



Why Copenhagen Still Matters: International Aspects of Domestic GHG Compliance

EPRI Board of Directors Meeting
November 16, 2009

Why Copenhagen Matters to U.S. Firms

- Proposed climate legislation **assumes abundant and cheap** U.S. and international “offsets” as a way to contain compliance costs
- But...
 - Although there is significant potential for offsets from forestry and agriculture, it **won't be available immediately** and globally
 - Energy-related CO₂ abatement in non-OECD is abundant and cheap, but **many institutional barriers** exist near-term
 - If developing countries participate in a global agreement, they will be **less willing to export** their cheap abatement options

International actions will help shape the U.S. climate landscape

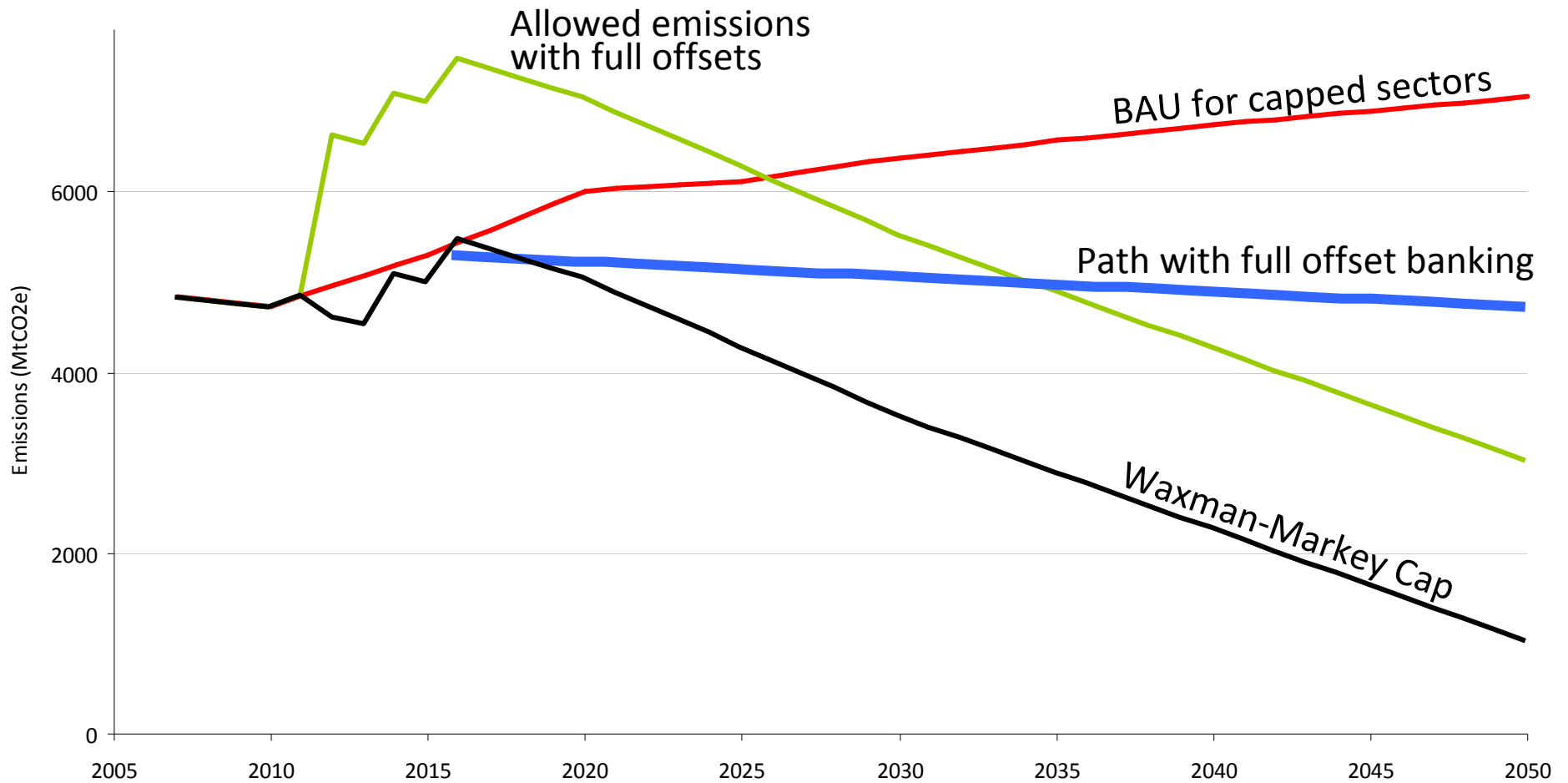


Implications of Offset Policy for Electric Company Strategy

Delavane Diaz
Project Manager

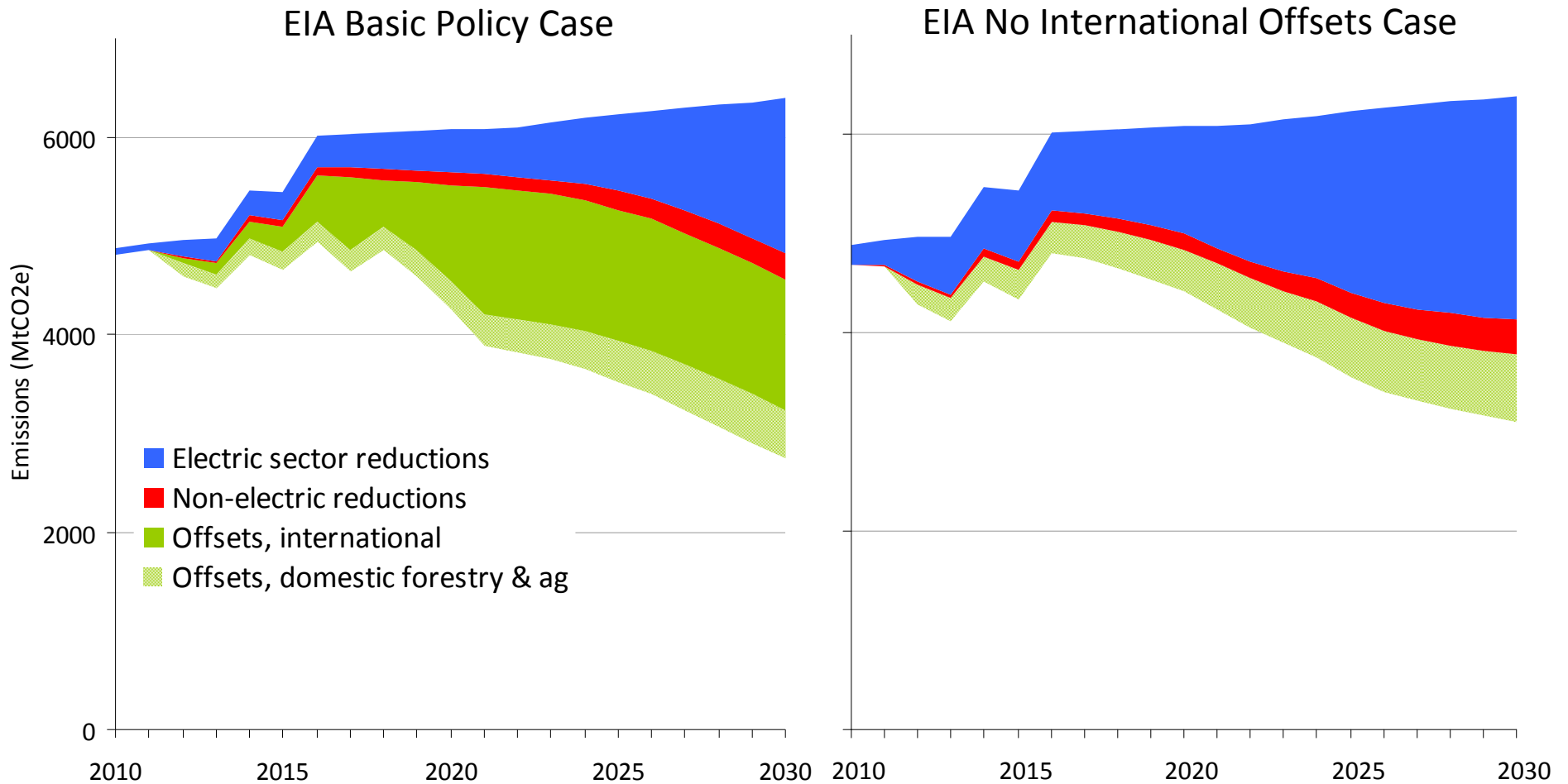
Generous Offset Provisions Could Loosen Proposed Cap

