Eradicating energy poverty through a climate neutral EU building stock

CENTRAL EUROPEAN UNIVERSITY

Diana Ürge-Vorsatz

Central European University

Vice Chair, WGIII, Intergovernmental Panel on Climate Change

EP Webinar on

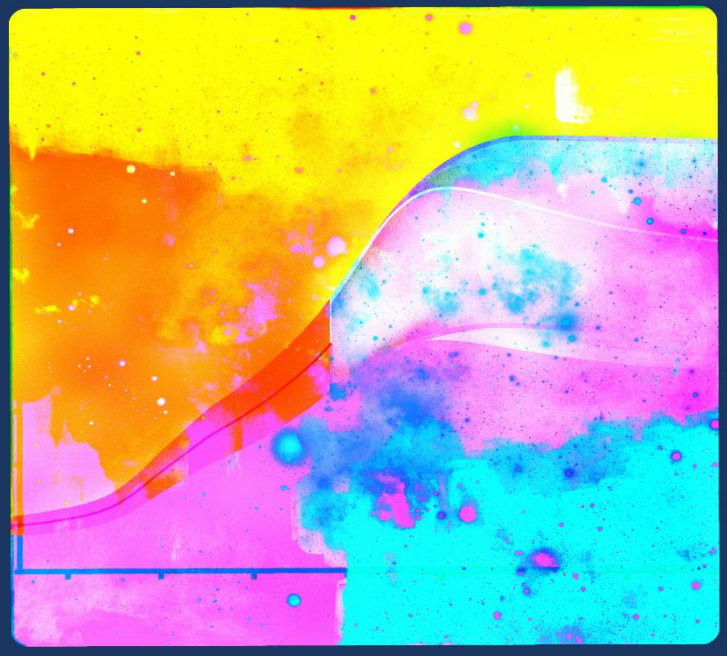
May 7, 2020 Online

ipcc
INTERGOVERNMENTAL PANEL ON climate change

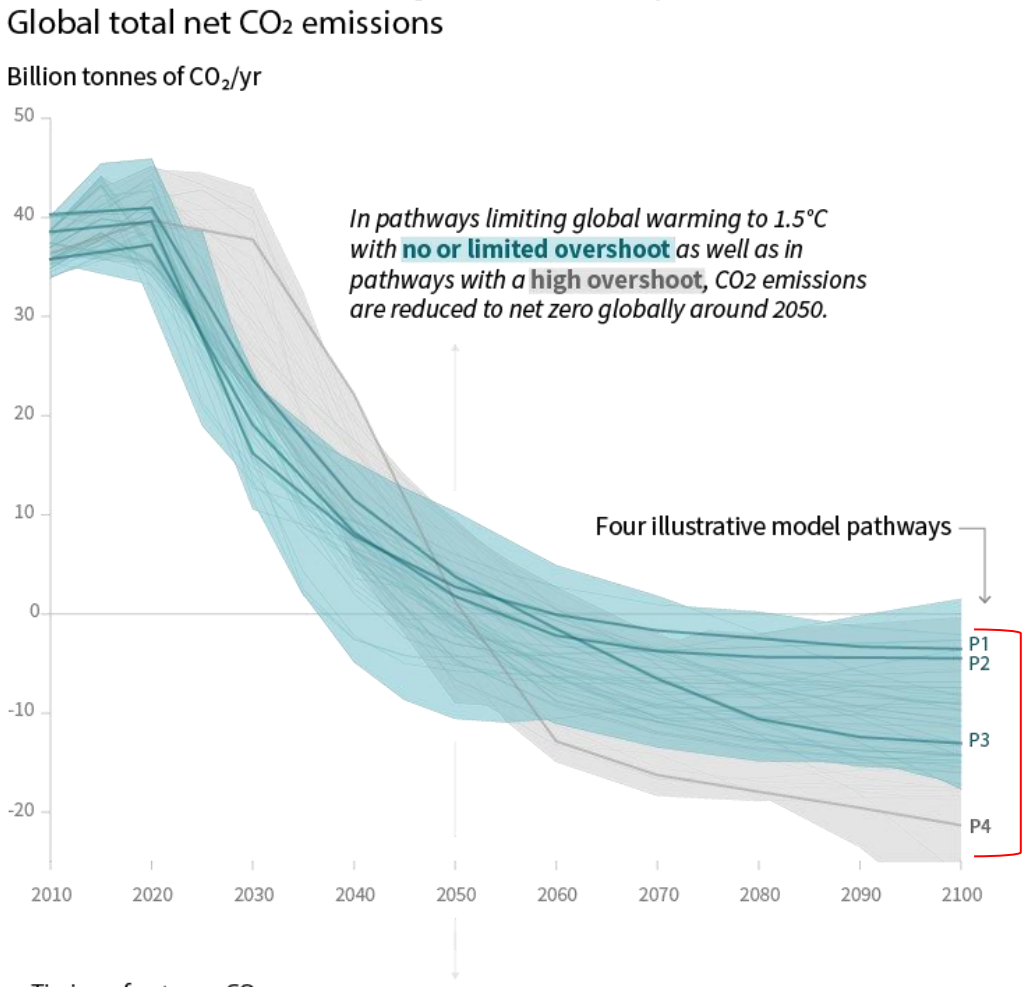
WMO UNEP

Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.



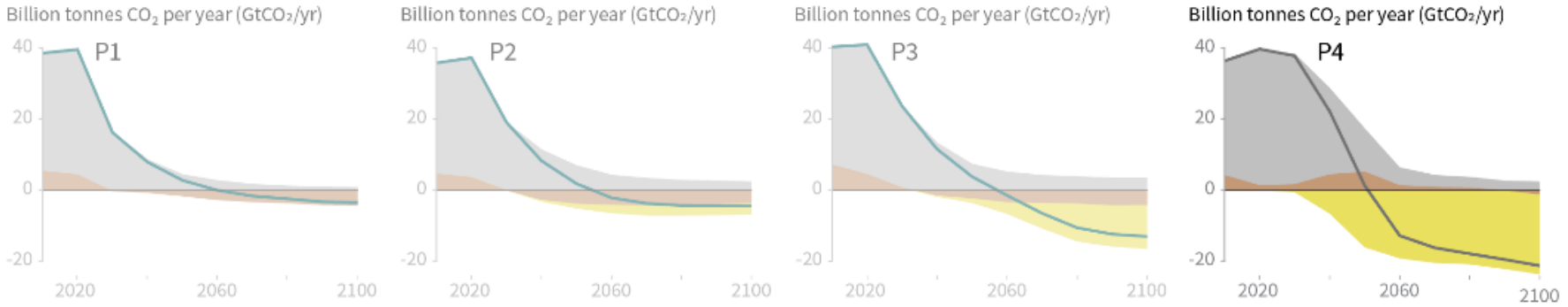
