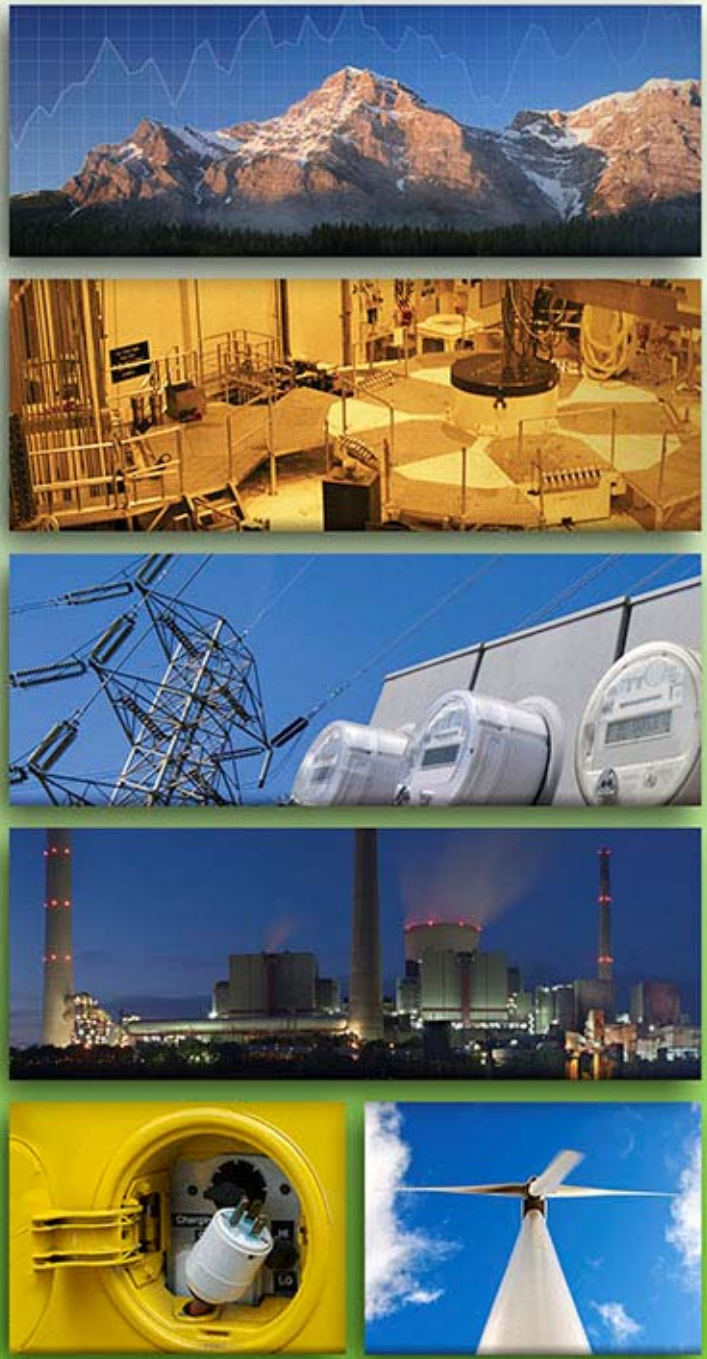

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The Challenge of Scaling Up Domestic and International Offset Supplies

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Global Climate Summer Seminar
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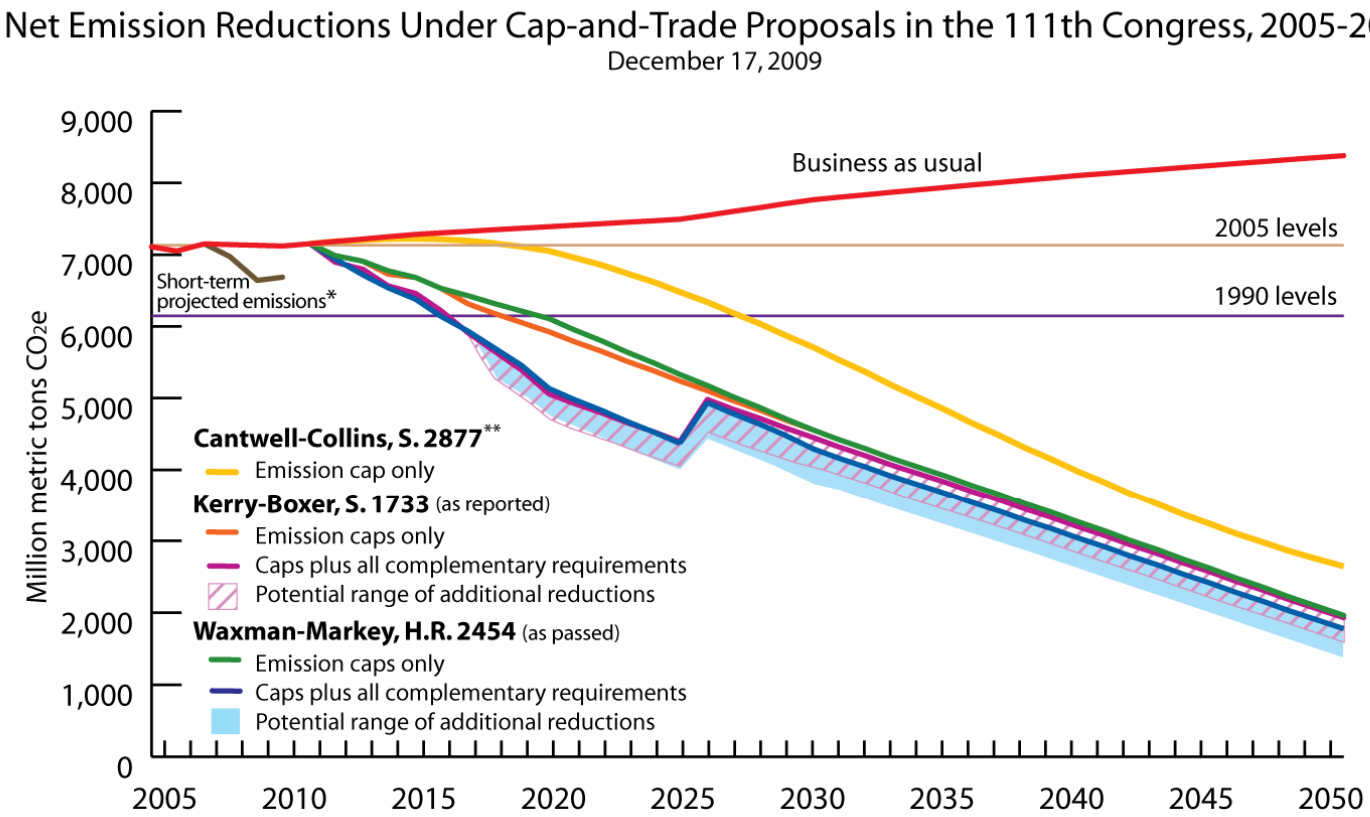
Today's Discussion

- Critical role of offsets for CO_2 cost containment
- Potential to scale-up offset supplies
  - The Clean Development Mechanism (CDM)
  - "Sectoral" Offsets
  - Reduced Emissions from Deforestation and Degradation (REDD)

The GHG Emissions Reduction Challenge



Most legislative proposals would require rapid and dramatic cuts in GHG emissions. In the near-term (2010-2015), there are no *large-scale*, *low-cost* CO_2 abatement options.