Emission Reductions Under an "80% by 2050" Cap-and-Trade Program



Lowest Cost Emission Reductions Come From Offsets and the Electric Sector

Compliance Sources in EIA Analysis of Waxman-Markey

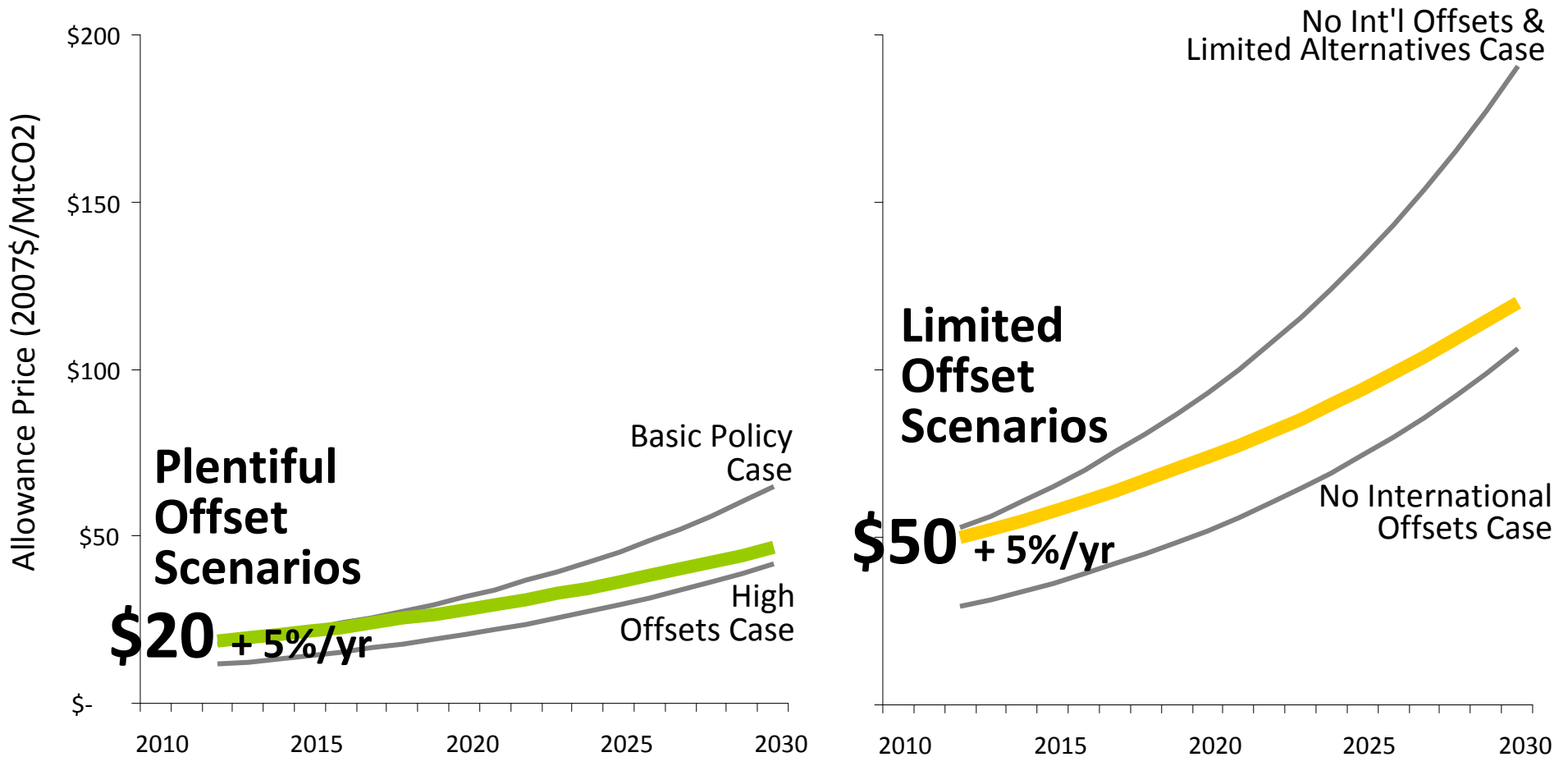


Source: EIA NEMS runs, HR2454 Cap, HR2454 No Int Offsets

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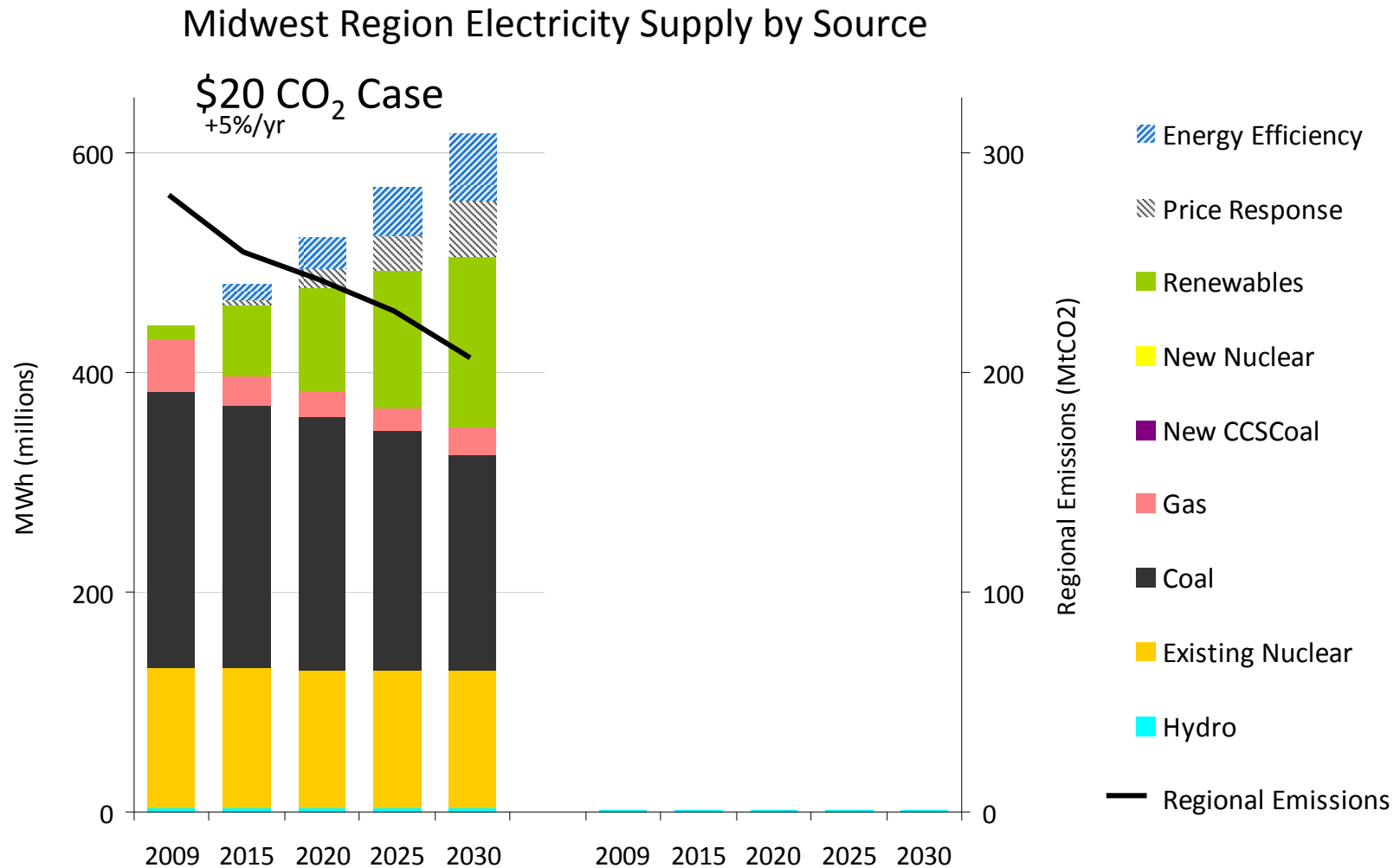
Two Possible CO₂ Price Paths Represent Alternative Offset Assumptions

EIA Allowance Price Estimates for Waxman-Markey



Source: EIA NEMS runs, HR2454 Cap, No Int Offsets, No Int Offsets/Lim, High Cost, High Offsets

Given a Portfolio of Technologies, CO₂ Policy Guides Electric System Choices

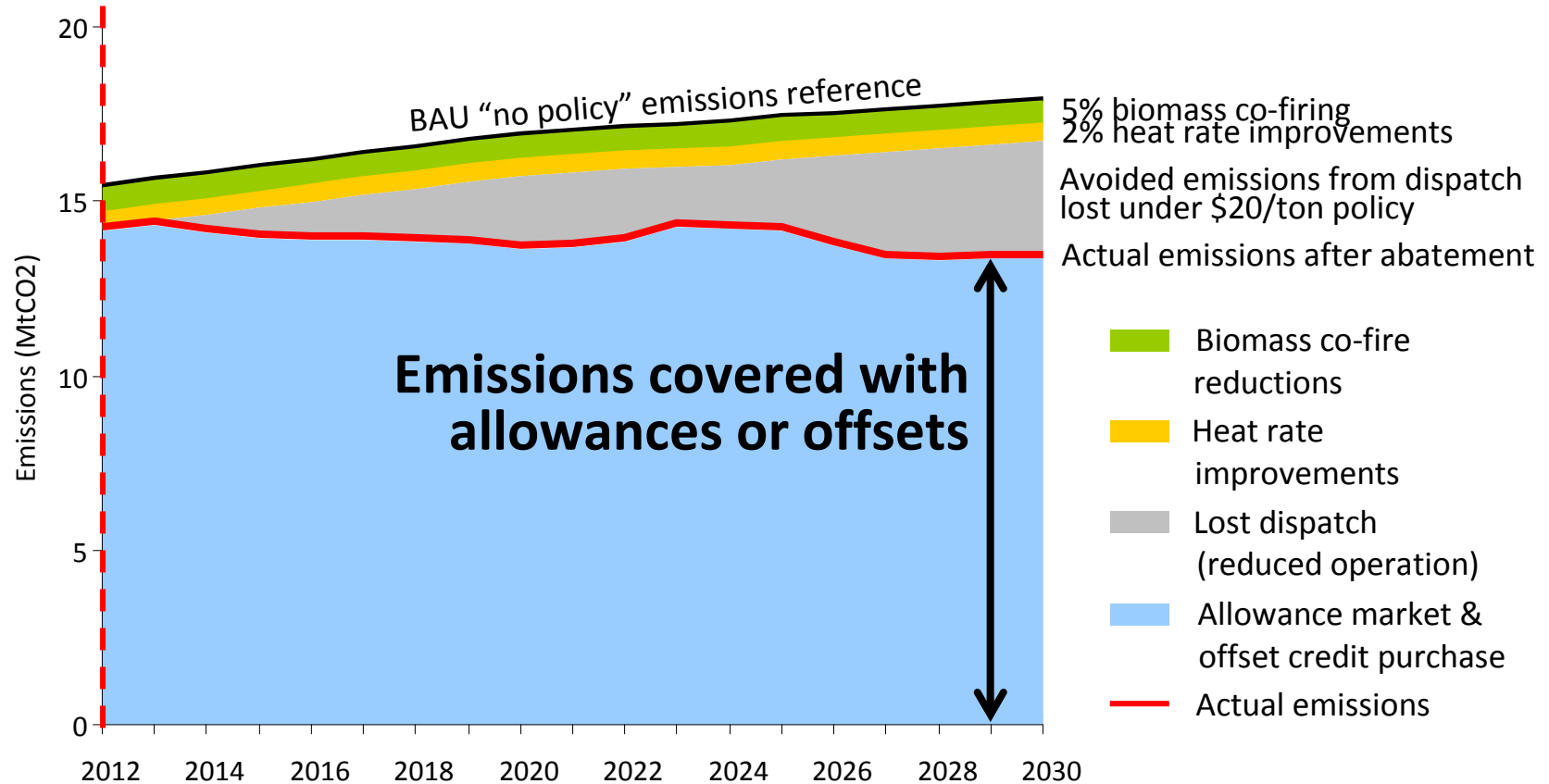


Source: EPRI Regional Stack Model, Midwest ISO results

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Companies Can Comply With Modest Abatement and Allowances at \$20/tCO₂

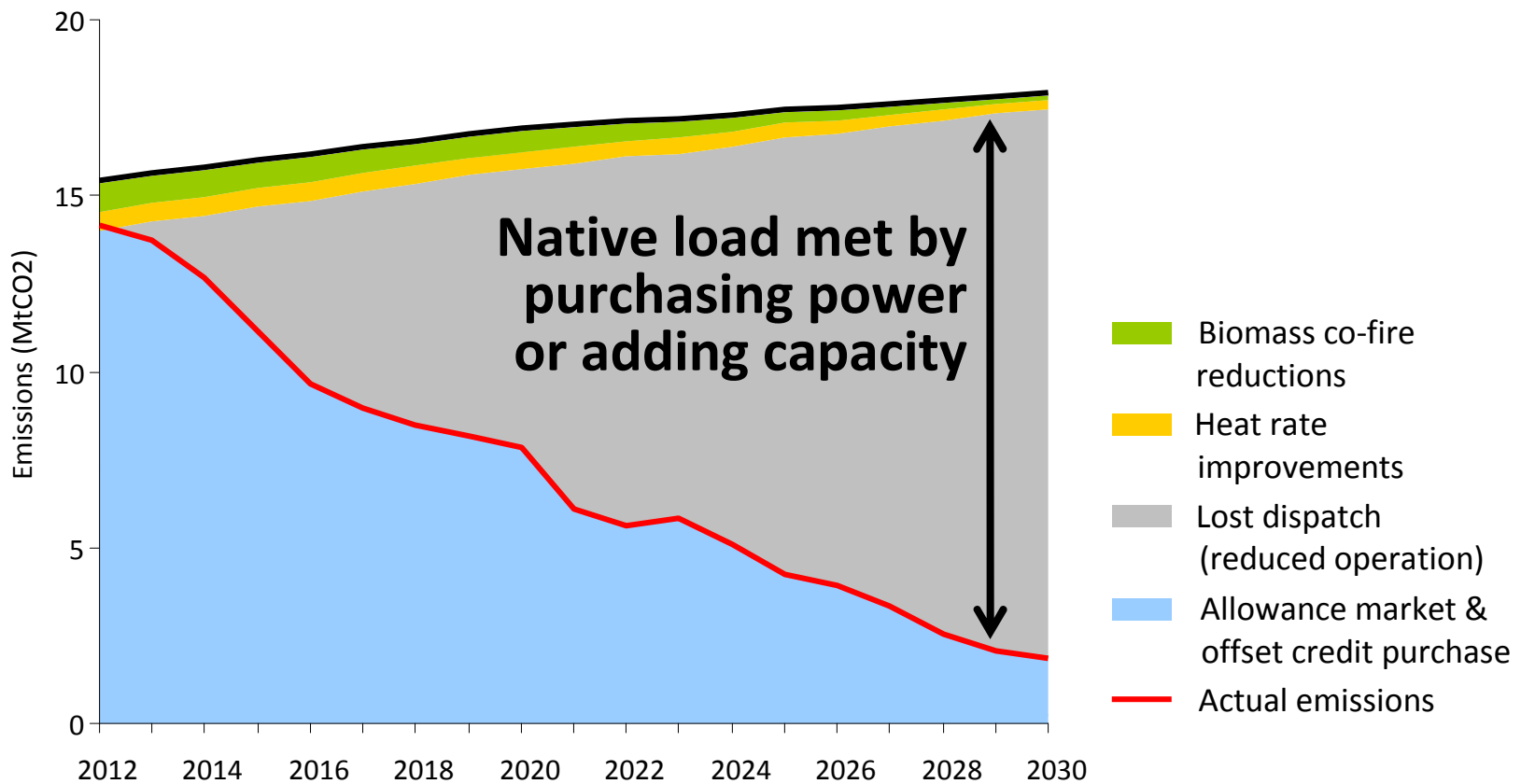
Policy takes effect 2012



Source: Midwest ISO and illustrative electric company results

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\$50 CO₂ Adder Transforms the Generation System – Existing Coal is No Longer Competitive



Source: Midwest ISO and illustrative electric company results

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Conclusions

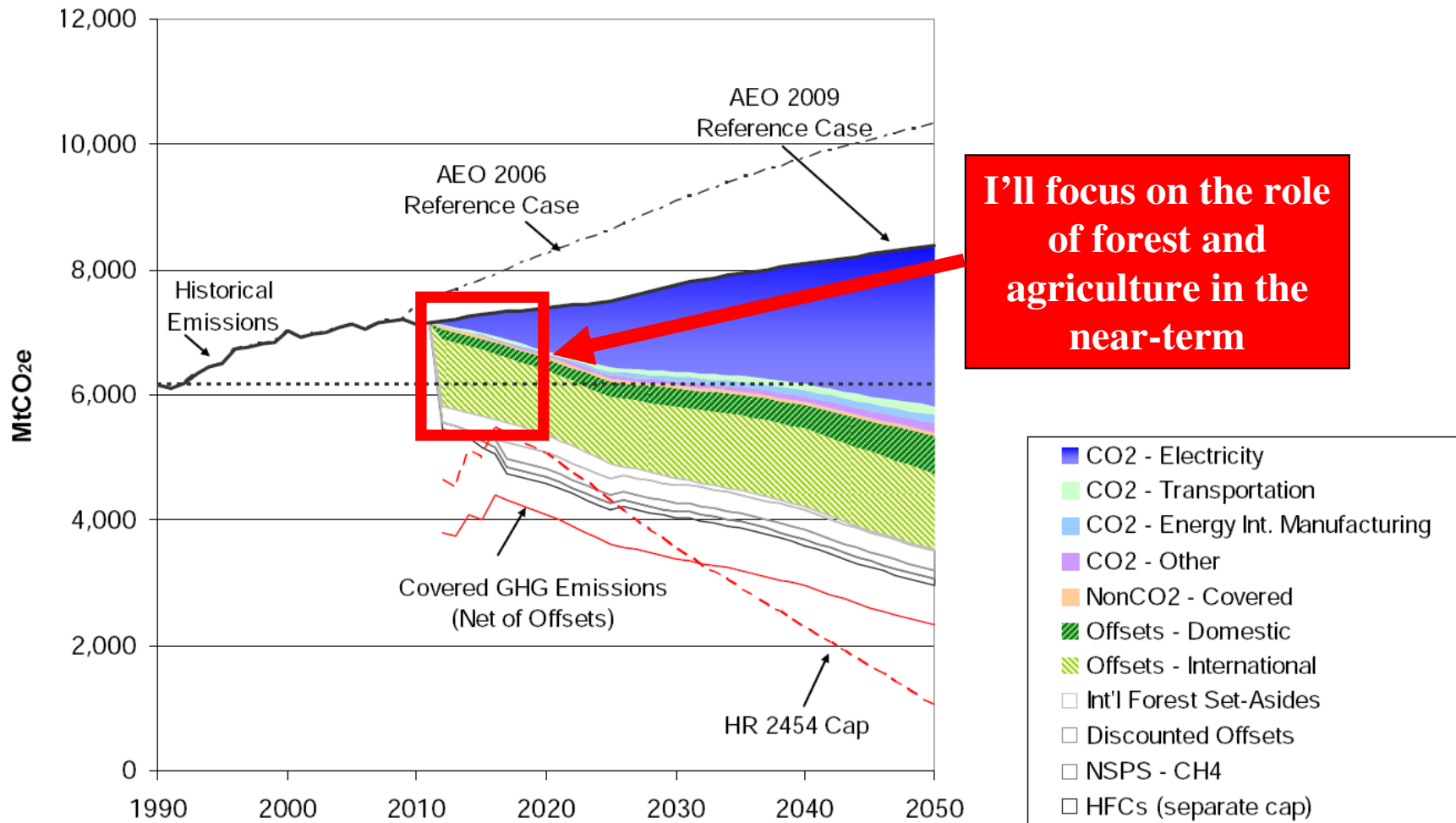
- CO₂ price expectations guide strategic investments
 - \$20 and \$50/tCO₂ paths could present dramatically different futures for power companies
- Current offset provisions in Congress make international policy a domestic compliance issue



