

Overview of Cap and Trade and Offsets

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Outline



- What is cap and trade and how does it work?
- US acid rain experience with cap and trade
- What are offsets and how do they work?
- EPA analysis of House cap-and-trade legislation
- Implications for agriculture

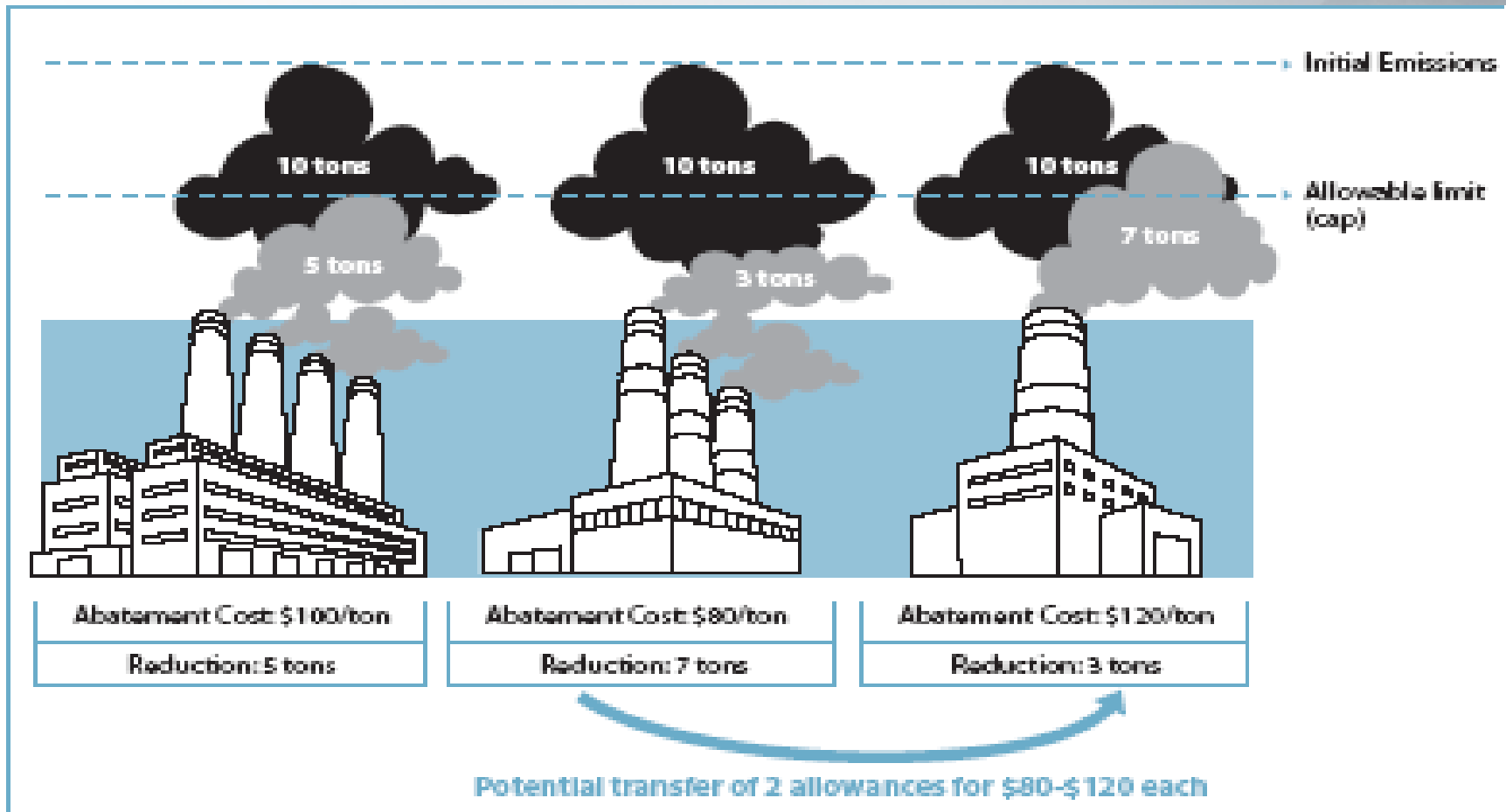
What is Cap and Trade?