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Implications of Near-term CO_2 Reductions

- CO_2 prices likely will rise to force natural gas to displace coal
- CO_2 allowance prices will be "high" ($\geq$ \$30/tCO_2) in early years of a new CO_2 cap-and-trade program ***unless…***
  - "Safety valve," "price collar," or other price-control mechanism(s)
  - Massive GHG reductions in other regulated sectors and/or EE

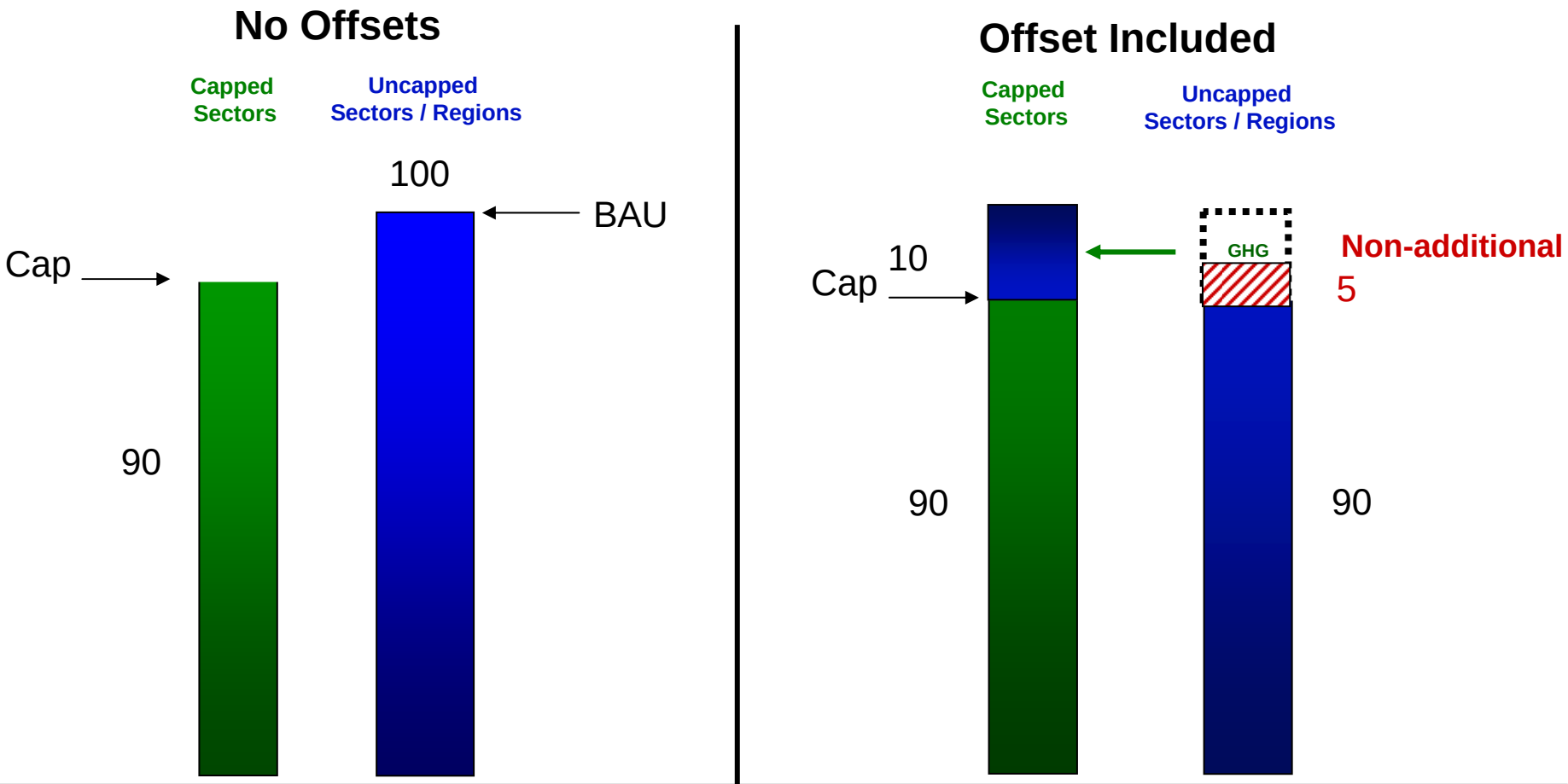
– Abundant offsets are available

Offset Supply is a Critical Issue in Evolving U.S. Climate Policy

- Critical role of offsets in containing future carbon costs has been recognized in federal legislation
  - "Waxman-Markey" (HR 2454)
  - "Kerry-Boxer" (S.1733)
  - Kerry-Lieberman draft (released 5/12/10)
  - Each would allow 2 $GtCO_2e$ of offsets for compliance
- The WCI would permit 49% of emissions reductions to be achieved with offsets

How can offsets mechanisms be scaled-up to provide robust supplies?

Offsets Substitute GHG Reductions in Uncapped Sectors & Regions for Internal Reductions



Offsets transfer emission reductions from "high" to "low" cost sectors and regions, but offsets do not increase the quantity of GHG reductions

CBO Estimates of the Effects of HR 2454 "With" and "Without" Offsets in 2030

	With Offsets	Without Offsets
Net economic cost ($2007)	$101B	$248 B
CO_2 allowance price ($/t$CO_2$e)	$40	$138

"The cost savings to the economy generated by offsets could be substantial…between 2012 and 2050 average annual savings from offsets could be about 70 percent under ACESA."
(CBO Analysis of HR 2454, p. 8)

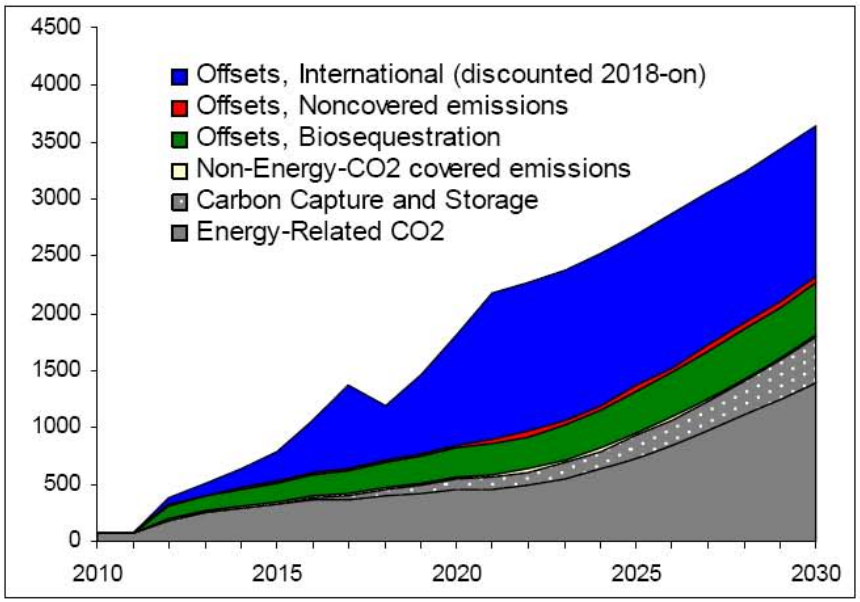
Source: "The Use of Offsets to Reduce Greenhouse Gases," Economic and Budget Issues Brief, Congressional Budget Office, August 3, 2009, Table 1.

Offsets are a Key Source of Compliance with "Waxman-Markey" (HR 2454)

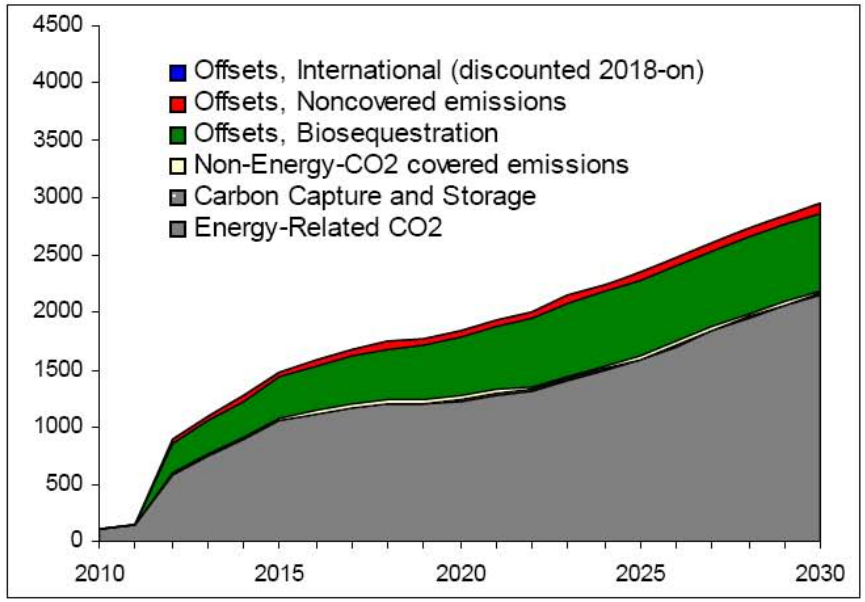
Figure 4. Sources of Cumulative Compliance in ACESA Main Cases, 2010-2030

