Chapter 11 Mitigation from a cross-sectoral perspective

Supplements to Dr. M. Grubb

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Items in Chapter 11

- Unconventional Mitigation Options: (with cautions)

  geoengineering (ocean fertilization, albedo control)
- Integration of Sectoral Mitigation Potentials in Chapters 4 to 10; incl. comparison b/w bottom-up and top-down
- Interactions among Sectoral Mitigation Options:

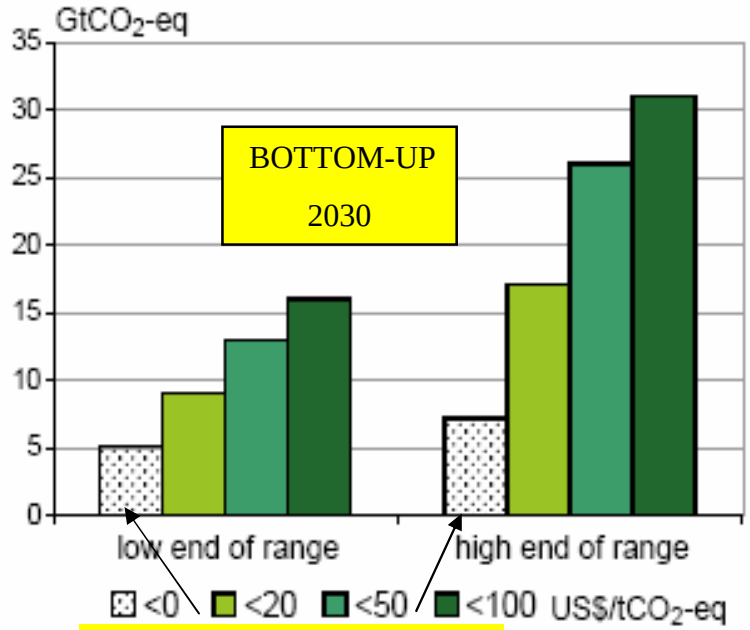
  carbon content of electricity; energy price effects; biomass utilization (bioenergy, biomass stock, and land use)
- Macro Economic Effects
- Endogenous Technology Change
- Spillover Effects: carbon leakage; technological spillover
- Synergies and Trade-offs:

  air pollution; employment; energy security → no regret
- Mitigation and Adaptation:

  sustainable policies for managing natural resources could provide both significant adaptation benefits and mitigation benefits, esp. in carbon sink enhancement

Economic potential is substantial for the mitigation of global GHG emissions over the coming decades

