REDD in the Carbon Market: Economic Implications

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Motivation

Questions about the impact of REDD on:

- GHG allowance prices
- Energy sector abatement
- Induced technological change
- Deforestation and associated environmental benefits
- Financial flows among countries

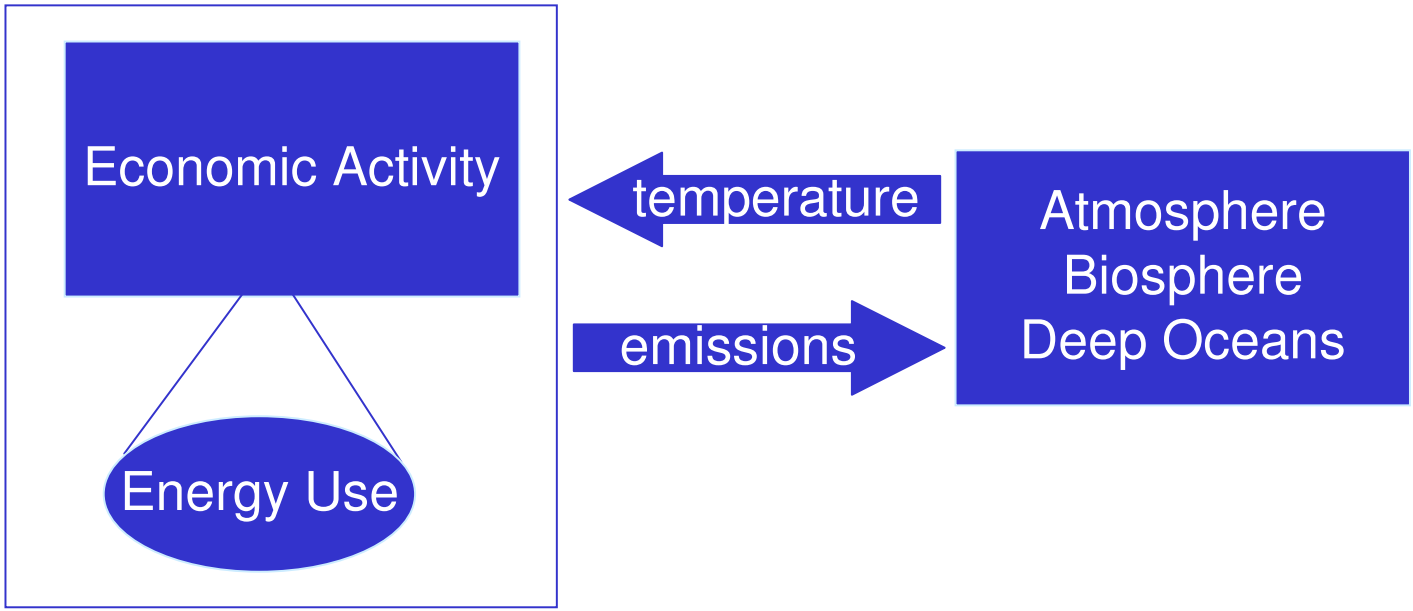
Two Global Carbon Market Studies

- "Top Down"
  - CMCC-FEEM (Anil Markandya, Valentina Bosetti, Massimo Tavoni)
  - Integrated assessment framework: WITCH model
  - Forestry data from Brent Sohngen (EMF21)
- "Bottom Up"
  - Internal EDF Analysis (Pedro Piris-Cabezas, Nat Keohane)
  - Cost curves from Sohngen and other sources.
  - Policy flexibility.

Top-Down Model

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, EDF, EMF, OECD)