Forestry and Agricultural Offsets: Reassessing Potential Supply

Steven Rose
Senior Project Manager

Early Offsets Assumed To Contain Overall Costs



Source: EPA Analysis of the American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress (6/23/2009)

Forestry & Agricultural Offsets 35% Of Near-term Abatement – Mostly Forests

- **Agriculture**
 - Cropland soil tillage changes
 - Cropland fertilizer management
 - Paddy rice water, amendment, and cultivar changes
 - Livestock manure and enteric emissions management
- **Forestry**
 - Afforestation: growing trees on non-forest land
 - Forest management: changes in harvest timing, management intensity, and species mix
 - Reduced deforestation of unmanaged forests
- **Bioenergy feedstocks & fossil fuel combustion** – also from these sectors (but capped)

Significant Implementation Challenges & Risks

- Program rules and timing?
 - Mechanisms/institutions for delivering?
 - International climate policy?
 - Financial viability – market interpretation of programs & mechanisms?
- Raises questions about availability and viability

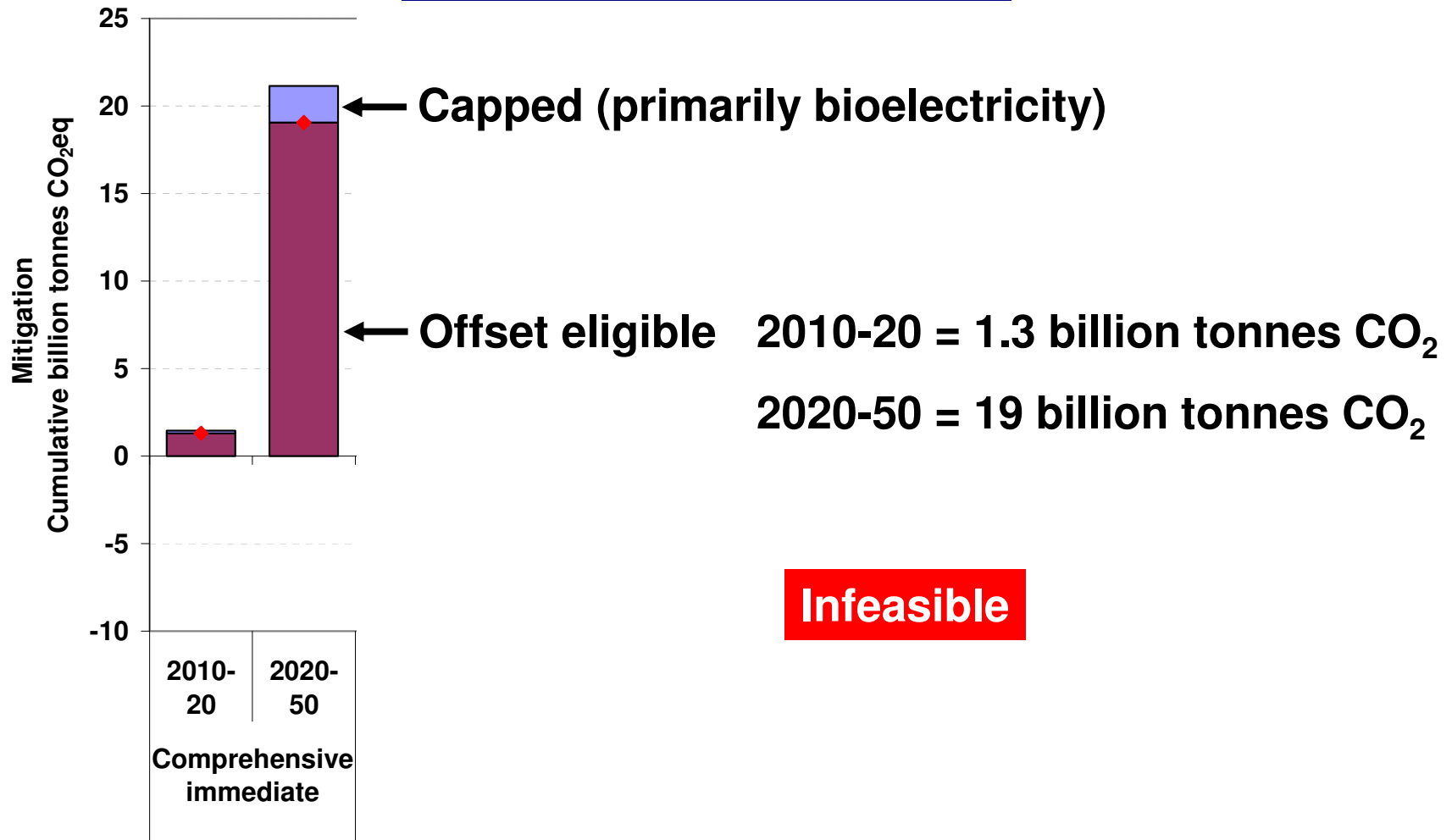
**Immediate, comprehensive & global availability
likely infeasible**

How Might A Domestic Forest/Agriculture Offset Program Unfold?

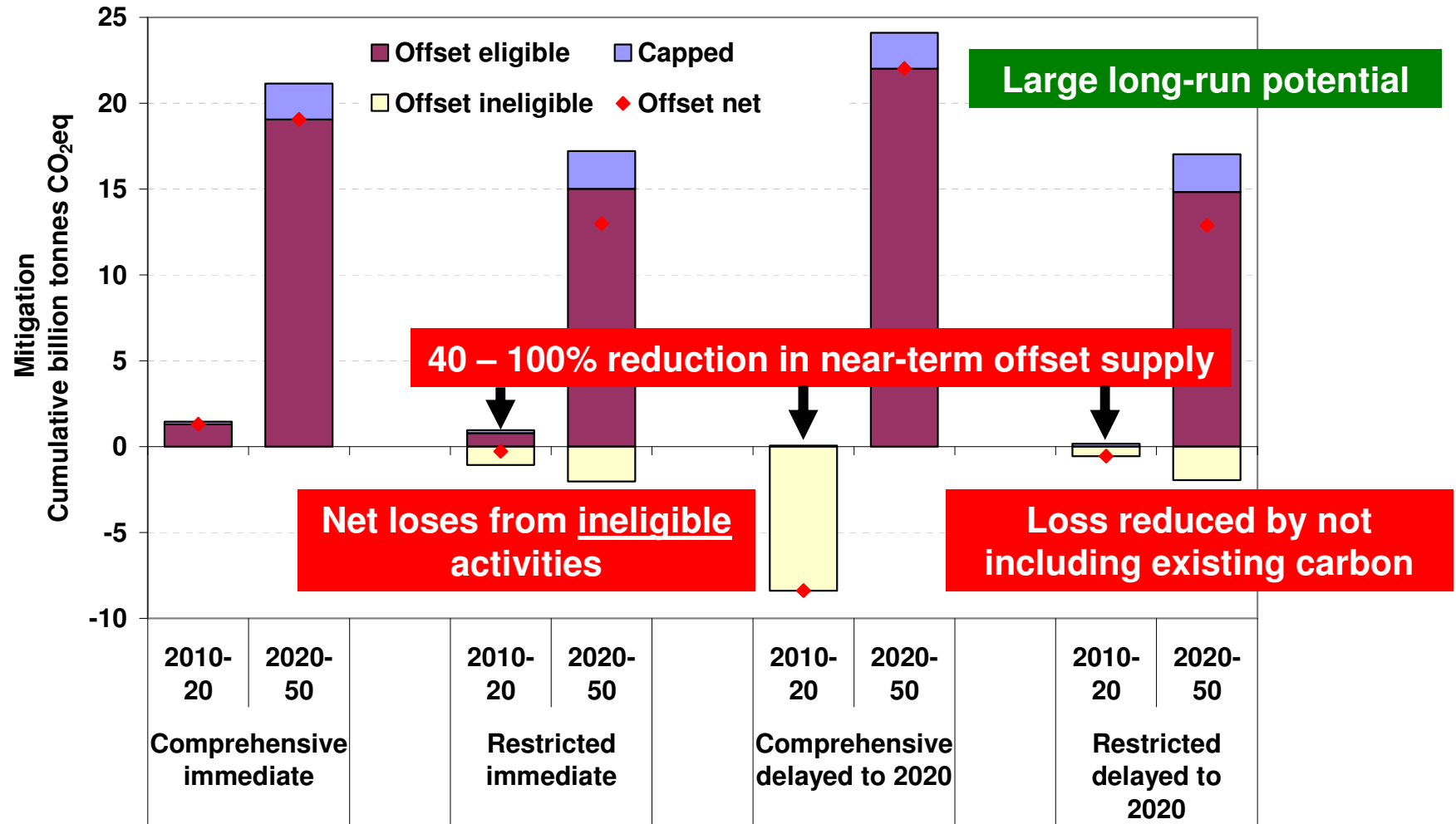
- **Comprehensive eligibility immediately (2010)** **Infeasible**
 - Comprehensive = soil carbon, soil nitrous oxide, livestock (manure, enteric), paddy rice, afforestation, forest management
- **Restricted eligibility immediately (2010)**
 - Restricted = livestock manure management and afforestation
- **Comprehensive eligibility delayed (to 2020)**
- **Restricted eligibility delayed (to 2020)**

Comprehensive Immediate Policy Delivers Maximum Offsets

With \$15/tCO₂eq (in 2010) + 5%/yr



Restrictions and/or Delay Reduces Availability, Creates Potential for Unintended Consequences

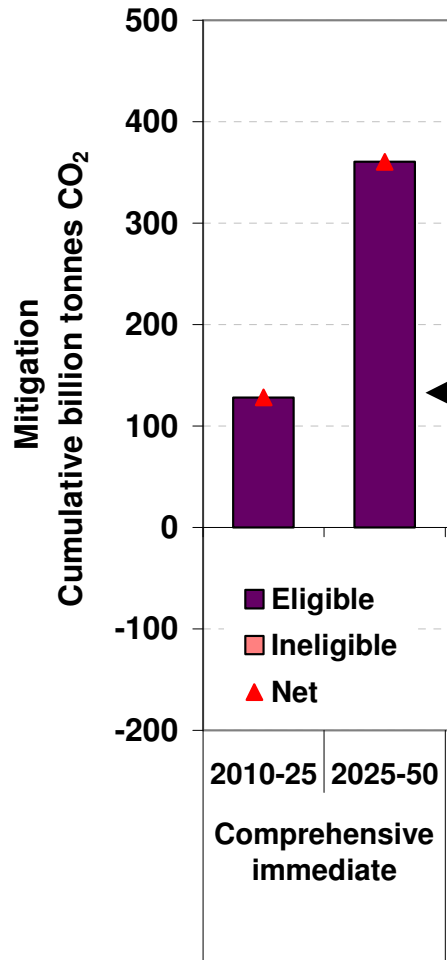


How Might An International Forest Carbon Program Unfold?