- A cap-and-trade program sets a mandatory limit on the aggregate emissions of all affected sources to achieve emissions reductions
- The government distributes emission allowances—either freely (allocation) or by sale (auction)—that total no more than the cap
- Allowances may be traded (purchased and sold) creating a market for allowances and establishing a price. This creates an incentive to reduce emissions
- Control requirements are not specified under a cap-and-trade program
- Each affected source must surrender allowances for compliance equal to its actual emissions
- The cap ensures achievement of the emission reduction goal while also providing flexibility to sources and predictability for the allowance trading market



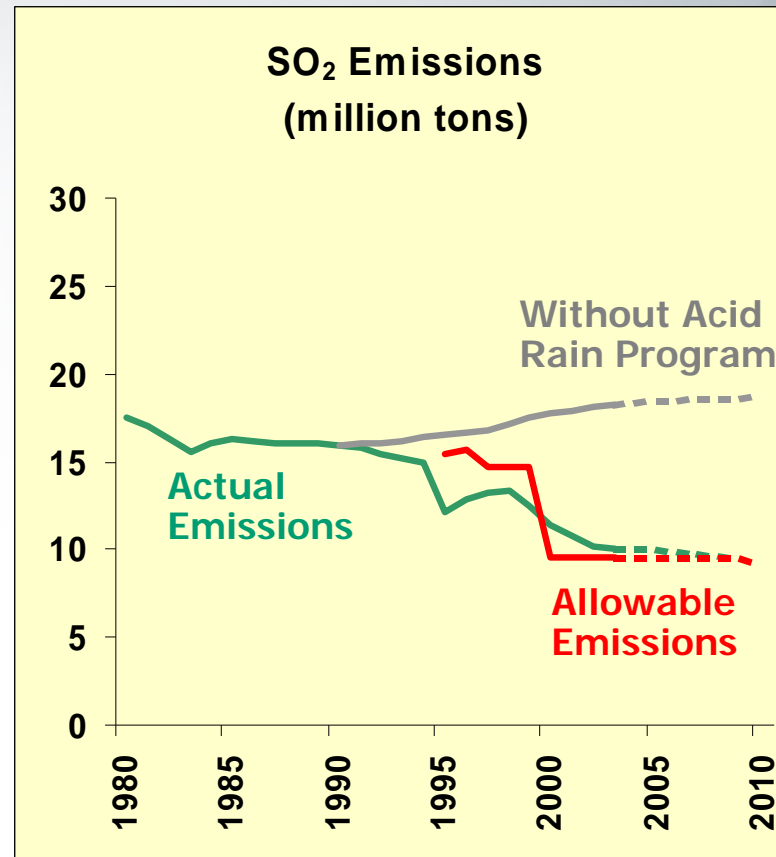
How Does Cap and Trade Work?