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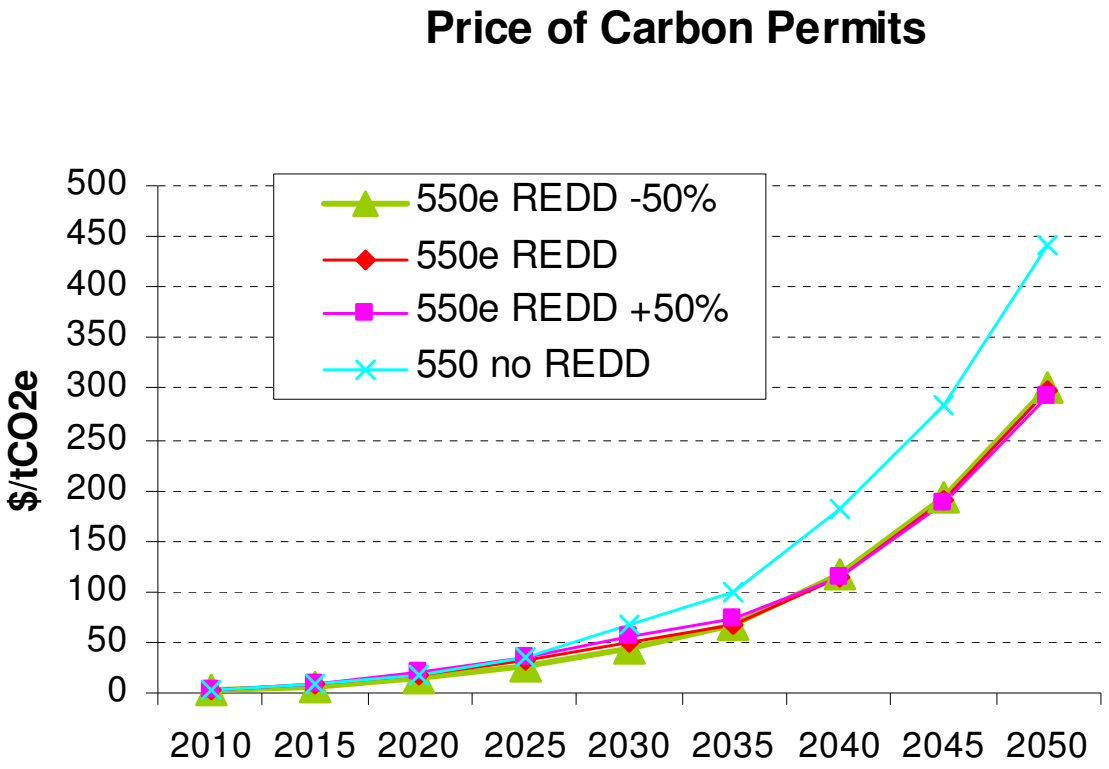
Price of Carbon Permits
(550 CO2e target, no banking)



Price of carbon decreases by about 14%-25% with global REDD.

About 10% decrease with Brazilian REDD only.

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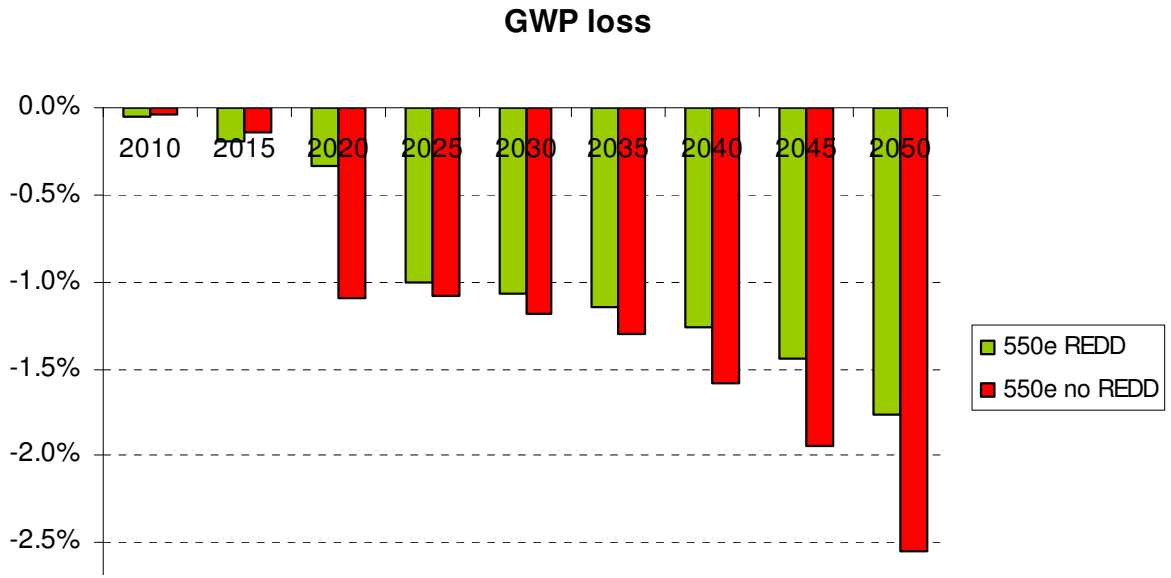
Source: WITCH model.

Policy costs
(550 CO2e target, no banking)



- Costs are decreased by introducing global REDD option.

- 2030: from 1.2% to 1.1%
- 2050: from 2.5% to 1.8%
- 2010-2050: from 0.89% to 0.67%