Global emissions pathway characteristics



Characteristics of four illustrative model pathways

Breakdown of contributions to global net CO_2 emissions in four illustrative model pathways

Fossil fuel and industry AFOLU BECCS



P1: A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

P2: A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.

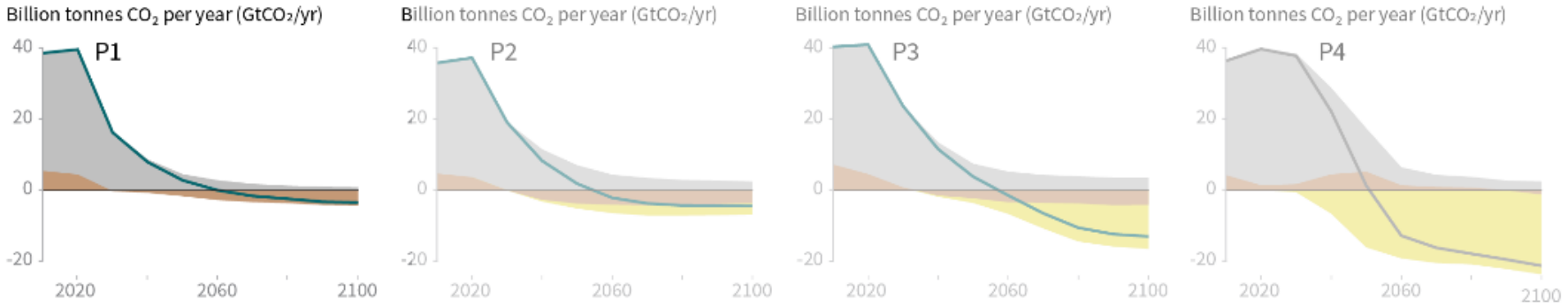
P3: A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