National SO₂ Trading Program



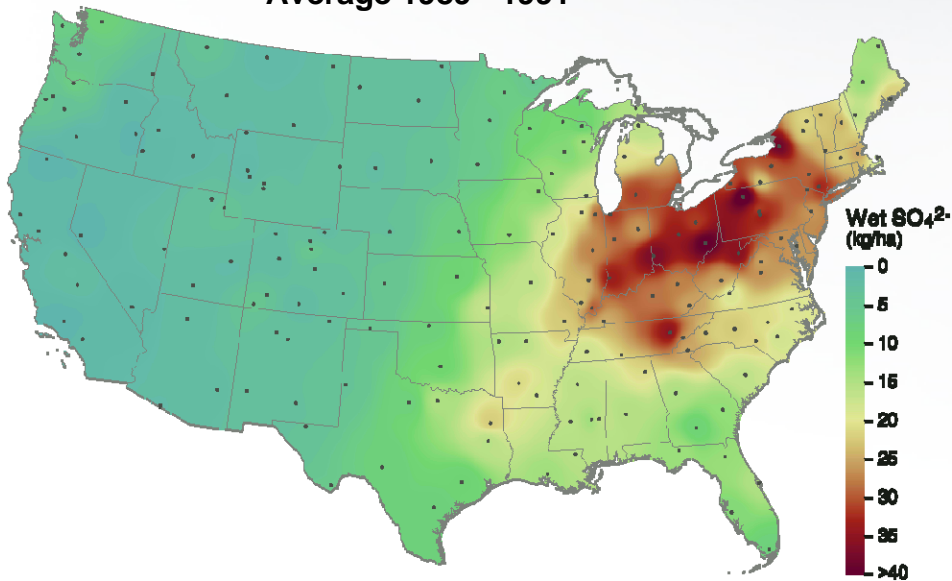
- **Problem:** Acid Rain
- **Scope:** National
- **Target:** Reduce SO₂ emissions from electric generators by 8.5 million tons (50% below 1980 levels)
- **Coverage:** ~3000 Electric Power Units



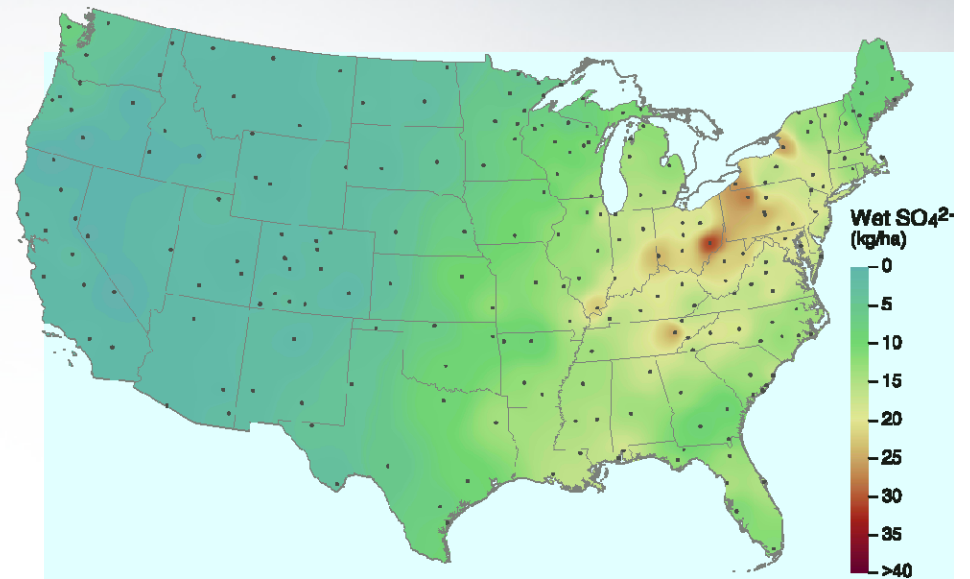
Major Reductions in Acid Rain



Wet Sulfate Deposition
Average 1989 - 1991



Wet Sulfate Deposition
Average 2001 - 2003



- Sulfur deposition and concentrations down 40% across the Eastern U.S.
- Signs of recovery are evident in some acid sensitive ecosystems

GHG Offsets



What are offsets?

- Emission reductions occurring at sources that are not capped (e.g., a landfill).
- With GHGs, emission reductions have the same effect regardless of where they take place.
- Advantages of offsets:
 - Provide incentives for reductions in sectors that are not amenable to trading.
 - Potential cost-savings for capped facilities.
- **Challenges**
 - Assessing “additionality” of reductions.