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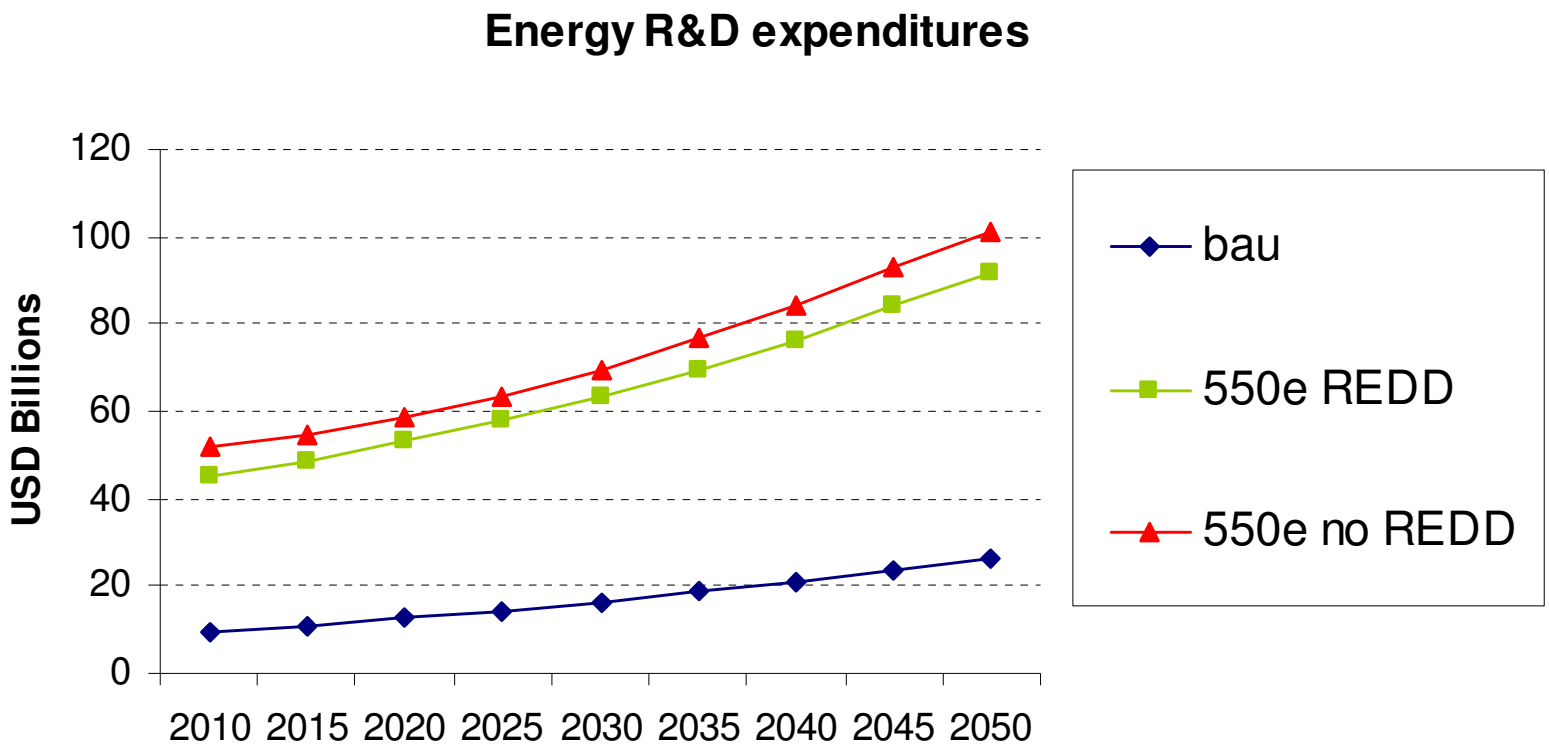
Source: WITCH model

Energy Research and Development



- Total energy R&D investments reduced by about 9%.
- CCS within 10 years with and without global REDD.
- Share of low/zero carbon electricity in 2050 is 82% vs. 87% with and without global REDD.

