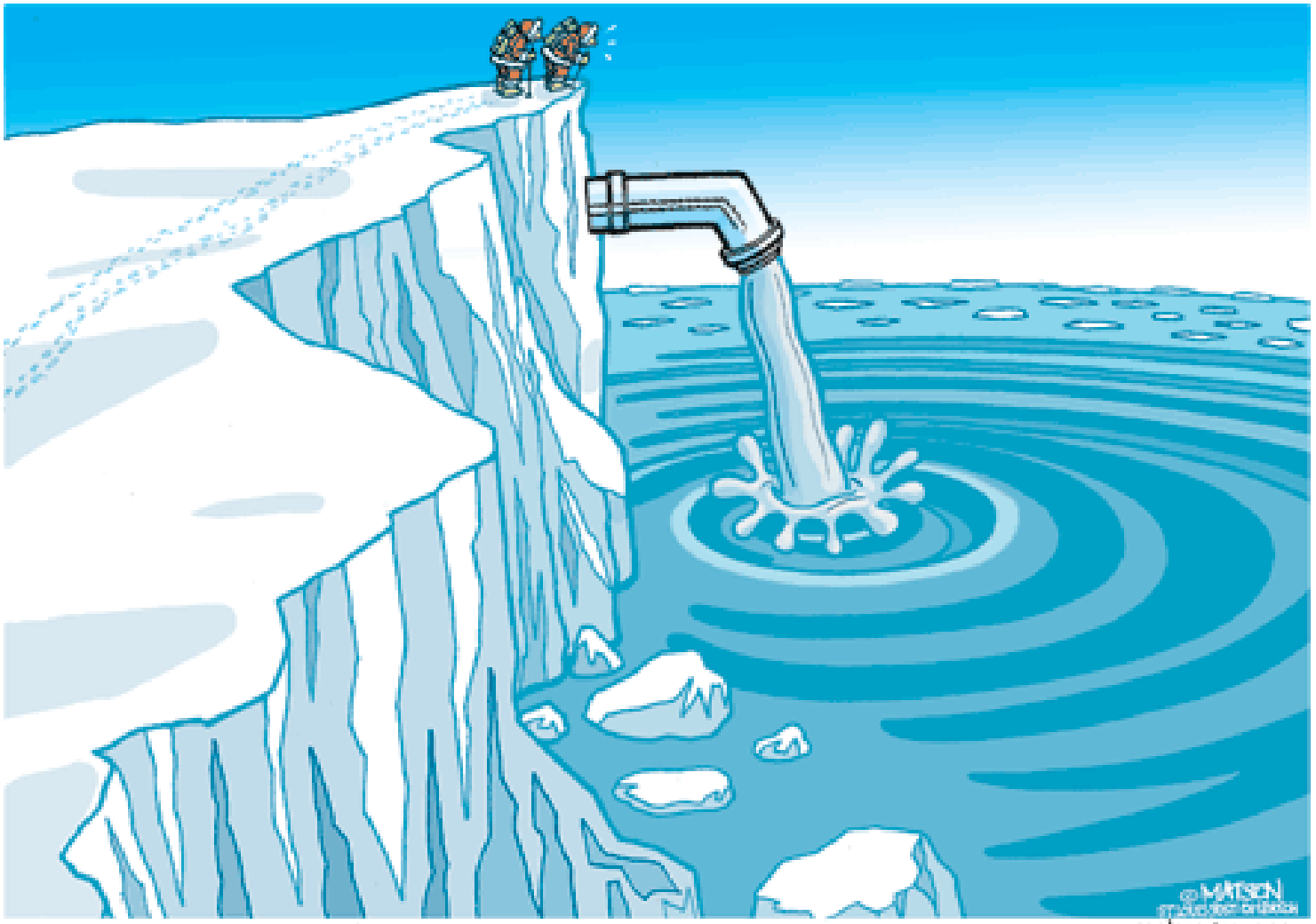
About 3CSEP@CEU

Center for Climate and Sustainable Energy Policy

- **On-going** and recently **completed projects**
  - Global Energy Assessment (GEA)
  - Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary
  - CO_2 mitigation potential in the Hungarian public and residential sector
  - Feasibility study for the introduction of a GIS in Hungary
  - *Changing Behaviour*
  - STACCATO initiative – Faluház project
  - Background research for a Post-Lisbon strategy in the field of climate and energy policy
  - Fuel poverty in Hungary: A first assesment

