EU could afford to lead international climate action, study says

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Major emitting countries may have to join the EU's effort much earlier to avoid a temporary overshoot of the 2 degree target, but even if they joined only in 2030, the overshoot would be limited to roughly 0.2 to 0.4 degrees Celsius. The initial unilateral leadership could be achieved at little extra costs for the EU. Late-comers would have the benefit of lower costs while they delay action but would face higher transient costs once their turn to decarbonize comes.

"The crisis-stricken EU is asking itself whether it can still afford climate leadership" says lead-author Elmar Kriegler of the Potsdam Institute for Climate Impact Research. "If international climate action remains muddled, and if it takes a leader to rise above this, an EU initiative could make a big difference. A more than one degree reduction of global warming translates into a host of avoided climate damages." However, this strategy only works if the rest of the world eventually joins, because no single region will be able to combat climate change alone. "Leading by example needs to be convincing to other countries," Kriegler says. "Therefore, front runners best ensure success of their efforts by demonstrating the economic feasibility of strong emissions reductions and by making it attractive for others to join."

Additional costs for the EU are estimated to be low because it already has implemented significant climate and energy policies that are expected to reduce emissions by 30 percent in 2030. The study investigated EU frontrunner action in line with its roadmap for moving to a low carbon economy, including an emissions reduction of 40 percent

in 2030 compared to 1990.

Carbon leakage is found to be small

Another reason why the costs for Europe are estimated to be low is that overall carbon leakage is projected to be small. One big fear of economies cutting greenhouse-gases is that energy-intensive industries migrate to parts of the world with much lower environmental standards, or that a decrease of fossil fuel use in one region reduces world market prices for coal, oil, and gas and hence drives up consumption elsewhere. Both effects can negate some of the frontrunner's efforts. However, the study found this effect to be small, with leakage rates around or smaller than 20 percent in all but one model. The leakage rate measures the fraction of excess emissions in the rest of world compared to the emissions reduction by the front runner.

If China joined the EU in leading the way to a global climate regime, early action could reduce emissions until 2030 by a multiple of what the EU alone would achieve, slightly increasing the probability of keeping global warming below 2 degrees Celsius. However, China's short term mitigation costs would be significantly higher than for the EU. "The case for early action by China would likely need to be made more broadly, particularly including co-benefits in terms of reduced air pollution," says Kriegler. "Moreover, late-comers face a clear trade-off between lower short term costs and higher transitional challenges, and this would also hold true for China."

A lock-in into fossil fuel infrastructure could waste billions

The transitional challenge that late-comers face when joining a global climate regime is due to the difficulty of rapidly elevating efforts from a

low to an ambitious level, according to the study. "The risk of being locked into fossil fuel infrastructure is a major argument against delayed action," says co-author Keywan Riahi of the International Institute for Applied Systems Analysis. This refers for instance to newly built coal fired power plants. "Today's energy planners are making investment decisions in the order of hundreds of billion dollars, which can turn into stranded assets once climate policies are introduced. This is why delays are costly, besides increasing the risks that stringent climate objectives might get out of reach."

The new multi-model study is part of the AMPERE project ("Assessment of Climate Change Mitigation Pathways and Evaluation of the Robustness of Mitigation Cost Estimates") and will be published in a special issue of the journal *Technological Forecasting & Social Change*. AMPERE established a European platform of state-of-the-art energy-economy models to undertake a series of analyses on the implications of short term climate policy for achieving long term climate objectives. It is coordinated by PIK and IIASA. The funding is provided by the European Union.

More information: E. Kriegler, K. Riahi, N. Bauer, V.J. Schwanitz, N. Petermann, V. Bosetti, A. Marcucci, S. Otto, L. Paroussos, S. Rao, T. Arroyo Currás, S. Ashina, J. Bollen, J. Eom, M. Hamdi-Cherif, T. Longden, A. Kitous, A. Méjean, F. Sano, M. Schaeffer, K. Wada, P. Capros, D.P. van Vuuren, O. Edenhofer (2014): Making or breaking climate targets: The AMPERE study on staged accession scenarios for climate policy, *Technological Forecasting and Social Change* DOI: 10.1016/j.techfore.2013.09.021

More articles from the AMPERE-project:

Riahi et al. (2014): Locked into Copenhagen Pledges - Implications of short-term emission targets for the cost and feasibility of long-term

climate goals, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.09.016.

Kriegler et al. (2014): Diagnostic indicators for integrated assessment models of climate policies, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.09.020

Bertram et al. (2014): Carbon lock-in through capital stock inertia associated with weak near-term climate policies, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.09.017

Eom et al. (2014): The Impact of Near-term Climate Policy Choices on Technology and Emission Transition Pathways, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.09.017

Schwanitz et al. (2014): The implications of initiating immediate climate change mitigation - A potential for co-benefits? Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2014.01.003

Bauer et al. (2014): CO2 emission mitigation and fossil fuel markets: Dynamic and international aspects of climate policies, Technological Forecasting and Social Change Change, DOI: 10.1016/j.techfore.2013.09.009

Schaeffer et al. (2014): Mid- and long-term climate projections for fragmented and delayed-action scenarios, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.09.013

Iyer et al. (2014): Diffusion of low-carbon technologies and the feasibility of long-term climate targets, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.08.025

Sano et al. (2014): Assessments of GHG emission reduction scenarios of

different levels and different short-term pledges through macro and sectoral decomposition analyses, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.11.002

Arroyo-Currás et al. (2014): Carbon leakage in a fragmented climate regime: the dynamic response of global energy markets, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.10.002

Marcucci and Turton (2014): Induced technological change in moderate and fragmented climate change mitigation regimes, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2013.10.027

Paroussos et al. (2014): Assessment of carbon leakage through the industry channel: The EU perspective, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2014.02.011

Otto et al. (2014): Impact of fragmented emission reduction regimes on the energy market and on CO2 emissions related to land use: A case study with China and the European Union as first movers, Technological Forecasting and Social Change, DOI: 10.1016/j.techfore.2014.01.015

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