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Interactive comment on "Global emissions of fluorinated greenhouse gases 2005–2050 with abatement potentials and costs" *by* Pallav Purohit and Lena Höglund-Isaksson

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The paper is a result of very comprehensive modelling of the projected deployment of HFCs, PFCs and SF6 in each of their current end uses and each region of the world. This has involved the assembly of a large quantity of data and many assumptions. The end result is only as good as the quality of the data and assumptions and both of these need to be revisited if the work is to be of any value. I have not attempted a comprehensive review of the changes required and, while the following are intended as examples of shortcomings, they are not the only ones that need to be addressed. 1. The values of the GWPs, quoted as being from AR5, in Table S2 are incorrect, particularly those for HFC-134a, the most widely used HFC, but also HFC-23, PFC-

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14 and SF6. This affects the numerical values of all of the results. 2. There seems to be an assumption in the models (or their inputs) that the industries using these materials are isolated regionally whereas in fact they are globalised. One result of this is that the prohibition of use of HFC-134a in mobile air conditioning (MAC) in Europe is considered not to affect its use in this application in the rest of the world. The reality is that manufacturers of original equipment are supra-regional and MAC systems that use HFC-134a have now, or shortly will be, superseded world-wide. The modelling needs to reflect the realities of the markets. 3. On a similar note, there is little or no justification for assumptions such as that in lines 21 to 24 of page 11 that abatement of HFC-23 emissions from Chinese production of HCFC-22 will remain constant. While it might happen that no new HCFC-22 production will have HFC-23 treatment and disposal, this is by no means certain. This is such an important assumption that, if Feng et al. (2012) give reasons, they should be repeated in this paper. 4. The paper contains a section on comparison with other studies but fails to mention the Representative Concentration Pathways used by IPCC to describe the future concentrations of all greenhouse gases. The baseline scenario given in this paper results in emissions between two and three times higher than the largest of the RCP scenarios (RCP8.5). At the very least this discrepancy needs to be addressed and sufficient reasons given to enable the scenario derived for this paper to be used in the broader context of future greenhouse gas emissions. Admittedly, the impact of the compounds covered by this paper amounts to less than 2% of the total impact of all greenhouse gases in the future, but although their effect is small, it is essential that it is placed accurately in the context of total greenhouse gas impacts. 5. Finally, the authors should avoid using percentages where absolute values would be more instructive. For example, the abstract states "Estimates show that it would be technically feasible to reduce F-gas emissions by 86 percent between 2018 and 2050". This percentage is influenced by both the baseline values and the projection. It would be far more instructive to quote the absolute values, that is "from X Pg CO2eq/yr to Z PgCO2 eq/yr". Furthermore, the value quoted does not agree with the value scaled from Figure 3 (92%).

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