- **Comprehensive eligibility immediately (2010)** **Infeasible**
 - Comprehensive = afforestation, forest management, reduced deforestation
- **Afforestation only immediately (2010)**
- **Afforestation to 2025, comprehensive after**
- **Nothing to 2025, comprehensive after**

Comprehensive Immediate Policy Delivers Maximum Offsets

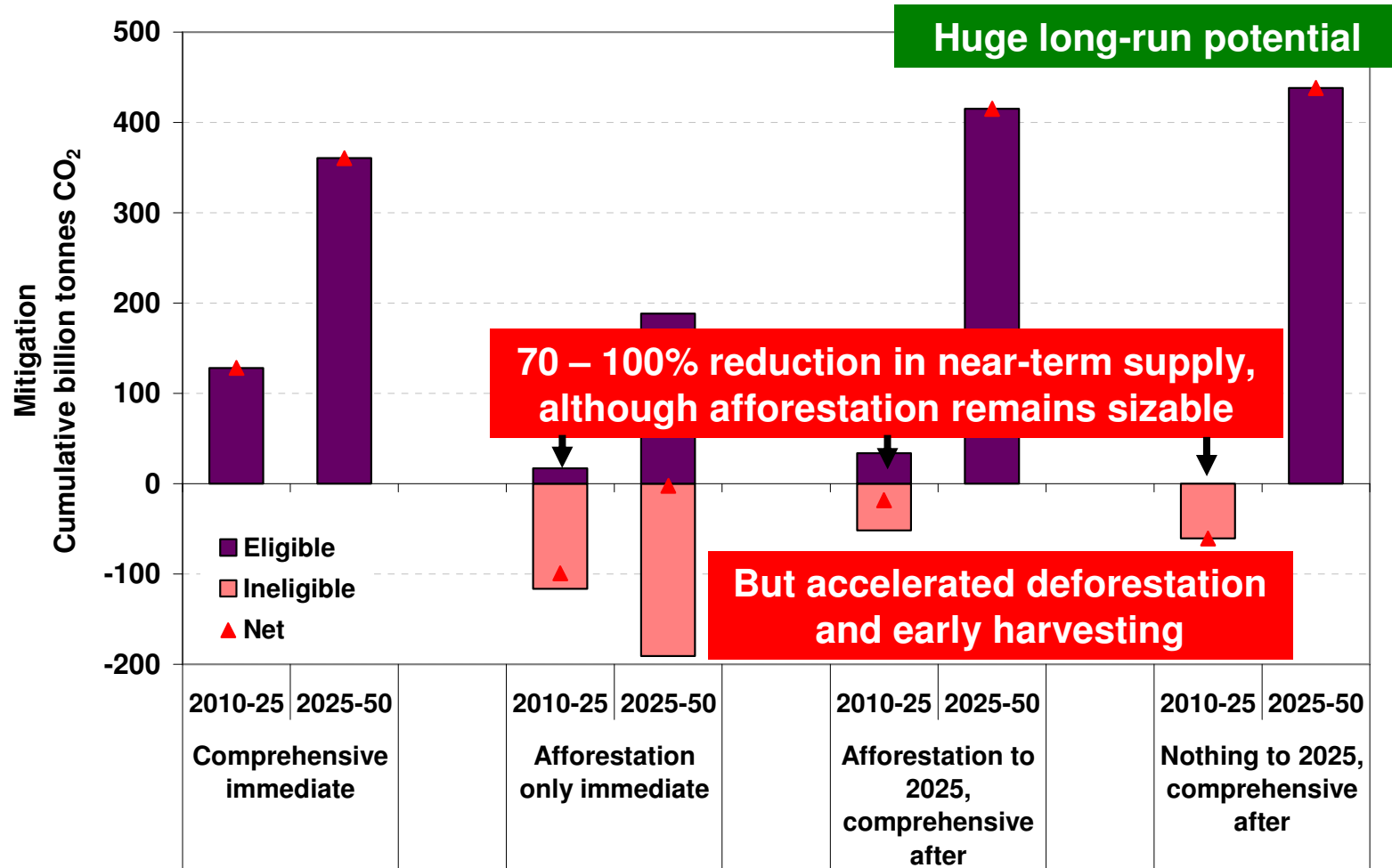
With \$15/tCO₂eq (in 2010) + 5%/yr



← Offset eligible 2010-25 = 128 billion tonnes CO₂
 2020-50 = 360 billion tonnes CO₂


Infeasible

Restrictions and/or Delay Reduces Availability, Creates Potential for Unintended Consequences



Conclusions

- Forestry & agriculture mitigation potential **won't be available immediately, comprehensively, and globally**
- **In the near-term,**
 - Less mitigation potential than estimated – possibly none
 - Near-term carbon losses seem inevitable – but there are management options
- **Significant long-run potential** that could moderate overall compliance costs
- Forest/ag policy **design** will affect offset supply (cost and availability) and net climate benefits



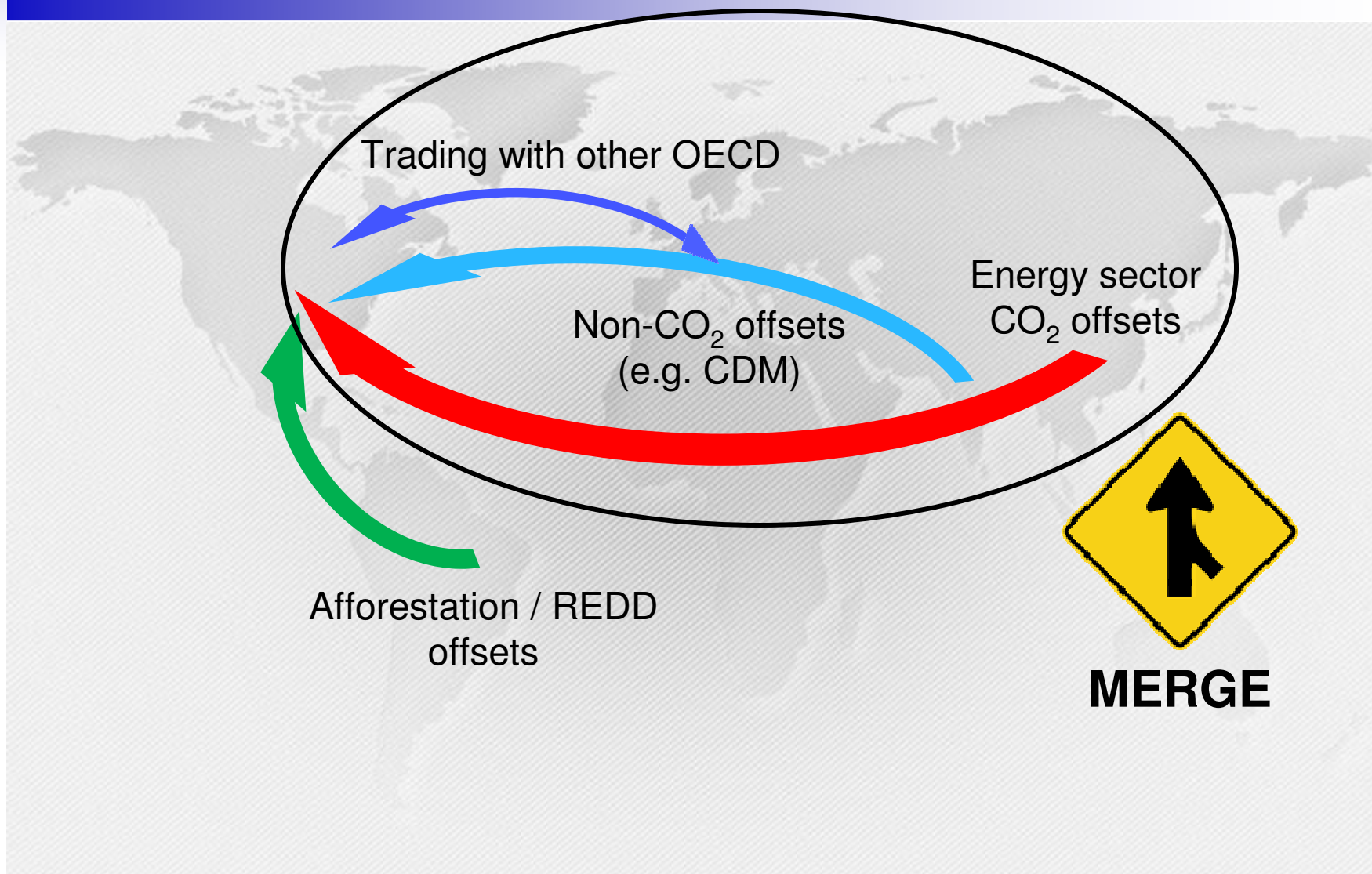
International Offsets: The Potential Role of the Energy Sector

Geoff Blanford
Senior Project Manager

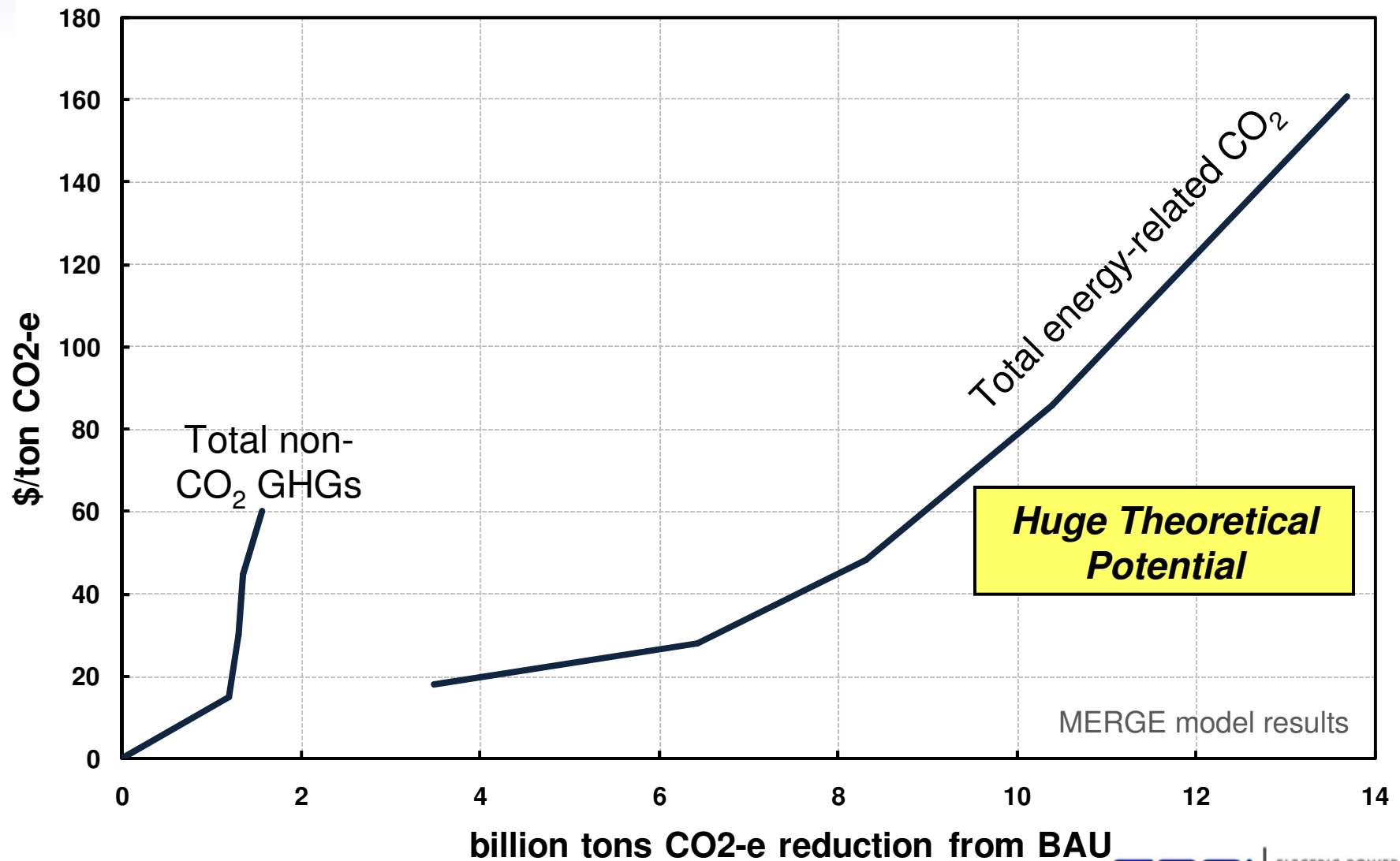
Context

- Under Waxman-Markey bill, energy-related offsets are admissible through a sectoral mechanism
- Energy-related CO₂ abatement in non-OECD is **abundant** and **cheap**, but many **institutional barriers** exist near-term
- In long-term, as support for **global stabilization** efforts broadens, non-OECD countries will become less willing to export cheap abatement options
- Is there a **window of opportunity** for offsets?