3CSEP

The climate change challenge

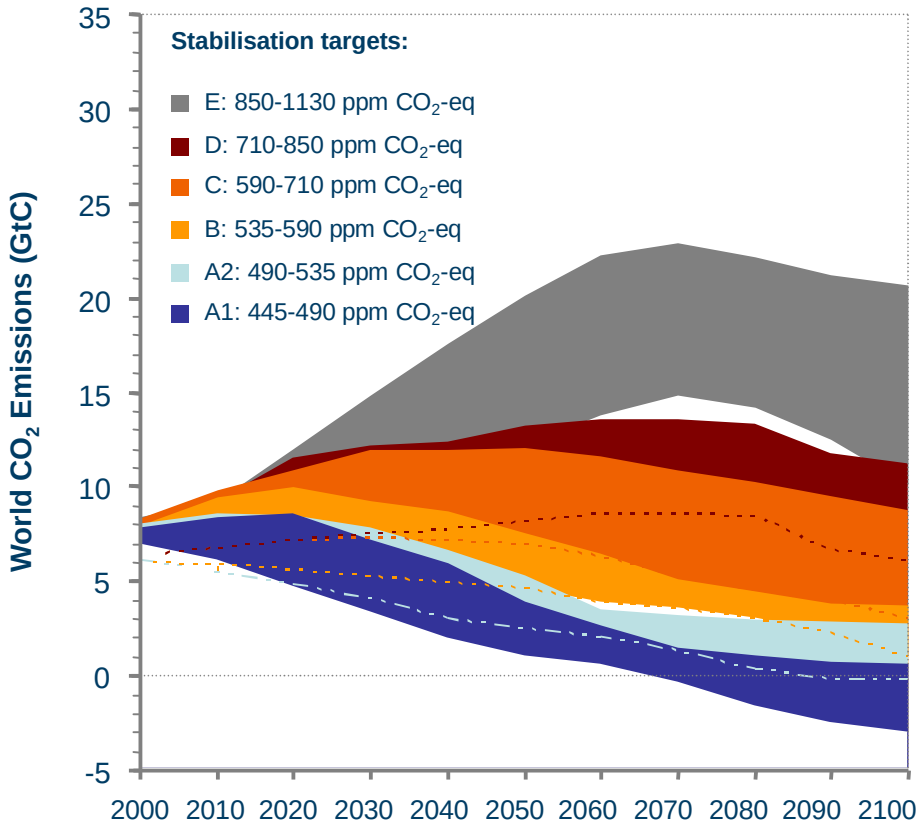


"HOW ON EARTH DO WE TURN IT OFF?"

In order to limit the impacts of CC, GHG emissions have to be reduced significantly

- Stabilizing global mean temperature requires a stabilization of GHG concentrations in the atmosphere -> GHG emissions would need to peak and decline thereafter (SPM 18 WG III)
- The lower the target stabilisation level limit, the earlier global emissions have to peak.
- Limiting increase to 3.2 – 4°C requires emissions to peak by 2020-2060.
- Limiting increase to 2.8 – 3.2°C requires global emissions to peak by 2000-2020.
- Limiting global mean temperature increases to 2 – 2.4°C above pre-industrial levels requires global emissions to peak by **2000-2015** and then fall to about **-50 to -85%** of 2000 levels by 2050.