(million metric ton CO_2-equivalent)

Basic

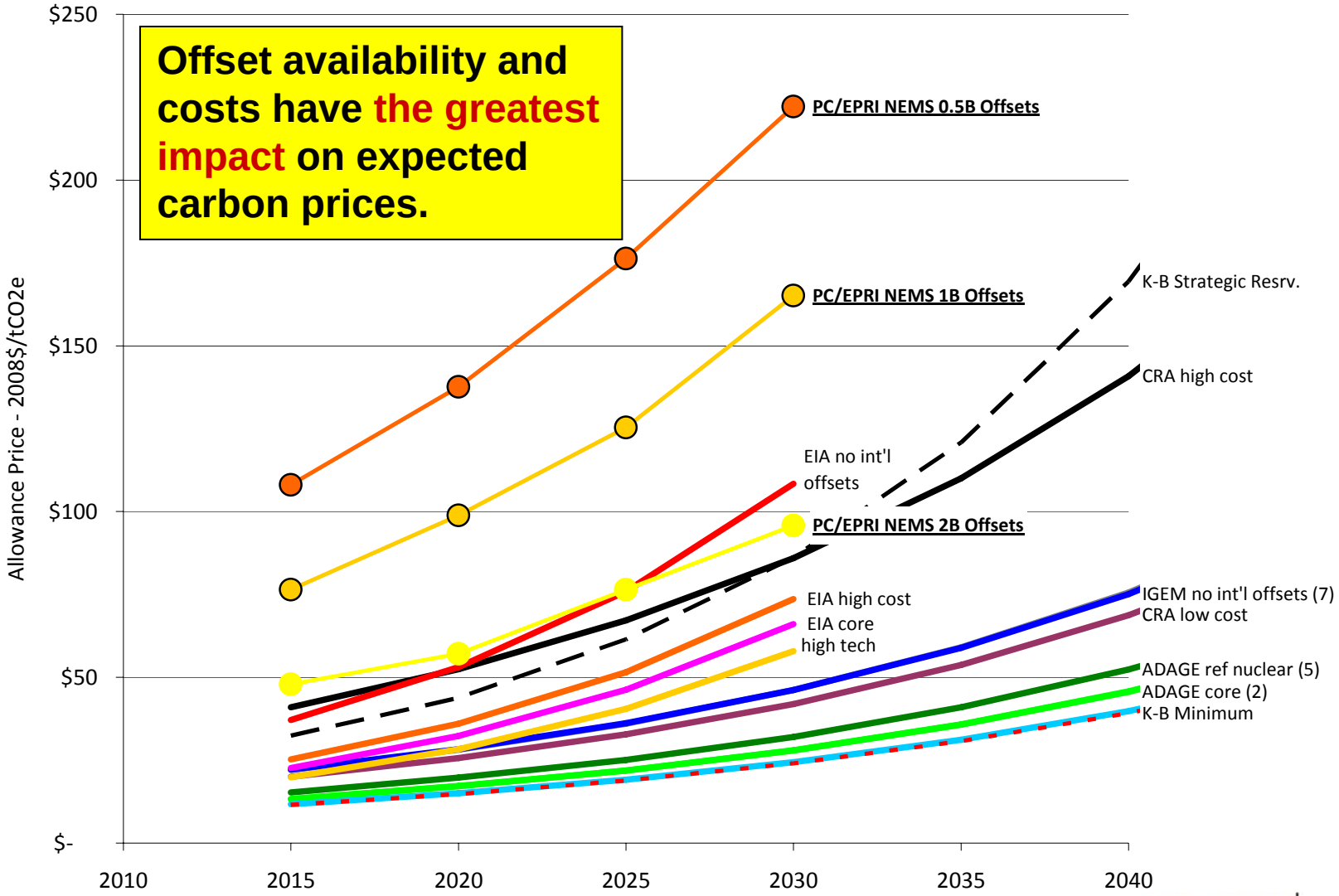


No International / Limited

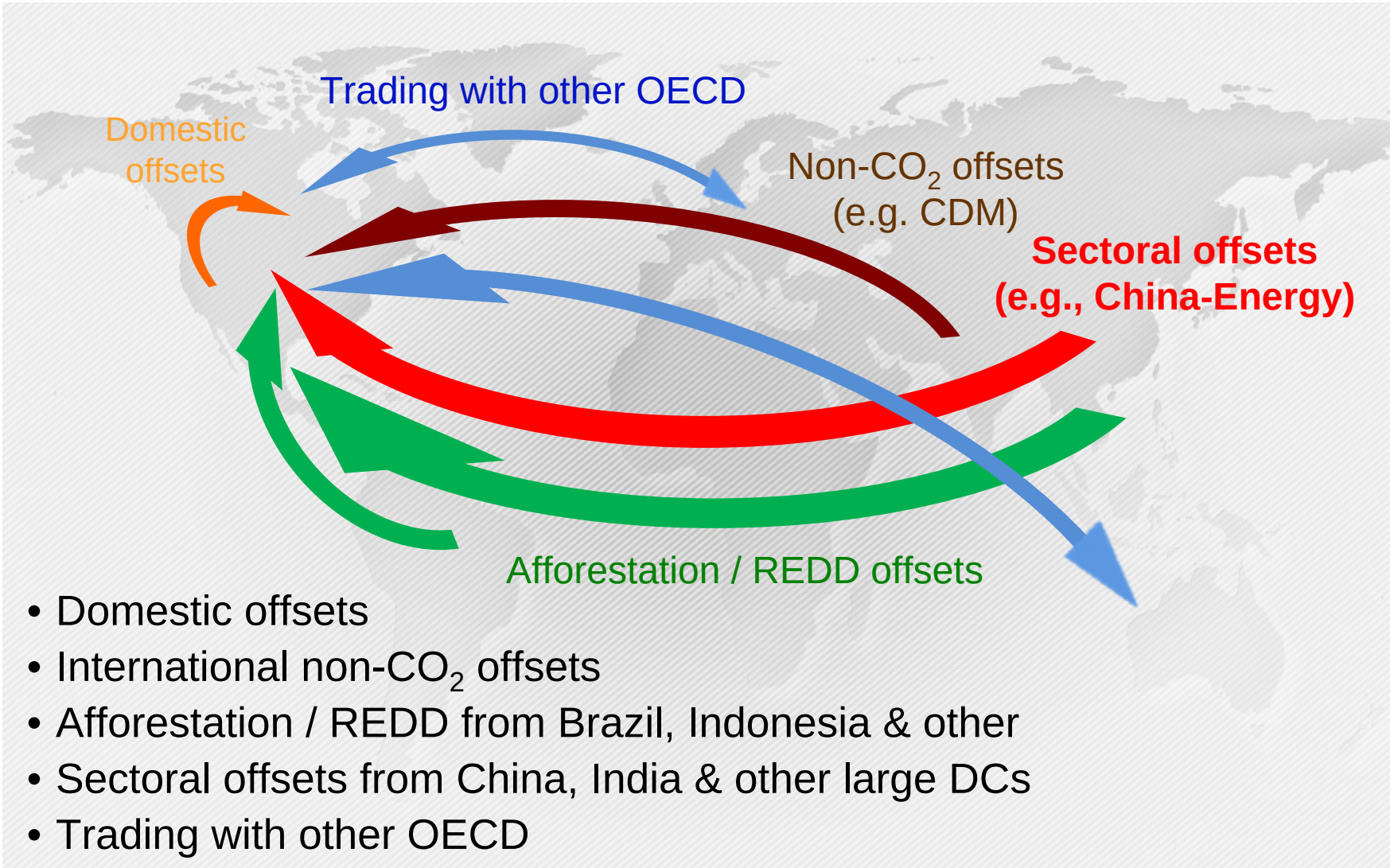


"…Given the potential of offsets as a low-cost compliance option, the amount of reduction in covered emissions is exceeded by the amount of compliance generated through offsets in most of the main analysis cases...In the ACESA Basic Case, domestic abatement…represents only 39% of cumulative compliance." (US DOE, ACESA Analysis, 8/09, p. ix.)

