

Biomass Use in a Climate context and sustainable potentials for BECCS

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Bioenergy, CCS and BECCS Options for Indonesia

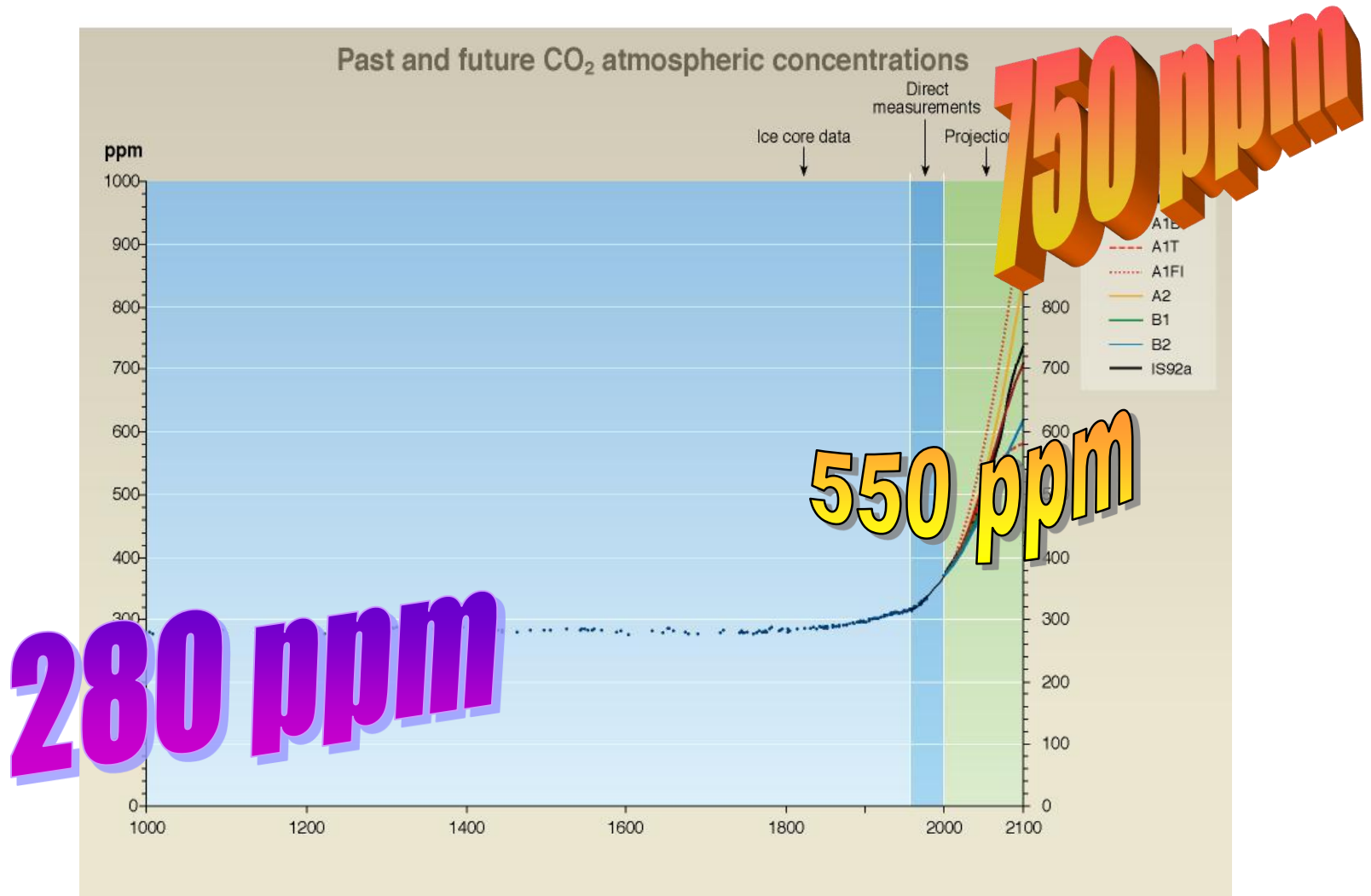
21st Sept.2012, Jakarta, Indonesia

Climate Risk Management

Objective: UNFCCC

...choose an atmospheric **concentration and emission pathway** which allows for the adaptation of eco-systems, food security and economic development....