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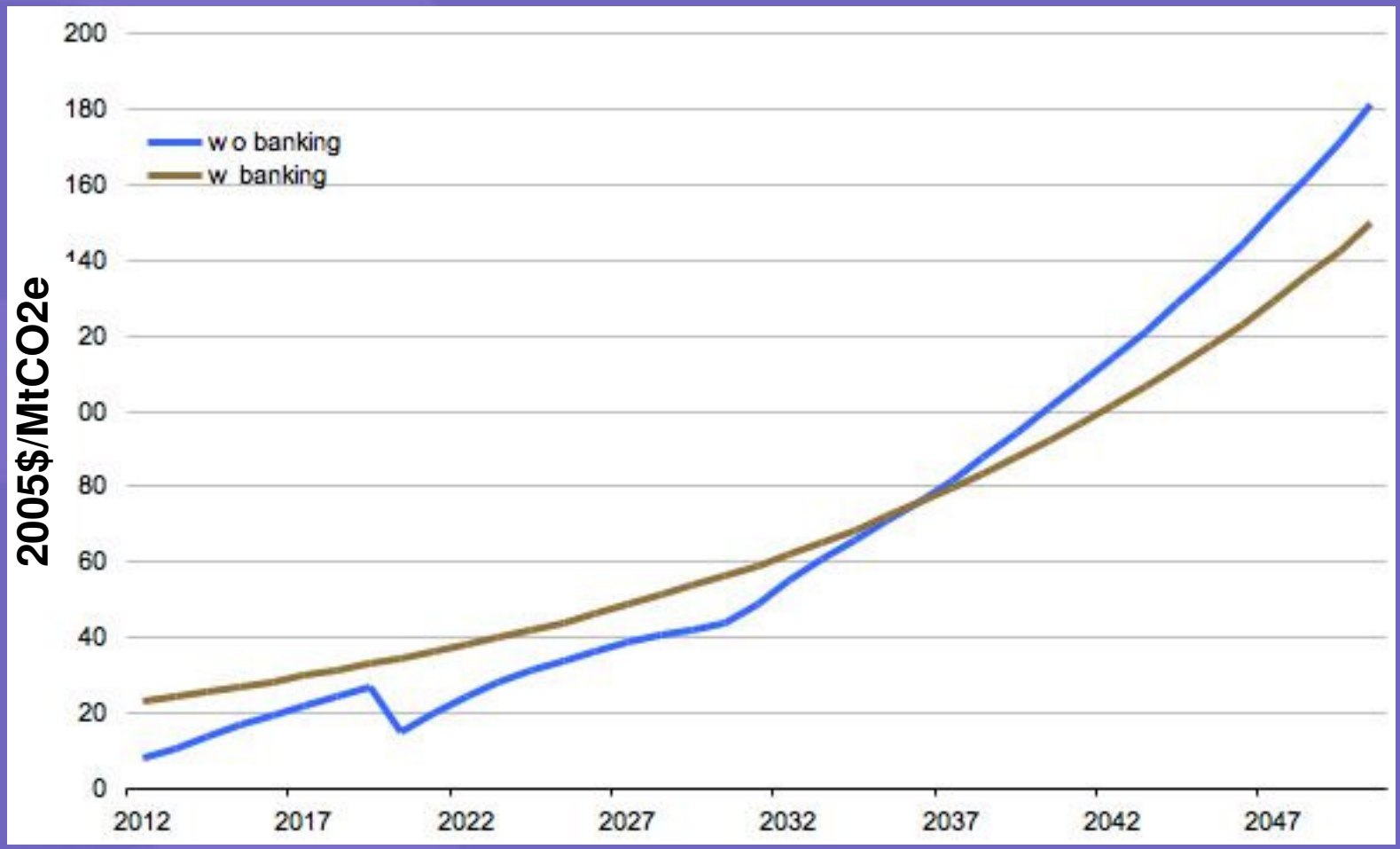
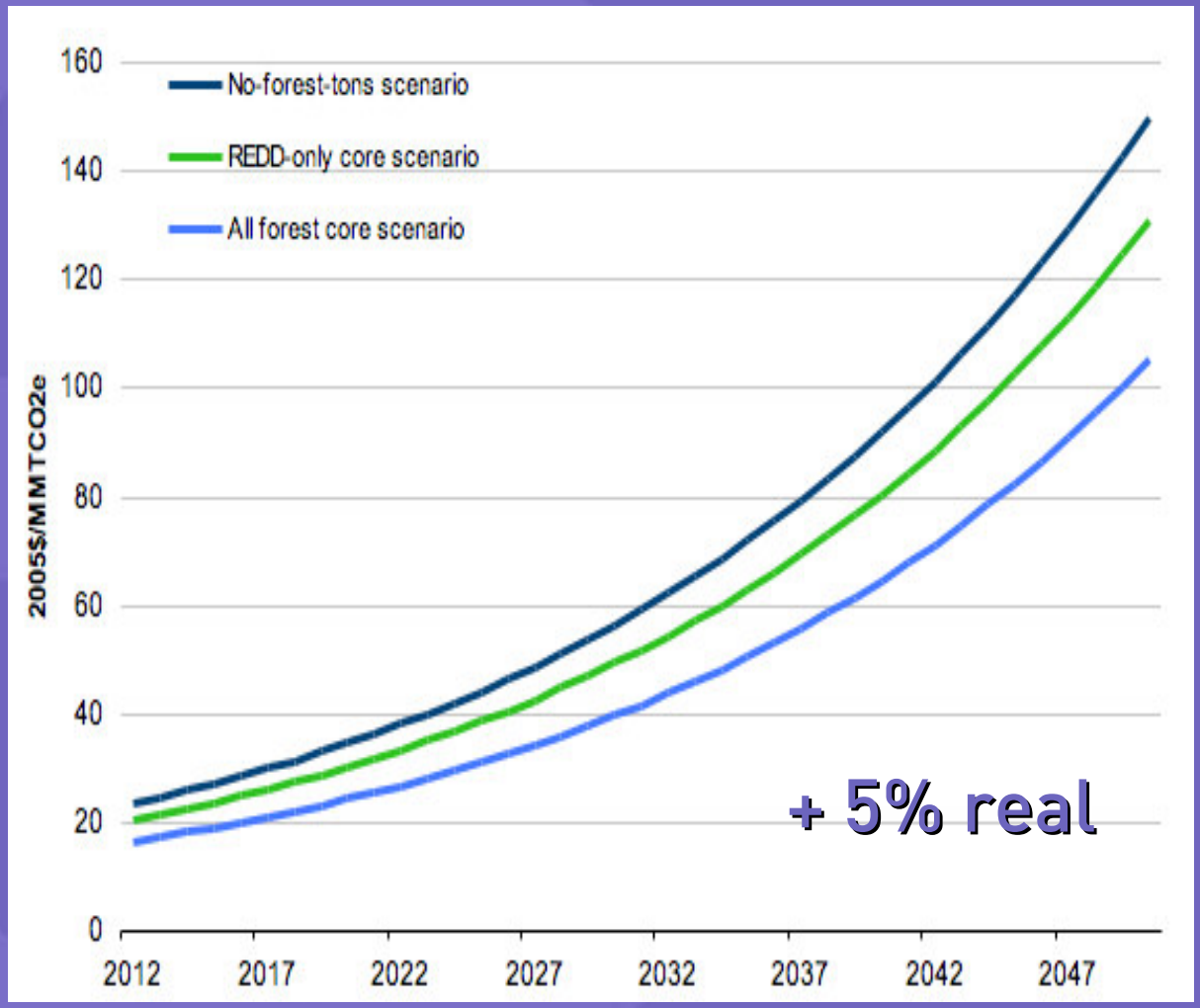
Source: WITCH model

