

CLIMATE CHANGE MITIGATION THROUGH IMPROVED ENERGY EFFICIENCY: THE FINDINGS OF THE FOURTH ASSESSMENT REPORT OF THE IPCC

D. Urge-Vorsatz, Professor and Director, Center for Climate Change and Sustainable Energy Policy (3CSEP), Department of Environmental Sciences and Policy Central European University, H-1051 Budapest Nador utca 9.

Abstract: The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) concludes that in order to stabilise climate change at 2 – 2.4 C, global greenhouse gas emissions will need to be reduced by 50 – 85% as compared 2000 levels by 2050. The report also concludes that while this task is Herculean, it is achievable if a portfolio of technologies that are currently available and those that are expected to be commercialised in the coming decades are deployed. The report refers to energy efficiency as playing a key role across many scenarios for most regions and timescales. In the short- and mid-term, conservation and efficiency play the most important role among the examined option categories (renewable energy, nuclear power, carbon capture and storage, fossil fuel switch and forest sinks) to reduce CO₂ emissions. From a sectoral perspective, the highest cost-effective and low-cost potentials for mitigating GHG emissions arise from the buildings sector. Based on bottom-up studies, this sector encompasses over one-third of the entire mitigation potential at 0 cost of carbon. In economies in transition, the cost-effective potential in the buildings sector is larger than in all other sectors combined. Capturing the cost-effective potential in buildings alone by 2030 can supply app. 38% of all mitigation needs to hold emissions on a scenario that caps climate change at 3C. In addition to their attractiveness from the perspective of cost-efficiency, energy conservation options are also associated with substantial co-benefits, including improved energy security, reduced mortality and morbidity, net employment benefits, improved competitiveness and new business opportunities. However, while the cost-effective and low-cost potential for GHG mitigation through energy efficiency is large, there are strong and numerous market barriers that prevent them to be captured on a market basis. Therefore, the unlocking of this low-cost potential requires a strong political commitment towards improved efficiency through the mobilization of policies. The report demonstrates that there is a broad portfolio of such policies is available and employed to kick-start and catalise markets to adopt energy-efficient technologies. Many of them have been demonstrated to save energy at negative costs, i.e. at net benefits to society, often at double- to triple-digit cost figures (i.e. under -10 or -100 USD/tonCO₂), in many world regions.

Key Words: *energy efficiency, climate change mitigation, potential, buildings*

Please be informed, that this full paper could be downloaded from the IEA Heat Pump Centre website <http://www.heatpumpcentre.org/>.