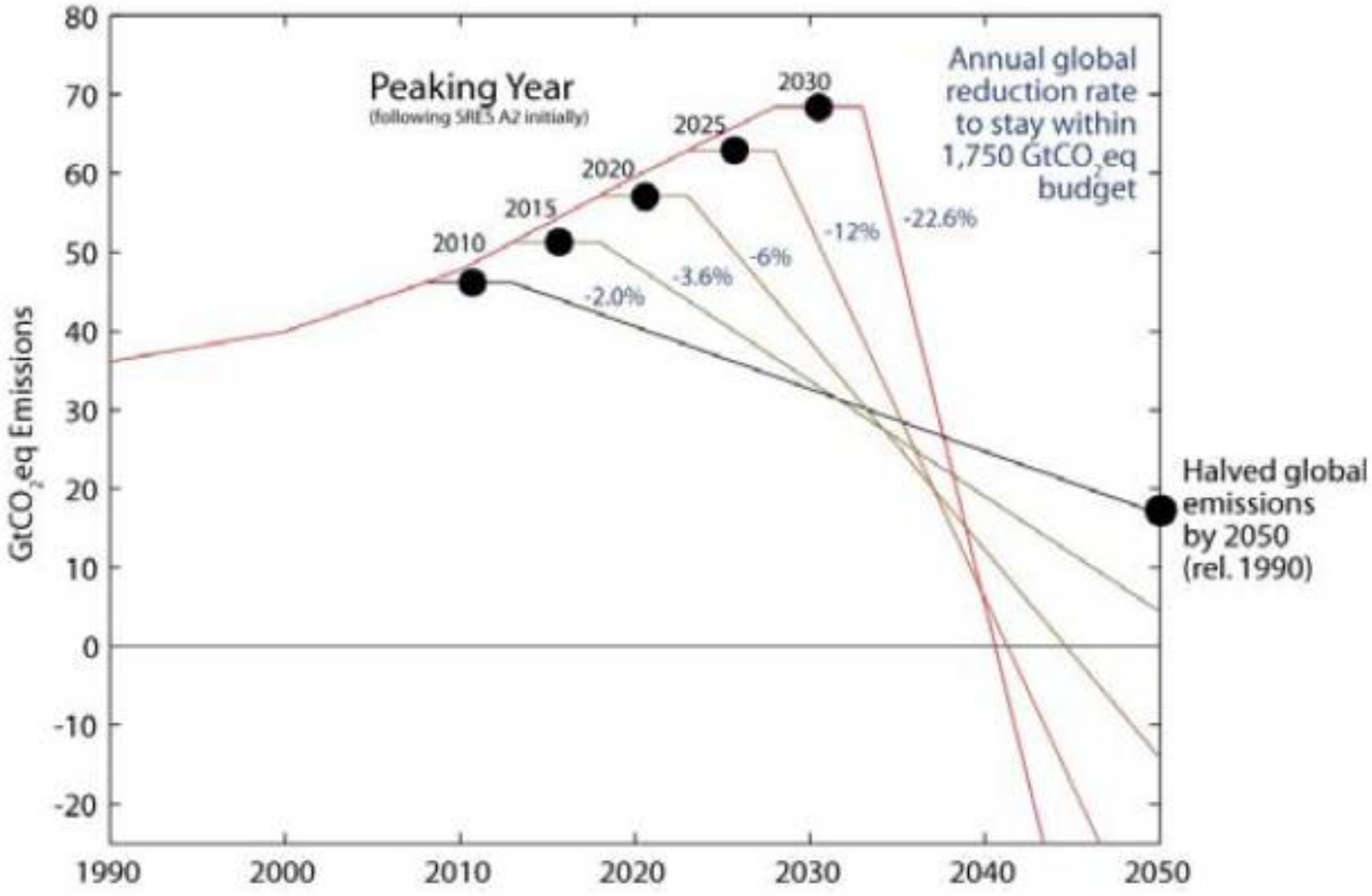
Based on SPM 7, WG III. Emission pathways to mitigation scenarios