P4: A resource- and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas-intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.

Characteristics of four illustrative model pathways

Breakdown of contributions to global net CO_2 emissions in four illustrative model pathways

Fossil fuel and industry AFOLU BECCS



P1: A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

P2: A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.

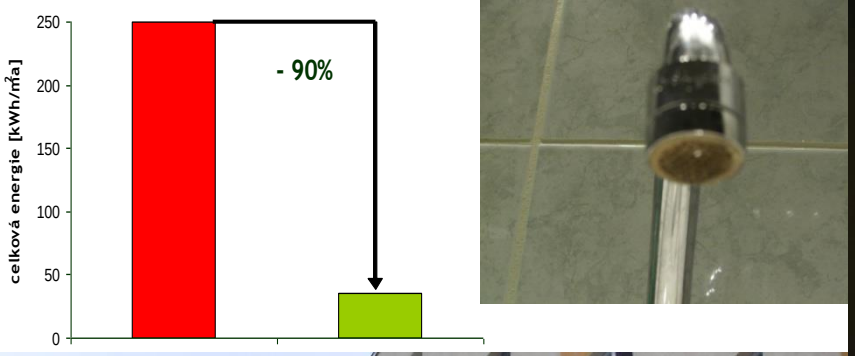
P3: A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

P4: A resource- and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas-intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.

forrás: E-On Energy Globe Award Hungary 2018

www.zeroenergia.net

Zero energy buildings are now a market reality even in low income regions


celková energie [kWh/m²a]
250
200
150
100
50
0
- 90%

Co-benefits of very high performance buildings

- Significant improvement in social welfare through disappearance of utility bills
  - Eradication of energy poverty?
- Elimination of mould
- Improved indoor air quality
- Health gains
  - Significantly reduced transmittable respiratory infections, allergies, reduced asthma, cardiovascular diseases, cancer
- Productivity gains
  - Chaterjee&Urge-Vorsatz found a 5 day annual reduction in sick leave in Germany
  - Children in energy poor households miss fewer days of school
- Reduced need for capacity expansion for an electrified 1.5C (warmer) planet

