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# **GHG Emissions Offsets: *Definition, Benefits and Interaction with GHG Cap-and-Trade Systems***

**EPRI GHG Emissions Offset Policy  
Dialogue Workshop 1**

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# Two Distinct Types of Carbon “Markets”

- **Allowance markets** – “*Cap and trade*” programs that allocate GHG emissions which are traded to achieve compliance goals.
  - AAU trading between countries under the Kyoto Protocol
  - EU Emissions Trading Scheme (EU-ETS)
  - Northeast Regional GHG Initiative (RGGI)
- **GHG offset / credit markets** – “*Baseline and credit*” programs that award *GHG offsets* for specific projects or activities that reduce GHG emissions against a project-specific baseline and are traded and used for compliance purposes.
  - Kyoto Protocol’s Clean Development Mechanism (CDM)
  - Kyoto Protocol’s Joint Implementation (JI) program
  - Australia’s NSW Greenhouse Gas Abatement Scheme (GGAS)
  - Chicago Climate Exchange (CCX)

# What are GHG Offsets?

***Project-based or programmatic GHG reductions*** that are *real, additional, permanent, measurable and verifiable* generated in **sectors and regions outside of the boundaries** of a GHG emissions cap and trade program.

## Compliance market:

"Regulated" GHG or CO<sub>2</sub> emissions markets where offsets can be used for compliance under mandatory cap-and-trade schemes (e.g. Kyoto – CDM/JI; RGGI)

## Voluntary market:

Individuals and companies buying GHG or CO<sub>2</sub> offsets on a voluntary basis to neutralize or reduce their "carbon footprint."  
(e.g., CCX, VCS, others)