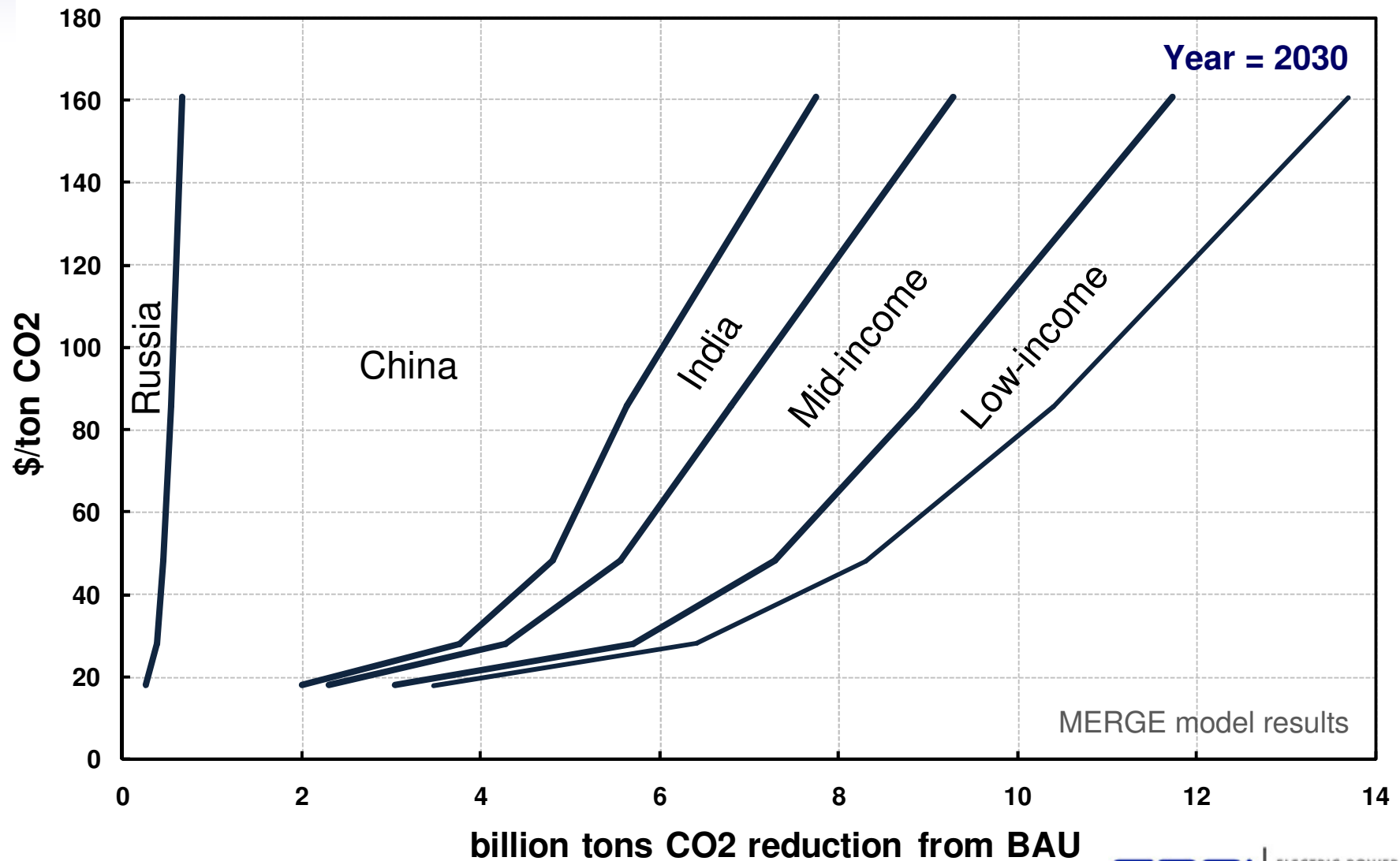
Sources of International Compliance



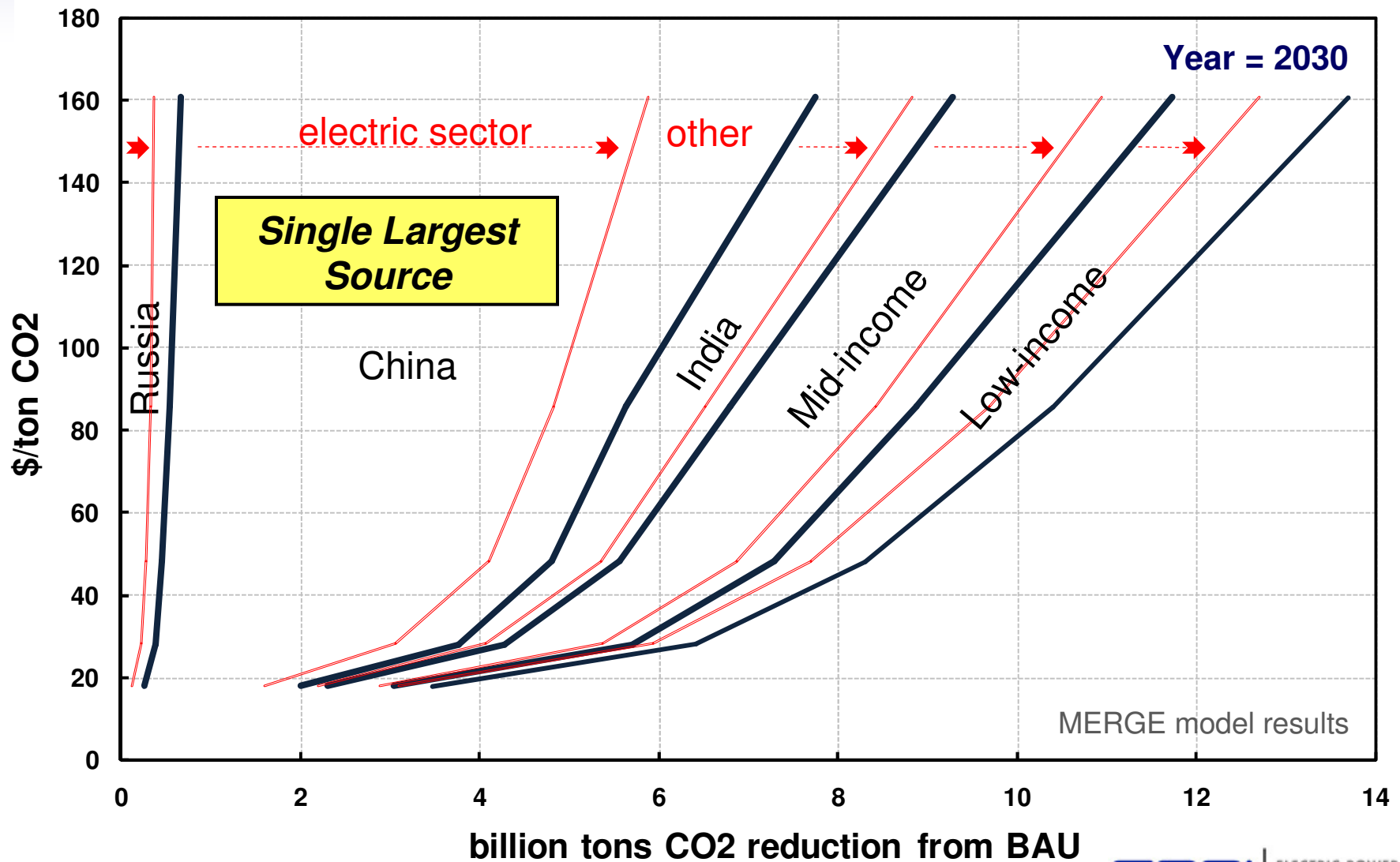
Non-OECD Abatement Opportunities in 2030



Energy-Related CO₂ Abatement By Region



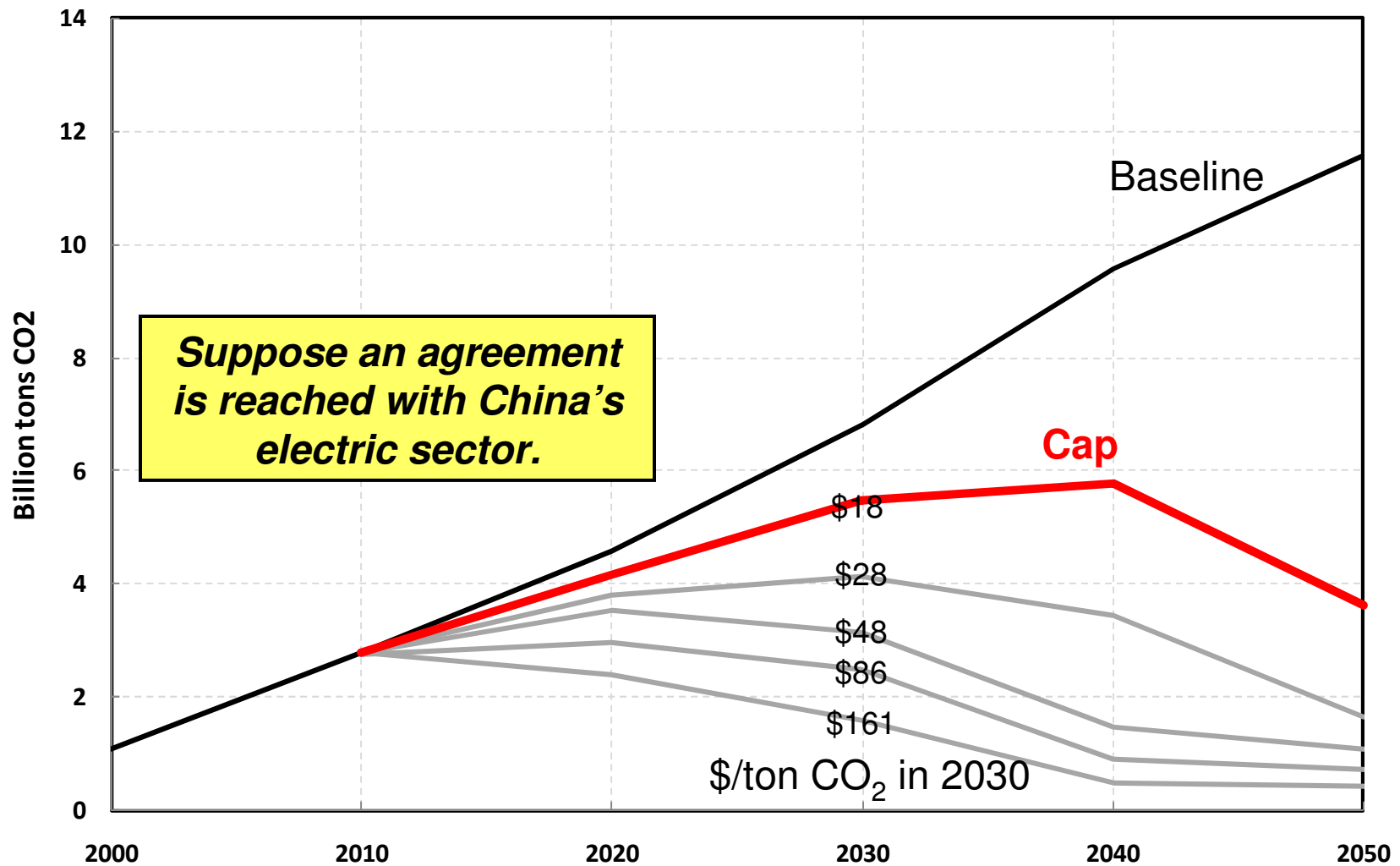
70% Of Abatement Occurs In Electric Sector



What Are The Institutional Barriers?

- Energy-related offsets must come from a capped **sector** in a **participating country** under a **qualifying agreement**
- Cap must be **below BAU**; only reductions beyond the cap can be sold as offsets, market mechanisms are unclear
- **Electric sector** is by far the largest sector (in terms of low-cost abatement), with **China** by far the largest country
- Would China accept an electric-sector cap linked to the US trading system? Or would it undertake its own policy?