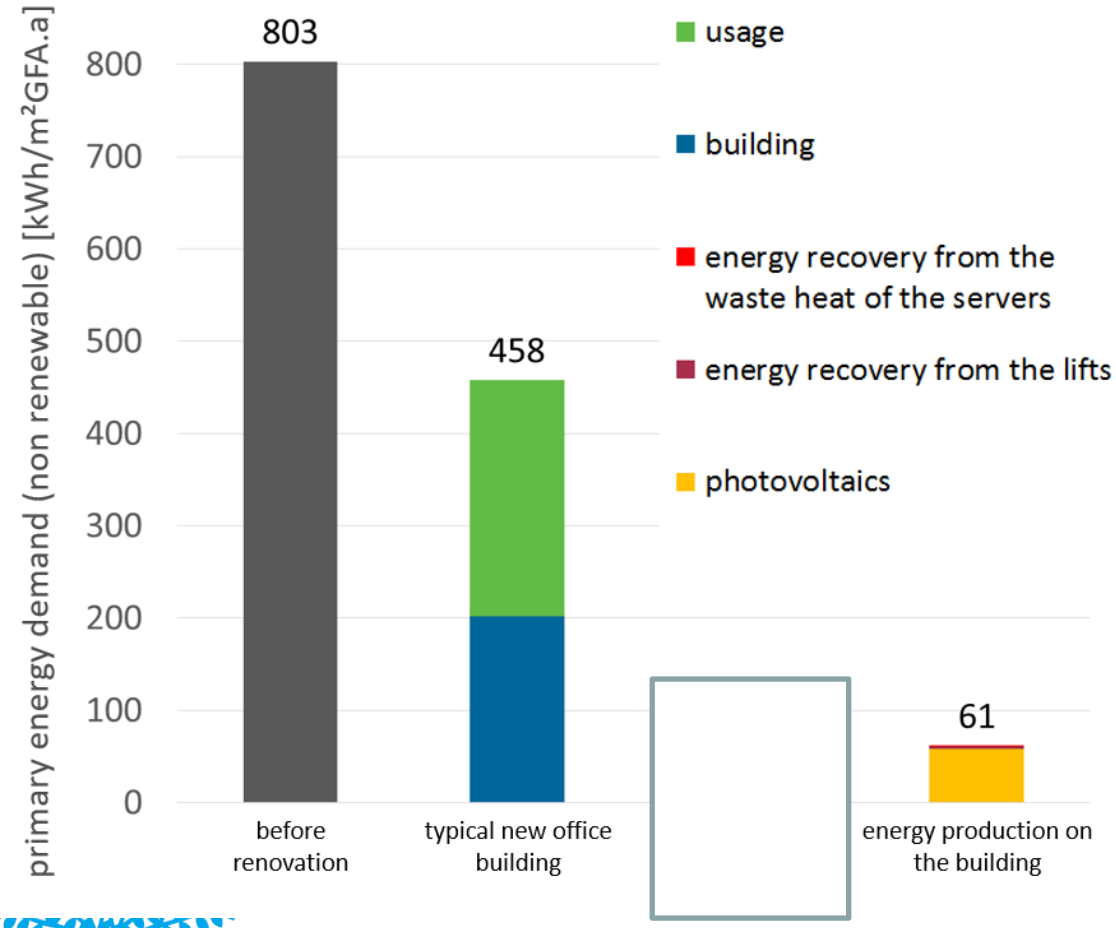
Rochestown House, Sallynoggin, Co Dublin is the first and largest social housing scheme in Ireland to be awarded **EnerPhit certification,** a Passive House standard for refurbishment

forrás: Klemens Schlögl, Schöber & Pöll, Austrian World Summit 2018, Vienna, May 2018