# Terminology

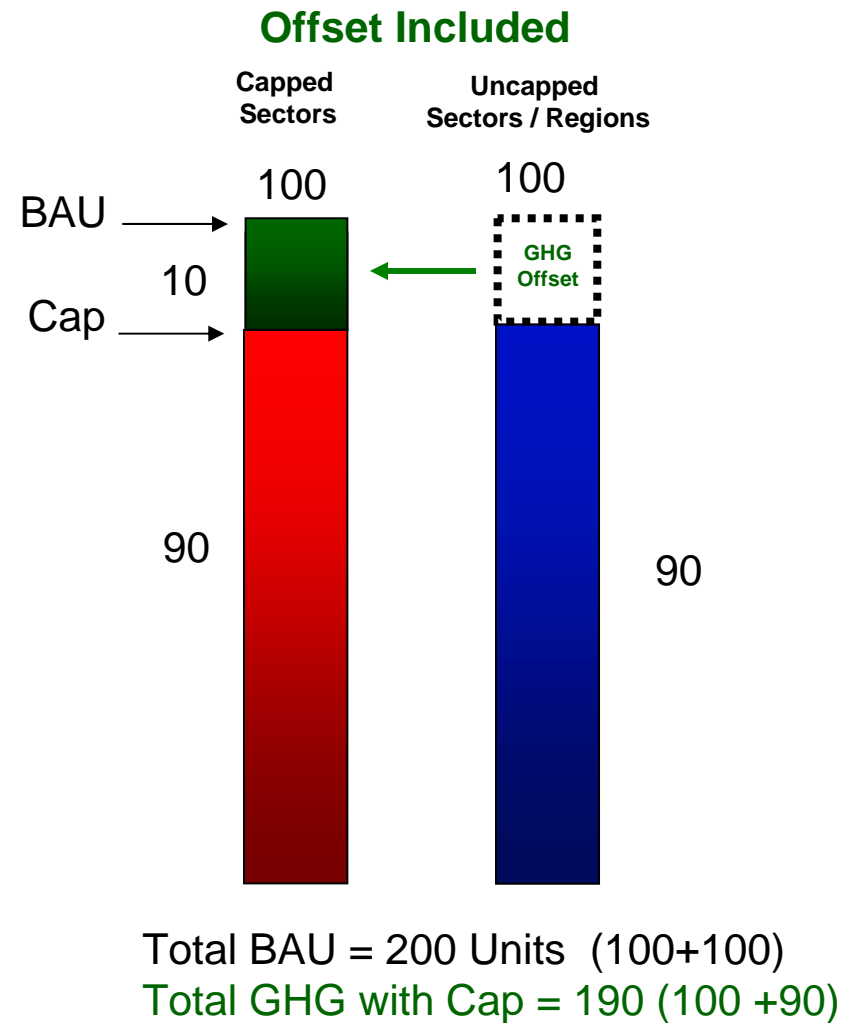
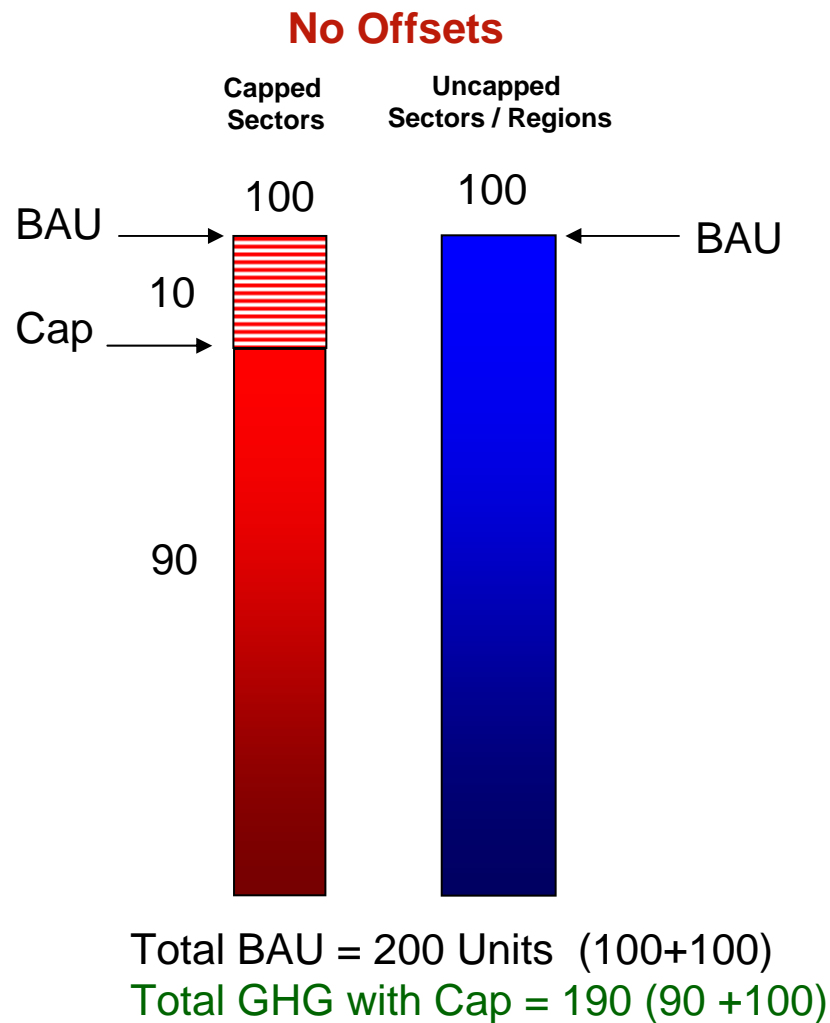
## Emissions *Allowance* (aka "Permit")

A *right to emit* a specified amount of GHG or CO<sub>2</sub> emissions (e.g. 1 allowance = 1 ton CO<sub>2</sub>e GHG *emissions*)

## Emissions *Offset* (aka "Credits")

Project-based or programmatic GHG or CO<sub>2</sub> emission reductions compared to "business-as-usual" emissions (e.g. 1 offset = 1 ton of CO<sub>2</sub>e GHG *emissions reduction*)

# GHG Offsets Can Substitute Emissions Reductions in Uncapped Sectors & Regions for “Internal” Reductions



# The Potential Benefits of GHG Offsets

- Reduce the cost of compliance with GHG cap and trade programs
- Reduce GHG emissions in uncovered economic sectors and regions
- Provide an incentive to develop new GHG abatement approaches, technologies & methods
- A mechanism to “link” global carbon markets
- A “bridge to the future” that includes a broader array of sectors and nations in GHG mitigation efforts.