Offset Project Type Examples

- **Methane capture**
 - Landfill, manure, coal mines
- **Agriculture and Forestry**
 - Afforestation, forest management, increasing agriculture soil C
- Others?

How do offsets work?



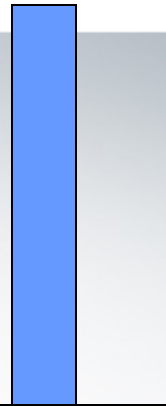
No Offset/No Cap



Landfill Emissions (without methane collection/combustion)



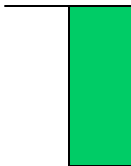
Power plant Emissions (no cap)



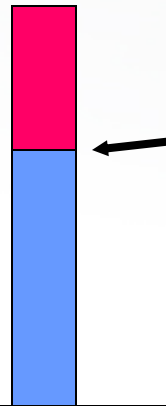
Offset/Cap



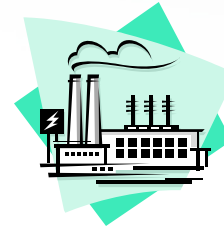
Landfill Reduction (with methane collection/combustion)



Power plant Emissions (with cap)



Cap



Potential offset sources in Agriculture and Forestry



	Strategy	Mitigation Activities	Target GHG
Sequestration	Afforestation	Convert agricultural lands to forest	CO ₂
	Forest management	Lengthen timber harvest rotation Increase forest management intensity Forest preservation Avoid deforestation	CO ₂
	Agricultural soil carbon sequestration	Crop tillage change Crop mix change Crop fertilization change Grassland conversion	CO ₂
Emissions Reduction	Fossil fuel mitigation from crop production	Crop tillage change Crop mix change Crop input change Irrigated/dry land mix change	CO ₂
	Agricultural CH₄ and N₂O mitigation	Crop tillage change Crop mix change Crop input change Irrigated/dry land mix change Enteric fermentation control Livestock herd size change Livestock system change Manure management Rice acreage change	CH ₄ N ₂ O

House and Senate bills



- House energy and climate bill (Waxman-Markey) passed the House on June 26, 2009
- Extensive process:
 - Discussion draft released March 31
 - Legislative hearings in April (over 70 witnesses)
 - Bill introduced May 15, marked up May 18-21, voted out of committee May 21
- Senate Committees developing bills by Sept. 28th

Domestic Offsets in the Waxman-Markey Bill: Highlights



- No explicit project types designated
 - To be determined by USDA (agriculture and forestry offsets) and EPA with input by Offsets Integrity Board
- Initial eligibility list after 1 year
- Additional project types within 2 years
- Application of a standardized methodology for establishing baselines
- Account for and address reversals and leakage