Carbon Price Estimates for "Waxman-Markey" with "Kerry-Boxer" Price Collar



Sources of "Off-system" GHG Abatement

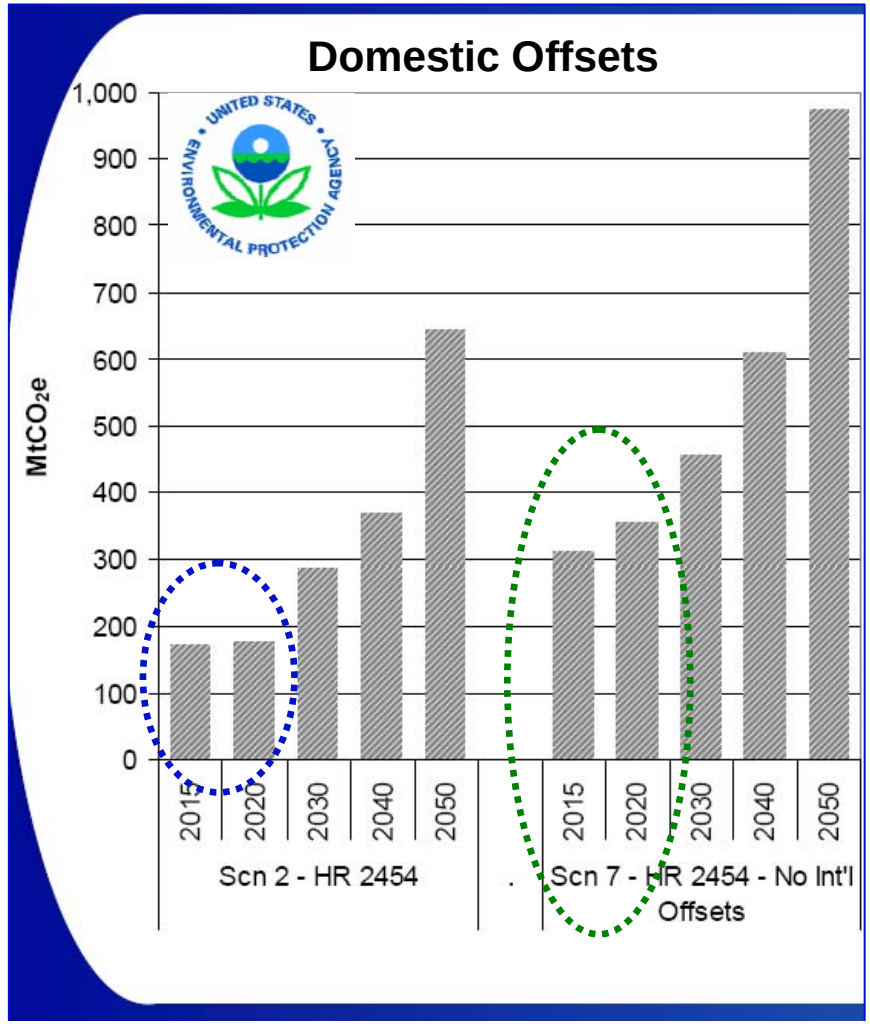


- Domestic offsets
- International non-CO_2 offsets
- Afforestation / REDD from Brazil, Indonesia & other
- Sectoral offsets from China, India & other large DCs
- Trading with other OECD

Domestic Offsets in HR 2454: Will Enough Come in the Near Term?

- Limited potential
- EPA estimates ~170MtCO$_2$e per year through 2020 @ $15/tCO$_2$e
- Largest sources are forest management & afforestation
- LFG, CMM, NatGas offsets may not be available due to NSPS
  - Could add ~130MtCO$_2$e
- Need time to develop offset rules, protocols and methodologies

Limited sectoral eligibility and difficulty implementing agricultural and forestry offsets, means domestic offsets will be limited in the near term.



Source: EPA Analysis of H.R. 2454 6/23/09, P. 23.