# Use of Offsets Dramatically Affects Price

Table: Allowance Price Comparison (2005 \$/tCO2e)

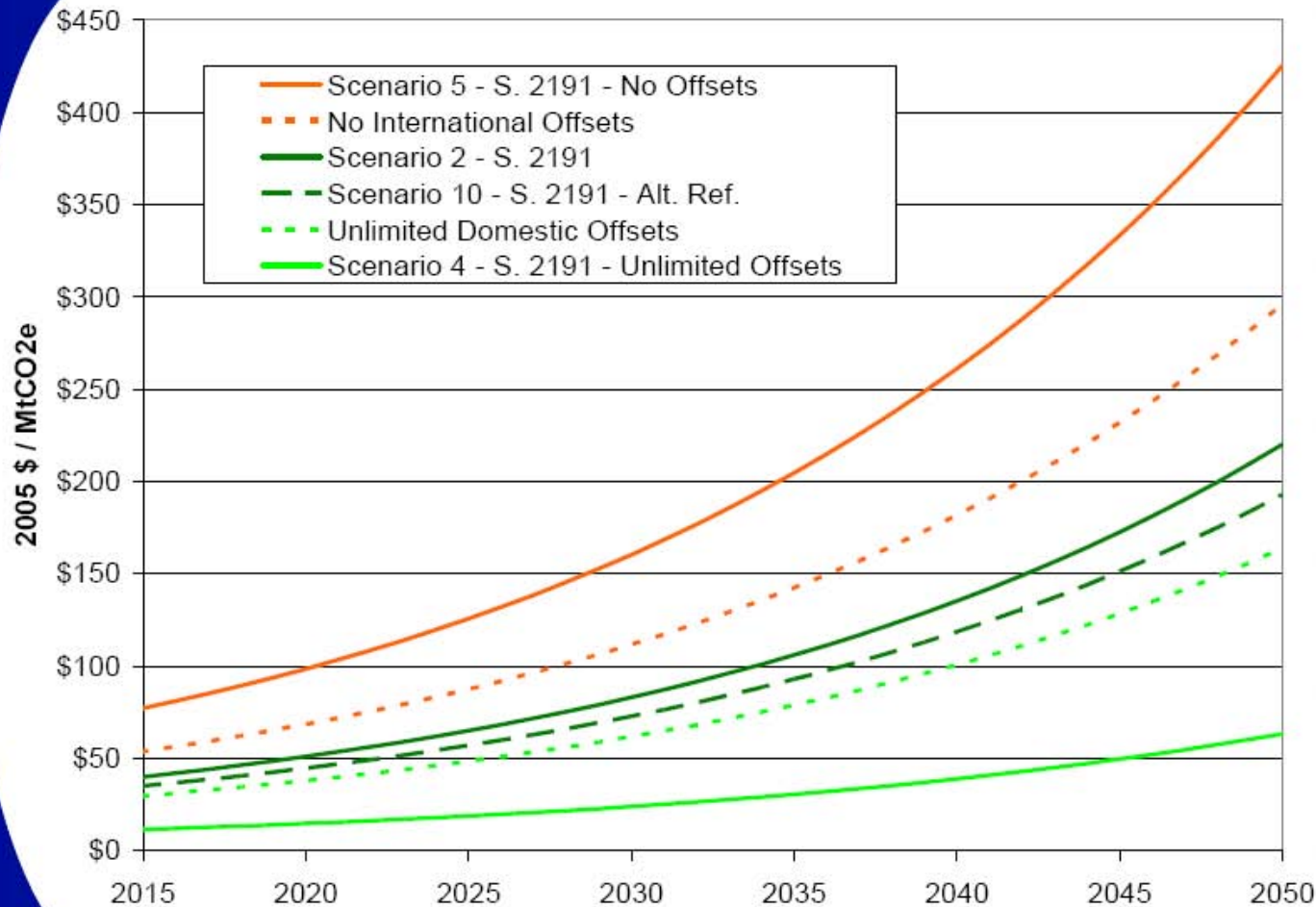
	2015	2020	2025	2030	2035	2040	2045	2050
<b>1) EPA Reference</b>								
ADAGE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
IGEM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>2) S. 2191</b>								
ADAGE	\$29	\$37	\$48	\$61	\$77	\$98	\$125	\$159
IGEM	\$40	\$51	\$65	\$83	\$106	\$135	\$173	\$220
<b>3) S.2191 w/ Low International Action</b>								
ADAGE	\$27	\$35	\$44	\$56	\$72	\$92	\$117	\$149
IGEM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>4) S.2191 w/ Unlimited Offsets</b>								
ADAGE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
IGEM	\$11	\$15	\$19	\$24	\$30	\$39	\$50	\$63
<b>5) S.2191 w/ No Offsets</b>								
ADAGE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
IGEM	\$77	\$98	\$126	\$160	\$205	\$261	\$333	\$425
<b>6) S.2191 Constrained Nuclear &amp; Biomass</b>								
ADAGE	\$39	\$49	\$63	\$80	\$101	\$129	\$164	\$208
IGEM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>7) S.2191 Constrained Nuclear &amp; Biomass, and CCS</b>								
ADAGE	\$55	\$69	\$88	\$112	\$142	\$181	\$229	\$290
IGEM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>8) S.2191 Constrained Nuclear &amp; Biomass, and CCS + Beyond Kyoto + Natural Gas Cartel</b>								
ADAGE	\$55	\$70	\$88	\$112	\$142	\$180	\$228	\$288
IGEM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>9) Alternative Reference</b>								
ADAGE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
IGEM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>10) S.2191 Alt. Ref.</b>								
ADAGE	\$22	\$28	\$36	\$46	\$59	\$75	\$95	\$121
IGEM	\$35	\$45	\$57	\$73	\$93	\$118	\$151	\$193