ALLOWANCE PRICES: WITH AND WITHOUT BANKING



Source: EDF

ALLOWANCE PRICES



1. Forest carbon credits from developing countries have considerable potential to help limit the cost of compliance.

1. Forest carbon credits do not compromise the estimated economic viability of critical low-carbon technologies.

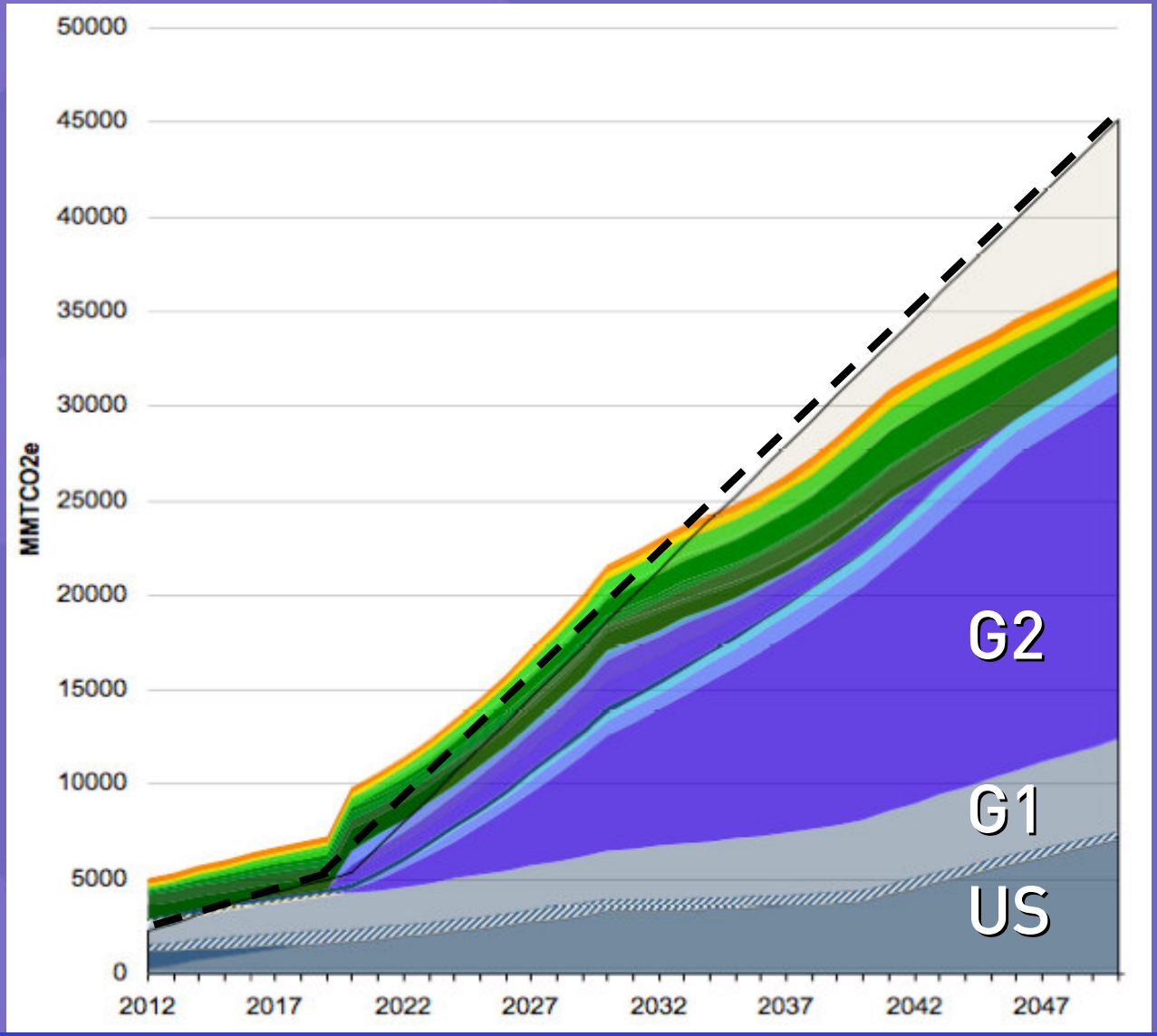
Source: EDF

ALLOWANCE PRICES: SENSITIVITY ANALYSIS

SCENARIO		2012	2020	2030	2040	2050
1	Baseline (no forest credits)	$23	$35	$56	$92	$150
2	REDD-only core	$21	$30	$49	$80	$131