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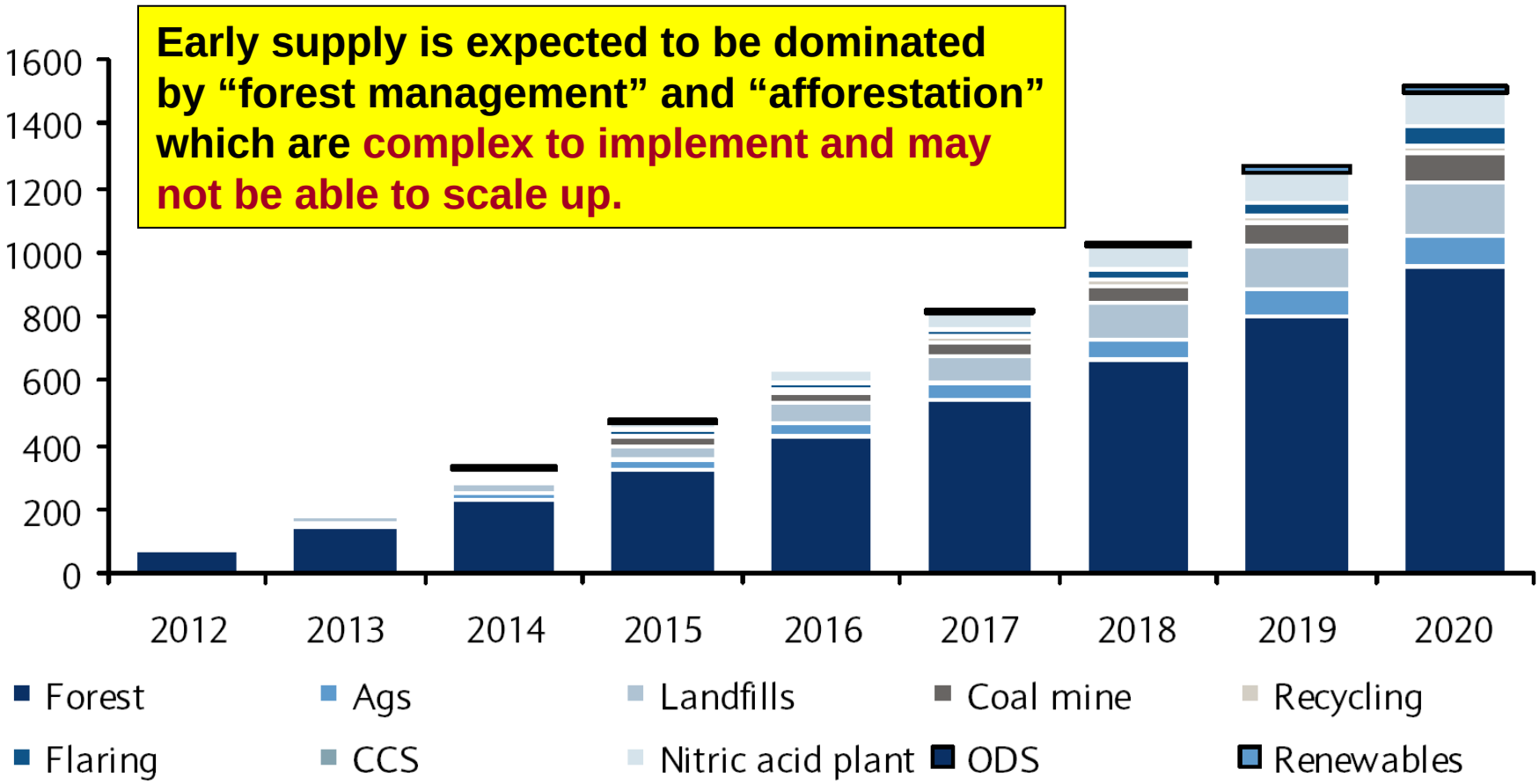
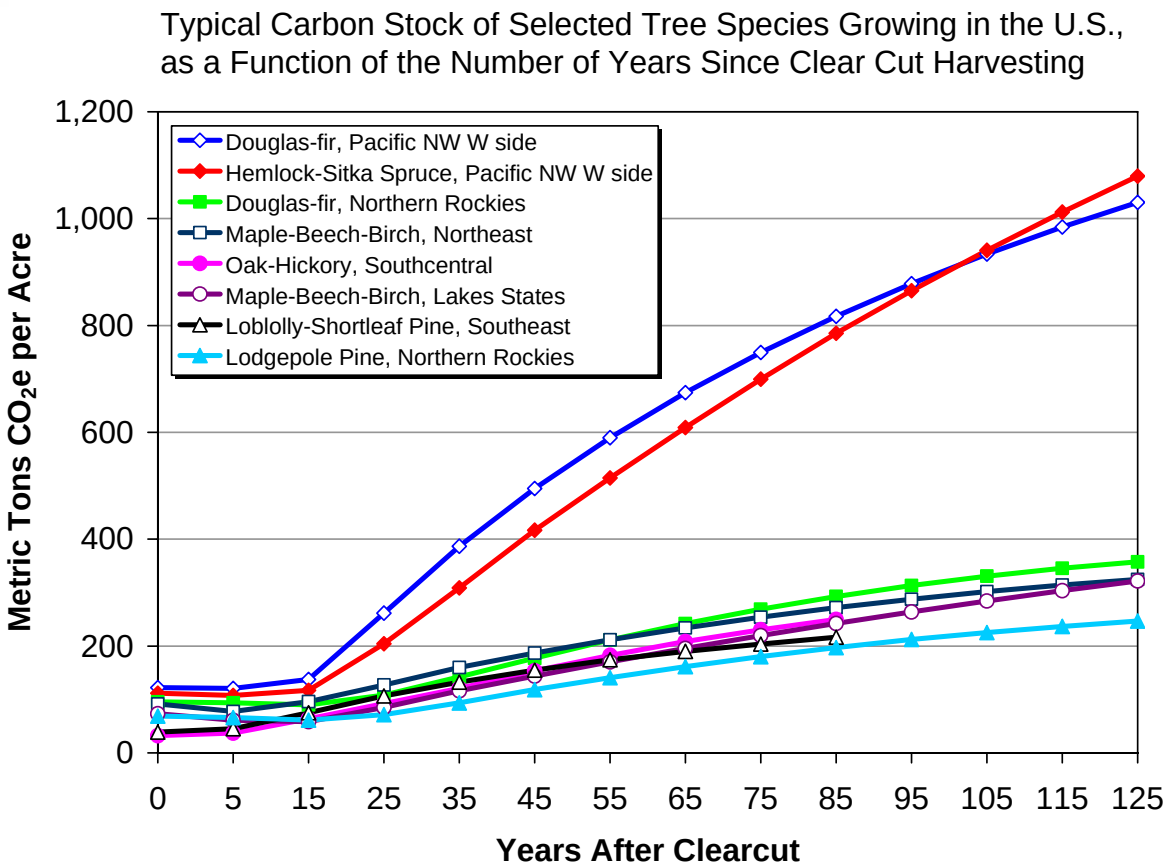
Aggregate U.S. Offset Supply Forecast to be Limited in the Near Term

Figure 16: Aggregate US offset supply to 2020



Source: Barclays Capital, Carbon Flash US Offset Supply, 4/7/2010.

Growing Trees in the U.S. Cannot Scale Sufficiently to Mitigate Climate Change



Source: U.S. Department of Energy., 2006. Voluntary Reporting of Greenhouse Gases Program. Final Technical Guidelines. Chapter 1, Emission Inventories, Part I Appendix: Forestry. http://www.pi.energy.gov/enhancingGHGregistry/ .

- "Good quality" land sequesters ~350 tCO_2 / acre over 100 yrs (3.5 tCO_2/ac-yr)
- A "standard" 1,000 MW coal plant emits 7.5 $MtCO_2$ / year
- **2 million acres of land** are needed to offset annual CO_2 emissions from one 1,000 MW coal-fired power plant.
- In 2008, total installed U.S. coal-fired generation:
  - 313,000 MW capacity
  - 1,445 generators

International Offsets in HR 2454 & "K-L" Will Enough Come in the Near Term?

- Large potential, but challenging to implement
  - International offsets (e.g., CDM)
  - "Sectoral" offsets
  - Reduced Emissions from Deforestation and Degradation (REDD)
- All three categories are problematic!!!

It is very difficult to see how international offsets can yield ~1.0 $GtCO_2$ per year, particularly at the "low" prices assumed by EPA.

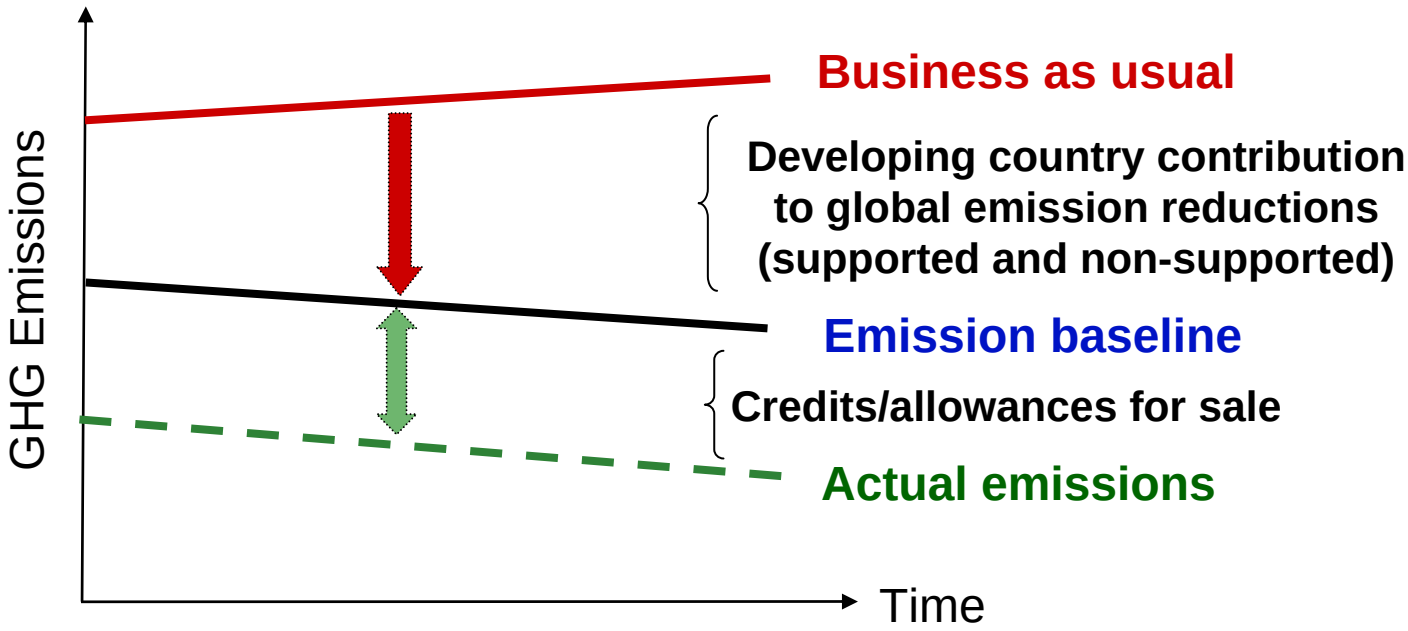
Existing CDM Has Significant Limitations and Cannot Scale Up Significantly

- It took many years to develop CDM (1997-2005)
- CDM has issued fewer offsets than expected
  - ~400 $MtCO_2e$ of offsets issued since inception
  - ~1.0 $GtCO_2$ expected over the "Kyoto" period (2008-2012)
- "Ton-by-ton" approach is inefficient and cannot scale
  - Offset methodologies are very complex
  - Current CDM registration cases < 500 –700 / year
  - Not possible to process 1000 – 2000 / year
- It currently takes more than 3 years to develop a CDM project from inception to offset credit issuance
- U.S. buyers will face international competition

What is a Sectoral Crediting Mechanism?