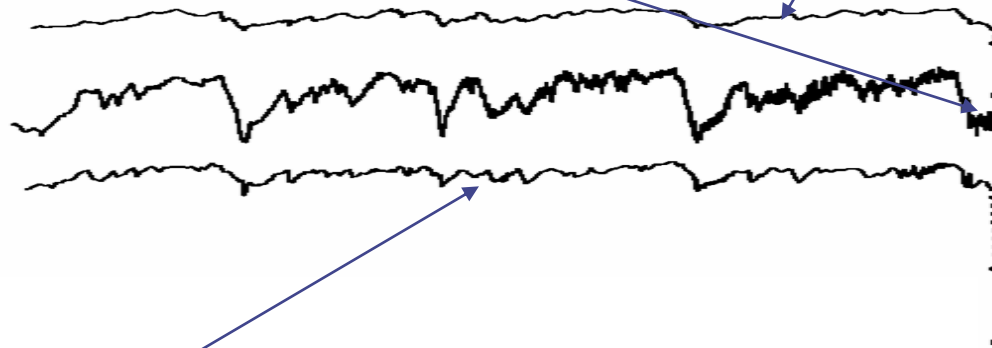
Effective compliance with Art. 2 UNFCCC!?



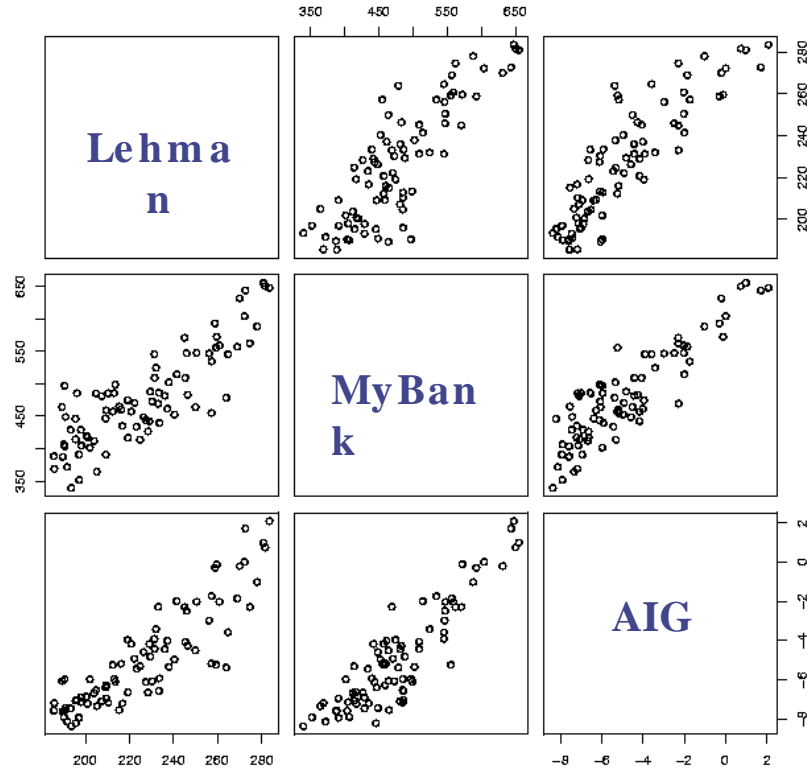
Risk analysis... the Chartist

MyBank

AIG



**Lehmann
Brothers**

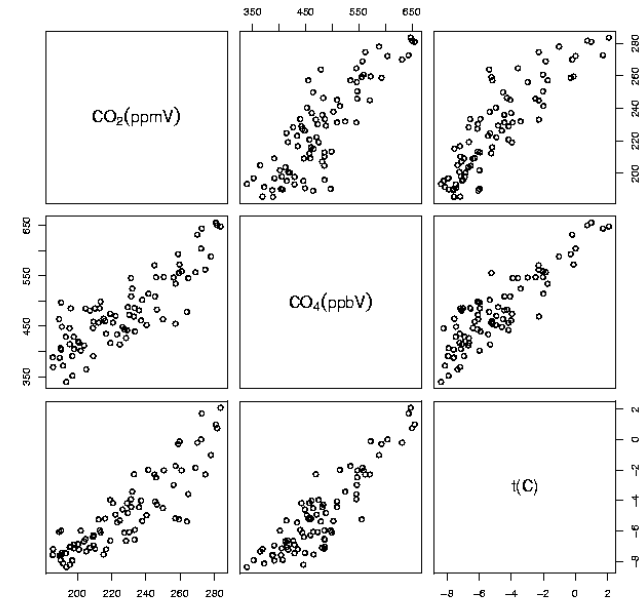
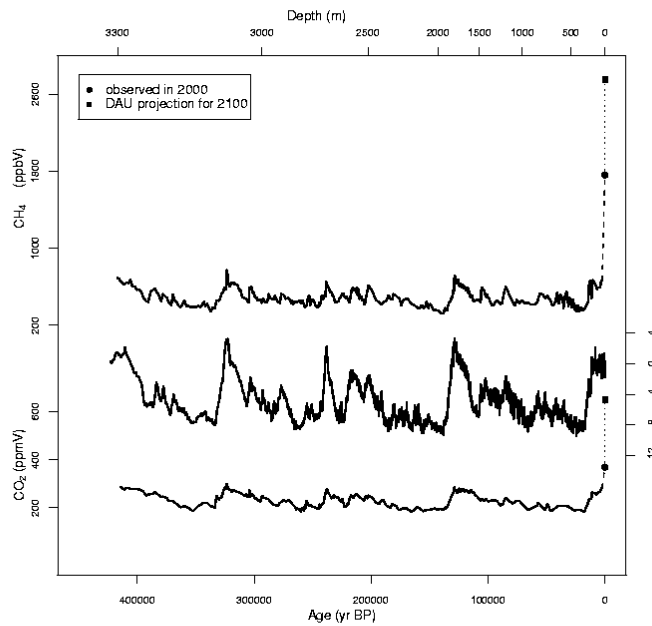




Bank Rescue

The image features a large, bold, red stamp with the words "Bank Rescue" written diagonally across the center. The stamp is superimposed over a black line graph that shows three distinct data series. The graph lines are jagged and fluctuate, with a notable sharp drop at the end of the series. The background of the slide is white, and there is a blue header bar at the top left containing the IIASA logo.

