

**CENTRO EURO-MEDITERRANEO
PER I CAMBIAMENTI CLIMATICI**



Fondazione
Eni
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**Reduced Emissions from Deforestation and
Degradation (REDD) in the Brazilian Amazon:
an economic assessment**

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Scope of the analysis

Motivation:

- REDD is gaining recognition as a mitigation option

Questions that arise from including REDD in an international carbon market:

- Economic implications (policy costs, carbon market)
- Crowding out of energy abatement
- Impact on technological change
- Carbon trading effects



Conclusions

- Assuming a Post Kyoto ICA, emissions from deforestation in Brazil can be significantly reduced from 2015 onward, and almost completely eliminated by 2030 (ancillary benefits).
- Brazilian REDD can contribute up to 15% of global abatement, in the short term, less in the longer term.
- Carbon prices are reduced by roughly 10%. Positive effect on global policy costs.
- Energy mitigation portfolio and technological innovation are not significantly affected by REDD (but nuclear declines in the long term). CCS deploys from 2020 onwards in both cases.



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Outline

General Idea:

- Climate stabilization policy consistent with 550 ppm_e objective.

Compare cases when REDD is included with those where it is excluded from the carbon market.

Stylized Features:

- Assume International Climate Agreement from 2010, covering a global carbon market
- Rights are allocated on the basis of the Equal Per Capita rule with full participation of all countries
- Energy-economy-climate model fed mitigation curves for avoided deforestation from Woods Hole
- Initial focus on Brazilian Amazon only (realistic assumption)

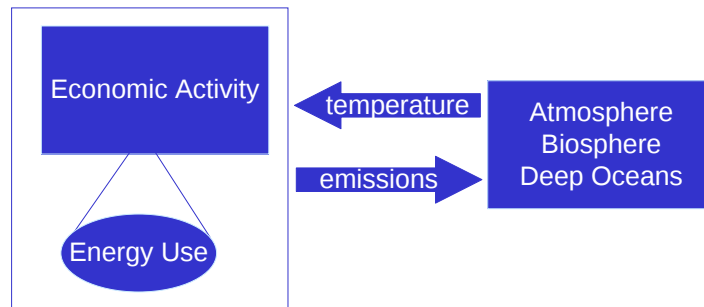


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Methodology

WITCH model (www.feem-web.it/WITCH)

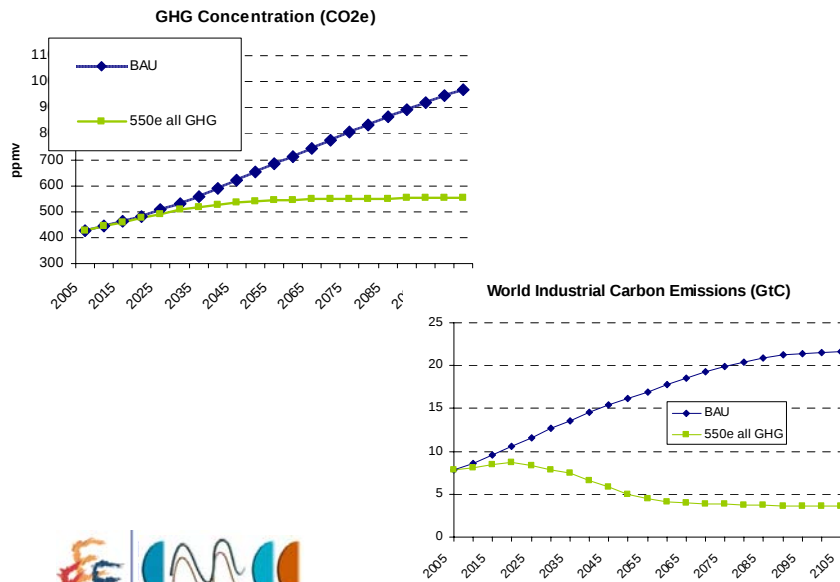
- Integrated Assessment Model designed for climate policy analysis
- Used extensively for academic research and policy support (FEEM, CMCC, EMF, EDF, OECD)



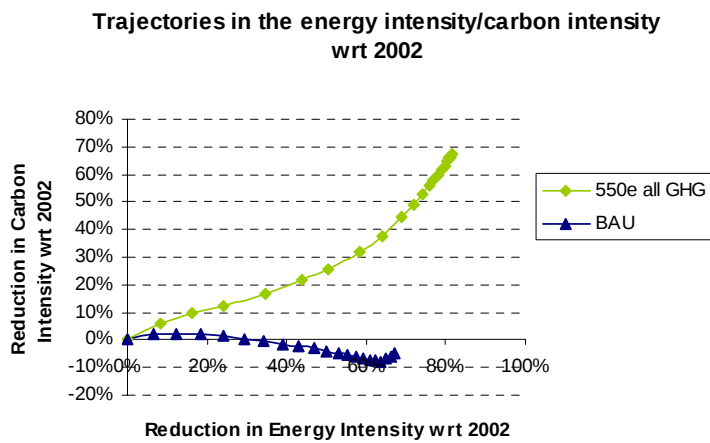
**Cost effectiveness analysis of climate
policy with a stabilization goal
(550ppmv all gases, equal per capita)**