Multigas and CO_2 only studies combined

3CSEP

The later emissions peak, the more ambitious reductions needed



***Source**: Meinshausen et al 2009*

3CSEP

Buildings offer large mitigation potentials at low costs…

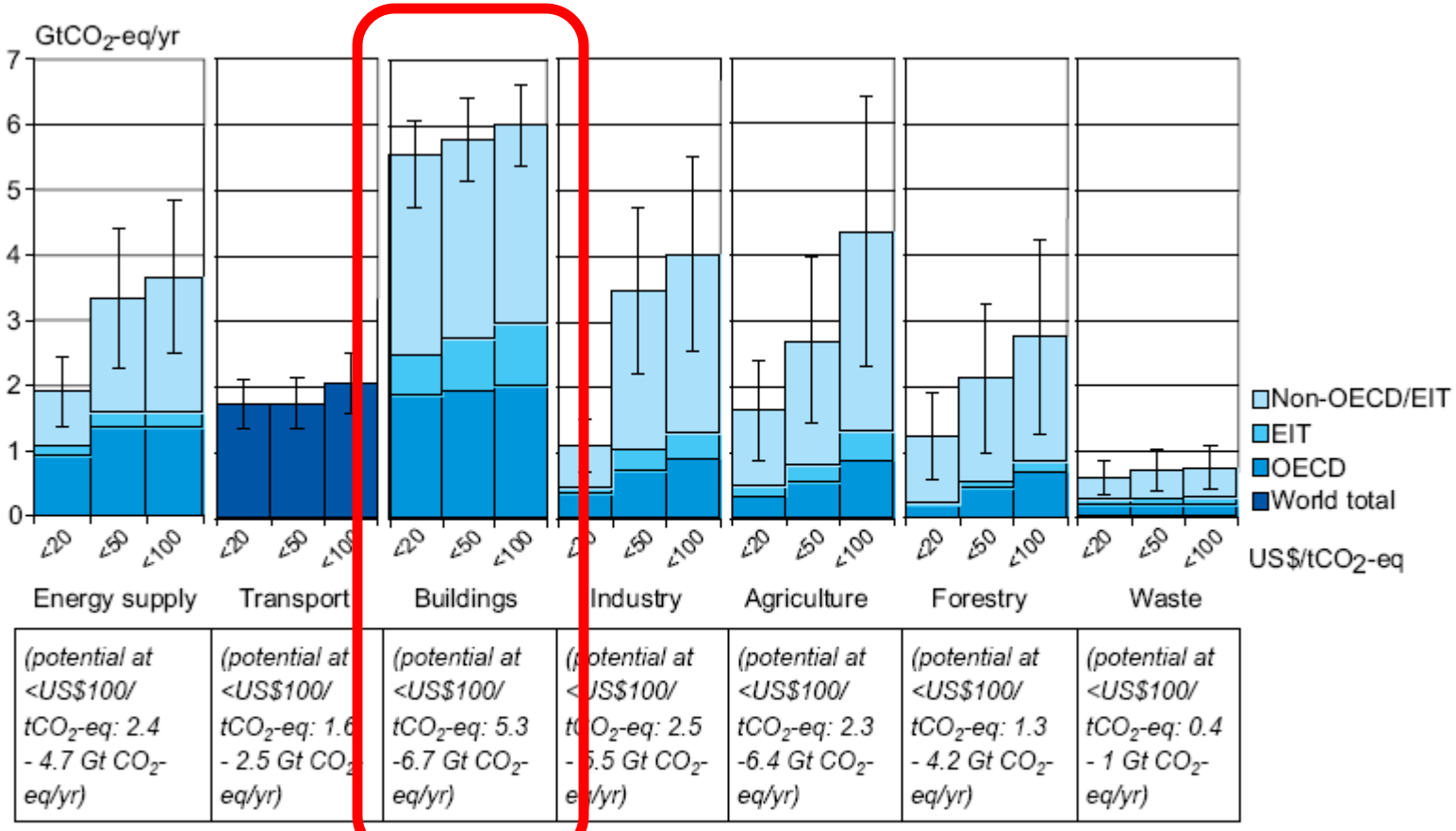
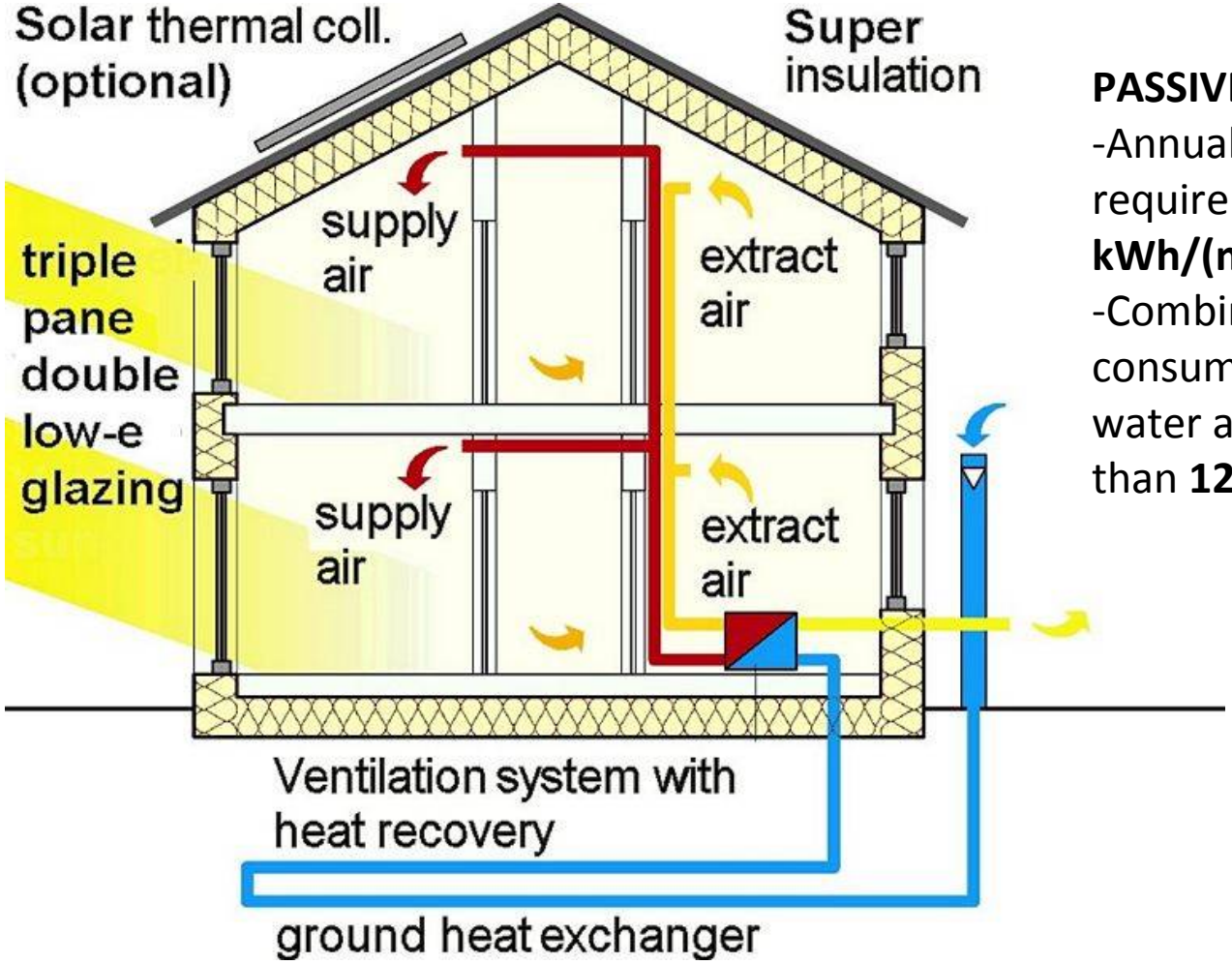