- Estimates are from both bottom-up and top-down studies



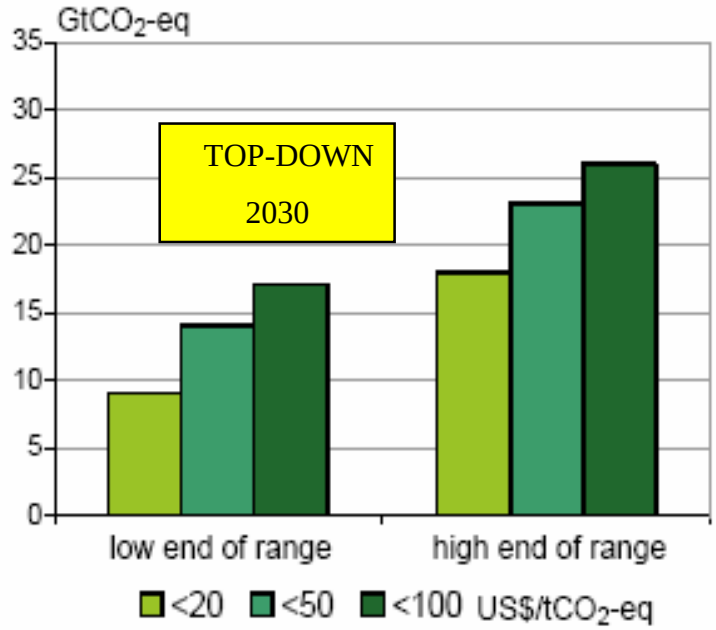
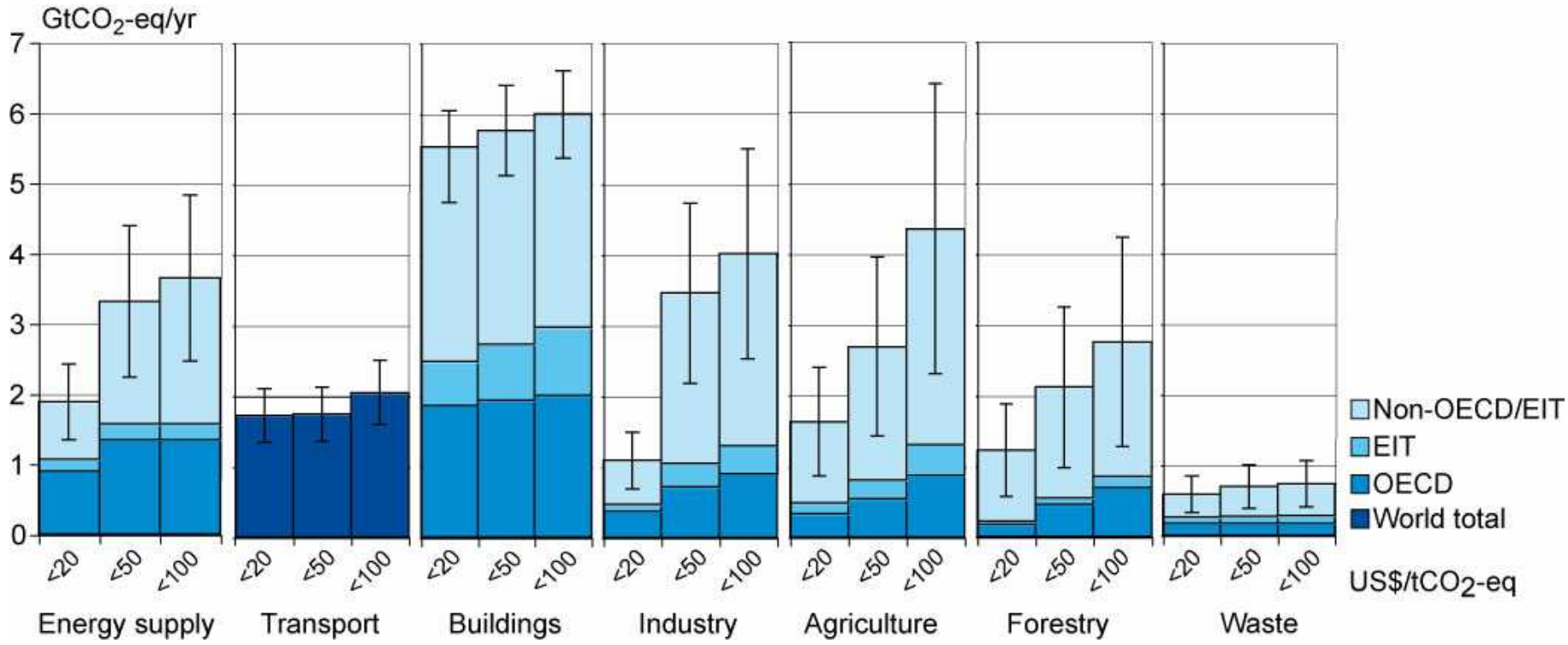


Figure SPM 5A:*Global economic potential in 2030 estimated. Cost categories in US$/tCO2eq.*	***Figure SPM 5B:*** *Global economic potential in 2030 Cost categories in US$/tCO2eq..*