3a	REDD x2	$18	$27	$43	$70	$115
3b	REDD x1/2	$22	$32	$53	$86	$140
4	All Forest core	$16	$24	$40	$65	$105
5a	All Forest x2	$12	$18	$30	$49	$79
5b	All Forest x1/2	$20	$29	$48	$78	$127

Source: EDF

WORLDWIDE ABATEMENT BY SOURCE: ALL-Forestry core scenario

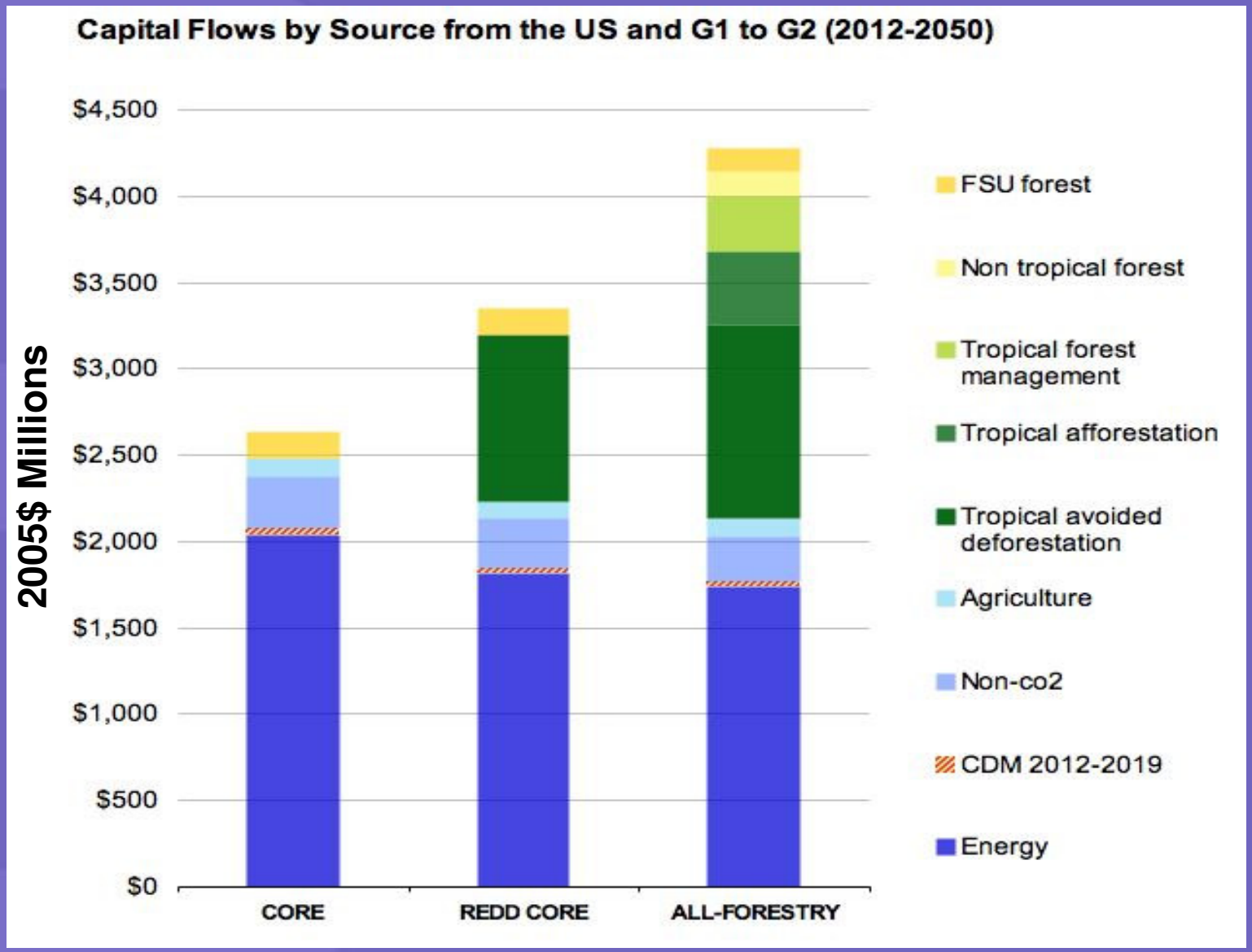


- Total abatement exceeds demand in the first two decades.
- The bank is comparable in magnitude to the quantity of forest carbon credits.
- Forest carbon credits only a small portion of the overall abatement.