Retrofit of Vienna Technical University building to energy plus level

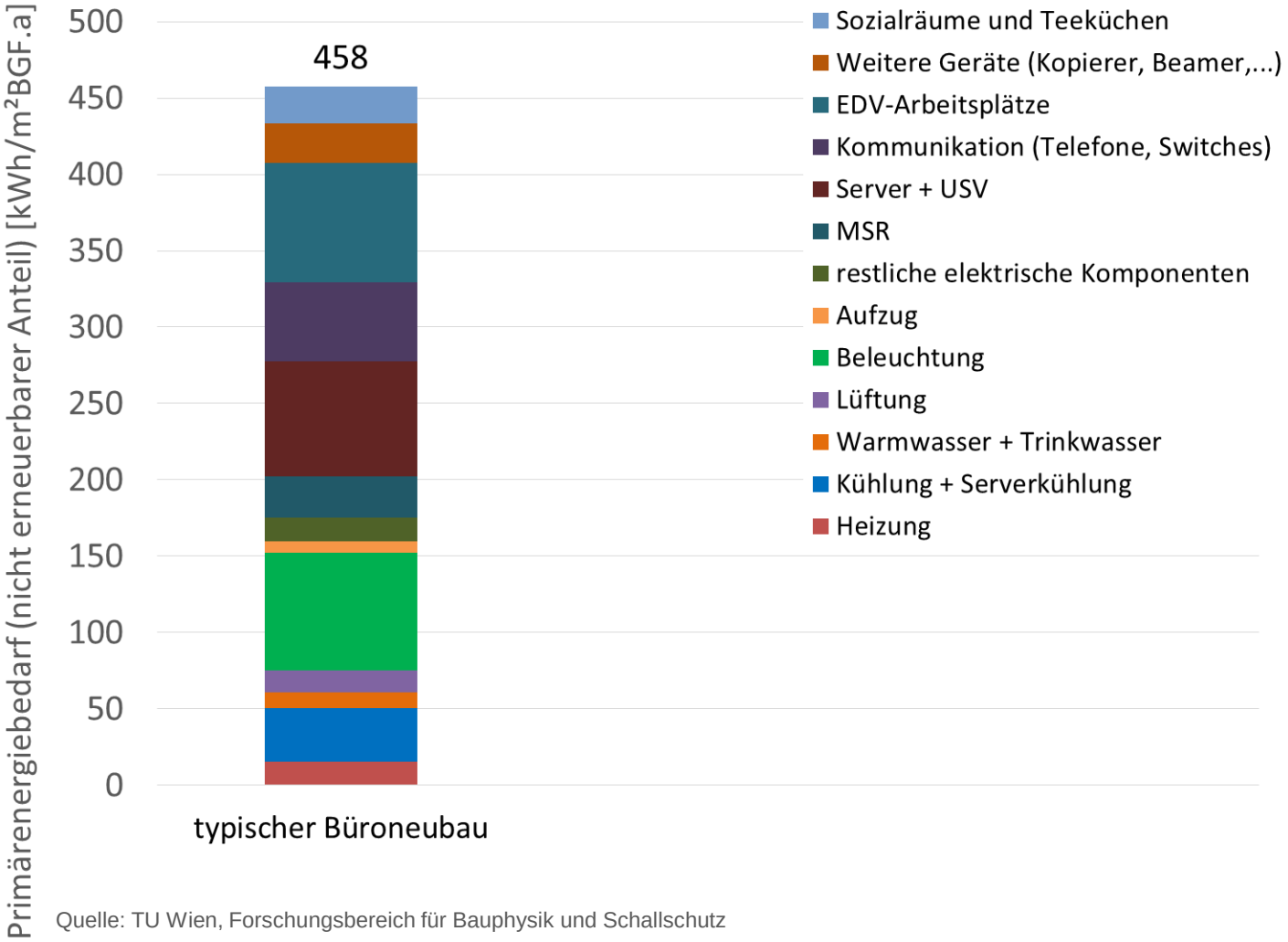
AUSTRIAN WORLD SUMMIT

Schöberl & Pöll GmbH
BAUPHYSIK und FORSCHUNG



Source: Klemens Schlögl, Schöber & Pöll, Austrian World Summit 2018, Vienna, May 2018

Disruptive electricity demand reductions arrive from innovatively optimising opportunities in systems rather than replacing individual technologies