China's Electric Sector Emissions

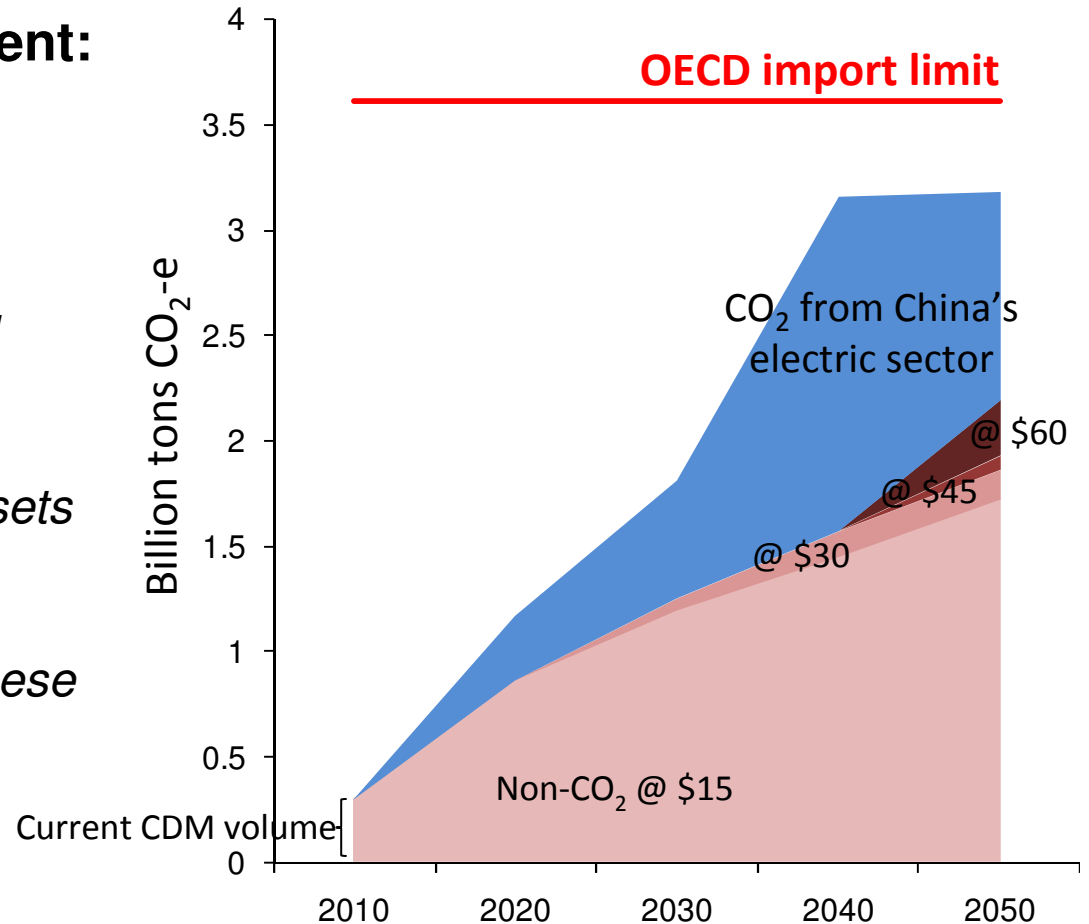


Offset Transfers From Non-OECD To OECD

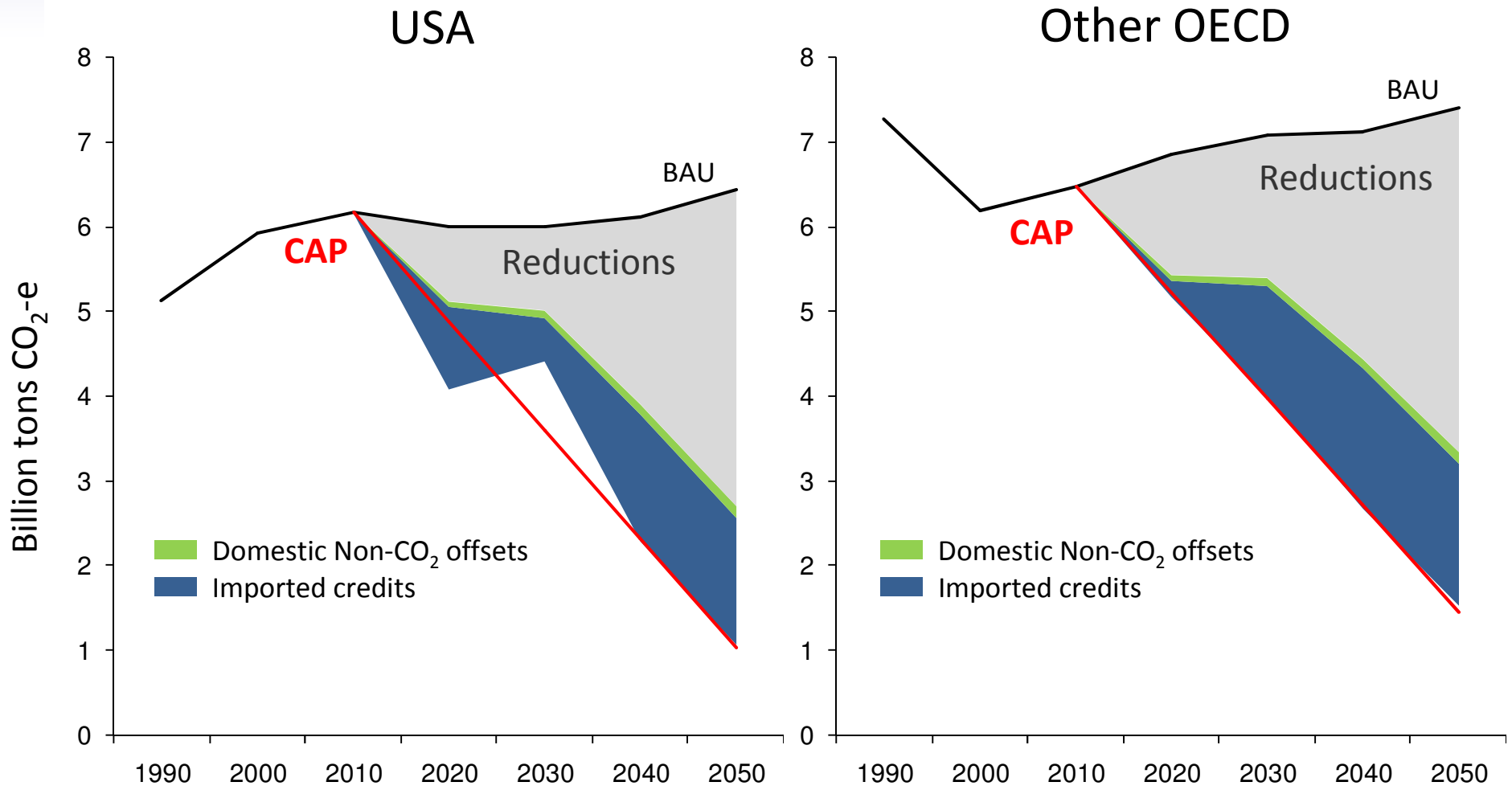
International policy environment:

- 80% below 1990 caps in OECD (USA + EU + Japan + CANZ)
- W-M scale offset provisions in all OECD countries
- Expanding CDM for non-CO₂ offsets from non-OECD
- Energy offsets from capped Chinese electric sector

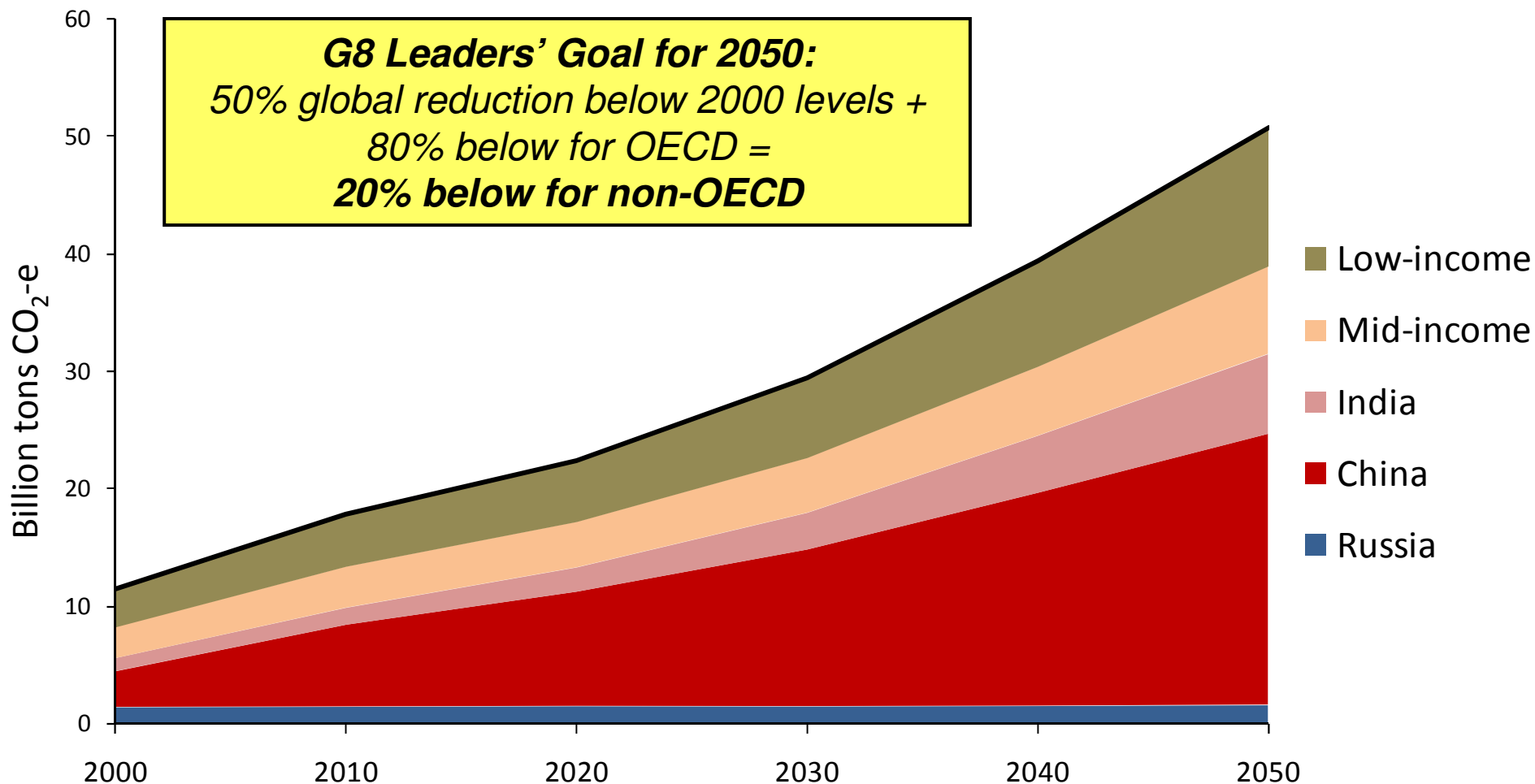
If institutional barriers are overcome, supply could become substantial.



