Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11952, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11952
EGU General Assembly 2008
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Triple Hedging for Mitigation – Managing the Risk of Expensive Renewables, Large Climate Sensitivity and Underground-CO_2 Leakage

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An optimal mitigation strategy crucially depends on three underdetermined main characteristics of the coupled economy-climate system: the learning rate of renewables (Bauer et al., 2005), climate sensitivity (Gerlagh and van der Zwaan, 2004) and the leakage rate of CO_2 (Bauer et al., 2005) sequestered underground in the context of carbon capture and sequestration (CCS). Optimal investment in mitigation options under uncertainty is the issue society ultimately has to deal with. Here we present an algorithm that delivers such optimal investment streams under uncertain climate and technology parameters (Held et al., subm.). It turns out that optimal investment paths cannot be mimicked by deterministic analyses, fed by re-tuned deterministic parameter settings, such as above-average climate sensitivity.

In this context the global rate of leakage from underground CO_2 in the context of CCS requires extra treatment: this parameter is up to now an ill-posed concept, as it will be a strong function of the institutional setting for CCS. Hence we have proposed CCS-bonds (Edenhofer et al., 2005) as an institutional incentive to determine (Friedmann et al., 2006) and reduce the globally aggregated leakage rate. We also discuss a version that allows for an elegant nesting with a global CO_2 cap and trade system. However, any such bond scheme will crucially depend on local detection limits of CO_2 leakage, prospects of which will also be summarised during this session.

The final goal must be an overall strategy to embed the risks of mitigation options in

an integrated assessment on the optimal mix of options.

References:

N. Bauer, O. Edenhofer, H. Held, E. Kriegler, Uncertainty of the role of carbon capture and sequestration within climate change mitigation strategies, in the peer-reviewed volume (I) by E. S. Rubin, D. W. Keith, C. F. Gilboy (Eds.) of Proceedings of the 7th International Conference on Greenhouse Gas Control Technologies (5-9 September 2004, Vancouver, Canada), 931-939, Elsevier, Amsterdam (2005).

O. Edenhofer, H. Held, N. Bauer, A regulatory framework for carbon capturing and sequestration within the post-Kyoto process, in the peer-reviewed volume (I) by E. S. Rubin, D. W. Keith, C. F. Gilboy (Eds.) of Proceedings of the 7th International Conference on Greenhouse Gas Control Technologies (5-9 September 2004, Vancouver, Canada), 989-997, Elsevier, Amsterdam (2005).

S. J. Friedmann, J. J. Dooley, H. Held, O. Edenhofer, The low cost of geological assessment for underground CO_2 storage: Policy and economic implications, Energy Conversion and Management 47 (13-14), 1894-1901 (2006).

R. Gerlagh and B. van der Zwaan, A sensitivity analysis of timing and costs of greenhouse gas emission reductions. Climatic Change 65, 39-71 (2004).

H. Held, O. Edenhofer, N. Bauer, How to deal with risks of carbon sequestration within an international emission trading scheme, in Proceedings of the 8th International Conference on Greenhouse Gas Control Technologies (19-22 June 2006, Trondheim, Norway), issued on CD-ROM (ISBN-0-08-046407-6), by Elsevier/IEA GHG (2006).

H. Held, E. Kriegler, K. Lessmann, O. Edenhofer, Efficient Climate Policies under Technology and Climate Uncertainty, resubmitted to Energy Economics.