Figure SPM.6: *Estimated sectoral economic potential for global mitigation for different regions as a function of carbon price in 2030 from bottom-up studies, compared to the respective baselines assumed in the sector assessments. A full explanation of the derivation of this figure is found in Section 11.3.*

…as long as optimal technologies are applied instead of sub-optimal…

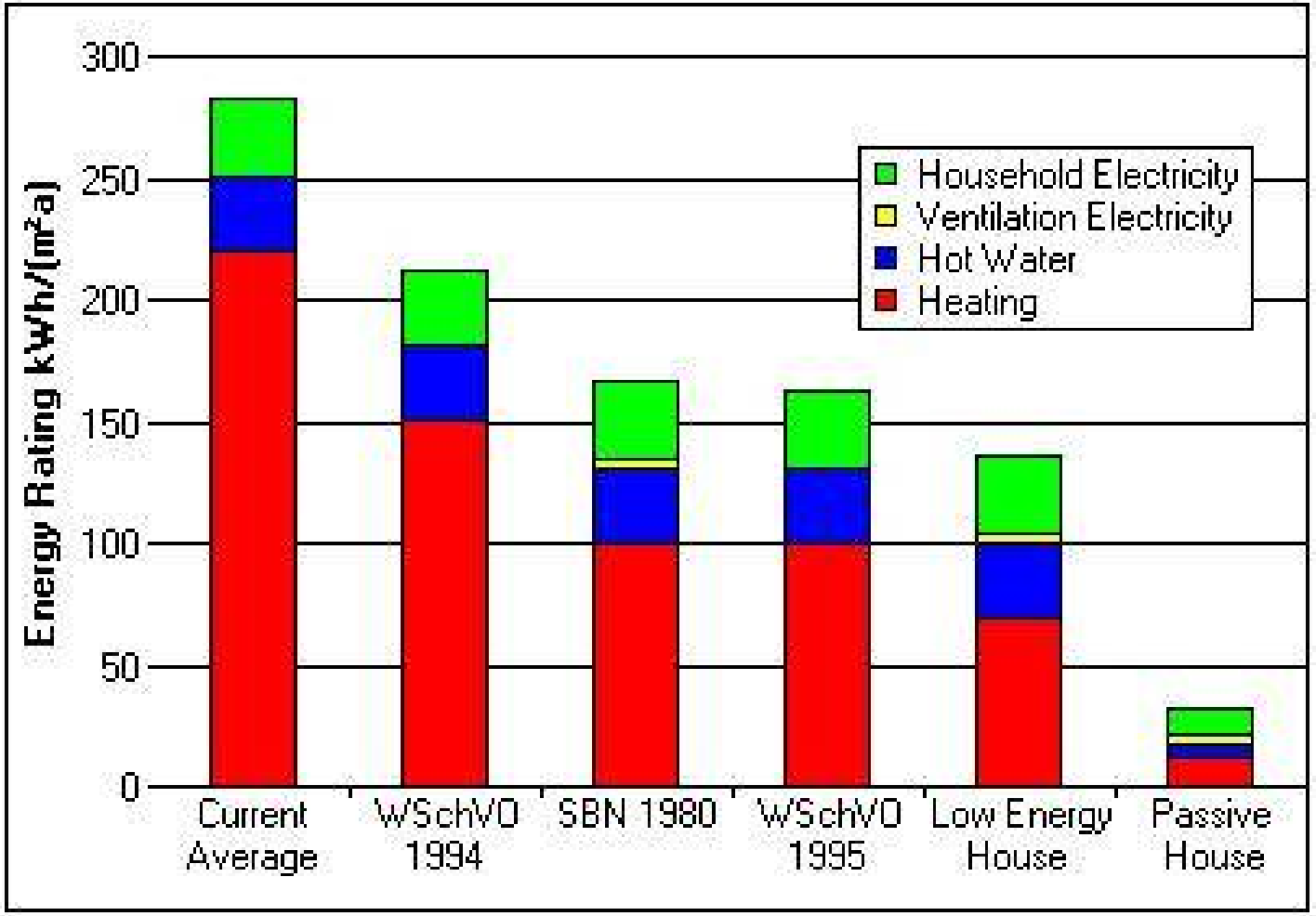


PASSIVE HOUSE

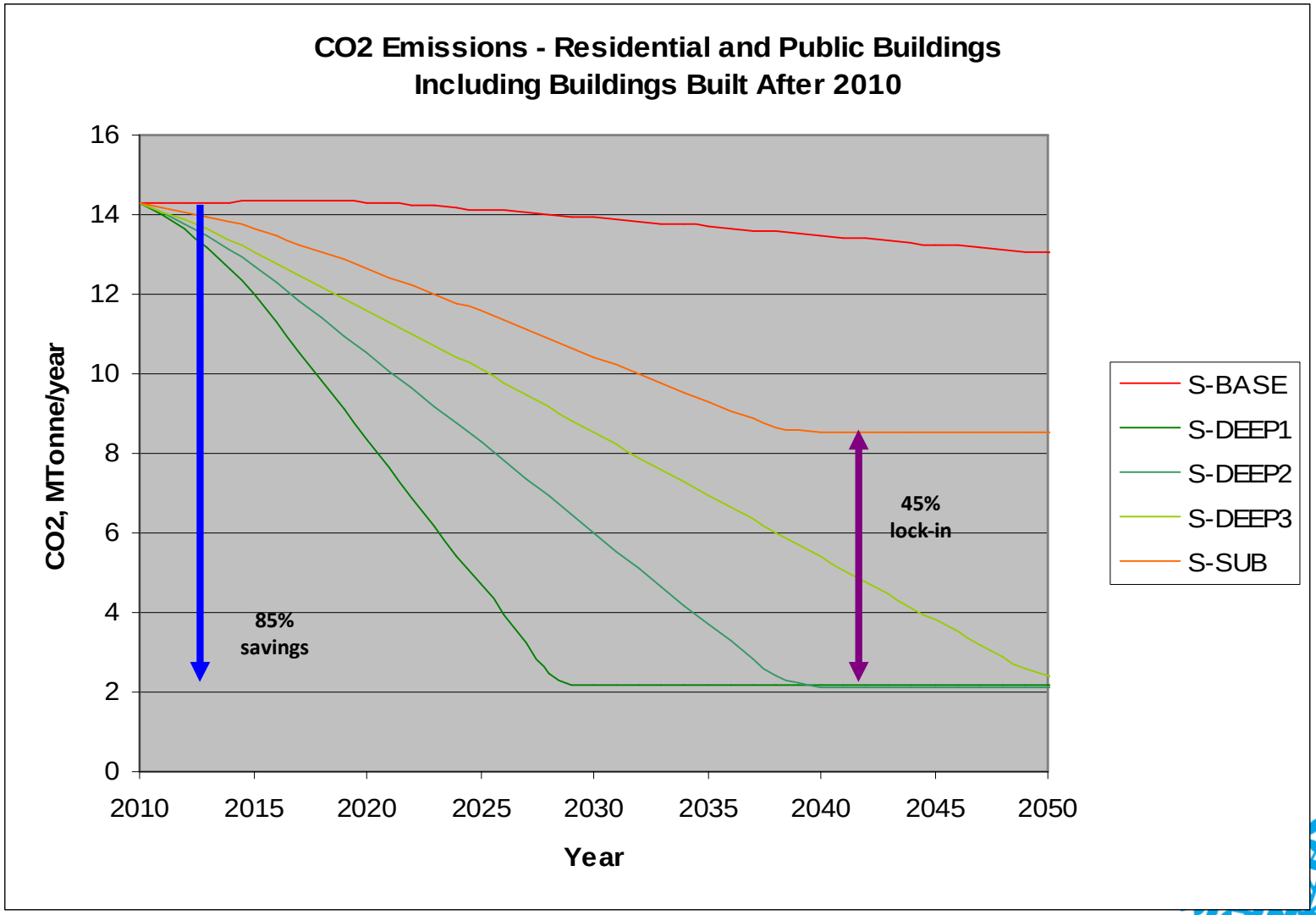
-Annual **heating** requirement less than **15 kWh/(m²a)**

-Combined primary energy consumption (heating, hot water and electricity) less than **120 kWh /(m²a)**

[Passive house standards]



…so as to avoid the lock-in effect!