Note: estimates do not include non-technical options such as lifestyle changes

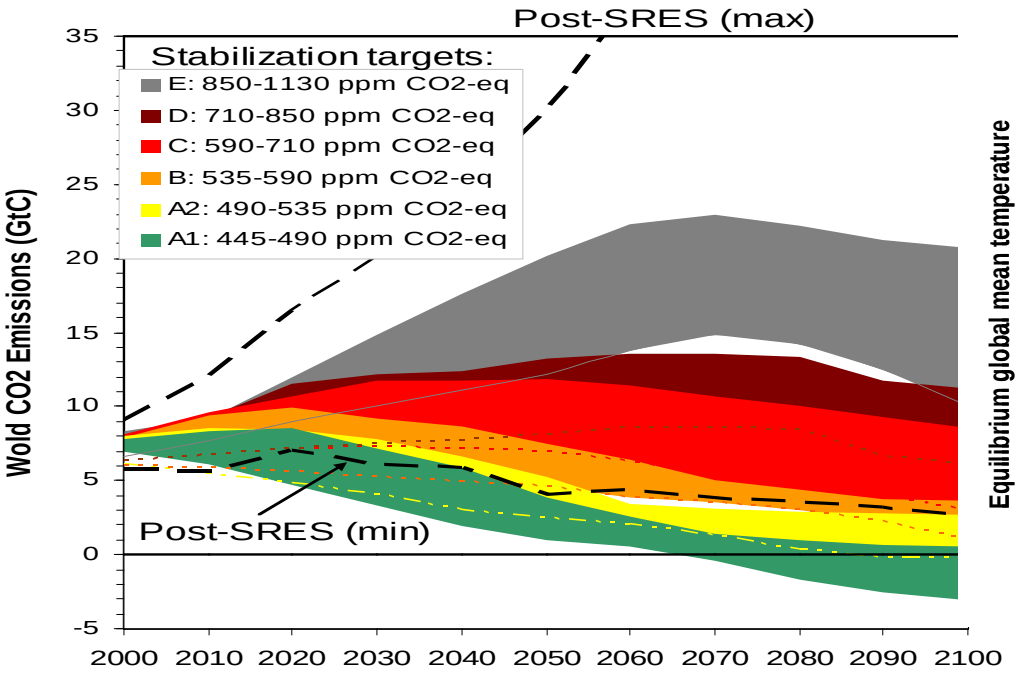
All sectors and regions have the potential to contribute (end-use based)



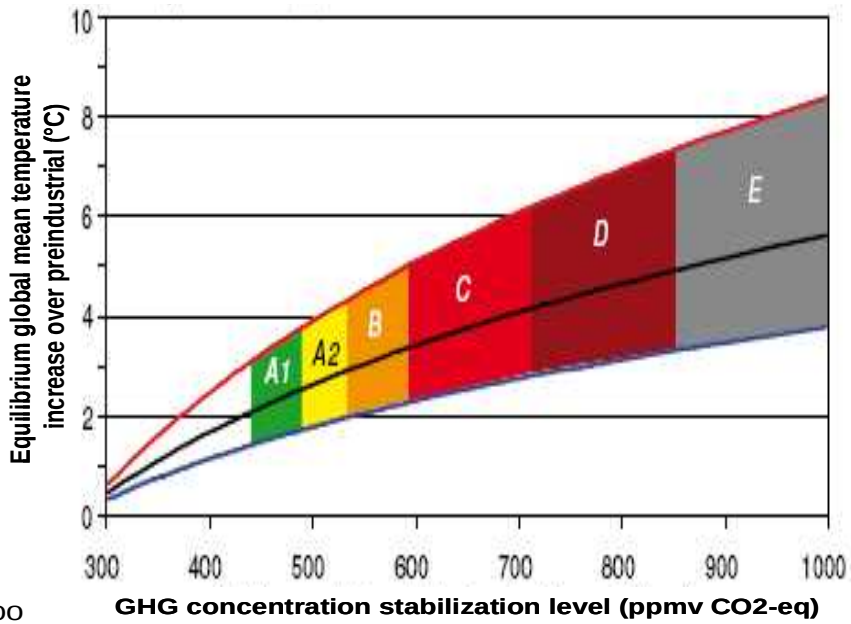
Note: estimates do not include non-technical options, such as lifestyle changes.

The lower the stabilisation level, the earlier global emissions have to go down

Global CO_2 in GtC



Mean temperatures °C



Multigas and CO2 only studies combined

What are the macro-economic costs in 2030 for different stabilization levels?