EPA analysis of H.R. 2454

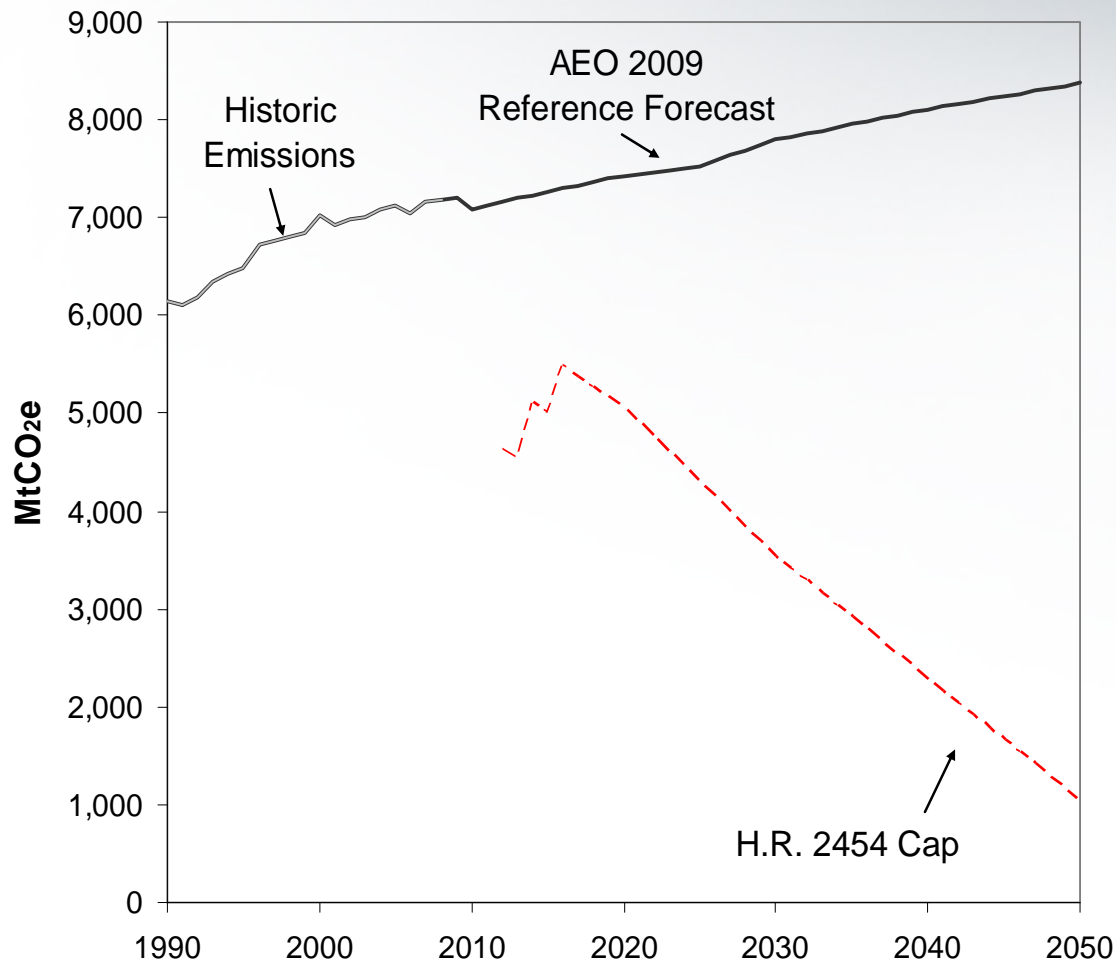
June 23, 2009



Major findings

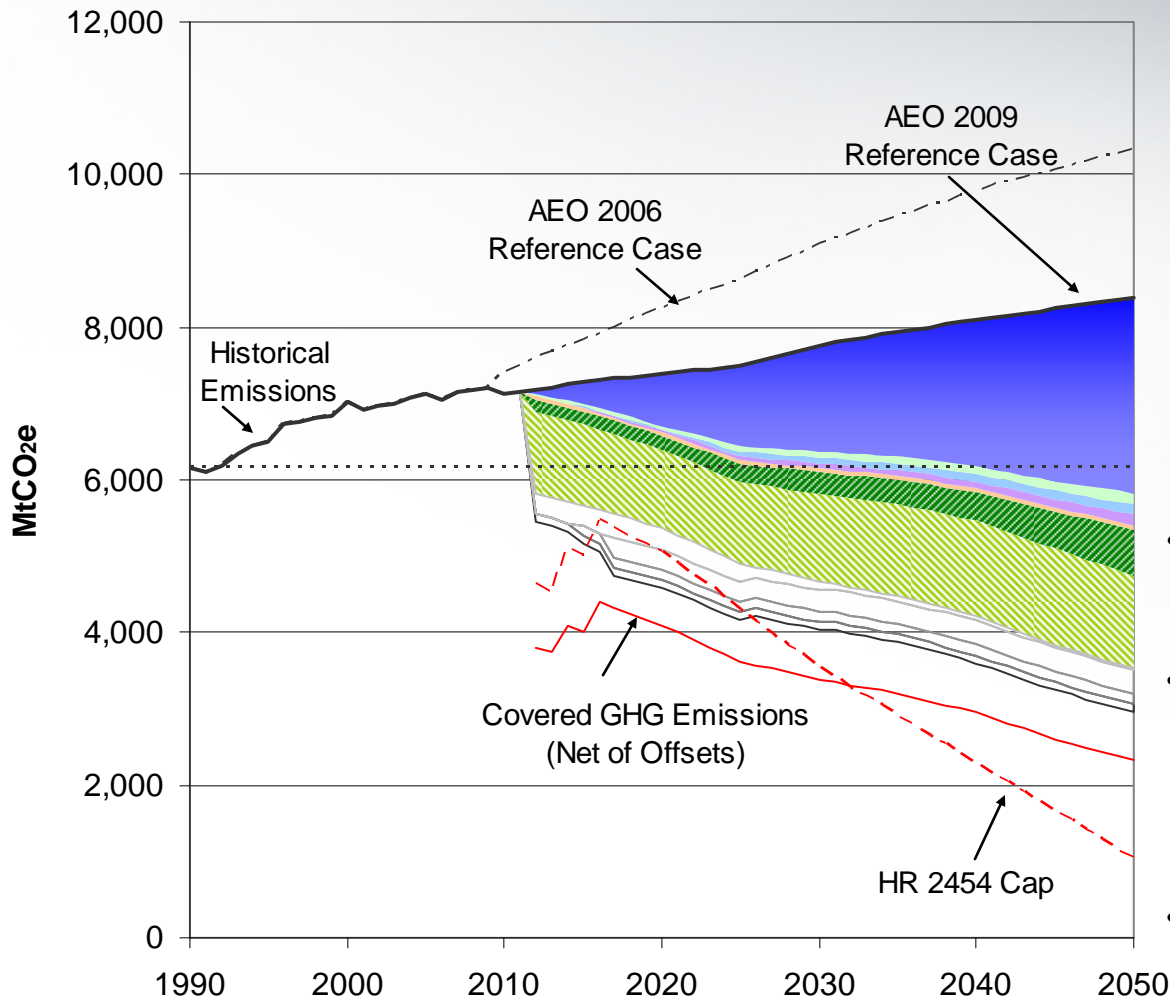
- Energy consumption levels that would be reached in 2015 without the policy are not reached until 2040 with the policy
- The share of low-or zero-carbon primary energy (including nuclear, renewables, and CCS) rises substantially under the policy to 18% of primary energy by 2020, 26% by 2030, and to 38% by 2050
 - without the policy the share would remain steady at 14%
- Largest sources of emissions abatement: electricity sector, offsets
- Offsets lower costs significantly
- Relatively modest impact on consumers, assuming bulk of revenues from program are returned to households (\$80-\$111/household/yr NPV)

H.R. 2454 Cap and Trade Provisions: Targets and Timetables



- Declining cap for GHG emissions:
 - 97 percent of 2005 level in 2012
 - 83 percent of 2005 level in 2020
 - 58 percent of 2005 level in 2030
 - 17 percent of 2005 level in 2050
- 85 percent of GHG emissions are covered. Coverage is phased in between 2012 and 2016 by sector
- Regulations for certain sectors
- Other sectors can provide offsets
 - 1 billion tons domestic offsets (primarily from agriculture and forestry sectors)
 - 1 billion+ tons international offsets