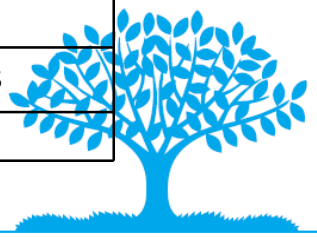


3CSEP

Behaviour is also important, though

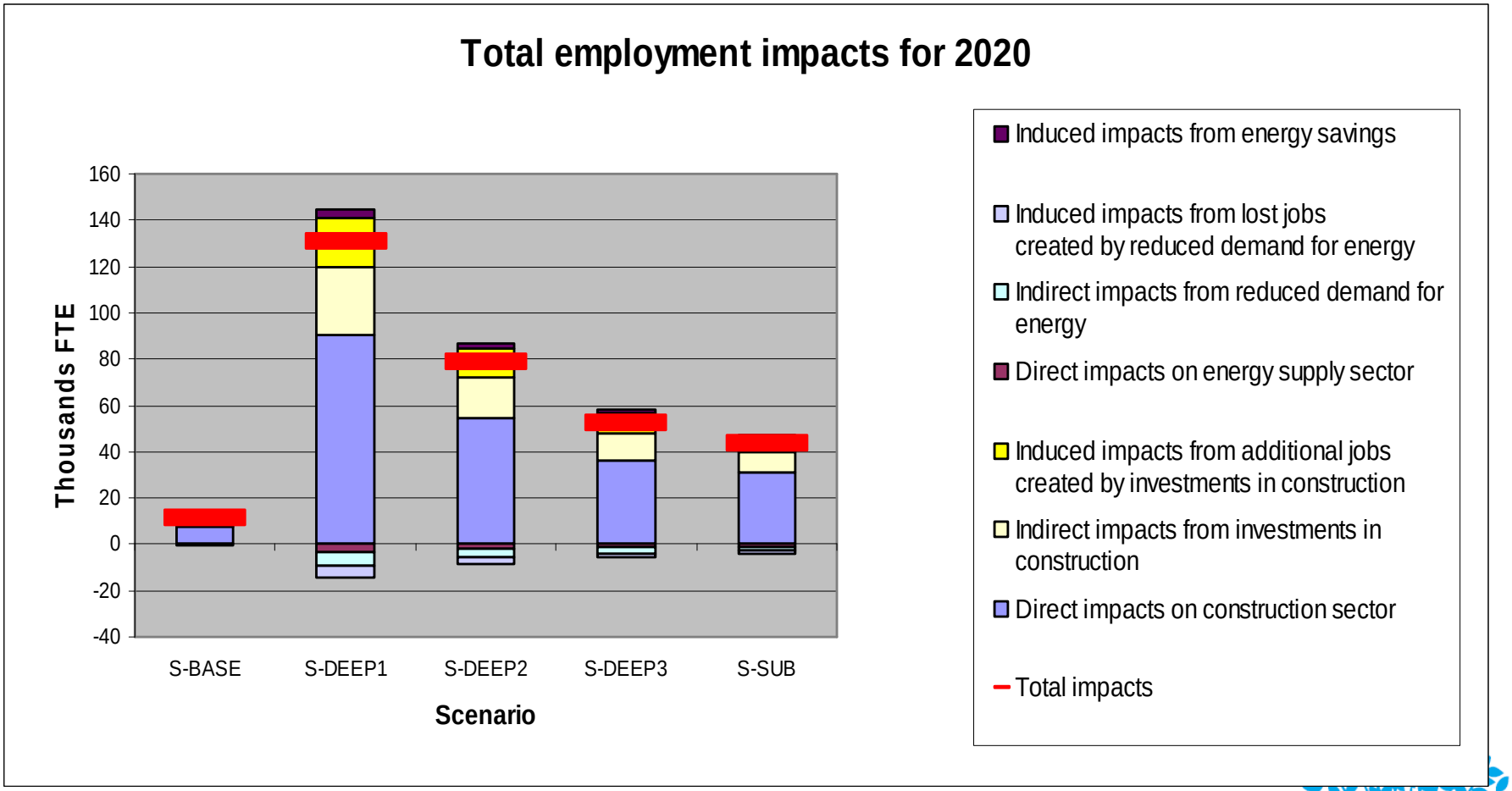
Energy efficiency in buildings provides benefits other than CC mitigation