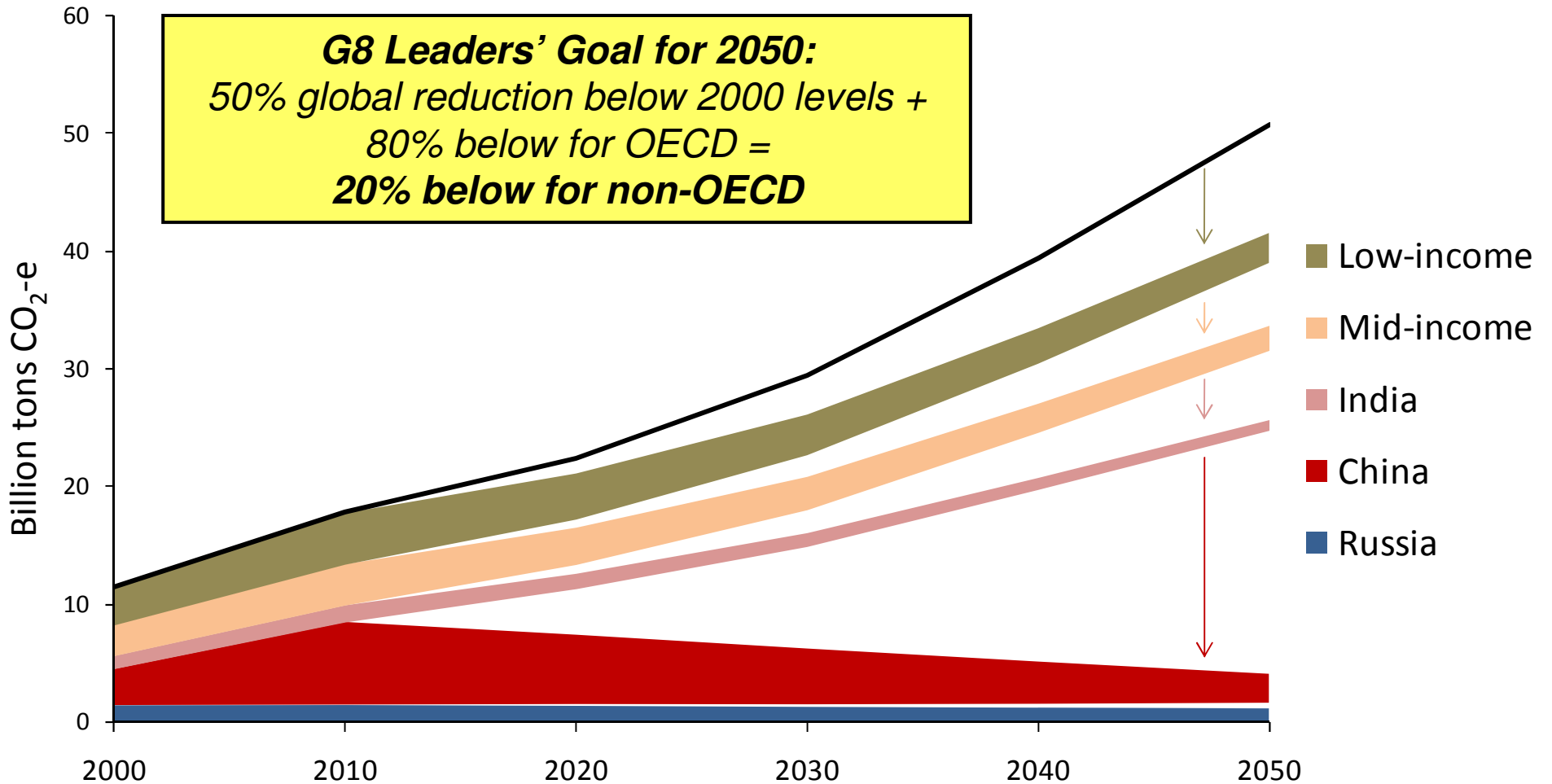
OECD Compliance After Offset Transfers



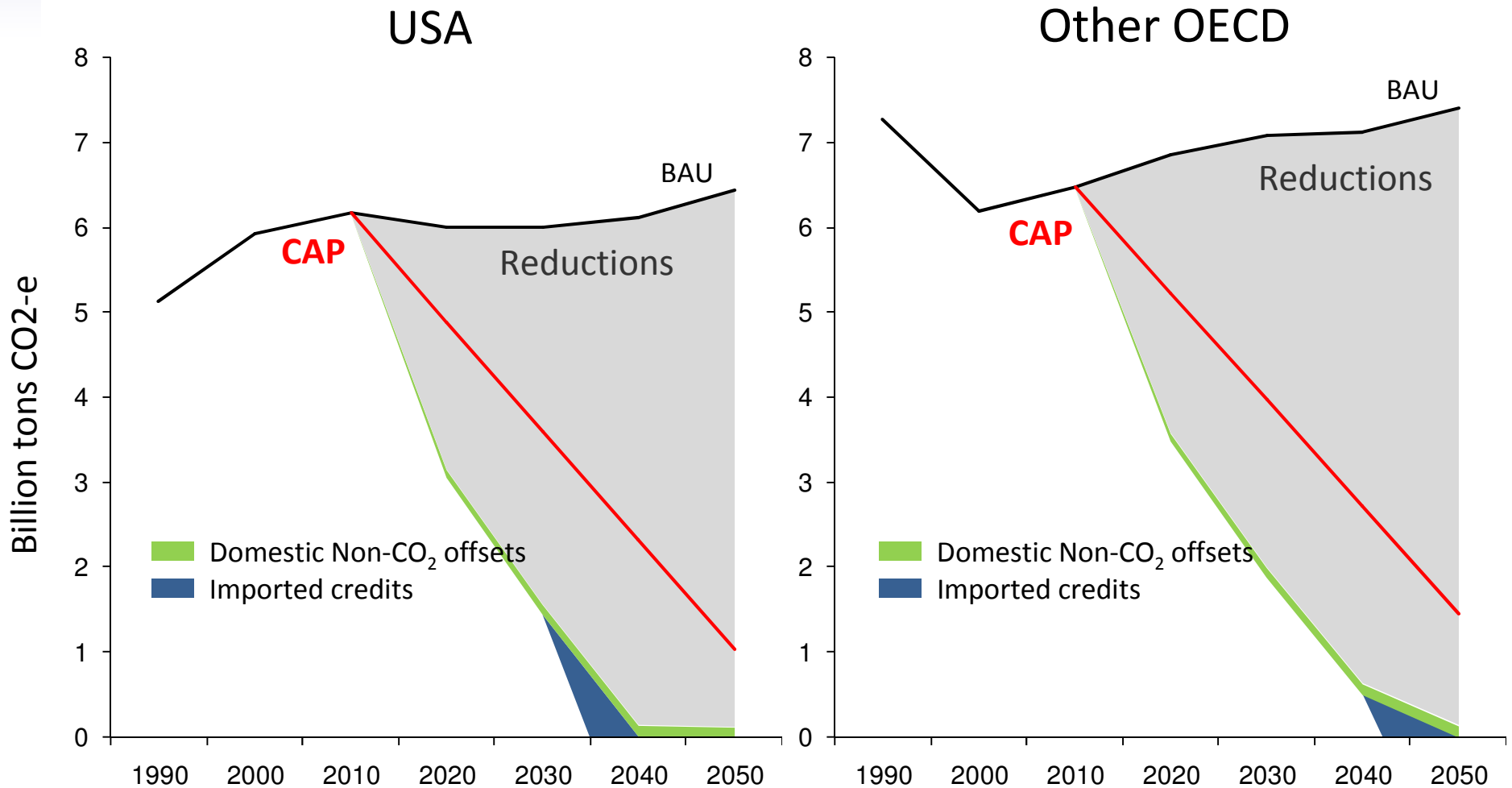
Baseline Emissions for Non-OECD



Significant Non-OECD Emissions Cuts Required To Meet 50% Global Reduction Target



For G8 Goal, Permit Trade Flows Other Direction



Conclusions

- Deals on sectoral policies may be important, particularly if there are **loose caps** on **electric sectors** in **large countries**
- Political economy behind such agreements is complex, could take **several years** to negotiate
- Even with a successful negotiation, mechanism for selling excess reductions to US compliance parties is not clear
- Ultimately, sectoral caps may be abandoned in favor of **national targets** as countries join stabilization effort



International Climate Policy: A “Second Best” Solution for a “Second Best” World?

Richard Richels
Senior Technical Executive

Why is Copenhagen (and Beyond) Important

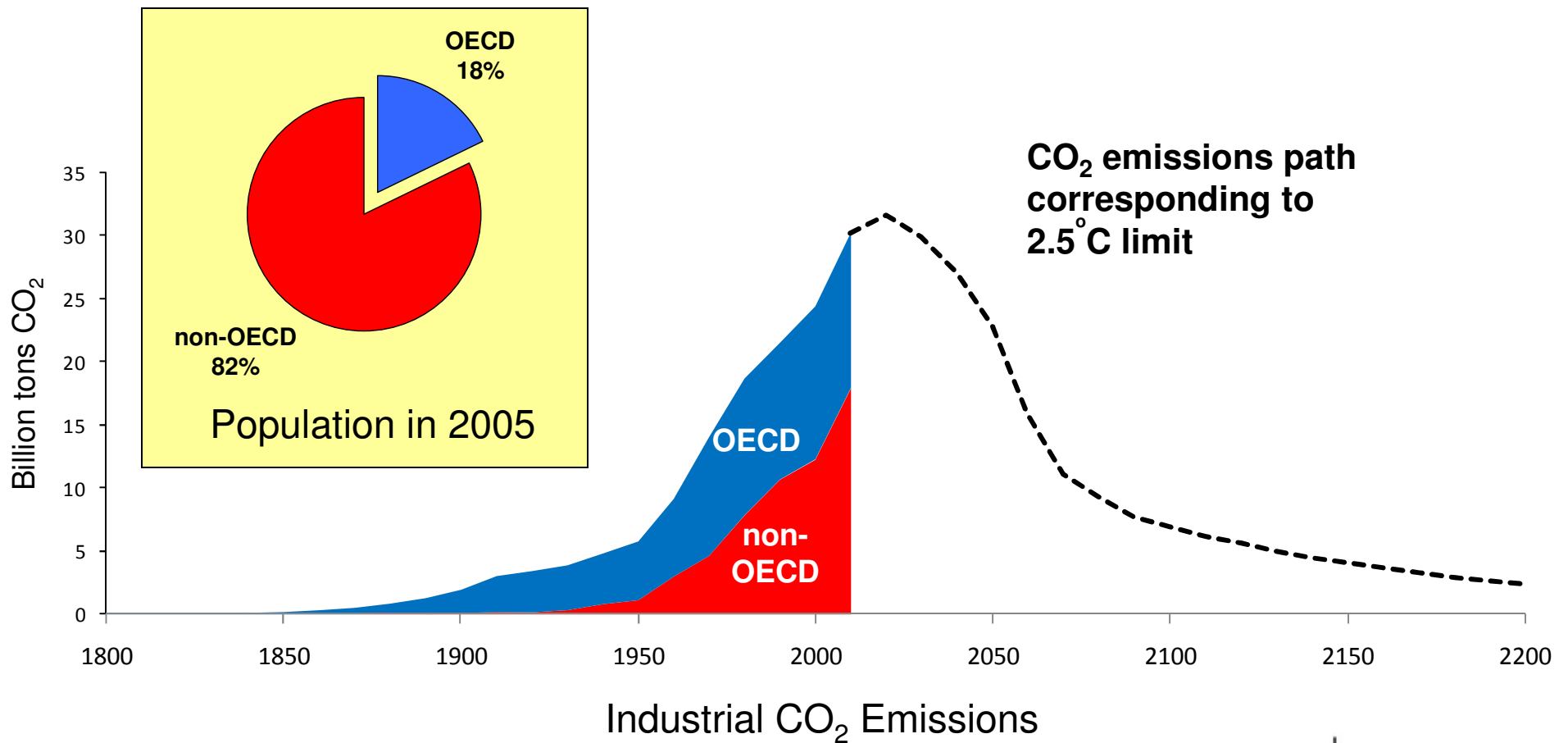
- Will be important in establishing what counts as emission reductions and who gets the credit for them
 - Forestry and agriculture offsets
 - Energy sector agreements
- Proposed global GHG reduction targets can lead to much higher prices for CO₂ than previous estimates
 - May be extremely difficult to achieve

Key Determinants Of Climate Policy Costs

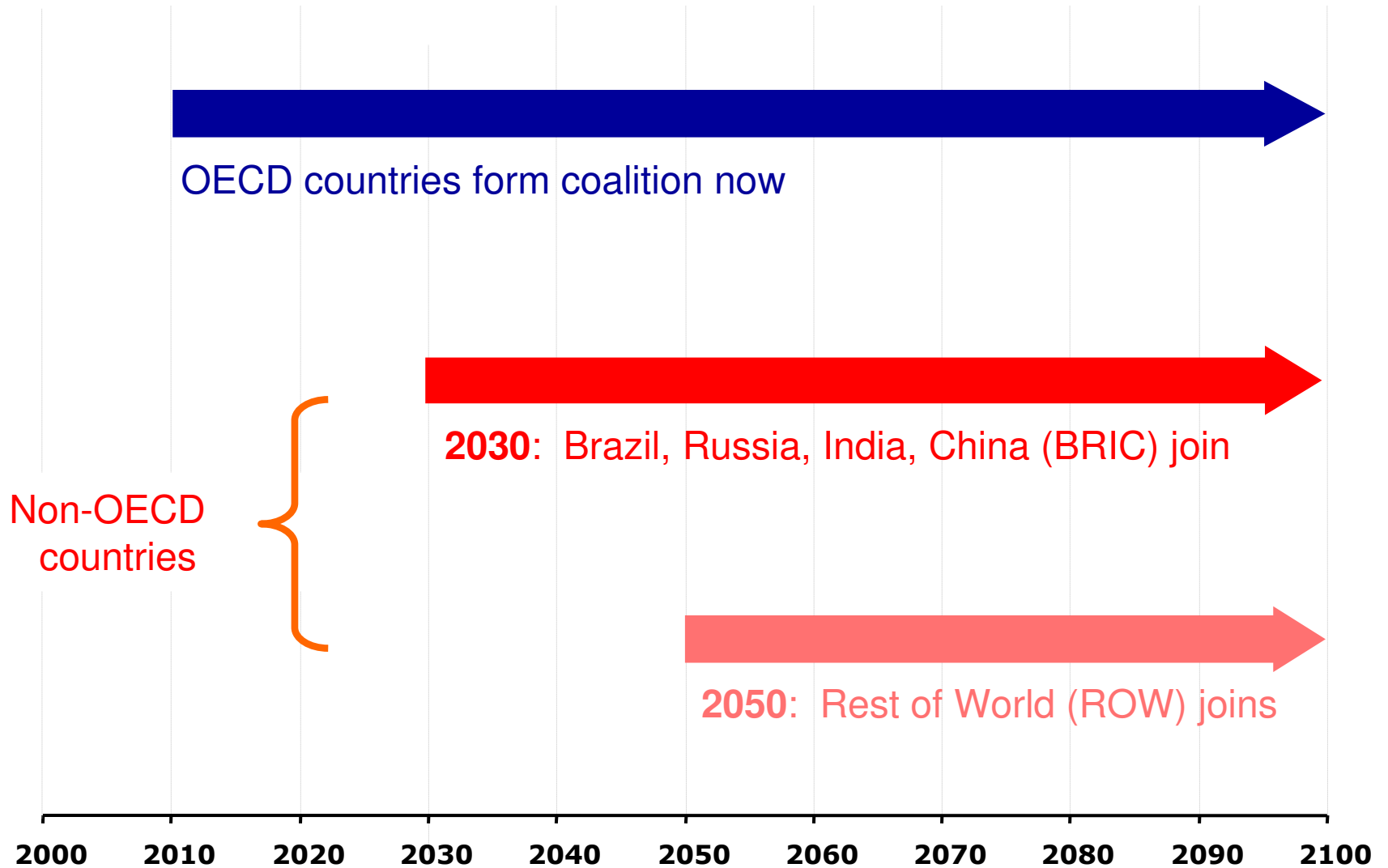
1. Limits imposed on global emissions
2. When countries agree to join coalition
3. Developing country behavior prior to joining coalition

What Are The Limits on Global Emissions?

Current proposals could place severe pressure on most countries



When Do Countries Join Coalition?



How Do Acceding Countries Behave?

Before joining coalition, non-OECD countries can:

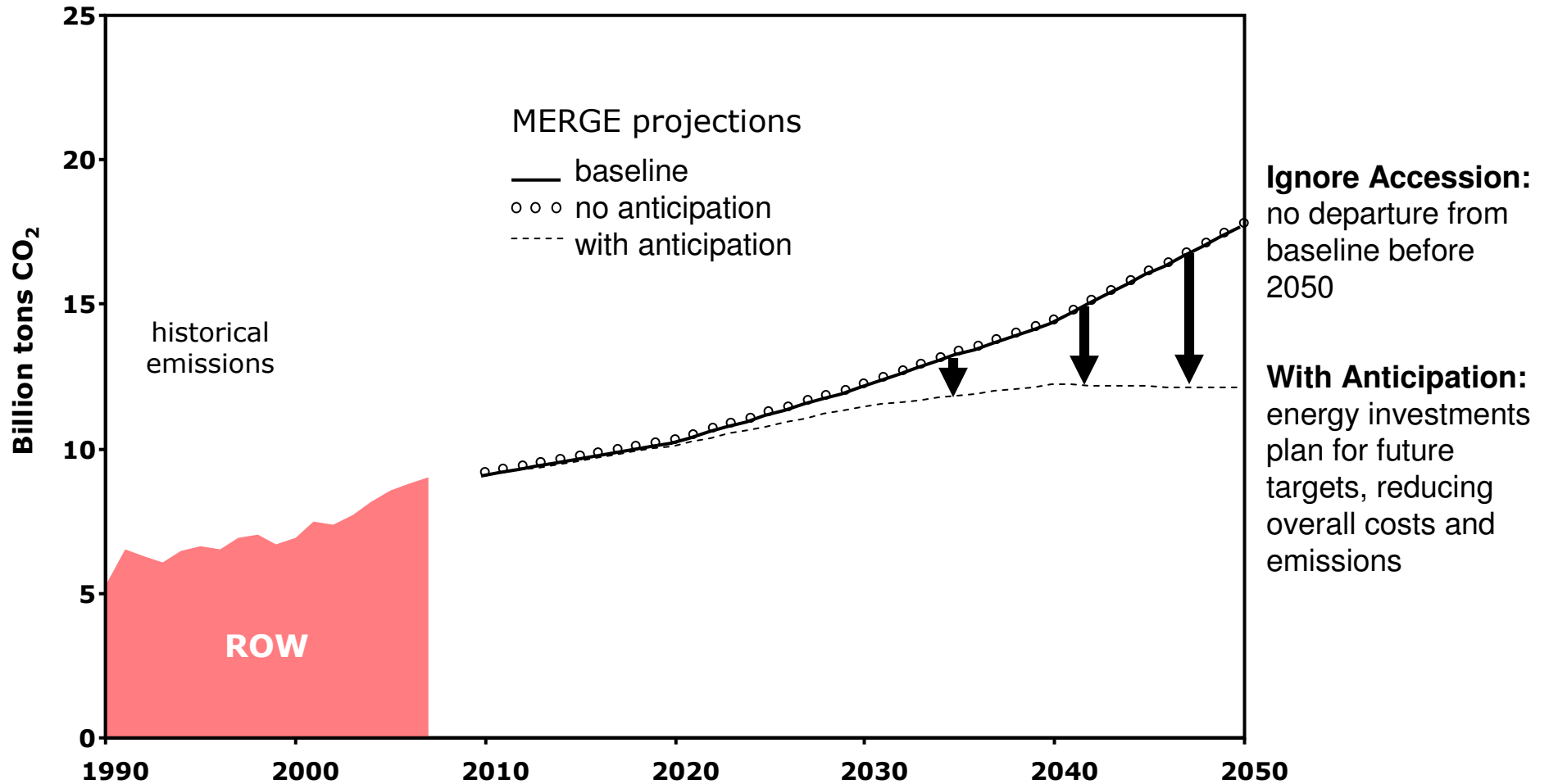
(1) Ignore Accession

No advance planning, business-as-usual until commitments are adopted

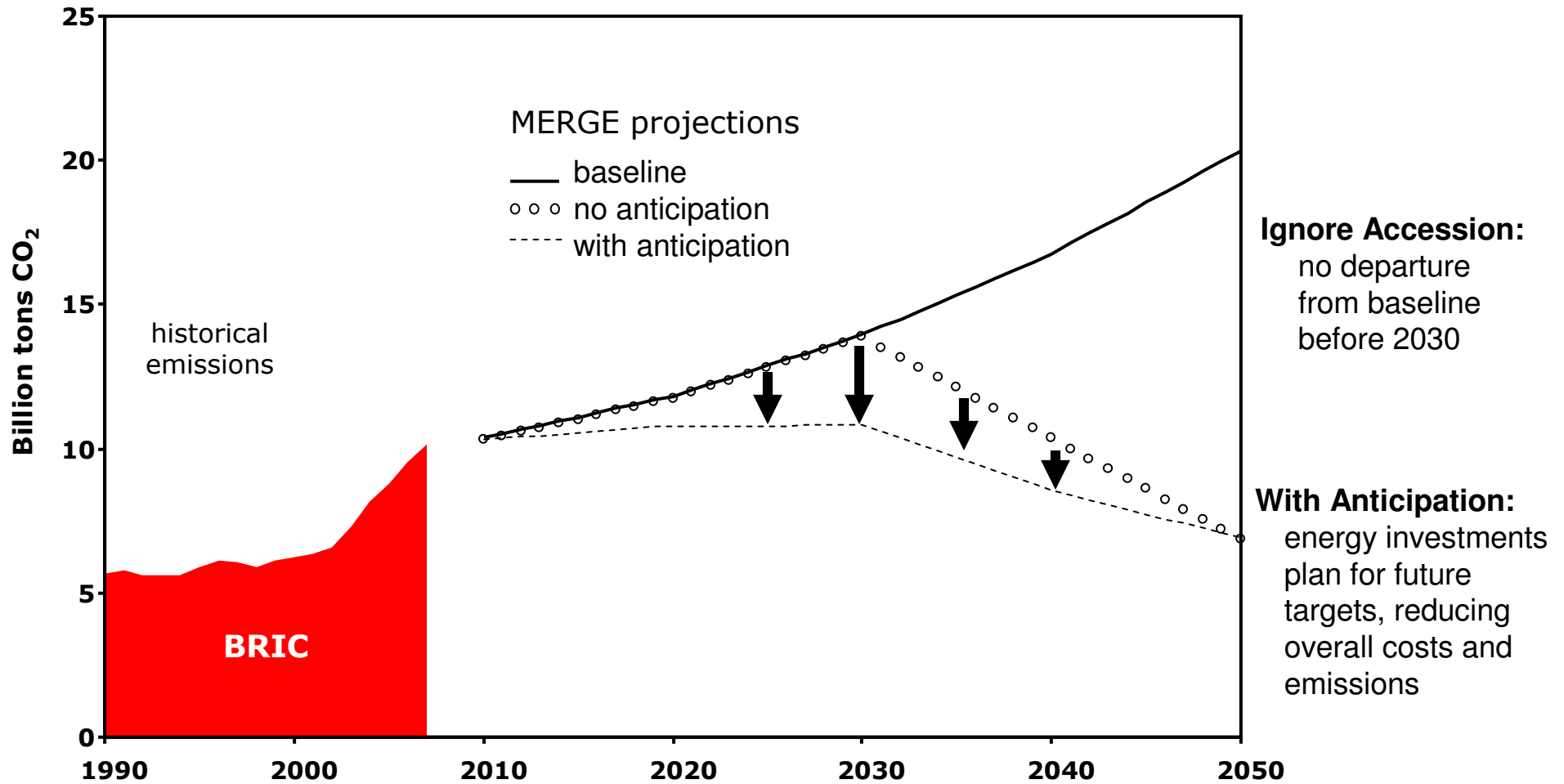
(2) Anticipate Accession

Expectations of future commitments lead to advance planning

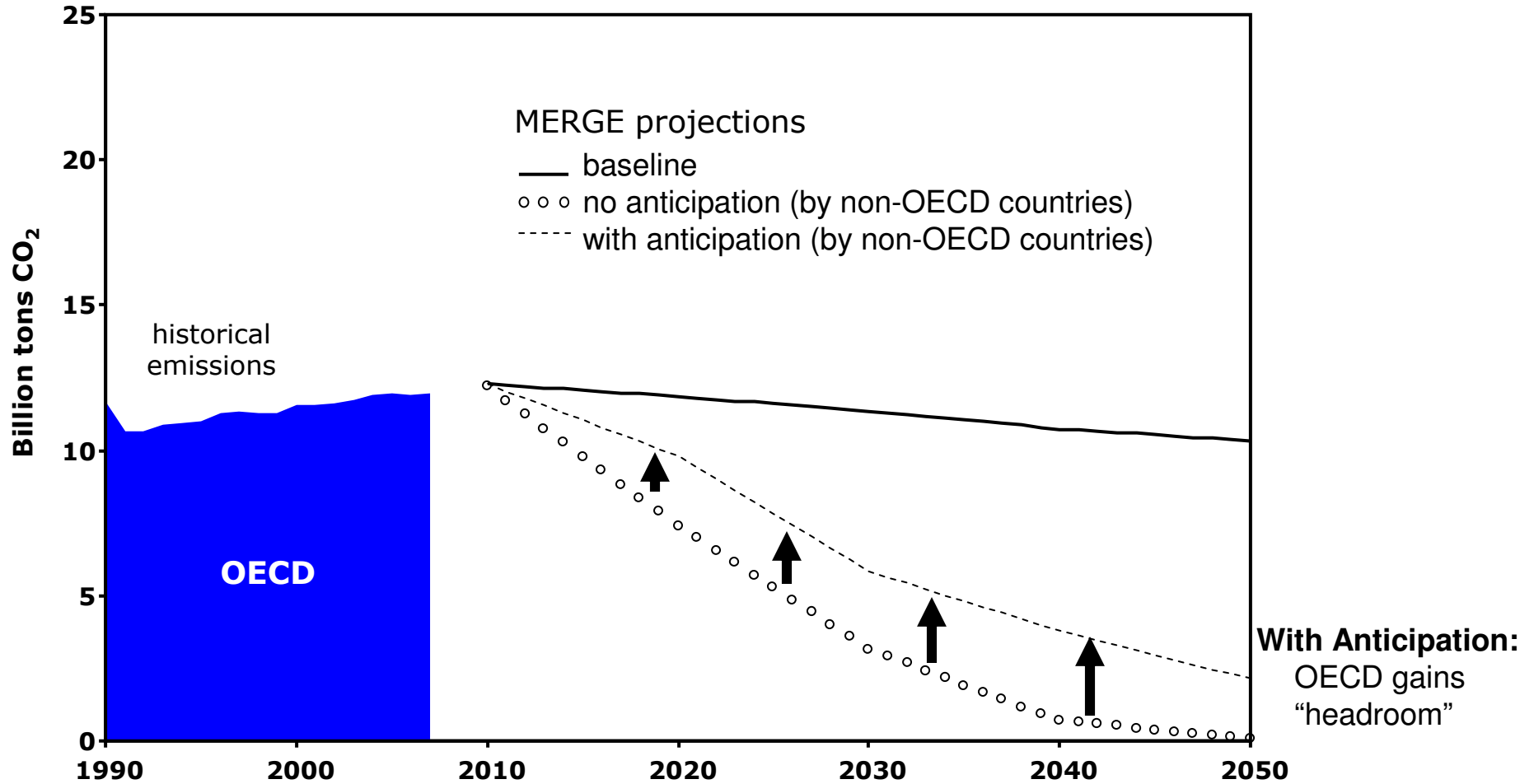
Effect of Anticipation on ROW Countries



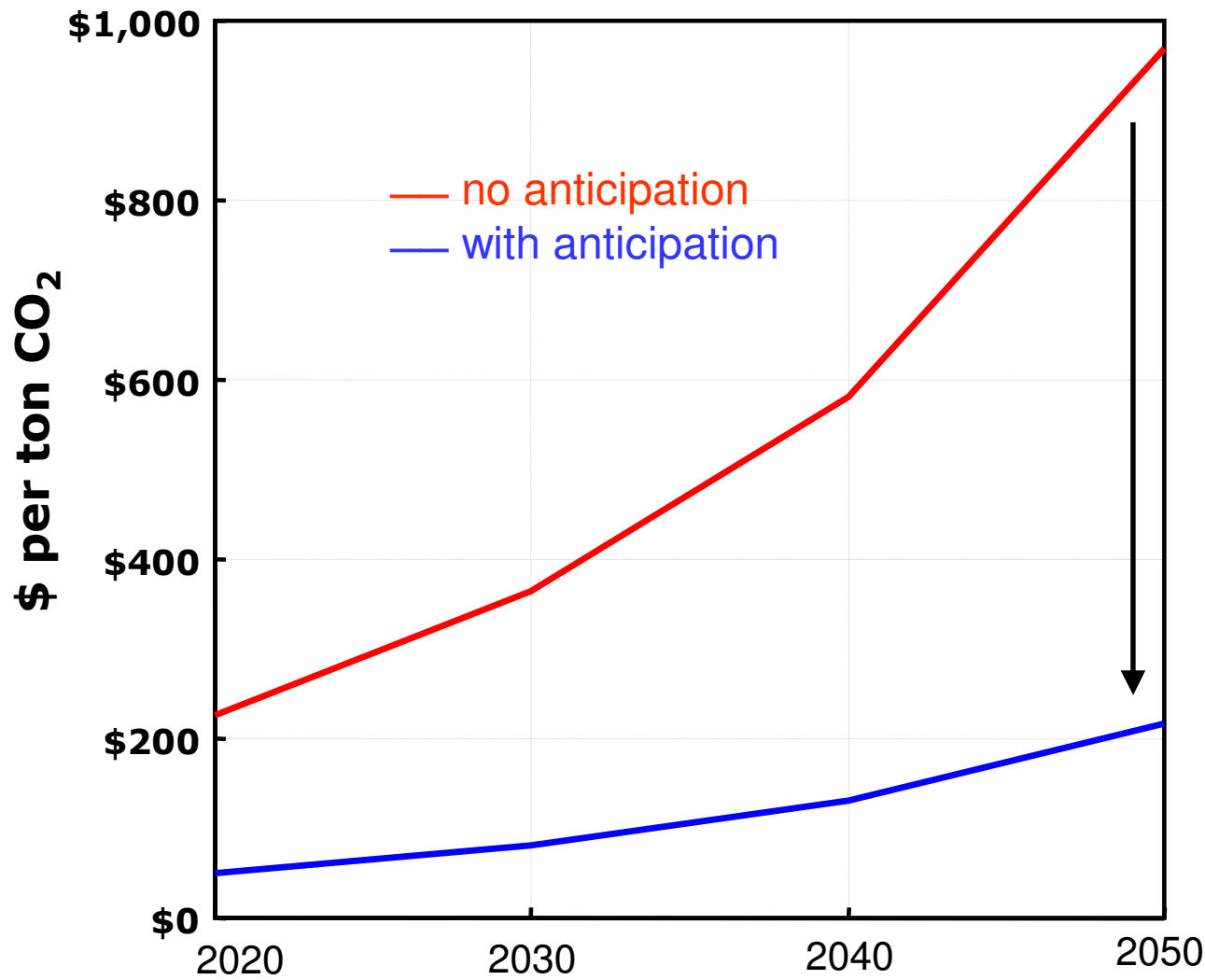
Effect of Anticipation on BRIC Countries



Effect of Anticipation by Developing Countries on OECD



Non-OECD Anticipation Significantly Reduces Global CO₂ Price



Reduction in Policy Costs due to Anticipation
\$18 Trillion

Conclusions

- Actions outside of US can have a major impact on domestic mitigation costs
- A commitment on the part of the BRICs and ROW **now** to reduce emissions at some date in the **future** can be a win-win proposition

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- But...
 - Although there is significant potential for offsets from forestry and agriculture, it **won't be available immediately** and globally
 - Energy-related CO₂ abatement in non-OECD is abundant and cheap, but **many institutional barriers** exist near-term
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International actions will help shape the U.S. climate landscape



Together...Shaping the Future of Electricity