Concentration and Emissions profile

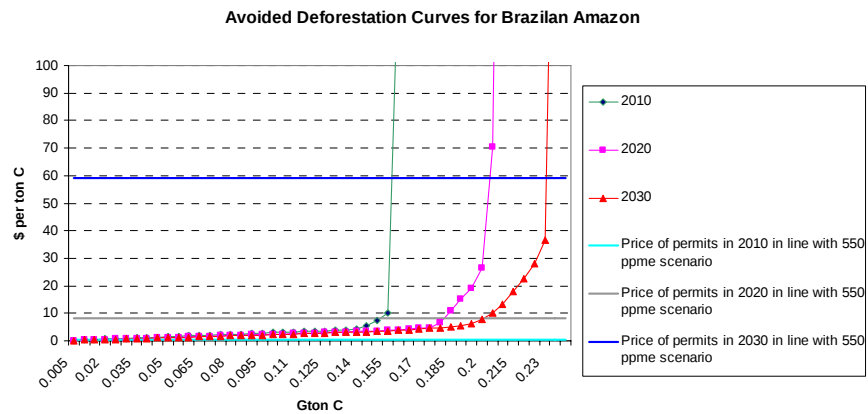


Energy abatement options



Policy induces a significant reduction in carbon and energy intensities

Price of Carbon Vs. Opportunity Cost of REDD in 550e Scenario



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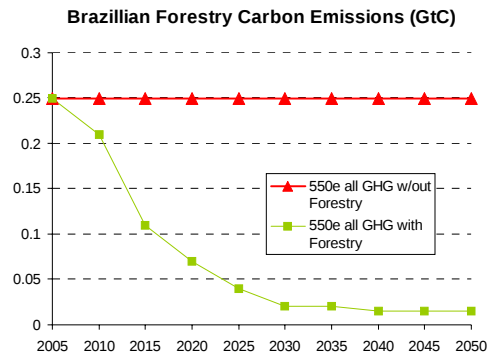
Comparison of results for:

- 1) 550e all GHG **w/out Forestry**
- 2) 550e all GHG **with Forestry (option available for Brazil only)**



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Forestry Emissions in Brazil

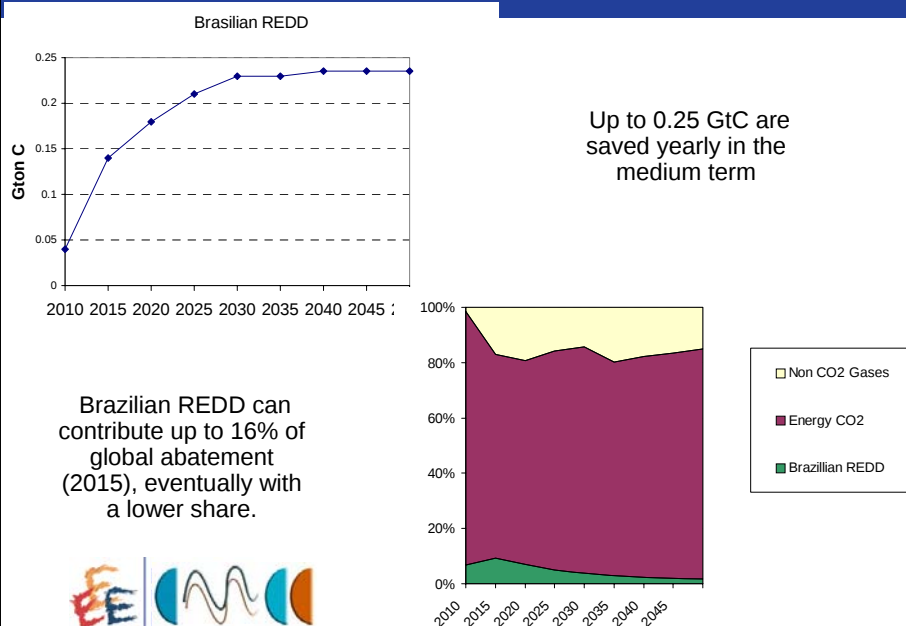


Emissions from deforestation are halved by 2015.
By 2030, almost all deforestation emissions in the Brazilian Amazon would be stopped.