Type	Category
Direct impacts on residents and on building users and owners	Reduced utility expenses
	Increased thermal comfort
	Improved indoor air quality and environmental conditions
	Enhanced protection against outdoor noise
	Fuel poverty alleviation
	Reduction of fuel-poverty related mortality and morbidity
	Improved safety conditions, lower maintenance costs and extended lifetime of buildings
	Increased rental or selling prices
Regional environmental and health impacts	Reduced regional air pollution levels
	Lower resource consumption and waste disposal
Wider societal gains	Better functioning of energy provision systems
	Improved energy security and reduced energy dependency
	Employment effects
	Improved workers productivity and enhanced learning in schools
	Lower long-term energy prices



3CSEP

Employment impacts of a large-scale, deep building energy retrofit programme in Hungary

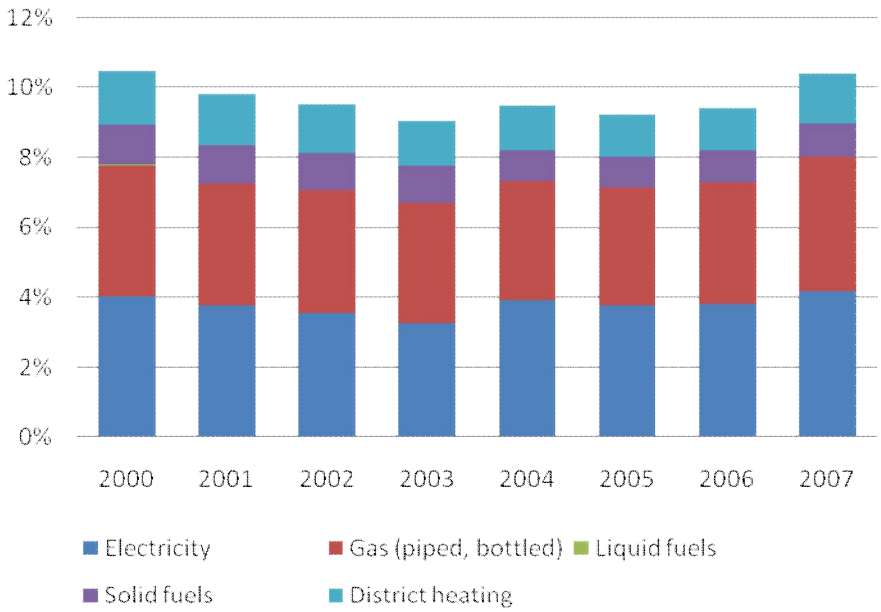


3CSEP

Fuel poverty alleviation

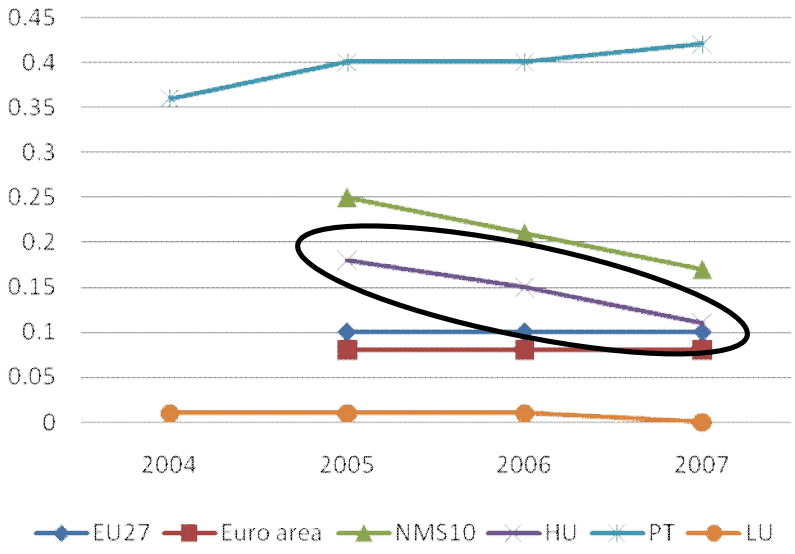
Incidence of fuel poverty in Hungary

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

Energy efficiency at the school

Green schools in the USA (Kats, 2006)

- Building a *green school* in the US is on average **2% more expensive** than a conventional school…
  - …but managers are concerned about costs and unaware of **benefits** for **school users** and the **society** such as
- Reduced energy and water/wastewater expenses
- Reduced operation and maintenance costs
- Reduced health impacts of outdooir air pollution
- Reduced absenteeism and improved student performance
- Reduction in asthma, cold and flu incidence rates
- Increased teacher attraction and retention, reduced number of teacher sick days

3CSEP

Apropos climate change!

ENERGY EFFICIENCY IN BUILDINGS

CENTER FOR CLIMATE CHANGE
AND SUSTAINABLE ENERGY POLICY

CENTRAL EUROPEAN UNIVERSITY

Thank you for your attention

http://3csep.ceu.hu/

3csep@ceu.hu