- A developing country voluntarily establishes an "emissions baseline" below BAU for a sector
- If actual emissions are ***below*** the baseline at the end of the sectoral crediting period, the country / sector would earn tradable credits ***ex-post***
- Under a "**no lose**" approach, if actual emissions are ***above*** the baseline at the end of the crediting period, the country / sector would not receive any tradable credits and would not be penalized

Offsets *Shift* Emission Reductions, but Sectoral Approaches Can Reduce Emissions



Sector "crediting" is designed to achieve additional emissions reductions, not just transfers as is the case with "pure" offsets.

Source: Based on presentation by Richard Baron of the IEA at the EPRI GHG Offsets Workshop 7: Sectoral on Feb. 25, 2010.

Developing an International "Sectoral" Crediting Program Will be Challenging

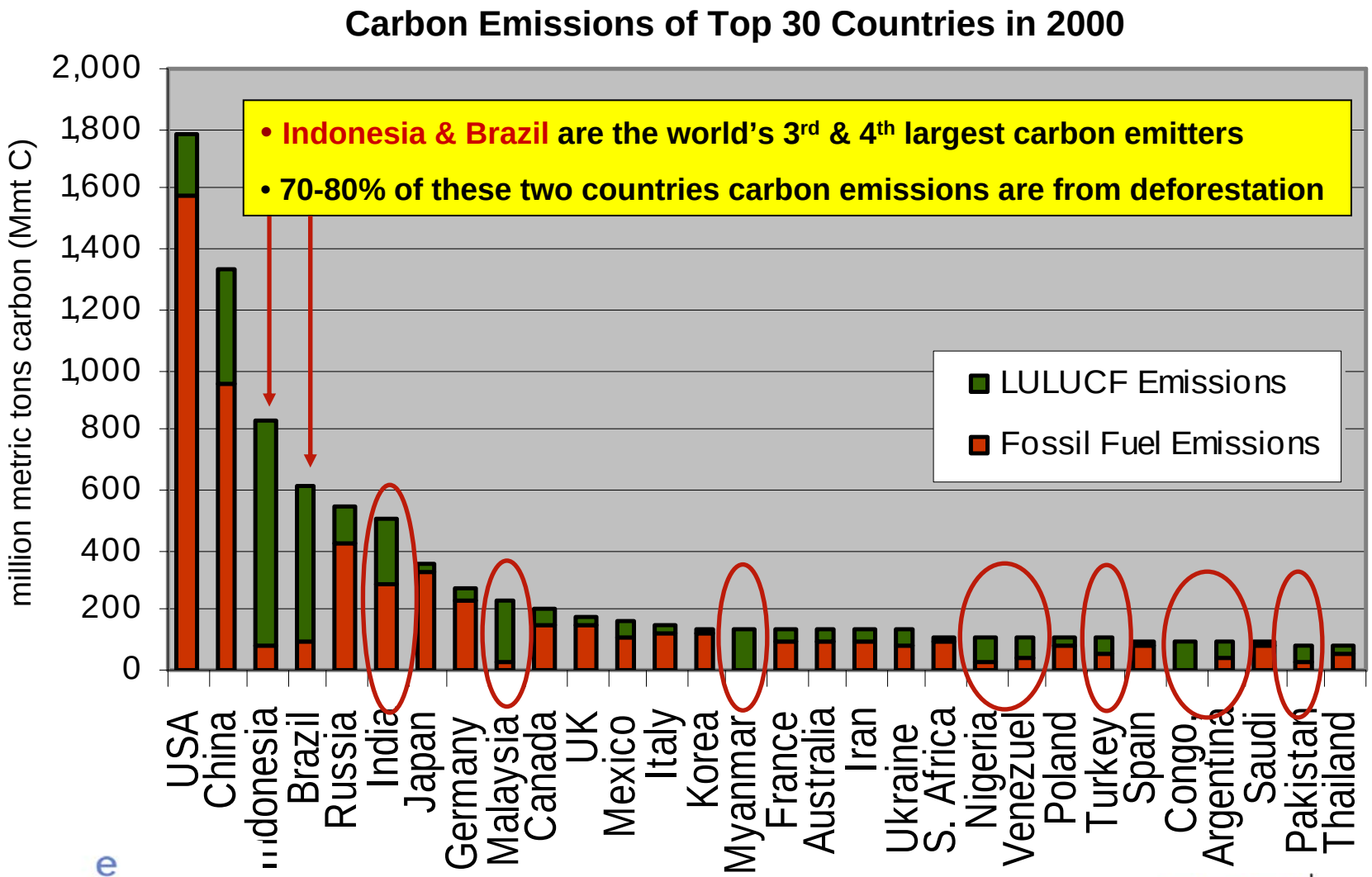
- Never been done before anywhere in the world
  - No existing international or domestic architecture
  - Requires multi- or bi-lateral agreements (HR 2454)
- Could take a long time, based on CDM experience
- Not clear how "compliance parties" pay for and receive sectoral-based offsets
- Sectoral "hammer clause" in W-M will curtail *project-based* offsets from China, India, Brazil, South Korea and Mexico

Key Role of LULUCF in Climate Change

- LULUCF is the 2nd largest source of annual global CO_2 emissions after fossil fuel consumption.[1]
  - Annual fossil CO_2 emissions = 26.4 $GtCO_2$ (2000-2005)
  - Annual LULUCF CO_2 emissions = 5.8 $GtCO_2$ (since 1990)
- LULUCF accounts for ~20% of annual global CO_2 emissions!
- FAO estimates global deforestation at 13 million ha/yr (1990-2005)[2].
  - Brazil accounted for ~50% of global deforestation in the humid tropics 2000-05
  - Amazonian deforestation accounted for ~60% of the total 2000-05

