

Austria in a 2050 Global Emissions Equity (GEE) World – - An extended picture



Contribution of WUP2 to ClimTrans2050: Austria's Emission Requirements in a Global Context

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ClimTrans2050 Stakeholders Workshop, Vienna, AT; 30 September 2015

Global Context

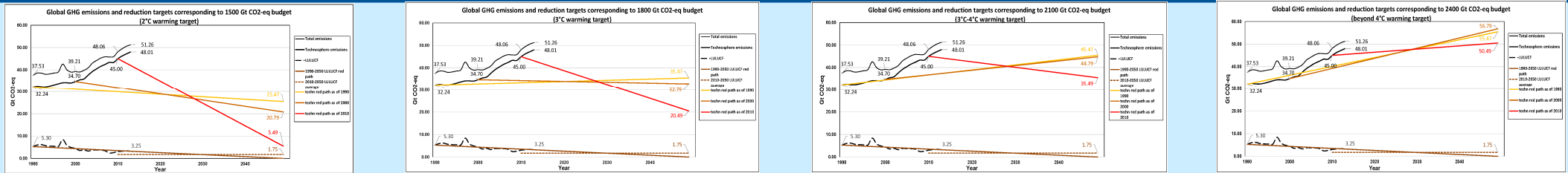


Fig. 1a : The budget of 1500 Gt CO₂-eq for global cumulative GHG emissions in the period 2000-2050 corresponds to the 2°C warming target (Meinshausen *et al.*, 2009). The thick black line represents global GHG emissions from technosphere only, while thin black line represents the total global GHG emissions that include also the emissions from land use and land use change (LULUCF) (see black dashed line at the bottom of the figure). The thick yellow, orange and red lines are the linear paths of reductions starting in 1990, 2000 and 2010 respectively, and were constructed so that they satisfy the 2000-2050 GHG emissions budget of 1500 Gt CO₂-eq. These reduction targets were derived under the assumption that sustainable land use will be achieved by the 2050 (i.e., the net emissions from LULUCF in 2050 will be zero). This assumption is represented by the brown line at the bottom of the figure. **Fig. 1b – Fig. 1d** present analogous global reduction targets for 2000-2050 cumulative GHG emissions budgets of 1800 Gt CO₂-eq, 2100 Gt CO₂-eq, and 2400 Gt CO₂-eq that correspond to warming targets of 3°C, between 3°C and 4°C and beyond 4°C, respectively.

Austria in a 2050 2 – 4 °C GEE World

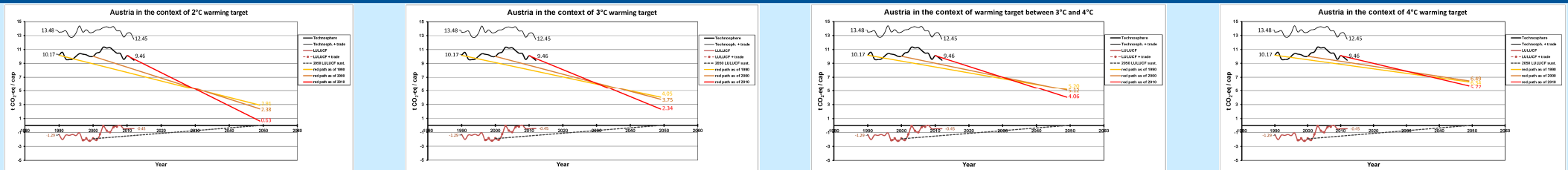


Fig. 2a: Translation of global warming target of 2°C onto Austria's per capita emissions targets. The thick black line represents the GHG emissions from technosphere that occurred on the territory of Austria only, while the thin black line represents all the Austria's technosphere emissions with international trade taken into account (i.e., emissions occurred outside Austrian territory that resulted from the production and transport of goods consumed in Austria). Similarly, brown lines at the bottom of the plot show the (negative) Austria's GHG emissions from LULUCF (with and without international trade of biomass taken into account). The gray dashed line is the LULUCF emissions path leading to zero land-use related emissions in the 2050. Yellow, orange and red lines are the reduction paths of per capita emissions starting in 1990, 2000 and 2010 derived from corresponding global emissions reduction paths depicted on Fig. 1a. **Fig. 2b – Fig. 2d** present analogous per capita reduction targets corresponding to warming targets of 3°C, between 3°C and 4°C and beyond 4°C, respectively.

Energy related functionalities in the context of Austria's warming targets

Two scenarios have been developed with use of the sGAIN models. We coin these scenarios Moderate Ambitious (MA) and Highly ambitious (HA). **MA scenario** will bring down CO₂ emissions to 42% compared to 2005. It is rather generous in the expansion of functionalities and is mainly based on increases of productivity and changes in the energy mix which can already be observed. **HA scenario** will obtain a 80% reduction of CO₂ emissions by 2050. It requires disruptive changes in particular in mobility leaving only 15% of transport based on combustion engines and a thorough improvement in the energetic efficiency of the building stock. Also some functionalities may be considered redundant and are therefore slightly reduced.

The figures below present CO₂ emissions paths resulting from MA and HA scenarios projected onto Austria's GHG emissions reductions paths for different warming targets. Taking into account that today's CO₂ emissions from energy functionalities constitute roughly 80% of Austria's technospheric CO₂ emissions we conclude that MA scenario would meet 4°C warming target while HA scenario would satisfy warming target slightly above 3°C.

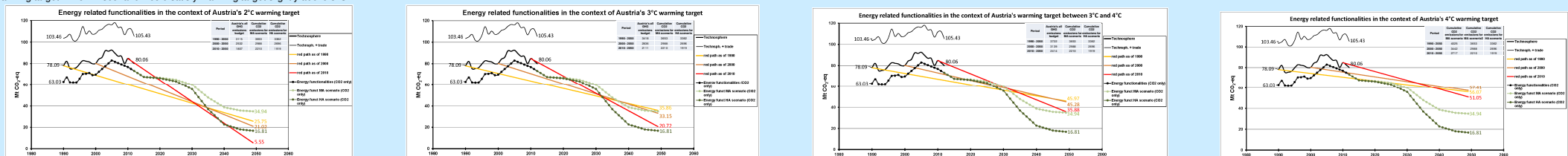


Fig. 3a: Energy related functionalities embedded into Austria's 2°C warming target. Similarly to Fig. 2a, thick and thin lines represent Austria's technospheric emissions with and without international trade taken into account. Yellow, orange and red lines are the emissions reductions paths corresponding to the per capita emissions reductions paths shown on Fig. 2a. Black dotted line represents historical CO₂ emissions for all energy related functionalities, while light and dark olive dotted lines are the CO₂ emissions paths for MA and HA scenarios, respectively. Table in the upper right corner of the figure enables comparison of the cumulative CO₂ emissions for these scenarios with the Austria's budget of cumulative emissions of all GHG corresponding to the 2°C warming target (all expressed in Mt CO₂-eq). **Fig. 3b – Fig. 3d** present MA and HA scenarios CO₂ emissions paths projected onto analogous reduction targets corresponding to warming targets of 3°C, between 3°C and 4°C and beyond 4°C, respectively.