

Interactive comment on “Impacts of climate mitigation strategies in the energy sector on global land use and carbon balance” by K. Engström et al.

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As editor, I am submitting a reviewer comment, thus closing the discussion, in light of the authors' long wait for the completion of this review process and of the first reviewer's excellent and thorough review.

The authors present a study of an integrated assessment model in which they first find parameter settings that allow the model to approximate a set of scenarios described in the Shared Socio-economic Pathways framework, and then add a mechanism intended to represent a carbon tax imposed on fossil fuel combustion, and note the impact of this tax on gross world product, on fossil fuel use, and on agricultural activity.

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Interactive comment

I concur with the first reviewer's comments and recommendations, especially with regard to the desirability of a more realistic accounting of the local cost to wealth of climate impacts (since these are already spatially resolved for use in the ecosystem model).

I have a number of additional suggestions for clarifications. It was not immediately clear to me that the various SSP scenarios would be imposed on the model through parameter choices (as opposed, for example to forcing the model through variable population growth rates or some other forcing mechanism). The introduction could be rewritten to make this much clearer, and also to address the first reviewer's concerns about how consistent the model trajectories are with the SSPs as defined.

The discussion of "damage on GWP" is confusing- this seems to be just a proxy for global warming averted, but since the climate-economy model calculates GWP explicitly, couldn't the GWP itself be shown, so that the increase in GWP due to the optimized carbon tax would be apparent in Figure 4? Similarly, the terms "challenges to adaptation" and "challenges to mitigation" don't seem to be as parallel in meaning as their grammatical parallelism would suggest. "Challenges to adaptation" seems to indicate political resistance to adaptation, while "challenges to adaptation" seems to indicate a structural likelihood of a lot of damage to GWP due to warming. Perhaps these should be rephrased as "resistance to mitigation" and "wealth available for adaptation" (which would have the opposite sign to "challenges to adaptation")? In this regard, l. 21 on page 8 seems problematic without a clear baseline: since higher γ means more damage per unit Carbon emitted, the required reduction in emissions to achieve a given reduction in damage is actually less, though of course the reduction in emissions required to achieve a given low *level* of damage would be larger.

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