Stabilization levels (ppm CO_2-eq)	Median GDP reduction[1] (%)	Range of GDP reduction [2] (%)	Reduction of average annual GDP growth rates [3] (percentage points)
590-710	0.2	-0.6 – 1.2	< 0.06
535-590	0.6	0.2 – 2.5	<0.1
445-535[4]	**Not available**	**< 3**	**< 0.12**

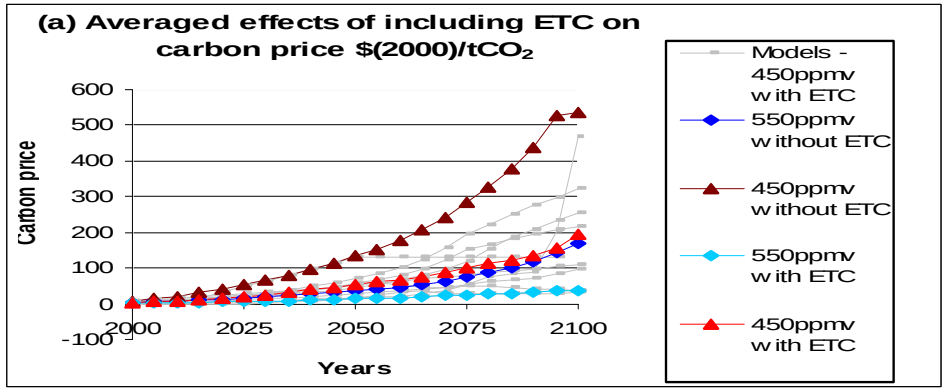
[1] This is global GDP based market exchange rates.
[2] The median and the 10th and 90th percentile range of the analyzed data are given.
[3] The calculation of the reduction of the annual growth rate is based on the average reduction during the period till 2030 that would result in the indicated GDP decrease in 2030.
[4] **The number of studies that report GDP results is relatively small and they generally use low baselines.**

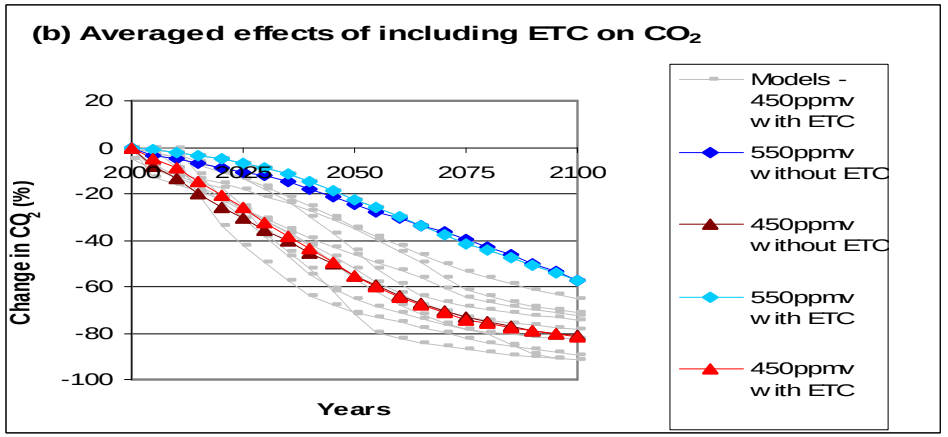
These net costs and ranges come for modeling studies that assume efficient markets etc. They do not include net environmental and other co-benefits, which can be substantial.

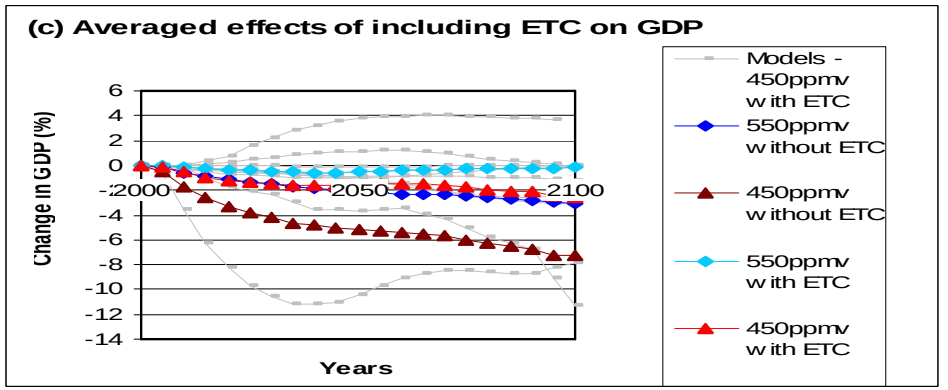
Average effects of including endogenous technological change: 9 models