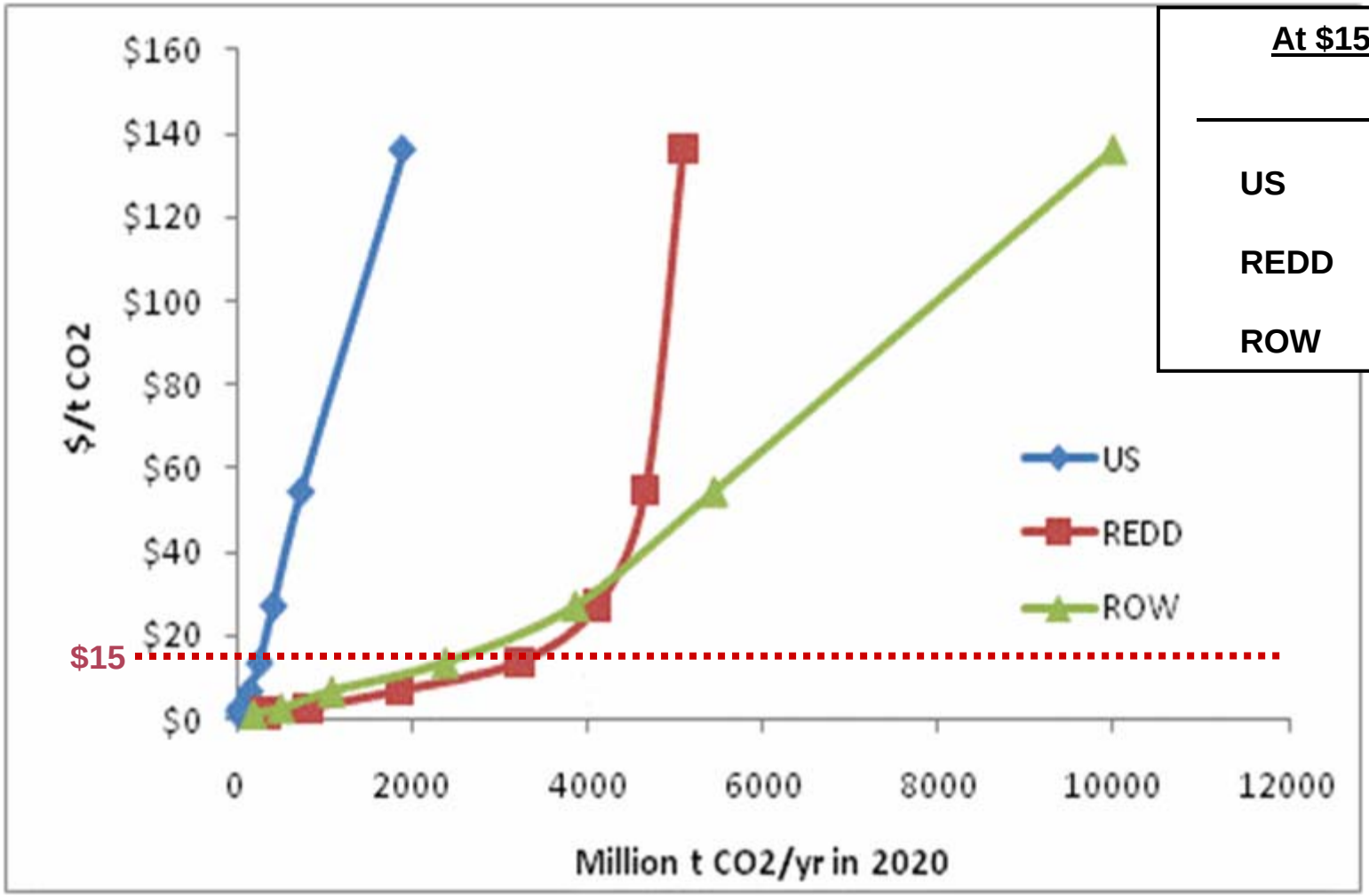
Notes: 1. IPPC 2008, AR4, Working Group 1.
2. FAO, Global Forests Resource Assessment 2005.

LULUCF is the Source of a Large Portion of Key Country GHG Emissions



REDD Mitigation Potential

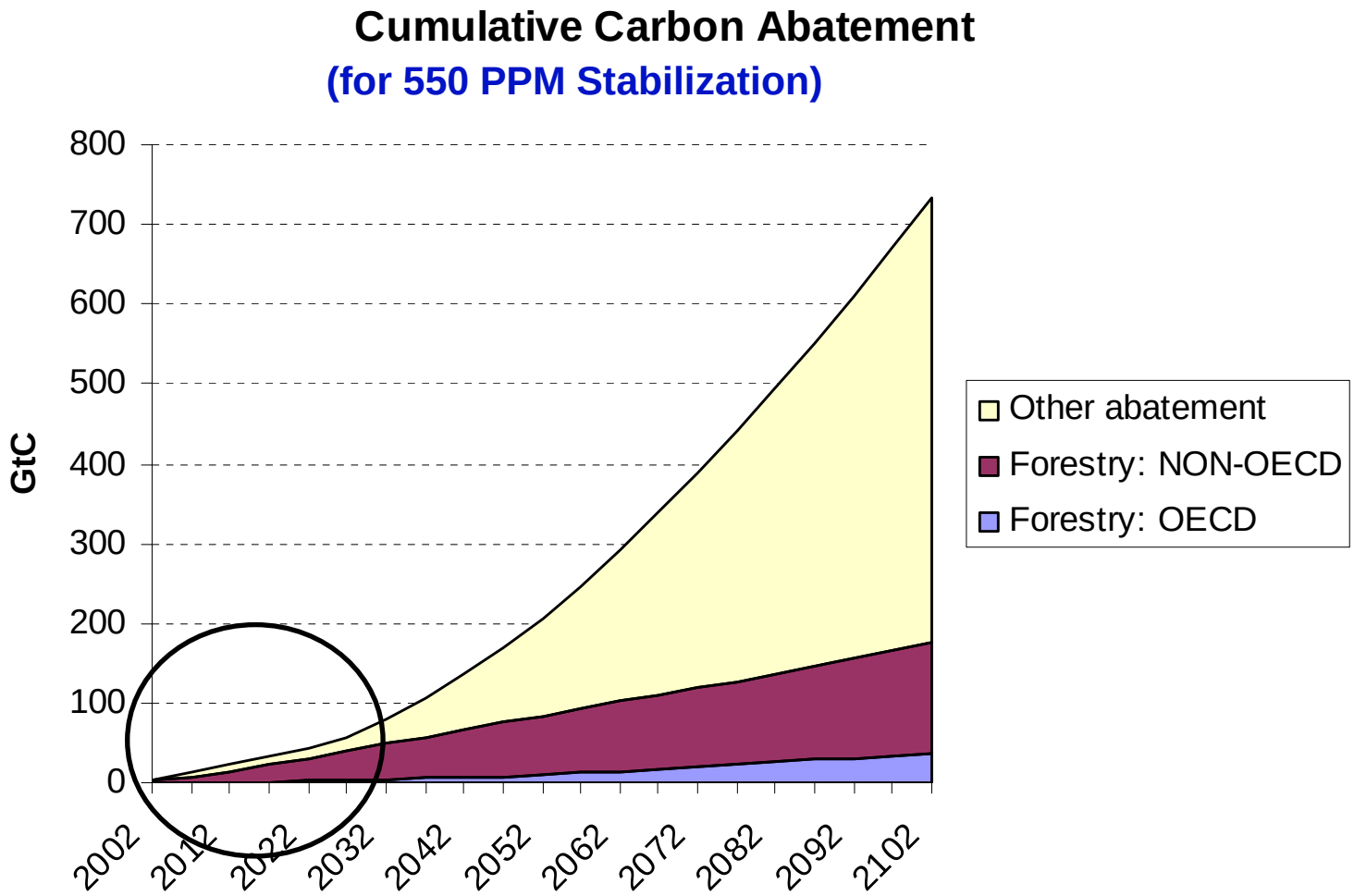
Comparison to US and ROW (Estimates for 2020)



