

Global carbon market and REDD

“The Real Costs of Climate Change”
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Massimo Tavoni, FEEM and Princeton Environmental Institute
EDF-FEEM project. P.I.: V.Bosetti (FEEM) and R.Lubowski (EDF)

Motivation

- Evaluate the implication of **linking REDD to a global carbon market**
- Role of carbon permits **banking** (store emission reduction credits for future use, allowed under Kyoto)

Methodology and set up

- Use the **Integrated Assessment Model** (www.feem-web.it/WITCH) with and without linkage of **REDD** to an international carbon market, and with and wout **banking** of carbon permits
- Simulate a **policy scenario consistent with** the stabilization of CO₂e concentrations at **550ppm** (3.5W/m²):

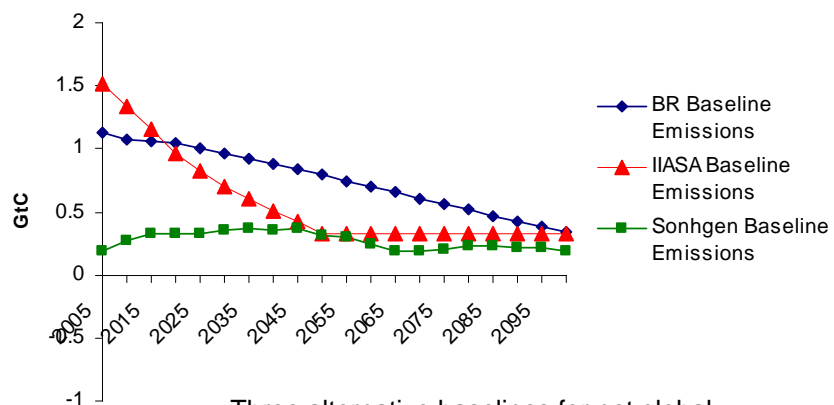
Forestry Emissions and Abatement Costs Data

REDD Data

- **Woods Hole Research Center (BR)**
 - Brazil only (Nepstad et al. 2008)
 - Baseline emissions for other countries from WITCH.
- **IIASA**
 - Data from IIASA cluster model (Eliasch 2008; Gusti et al. 2008)
- **B. Sohngen**
 - Global Timber Model of Brent Sohngen, Ohio State University
 - Data from Energy Modeling Forum 21 (2006)

Global Forestry Baseline Emissions

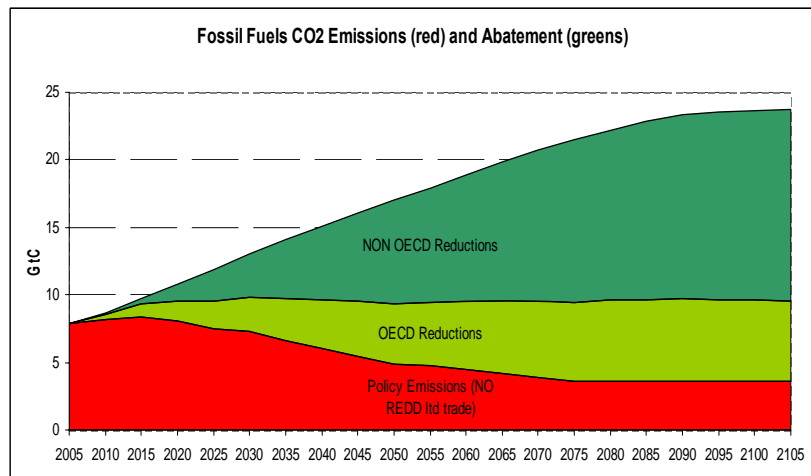
Forestry Emissions



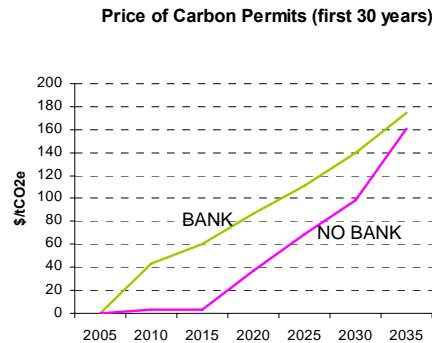
Three alternative baselines for net global forestry emissions.