US GHG Emissions & Sources of Abatement under HR 2454

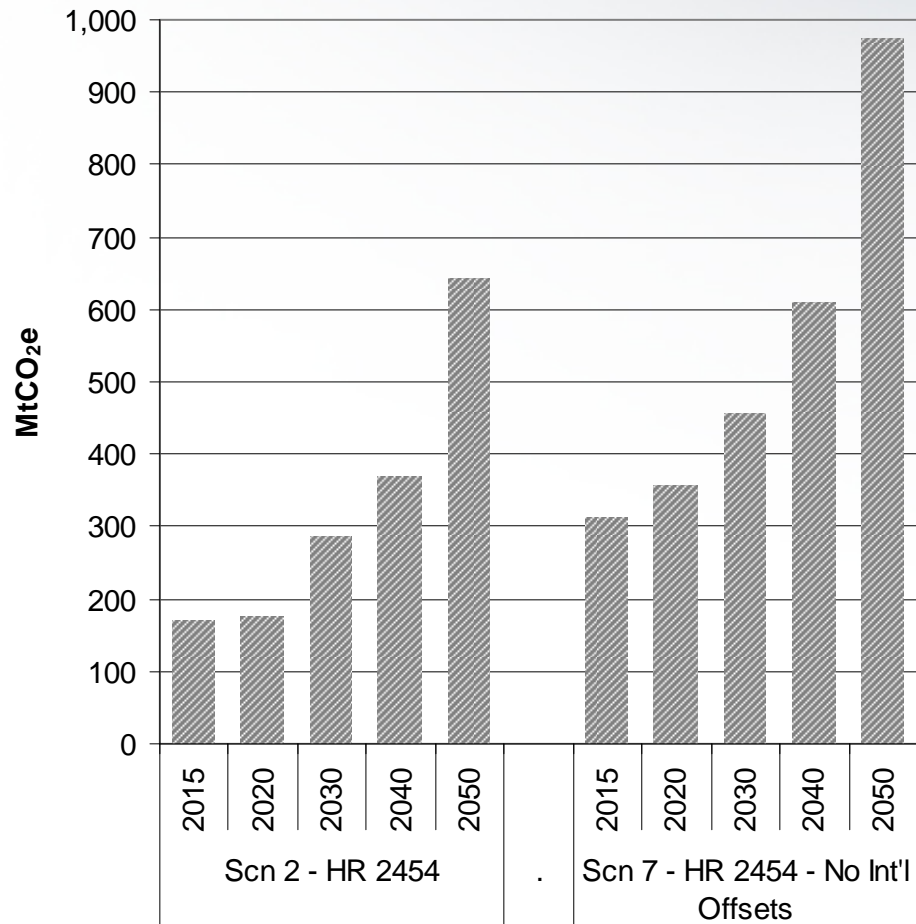


- CO2 - Electricity
- CO2 - Transportation
- CO2 - Energy Int. Manufacturing
- CO2 - Other
- NonCO2 - Covered
- Offsets - Domestic
- Offsets - International
- Int'l Forest Set-Asides
- Discounted Offsets
- NSPS - CH4
- HFCs (separate cap)

- The updated reference case for this analysis is based on AEO 2009, and the old reference case from EPA's S. 2191 analysis was based on AEO 2006.
- Cumulative 2012-2050 GHG emissions are 14% (51 bmt) lower in the AEO 09 baseline compared to the AEO 06 baseline in ADAGE due to the inclusion of EISA, lower initial (2010) GDP (\$13.2 trillion in AEO 09 vs \$14.6 trillion in AEO 06), and a lower projected GDP growth rate (2.5% in AEO 09 vs 3.0% in AEO 06).
- International forest set-asides, discounted offsets, NSPS provisions for landfill and coal mine methane, and the HFC cap all provide additional abatement that does not help to meet the main cap.