Averaged effects of including ETC on carbon tax rates, CO_2 emissions and GDP: 9 global models 2000-2100 for the 450 ppm and 550 ppm CO_2 only stabilisation scenarios

Source: IPCC WG3 Report, 2007, Figure 11.9







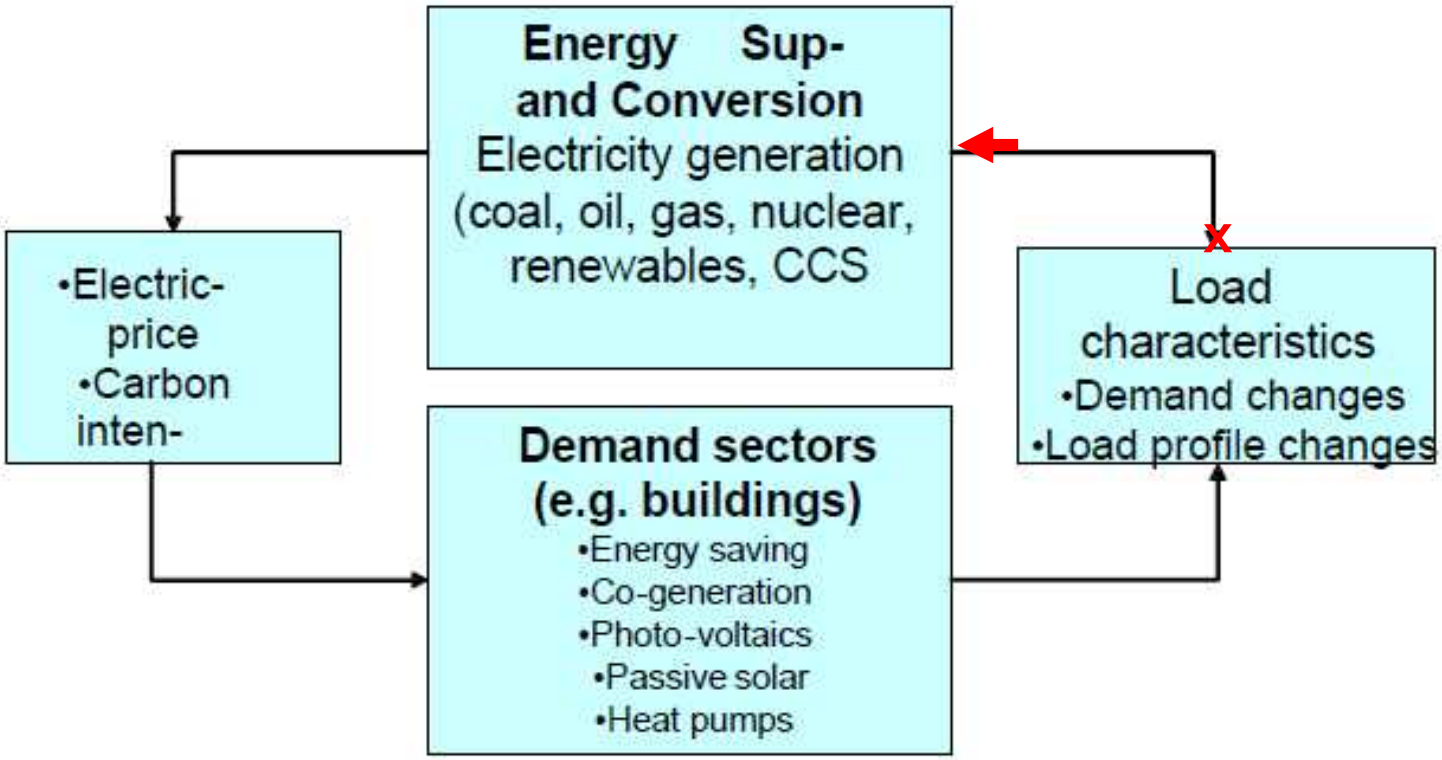


Figure 11.2: *Interactions of CO_2 mitigation measures between electricity supply- and demand-sectors*