The **No REDD** Climate Policy Case

The Basic Policy: Emissions and Abatement (CO₂)



Price of CO2 Permits

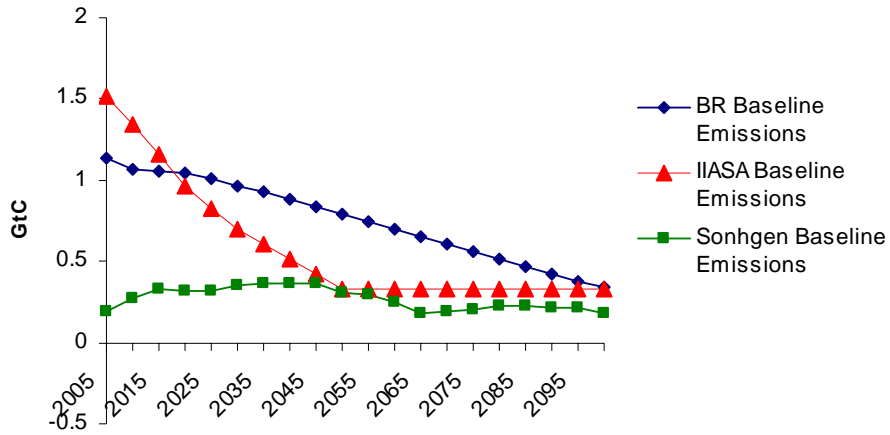


- A strong carbon price signal is needed to achieve 550ppm
- The option of banking raises the price initially (lowers it thereafter).

