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Interactive comment on "Global anthropogenic methane emissions 2005–2030: technical mitigation potentials and costs" *by* L. Höglund-Isaksson

Anonymous Referee #2

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This is an excellent and comprehensive study that shows an estimate of 2005 global methane emissions, emissions projected for 2030, and the availability of methane reduction measures for 2030 as a function of cost.

This work will clearly be among the studies that will be widely referenced as a source of emissions estimates and for its estimates of the availability of emission reductions at different costs. The paper is strong in the comprehensiveness and detail in its estimates; while the paper is not highly detailed in all of the assumptions used, the extensive supporting information provides ample detail.

While I expect that this will be a publishable paper of high quality, I thought that there

was one important omission that limits the usefulness of this paper in its current form. The author is careful to compare estimates of 2005 emissions with other studies. However, I think it would be relevant also to compare with the RCP scenarios, as these will be widely used, particularly for the 2030 projection. In addition, there is no comparison of the cost curves with previous work. As I understand it, many global integrated assessment models now use methane cost curves from the EPA and Stanford EMF. It would therefore be relevant to compare these cost curves with those used previously – at least to say whether this new study has identified new measures that were not included previously.

I also think that there is a missed opportunity to present results that are more policy relevant. The author focuses on the costs associated with "max implementation". But some of the measures included here are so expensive that they would not likely be chosen. Instead there is an opportunity to discuss the emission reductions available at a net cost-savings or at modest prices (such as 25 Euros per ton CO2 equivalent). Reporting these figures not only provides a point of comparison with previous studies, but also might get the attention of people who could actually make decisions on methane control. These quantitative indicators could then be featured in the abstract and conclusions sections.

More specific comments and questions:

- The abstract is short for my taste, and in particular, it lacks any results regarding the analysis of mitigation costs. This might be a good place to summarize how much reduction is available at a cost savings.

- In equation 1, it looks like different mitigation measures are added together. If we took two technologies that each reduced emissions by 50% from the same source, and applied both, would the net reduction be 100% or 75%? I would think 75%, but perhaps I am wrong. I'd like to see the author justify the treatment of multiple measures.

- I think Equation 3 would be better if it specified units in the description. This is

important for equation 4, as this equation would only hold for some set of units that are not specified in the paper (that is, the 3 should have units).

- Section 2.2.3 – I understand the motivation that a social perspective should consider a longer lifetime than the private. But shouldn't that lifetime also be a function of the technology? I'm surprised to see a uniform lifetime applied to all measures.

- Section 3.3 and figures 8 and 9 – I don't know what the "weighted marginal cost" means.

- Section 4 – since this deals with uncertainty in emissions and not in mitigation costs, would this be better before 3.3?

- Conclusions – consider whether this section can be more quantitative, particularly for the mitigation measures.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 11275, 2012.