Data is from the climate system!!!



Arguments for rescue of countries /banks

Pro

- Too large to fail
- Large systematic risk to economy and society

Con

- Large sunk costs are needed – today
- Outcome of rescue action is uncertain

Why do states not
intervene as decisively
with climate risks??!!

Arguments for rescue the climate system

Pro

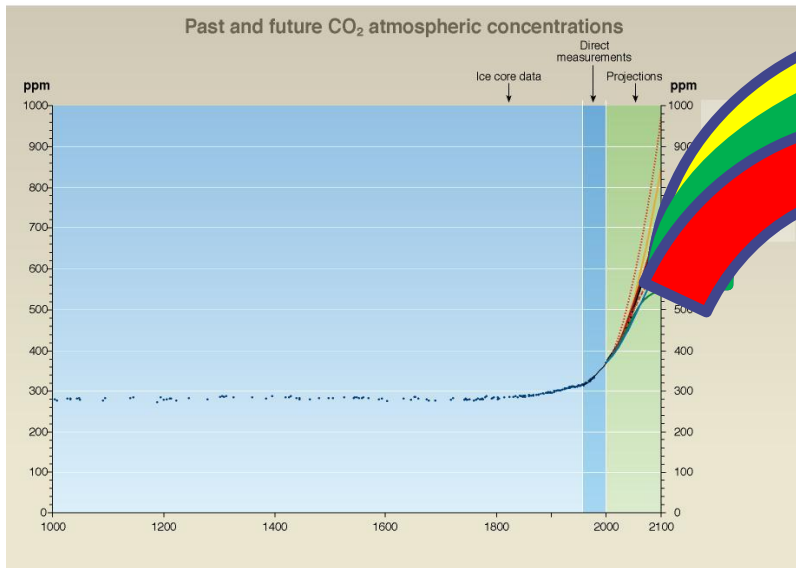
- Too large to fail
- Large systematic risk to economy and society

Con

- Large sunk costs are needed – **today?**
- Outcome of rescue action is uncertain **and in the distant future**