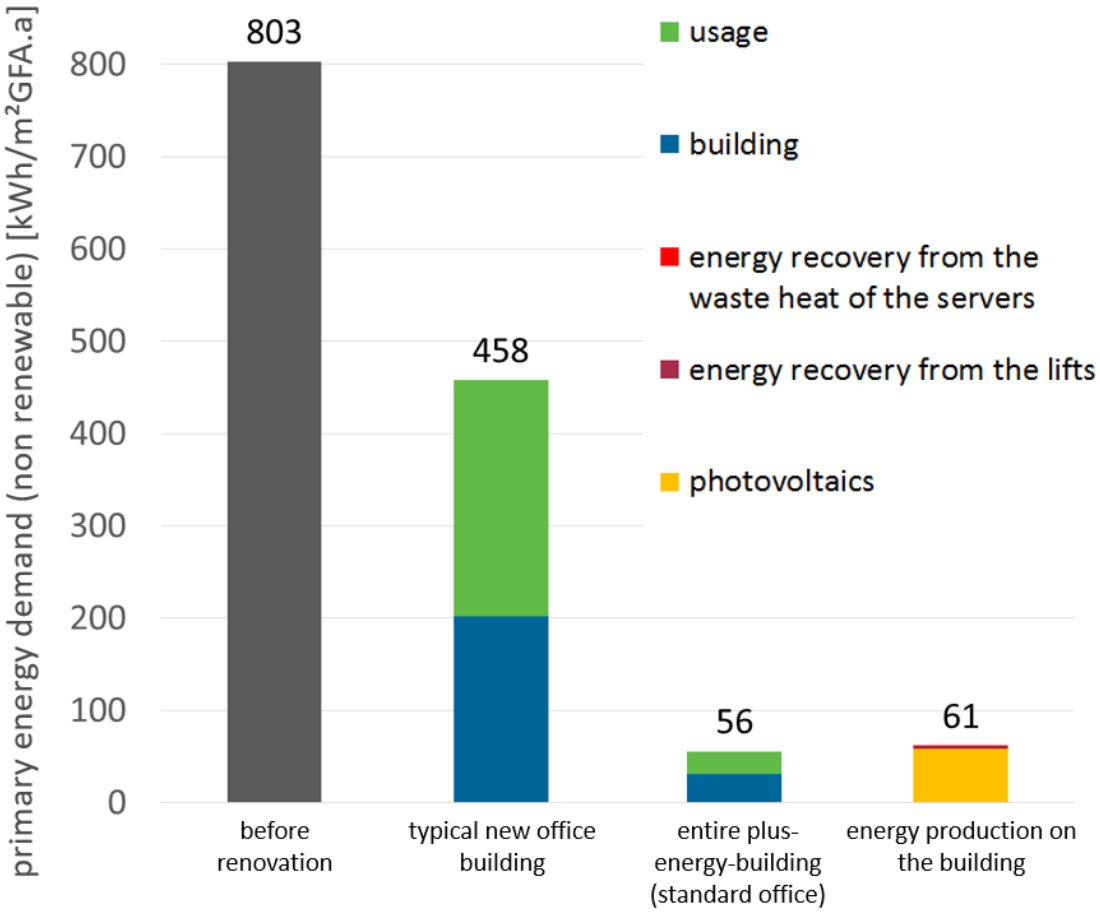


Quelle: TU Wien, Forschungsbereich für Bauphysik und Schallschutz

Retrofit of Vienna Technical University building to energy plus level

AUSTRIAN WORLD SUMMIT

Schöberl & Pöll GmbH
BAUPHYSIK und FORSCHUNG



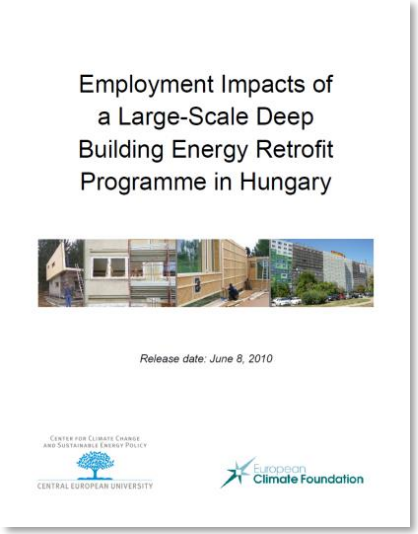
Source: Klemens Schlögl, Schöber & Pöll, Austrian World Summit 2018, Vienna, May 2018