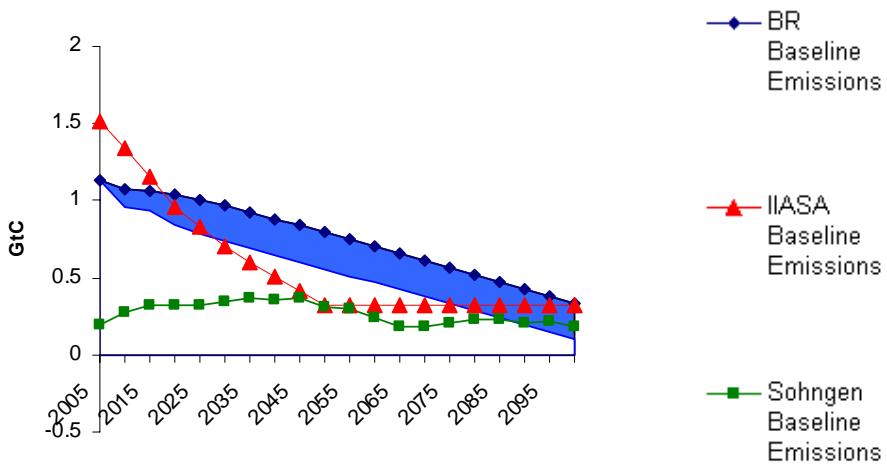
The REDD Climate Policy Case

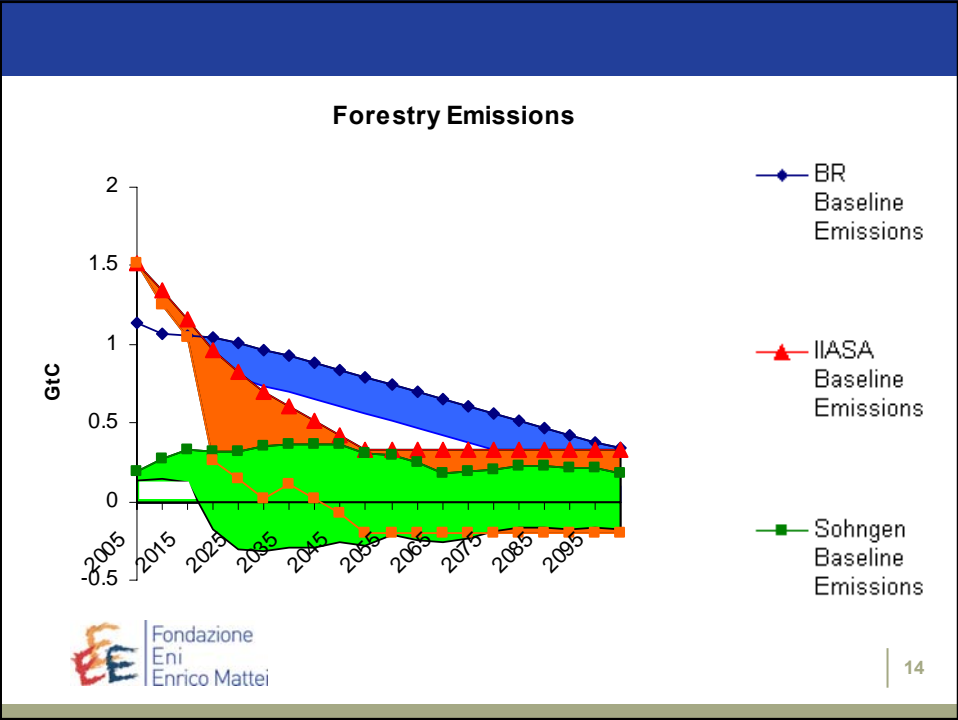
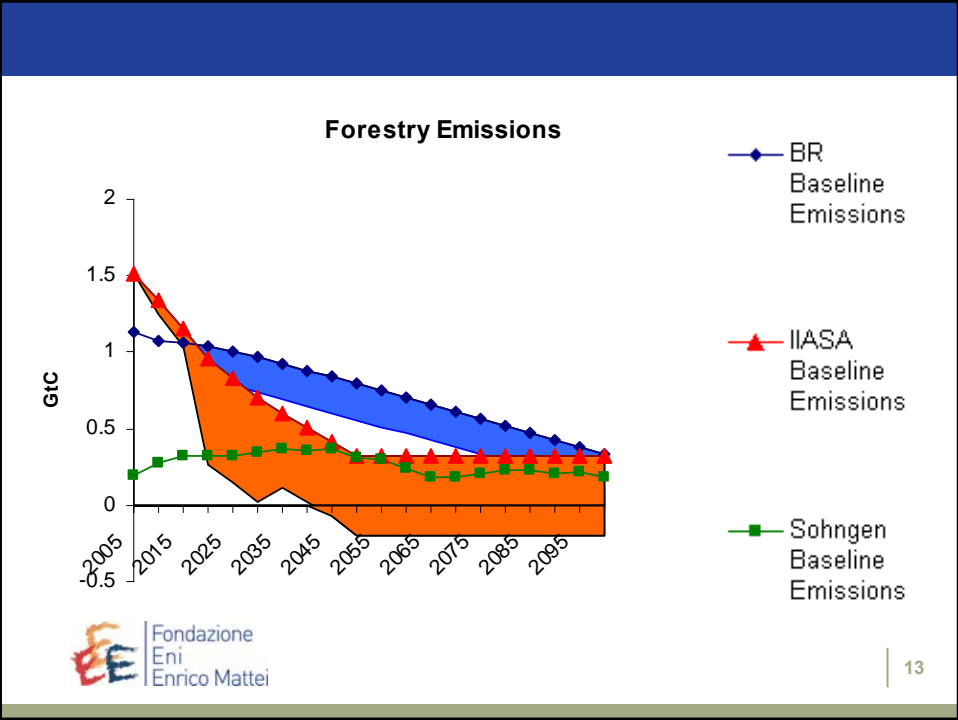
Can a carbon mkt help stop deforestation ?

Forestry Emissions



Forestry Emissions





By How Much Will REDD Reduce the Economic Costs of a Climate Policy ?