We do **not know** where to stabilize

FIGURE 9.1
SPM - 10a



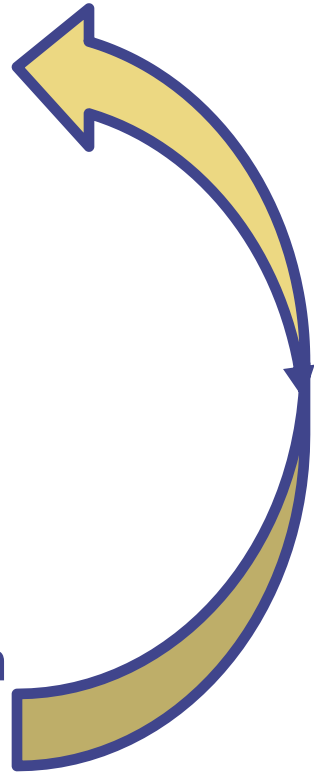
.....thus the **flexibility** of the Energy system matters

How to stabilize atmospheric CO₂ concentrations

- Use less energy
 - Improve energy efficiency
 - Life style changes
 - Stabilize population

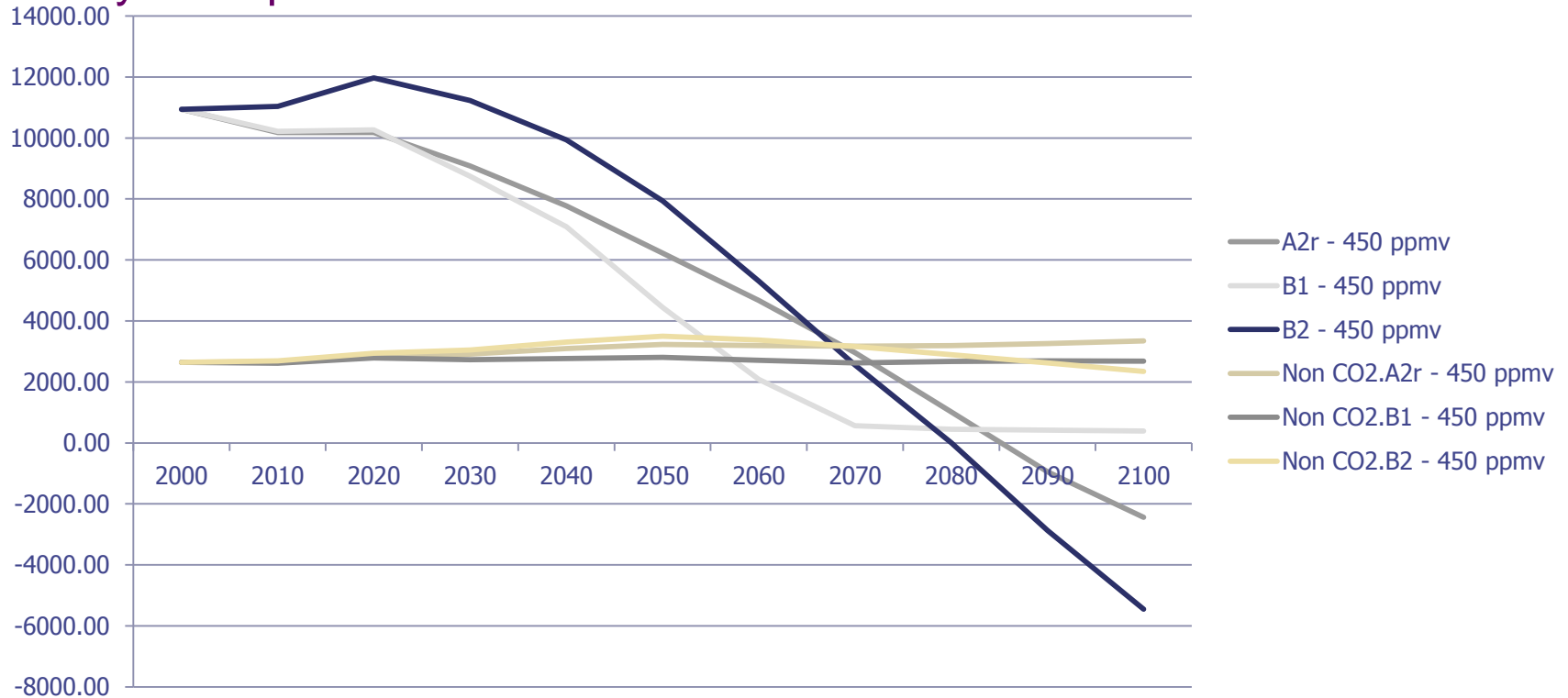
- Use other forms of energy (incl. R&D)
 - Natural gas instead of coal
 - Renewables
 - Nuclear