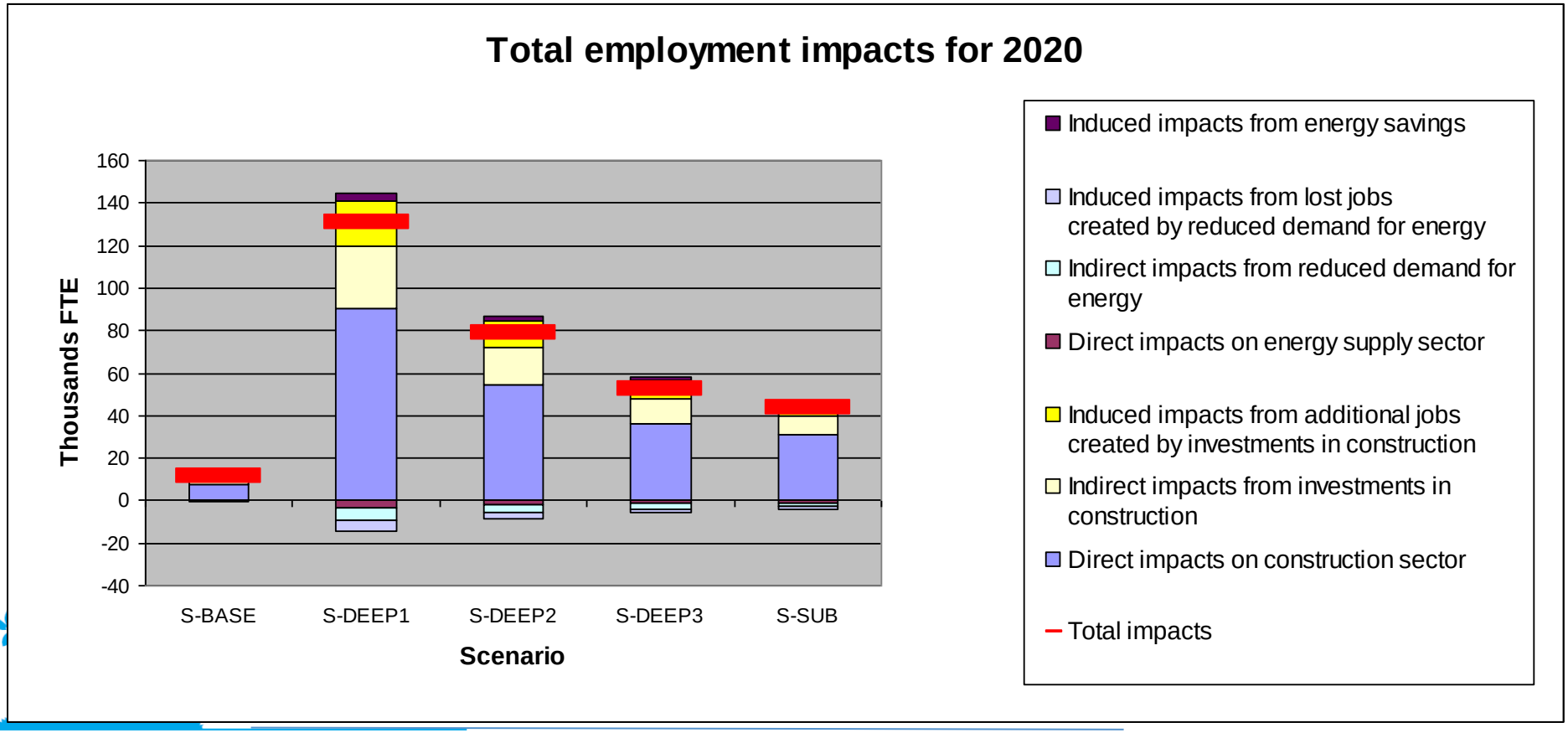
Innovative financing solutions needed

- For bridging the major discount rate gap between public (climate) interests and private investor/owner expectations
- Needs substantial public investment
- The COVID recovery efforts could be once-in-a-lifetime opportunity to fast-forward the deep retrofits of European building stocks
- Countries provide Covid19 support in order 5 to 28% of their GDP. Investments of around 2.5% of GDP would be necessary globally annually to solve climate crisis. If only a small part of this recovery is spent on deep retrofits, we will come a long way
- Retrofits identified in almost all post-COVID recovery advice, eg. Sir Nicolas Stern
  - https://www.carbonbrief.org/leading-economists-green-coronavirus-recovery-also-better-for-economy

Net employment impacts of a deep retrofit program in Hungary

- Direct effects
  - Calculated with bottom-up method
- Indirect + induced effects
  - Application of I/O tables
  - Indirect + induced impacts have the same order of magnitude as the direct impacts