Source: EDF

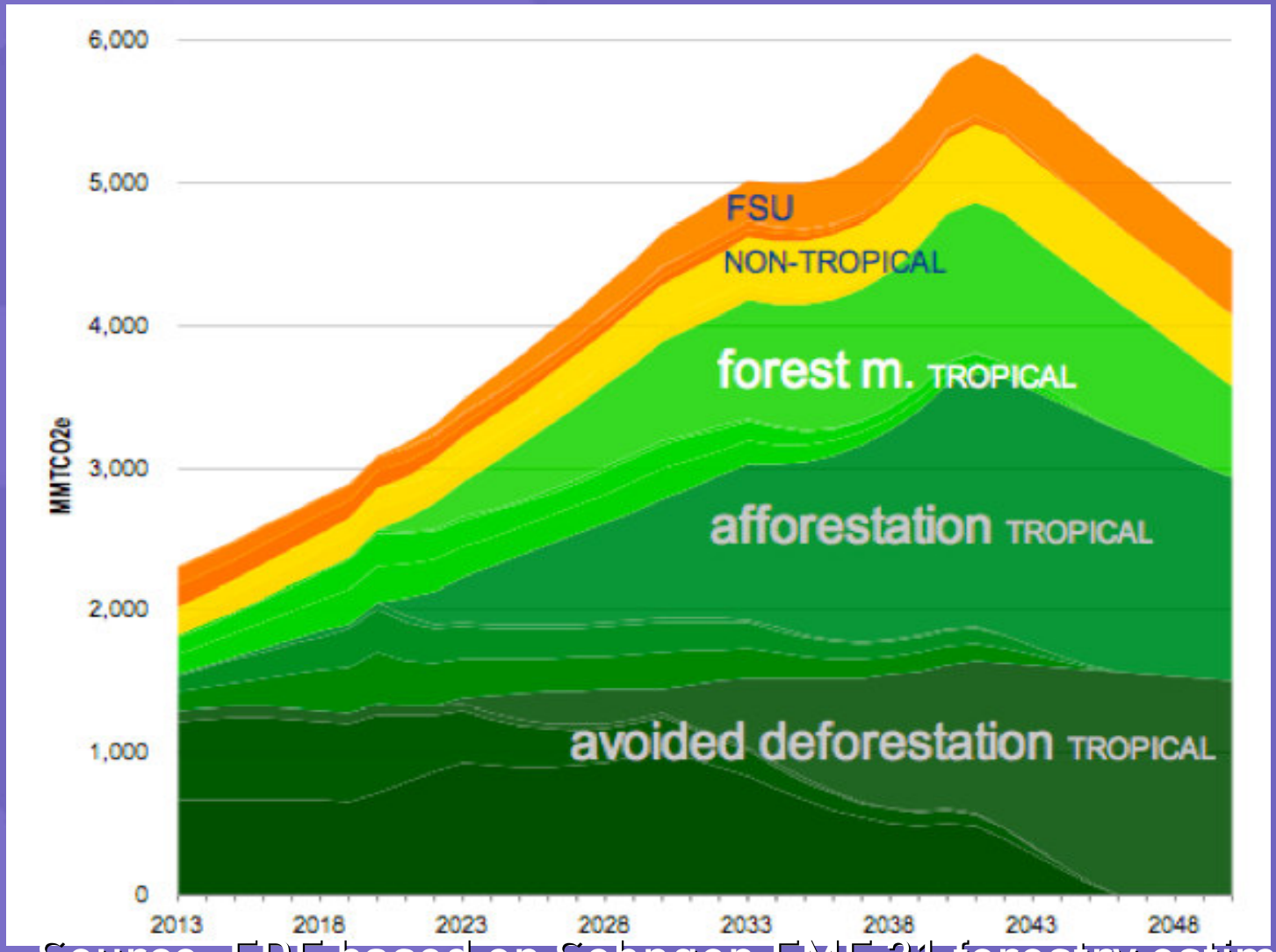
Conclusions

- Forest carbon credits have considerable potential to reduce deforestation and limit the cost of achieving a 2° C warming limit.
- Forest carbon credits do not compromise the economic viability of critical low-carbon technologies.
- The key qualitative conclusions are robust to alternative assumptions about the availability and cost of forest carbon credits.
- The ability to bank allowances is a an important factor in sustaining prices at a moderate level.