- Capture and store carbon
 - From fossil fuels and/or biomass (in energy conversion plants)
 - From the atmosphere (in trees, soils or in CO₂ capture facilities)

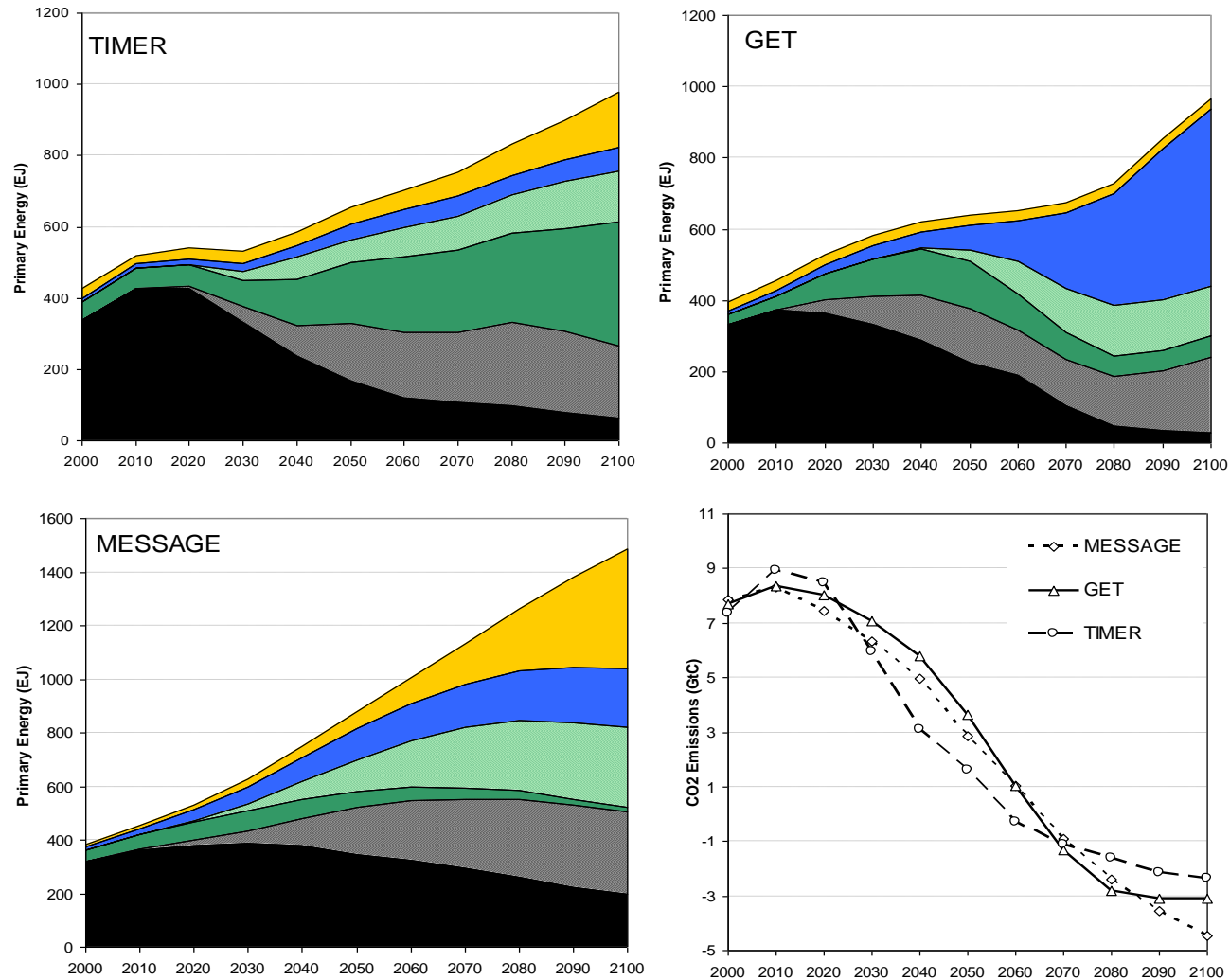


450ppmV Stabilization scenario

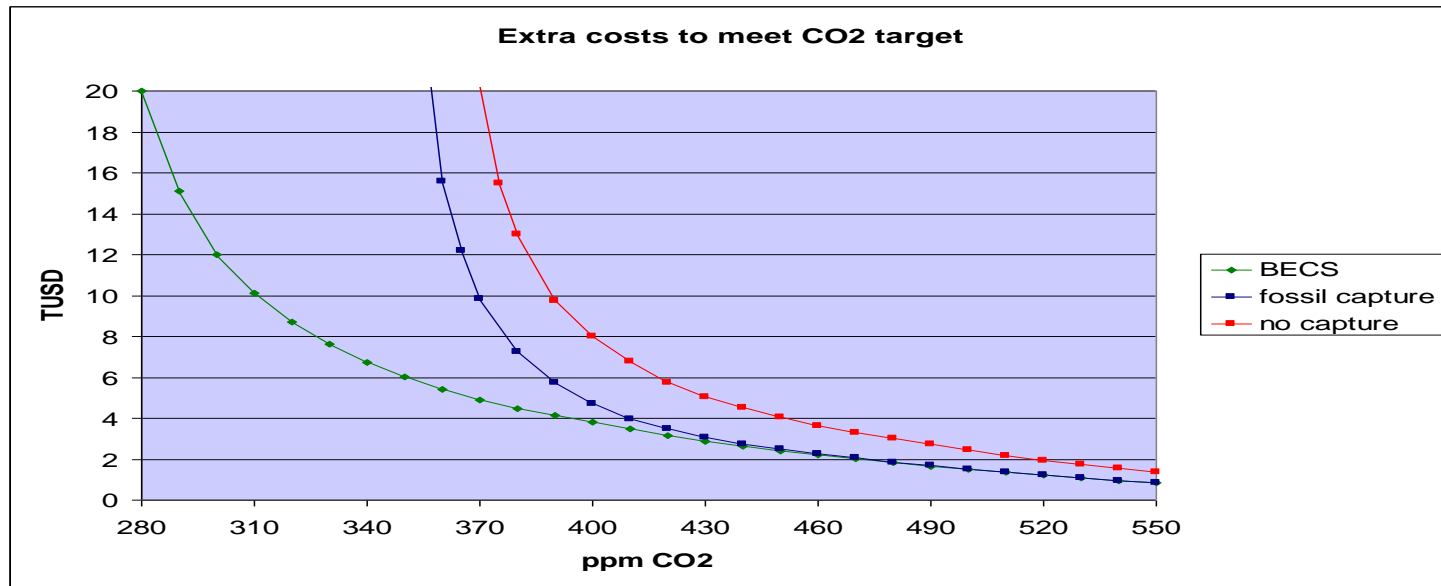
MtC/year equivalent emissions



Global Energy Portfolio – 2DG target



Value of (BE-)CCS when climate target is uncertain



Without BECCS Low Stabilization
Targets are **NOT Feasible!!!**

Without BECCS the Global Energy
system is **NOT** sufficiently **Flexible**
to reduce emissions quickly