Source: EPA Analysis of the Lieberman-Warner Climate Security Act of 2008, S. 2191 in 110th Congress March 14, 2008.

EPA Analysis of S. 2191



# Scenario Comparison – GHG Allowance Prices (IGEM)



- Compared to the variation in allowance prices between the various alternative technology scenarios, there is a greater variation in allowance prices amongst the alternative offset and international credit scenarios.
- Allowing the unlimited use of domestic offsets and international credits can reduce allowance prices by 71% compared to scenario 2.
- Allowing the unlimited use of just domestic offsets can reduce allowance prices by 26% compared to scenario 2.
- If international credits are not allowed, allowance prices increase by 34% compared to scenario 2.
- If both international credits and domestic offsets are not allowed, allowance prices increase by 93% compared to scenario 2.
- Allowance prices are 12% lower under the alternative reference case compared to scenario 2.



## EPA's Offset Conclusions re: S.2191

- If use of domestic offsets and international credits are *unlimited*, allowance prices fall 71% as compared to S.2191.
- If use of domestic offsets is unlimited, and international credits are still limited to 15%, allowance prices fall by 26%.
- If international credits are not allowed (or are more expensive than U.S. GHG allowances), and domestic offsets are still limited to 15%, then allowance prices increase by 34%.
- If domestic offsets and international credits are *not allowed*, and the caps must be met solely through emissions reductions in covered sectors, then allowance price increases by 93% compared to S.2191.

Source: EPA Analysis of the Lieberman-Warner Climate Security Act of 2008, S. 2191 in 110th Congress March 14, 2008.

# Key Offset Concepts

- *Project Baselines* – A project “baseline” is the schedule of GHG emissions related to a project that would be expected to occur in the absence of the project (aka “Business-as-Usual” (BAU) emissions)
- *Additionality* – A GHG abatement project is considered “additional” if it would not have occurred without the added incentives provided by the carbon market.
- *Leakage* – Refers to increased GHG emissions outside of a GHG abatement project boundary that are directly or indirectly caused by the project.
- *Permanence* – Refers to the potential to reverse GHG emissions reductions achieved by an abatement project.

# Different Approaches Can Be Used to Create “Approved” Categories of GHG Offsets

- Pre-approval of GHG offset types (i.e., “Positive List”)
  - The relevant regulatory entity determines *a priori* the types of offsets affirmatively to be allowed for compliance purposes.
  - Typically involves development of approved “project protocols”
  - GHG offsets awarded based on application of protocols
  - NSW-GGAS and RGGI use this approach
- “Project-based” methodology development
  - Offset project proponents submit project-specific methodologies to the relevant regulatory entity for review, evaluation and approval.
  - GHG offsets awarded based on application of specific methodology
  - Potentially more flexible than a simple “positive list,” but can require very substantial efforts by both regulators and project proponents.
  - Adopted by the UN’s CDM and JI programs.



# Thank You

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