At $15/t CO_2	$MMtCO_2/yr$
US	271
REDD	3,312
ROW	2,530

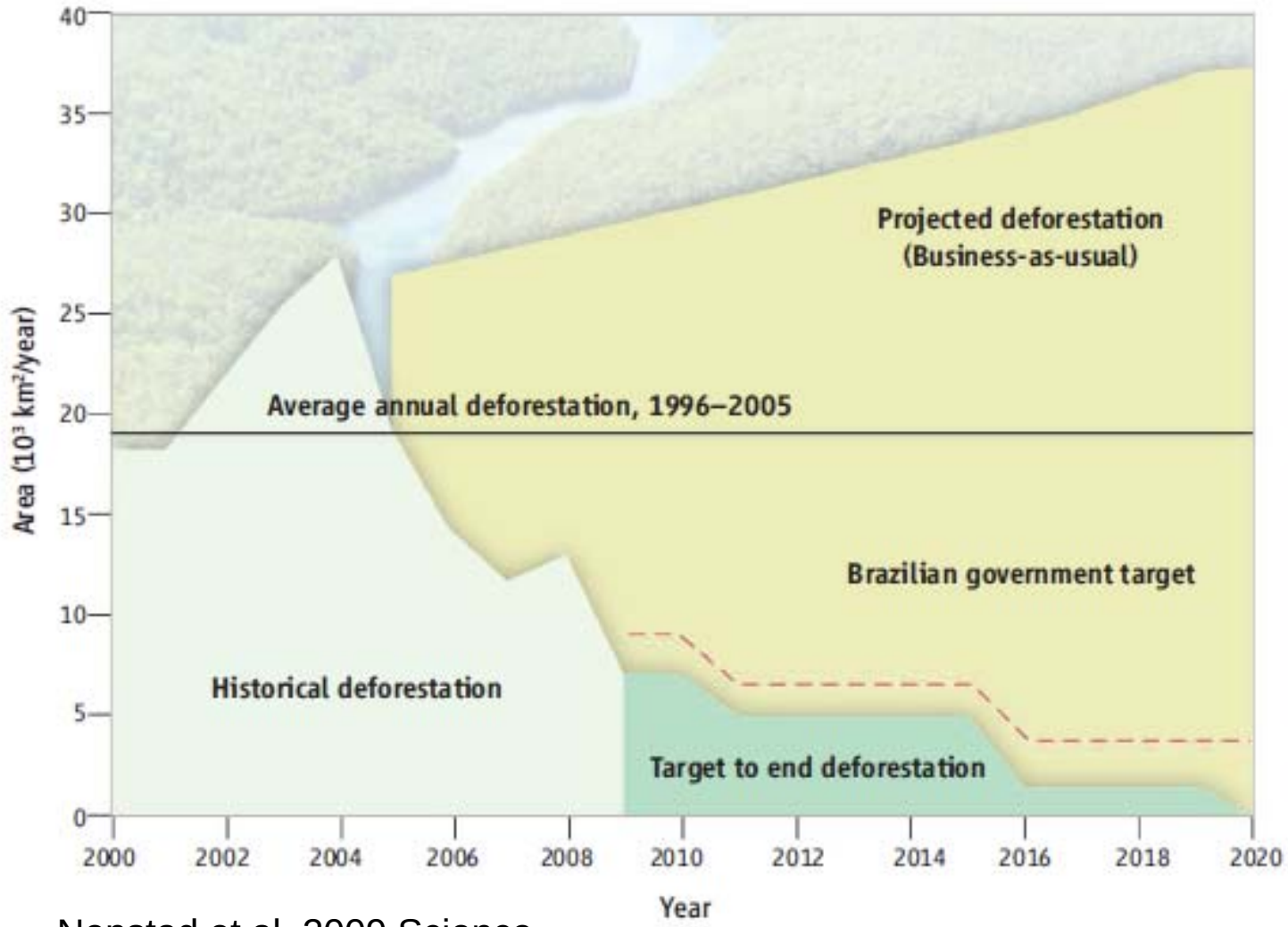
Source: Global Timber Model (Sohngen and Mendelsohn, 2007; Sohngen and Sedjo, 2006)

REDD Could Comprise More than 70% of Abatement Potential Over the Next 25 Years



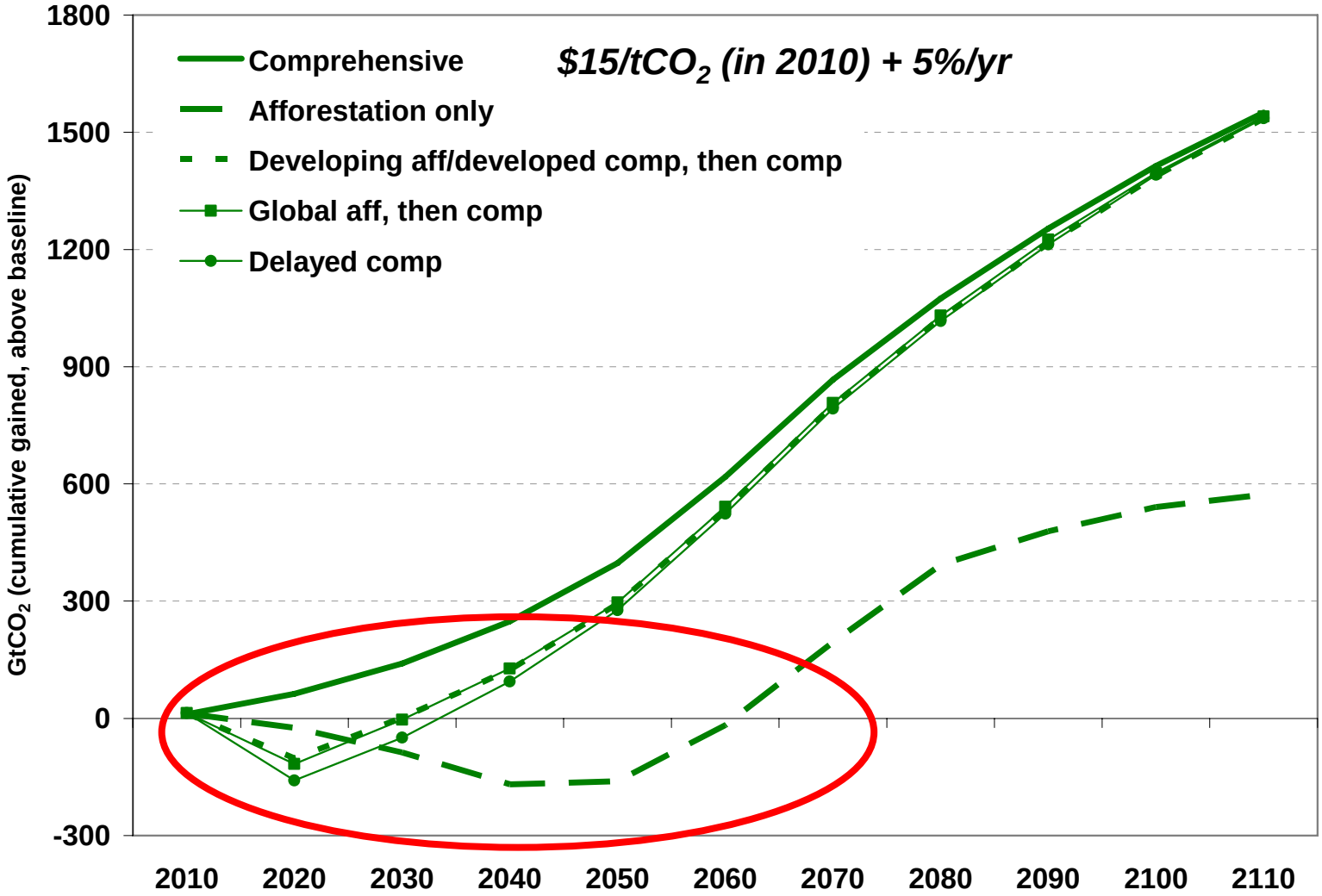
Source: Tavoni, Sohngen, and Bosetti (2007)

Availability of REDD-based Offsets Will Depend on Baseline and Targets



Nepstad et al. 2009 Science

Restricted or Delayed *Comprehensive* Forest Policies Cause Emission Leakage



Source: Rose and Sohngen, (forthcoming 2010).

Challenges for REDD-based Offsets

- Many REDD projects are located in “risky” countries
- Many potential host countries lack essential expertise, institutional capacity and governance
- In W-M and K-L, REDD-based offsets must be supplemental to “deforestation emissions baselines” which require “zero net deforestation” in 20 years
- “Domestic” GHG abatement commitments made by key countries like Brazil are likely to limit future supply of low-cost REDD-based offsets
- Lack of a “comprehensive” policy for forest-based carbon sequestration will lead to significant near-term leakage.

Forward Progress on Scaling Up Offsets

- CDM reform is happening now, albeit slowly
  - Programmatic CDM
  - Standardized baselines
  - Simplified methodologies
- REDD is moving forward in the international negotiations and may be the first “sectoral” program
- Growing U.S. domestic “voluntary” market may help soften the transition to a compliance market
  - “Early action” offset credits
  - Existing and evolving protocols and methodologies

Key Insights

- The option to use offsets for compliance combined with robust offset supplies are critical for achieving CO_2 cost containment.
- The massive scale envisioned in federal legislation will be difficult to realize in the near term (2012-2016), so CO_2 prices could rise to a level that stimulates gas-for-coal fuel switching.
- Existing options to scale up offset supplies are not sufficient. New designs & approaches are needed.
- Sector-based offset supplies could be large, but these policies are complex and could take years to negotiate and implement.
- There is a “zero-sum game” between developing country mitigation actions and the potential supply low-cost offsets from these countries.

Thank You

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