BECCS allows to buy time for R&D and energy efficiency measures

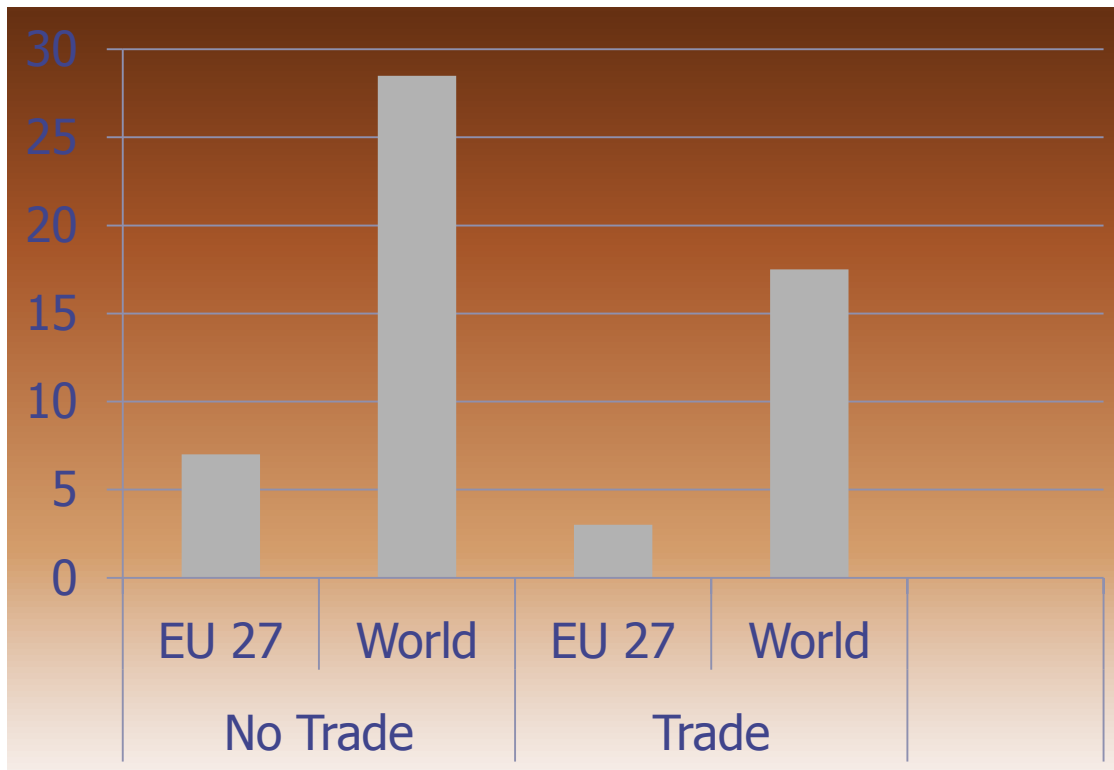
- Incremental
- Radical new technologies