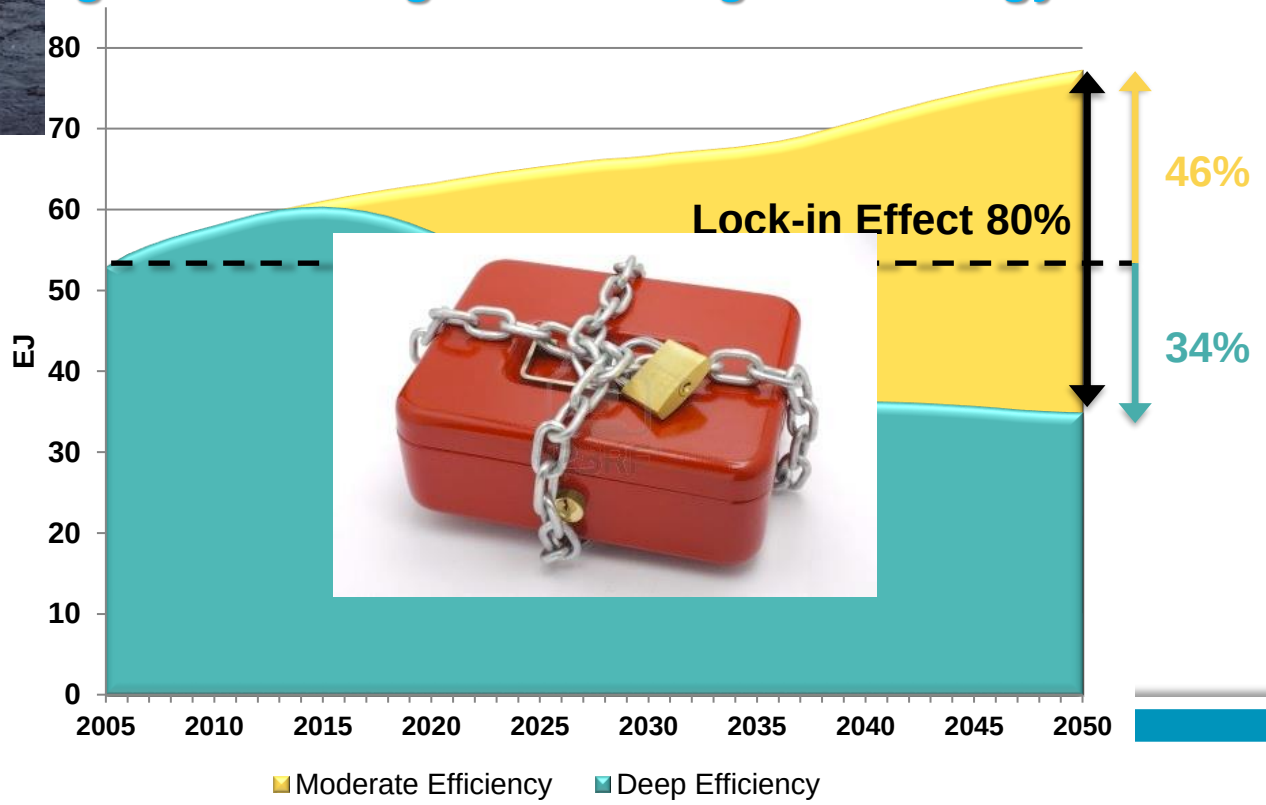




The Lock-in Risk:

every building we build or retrofit to less than ZEB locks us into a warmer future with more energy poverty locked in

global heating and cooling final energy in two scenarios



comment

Locking in positive climate responses in cities

Well-intended climate actions are confounding each other. Cities must take a strategic and integrated approach to lock into a climate-resilient and low-emission future.

Diana Ürge-Vorsatz, Cynthia Rosenzweig, Richard J. Dawson, Roberto Sanchez Rodriguez, Xuemei Bai, Aliyu Salisu Barau, Karen C. Seto and Shobhakar Dhakal

Thank you for your attention

Diana Ürge-Vorsatz

Vice Chair, WGIII, IPCC

Central European University

Twitter: @dianaurge

Email: vorsatzd@ceu.edu