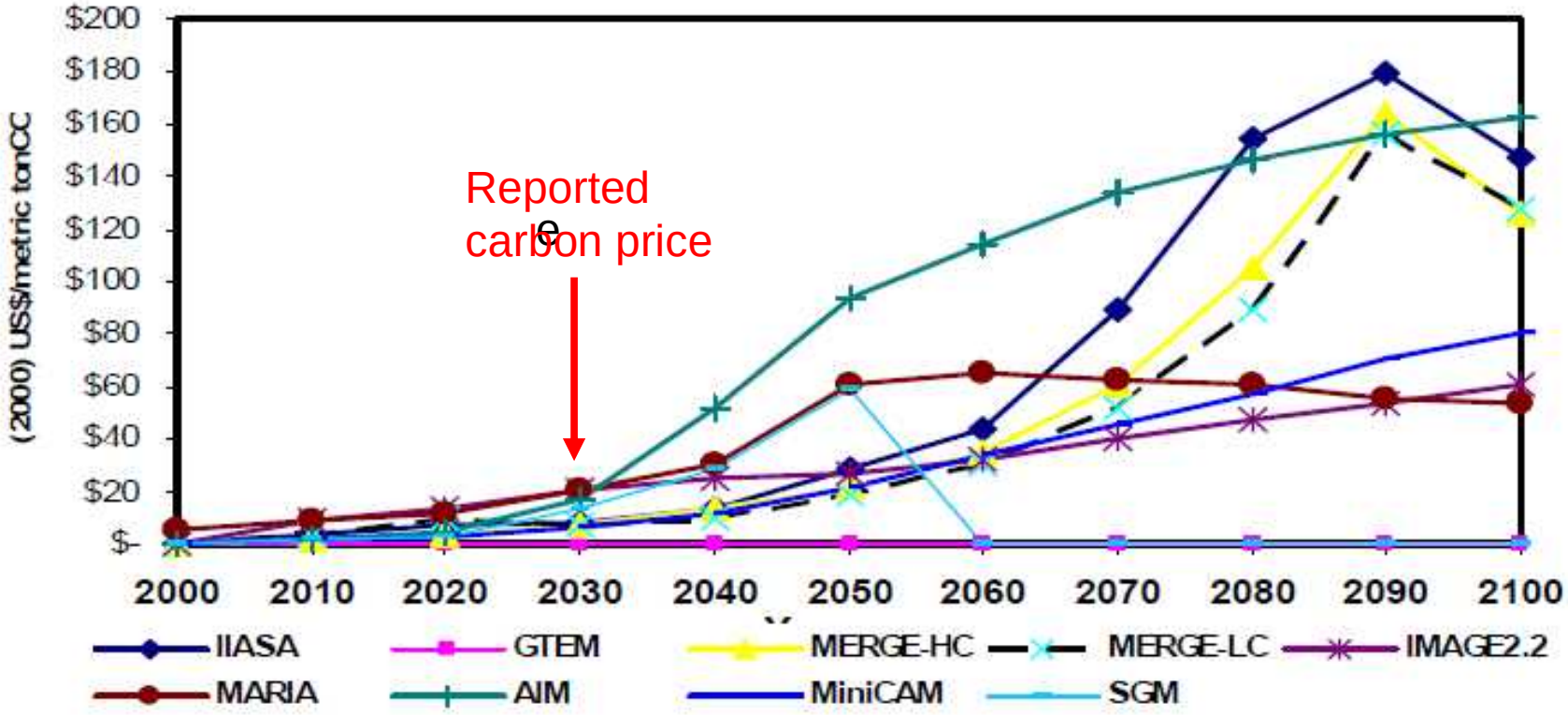


Figure 11.7: Carbon price projections for the 550mmpv CO_2-only stabilization scenario. Source: Weyant (2004).

Final draft (remain to be modified)