Capital Flows by Source from the US and G1 to G2 (2012-2050)
2005$ Millions
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
CORE
REDD CORE
ALL-FORESTRY
FSU forest
Non tropical forest
Tropical forest management
Tropical afforestation
Tropical avoided deforestation
Agriculture
Non-co2
CDM 2012-2019
Energy

Source: EDF

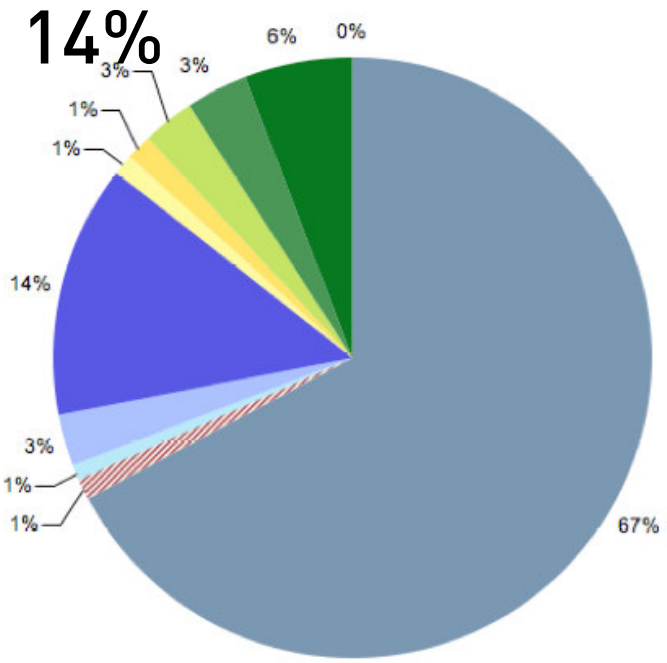
COMPOSITION OF FOREST CARBON CREDITS FROM G2



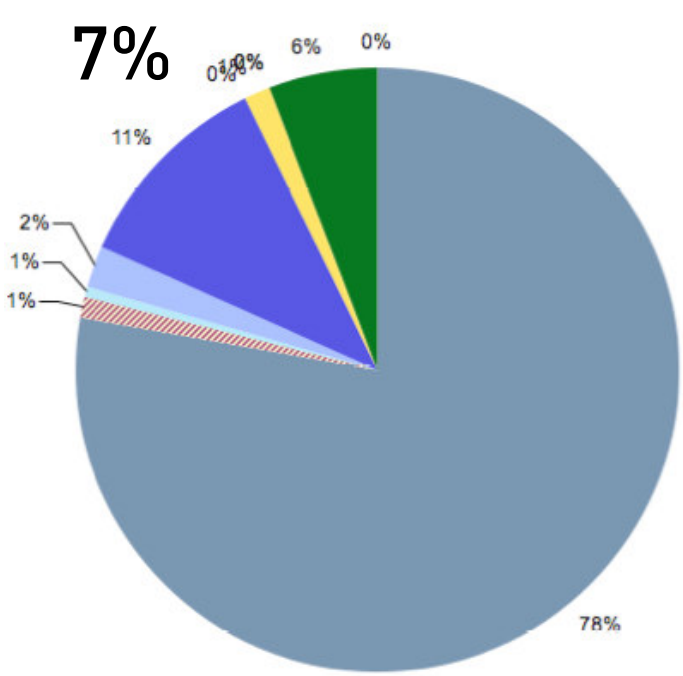
Source: EDF based on Sohngen EMF 21 forestry estimates.

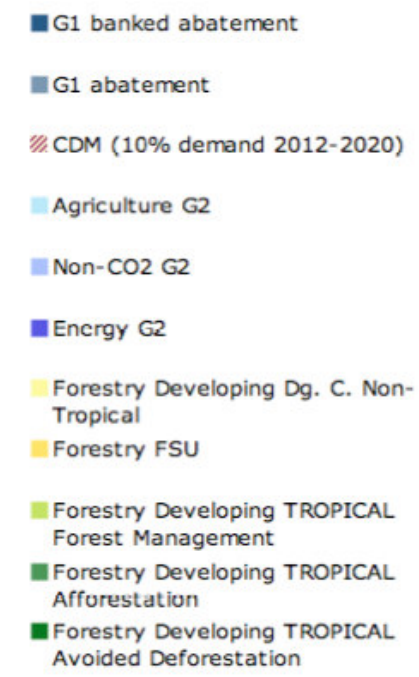
COMPOSITION OF TOTAL ABATEMENT FOR G1

All-forestry



REDD only





G1 total abatement: 166 GTCO2e.

Source: EDF

DEFORESTATION REDUCTIONS

	2012	2020	2030	2040	2050
All-Forest y original Sohngen	68%	69%	82%	97%	100%
REDD-only original Sohngen	84%	82%	90%	100%	100%
REDD-only PNAS SOHNGEN	76%	88%	96%	100%	100%
REDD-only PNAS SATHAYE	62%	75%	94%	100%	100%
REDD-only PNAS DIMA	47%	62%	83%	100%	100%

Potential for major reductions in deforestation.

Source: EDF based on Kindermann et al. 2008 in PNAS.