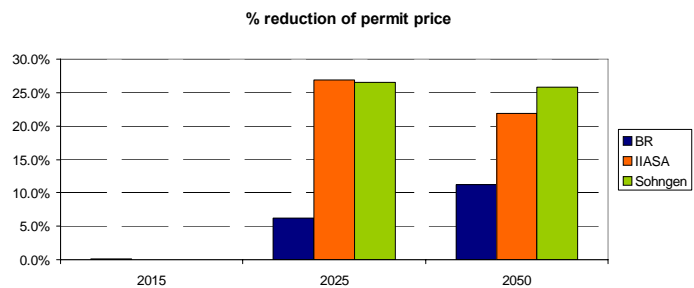
Woods Hole Research Center
(Brazil only) -12%

IIASA -25%

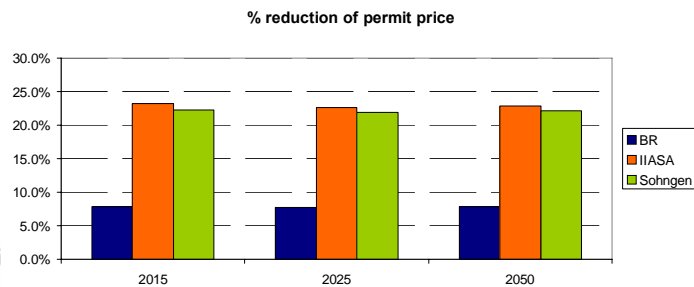
Sohngen -23%

Will REDD depress Carbon Prices ?

NO BANKING



BANKING



- REDD reduces investments in Renewable power by 2% per year (Brazil only) to 5% per year (all REDD countries)
- Banking increases investments till 2030 by 5-10% per year

Linking REDD to a global carbon market

- **EMISSIONS FROM FORESTRY:** By 2050, global tropical deforestation emissions reduced by 28% with only Brazil, by 90% with global involvement.
- **CLIMATE POLICY COSTS:** REDD reduces costs of a 550 CO₂ eq stabilization policy by 10 to 25%, or can provide, for the same policy costs, a **MORE STRINGENT CLIMATE TARGET** (by 30-50ppm)
- **PRICE OF CARBON PERMITS:** Reduction in carbon prices by 10-25%, initially significant only if banking is allowed.
- **INNOVATION:** REDD has modest effect on energy R&D and W&S investments, more than compensated by banking.

Back up slides

Basic Scenario (NO REDD)

Before 2050

- Annex 1 countries : 30% below 1990 by 2020 and 60% below 1990 by 2050.
- Before 2020, Developing Countries are allocated their baseline emissions
- From 2020, DCs decrease emissions to 1990 levels by 2050.
- Africa continues with "Business as Usual" (BAU)

After 2050

- Annex 1 and most of DCs slowly decrease emissions (65-75% below baseline)
- Africa continues with BAU

Market Assumptions:

- 1) Global carbon market, limited until 2020 (A1 countries can buy on carbon market up to 10% of allocated emissions)
- 2) Unique carbon market for all gasses and cap on other gasses mimics that on CO₂ in terms of regional allocations.
- 3) Scenario set ups:
 - 4i) Allowing flexibility on when to reduce: banking (BANK)
 - 4ii) No banking allowed (NO BANK)



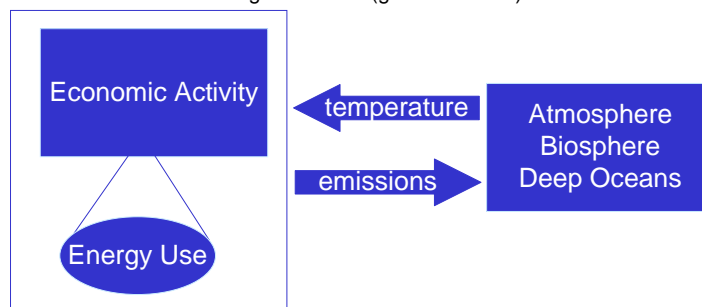
The WITCH Model

The WITCH integrated assessment Model

WITCH: World Induced Technical Change Hybrid model

Hybrid I.A.M.:

- **Economy:** Ramsey-type optimal growth (inter-temporal)
- **Energy:** Energy sector detail (technology portfolio)
- **Climate:** Damage feedback (global variable)



Distinguishing Features

- **Hybrid** top down bottom up model
- Focus on **technological change**:
 - Learning by Doing in W&S
 - Innovation (R&D):
 - Energy intensity
 - Breakthrough Carbon Free Technologies
- Focus on channels of **interactions among regions**:
 - R&D spillovers
 - Environmental externalities
 - Exhaustible common resources
 - Trade of emission permits
- Focus on regions' **strategic behaviour**

Mitigation in Europe: domestic vs international