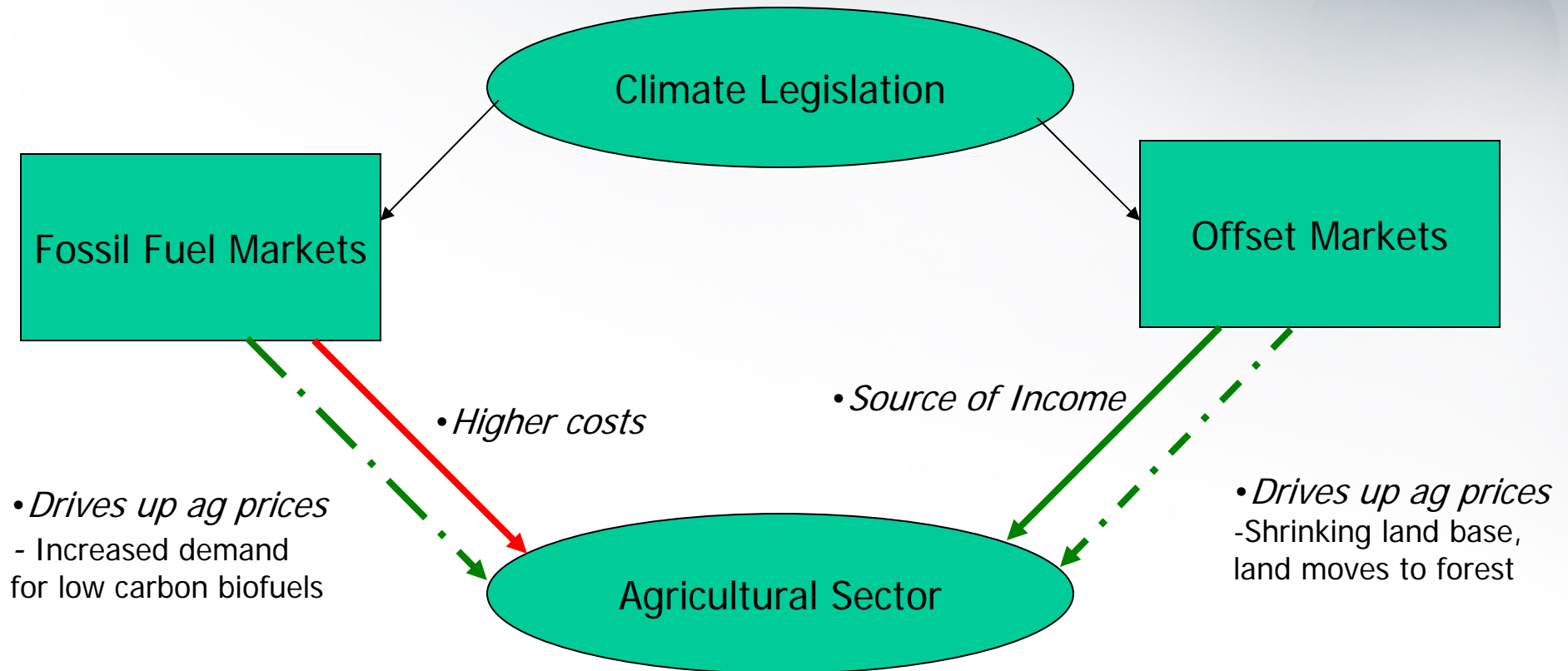
Domestic Offsets Usage

H.R. 2454 Scenario Comparison



- The annual limit on the usage of domestic offsets is non-binding.
- In our analysis, we assume that landfill and coal mine CH₄ are covered under new source performance standards (NSPS) and are thus not available for offsets.
- Restricting the use of international offsets, as in “scenario 7 – H.R. 2454 No Int'l Offsets” has a large impact on allowance prices (89% increase relative to ‘scenario 2 – H.R. 2454’).

Interactions between Climate Policy and Agricultural Sector



Implications for agriculture



- There is substantial GHG offset potential in agriculture and forestry
- Potential increases in bioenergy crops and changes in agricultural land base could stimulate commodity prices
- Some increases in fuel and energy prices in long-run
 - Small change for transportation fuels
 - Natural gas (10%) and electricity (13%) by 2030
- After accounting for bioenergy and offsets, USDA analysis shows net impact of climate policy scenarios on net farm income is positive

For more information



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