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Braslian Amazon REDD

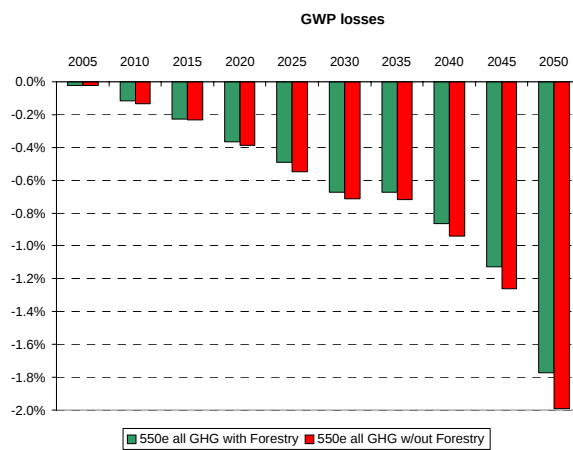


Economic Implications



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Policy costs

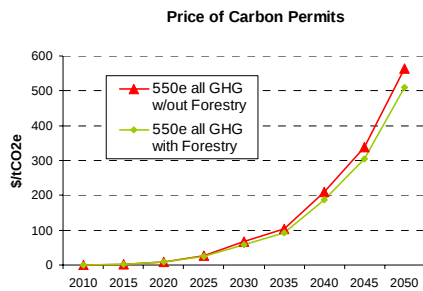


- Economic Policy costs are decreased by the forestry option
- 2030: from 0.71% to 0.67%
- 2050: from 2% to 1.8%



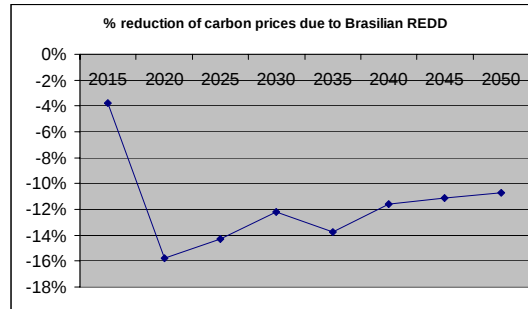
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Price of Carbon Permits

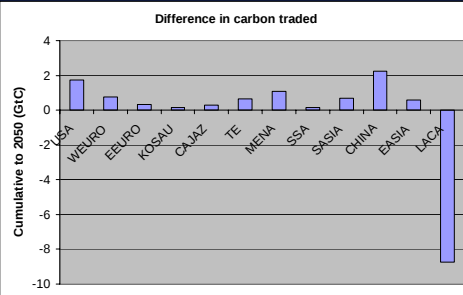


Price of carbon slightly decreases

By roughly 10%.

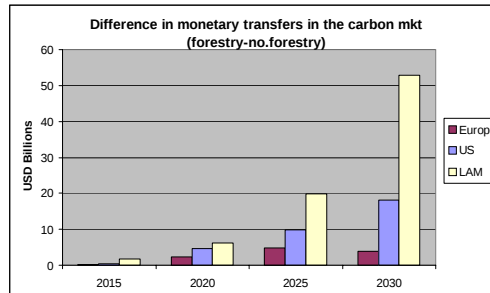


Carbon Permit Trading



US and EU buy slightly more permits, LAM less

Lower carbon prices ensure that all countries gain

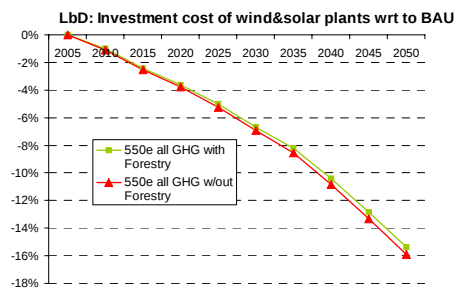
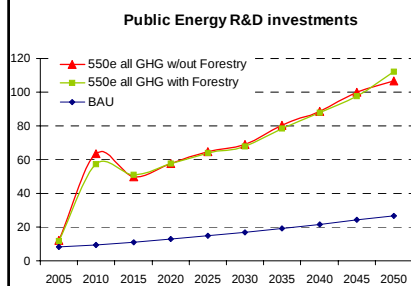


Implications for energy mitigation portfolio



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Endogenous Technical Change

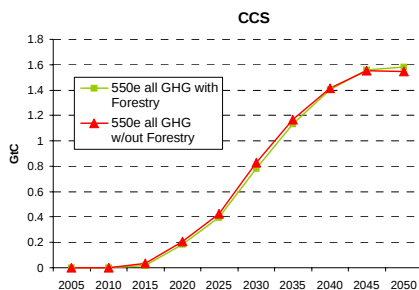


- R&D investments are almost unaffected, expect at the very beginning
- Similarly for experience in renewables



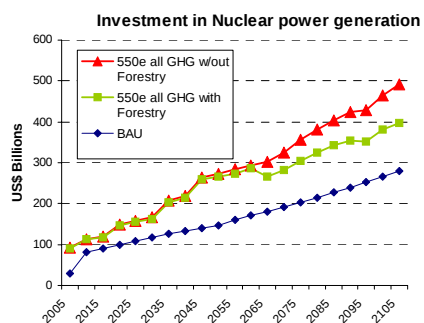
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Endogenous Technical Change



CCS penetrates in 2020 in both cases

Nuclear power investments are decreased in the very long term (possible advantage?)



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To do next

- ❑ Include avoided deforestation from all countries
- ❑ Account for Permanency Issue
- ❑ More Sophisticated REDD Policy Scenarios
- ❑ Different assumptions on burden sharing rule and distributional impact of REDD
- ❑ Including Uncertainty (of stringency of target, of countries participation) in the picture



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www.feem-web.it/witch



A World Induced Technical Change Hybrid Model



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