Impacts of Biomass policies

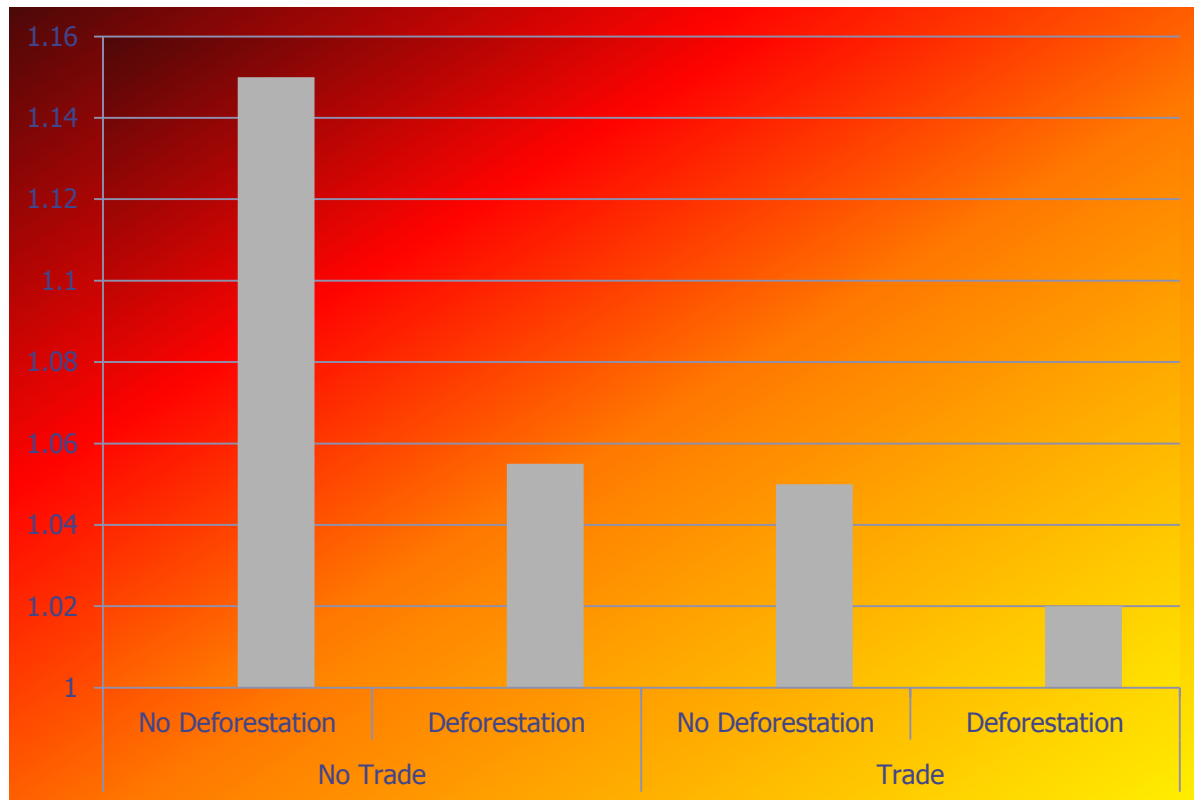
Impact on Deforestation

Mha, based on WEO 2020 targets,

If not constrained (e.g. by REDD) important deforestation occurs

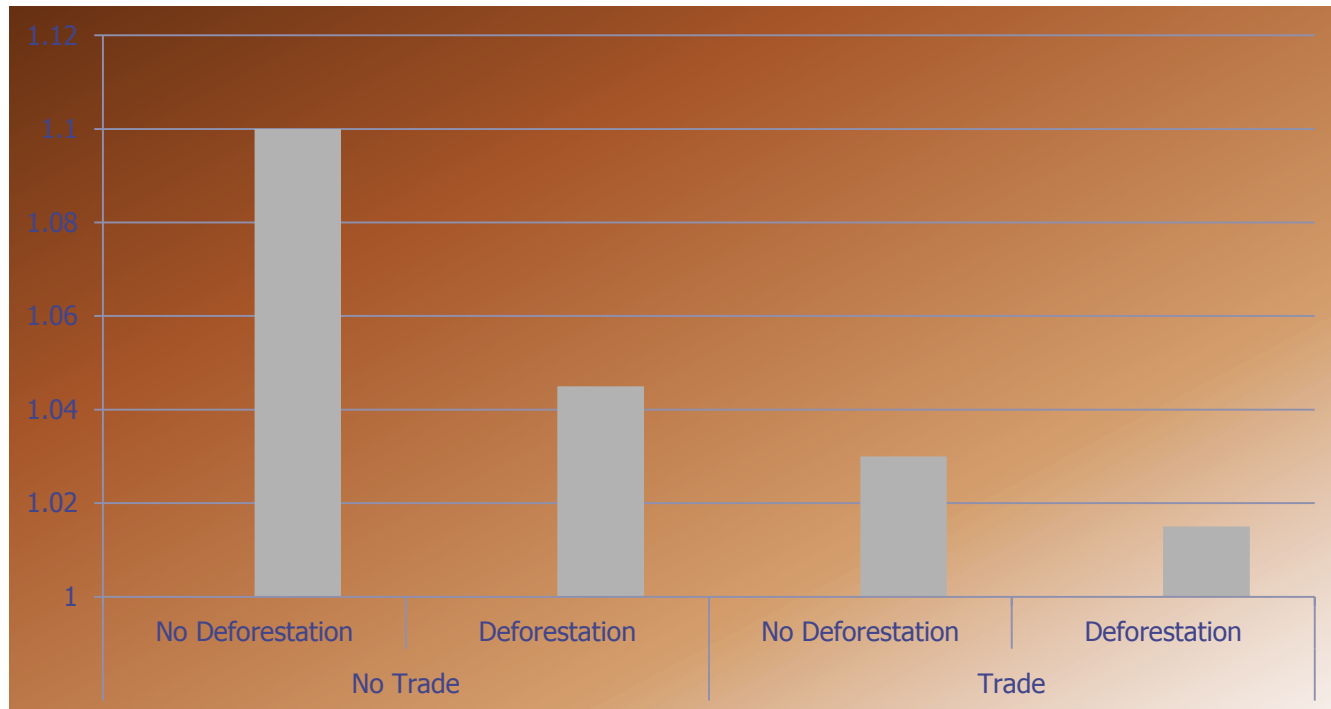


Impact on Crop Price Index



Crop price index, avoiding deforestation further increases the effect of biofuels on crop prices – Trade mitigates the price increase most!

Impact on Irrigation Water Use



Irrigation water use index, avoiding deforestation further increases the effect of biofuels on crop prices – virtual water is the big issue

Final Conclusion

- BECCS intensifies competition for land, but trade matters
- High degree of planning to be part of an integrated carbon-energy-forestry-agriculture-waste management industry strategy
- In transition to BECCS think about CO₂ as a valuable fertilizer and CCS as temporary storage.
- Vast variety of technologies make BECCS an opportunity for not only rural development