

The Key Role of GHG Emissions Offsets in a U.S. CO₂ Cap-and-Trade Program

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“Together...Shaping the Future of Electricity”



- Non-profit “501(c)(3)” organization founded 1973
- Scientific research consortium established to perform objective electricity research for the public benefit
 - Generation, including renewables
 - Environment
 - Power Delivery, Markets, Energy Efficiency
 - Nuclear
 - Innovation
- Members include IOUs, co-ops, munis, merchants, FPMAs, federal / state / local government & OEMs
- More than 450 participants in over 40 countries
- Principle locations: Palo Alto, CA, Charlotte, NC, and Knoxville, TN

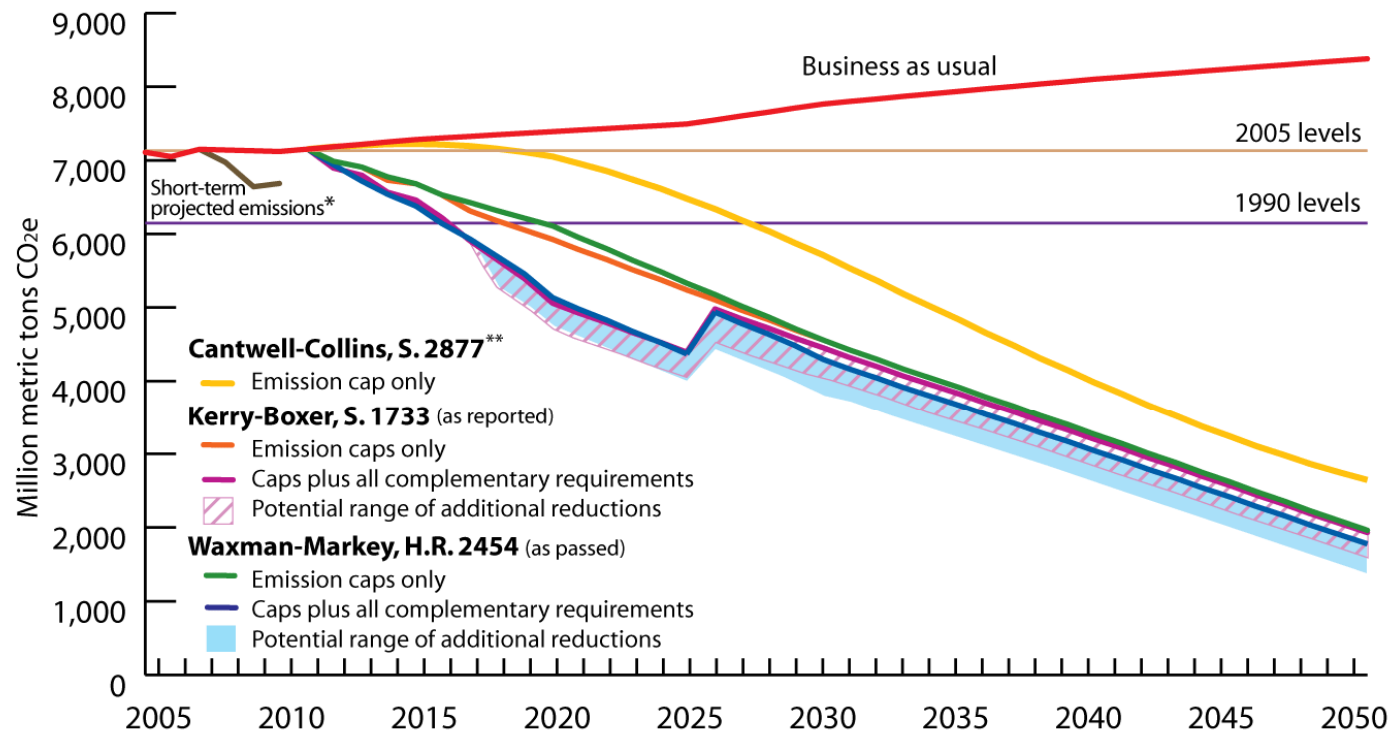
Today's Discussion

- GHG Emissions Reduction Challenge
- Benefits and Risks of Offsets
- Offsets and Waxman-Markey (HR 2454)



The GHG Emissions Reduction Challenge: Rapid & Dramatic GHG Reductions

Net Emission Reductions Under Cap-and-Trade Proposals in the 111th Congress, 2005-2050
December 17, 2009



In the near-term (2010-2015), there are *no large-scale, low-cost CO₂* abatement options available

Implications of Near-term CO₂ Reductions



- CO₂ prices likely will rise to force natural gas to displace coal
- CO₂ allowance prices will be “high” ($\geq \$30/\text{tCO}_2$) in early years of a new CO₂ cap-and-trade program *unless...*
 - “Safety valve,” “price collar,” or other price-control mechanism(s)
 - Massive GHG reductions by other regulated sectors (unlikely), or....
 - **Abundant offsets are available**

GHG Offsets: Benefits & Risks



A coal mine methane destruction facility.



MI corn fields are part of the EPRI-MSU N₂O offsets project



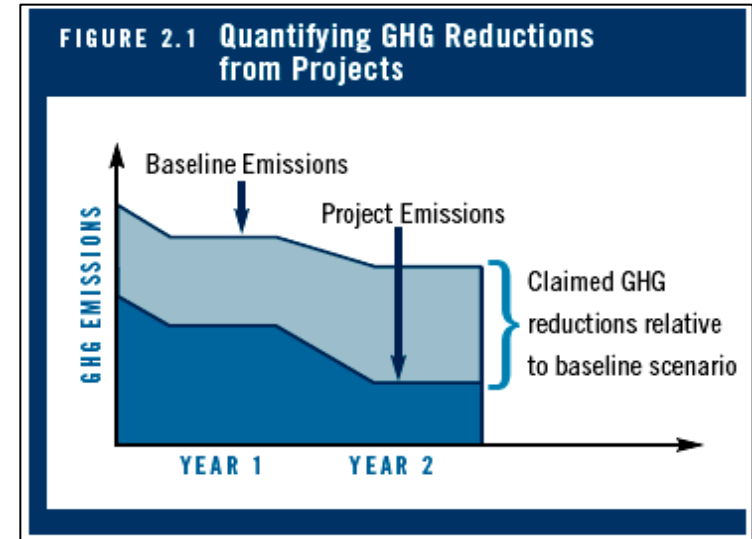
Wind farms in China can generate offsets in the CDM



Avoiding deforestation can generate REDD credits

What are Greenhouse Gas Offsets?

- “Credits” for GHG emission *reductions, avoidance or sequestration* that occur in sectors or geographic regions **outside of an emissions cap**
- Offsets = Difference between “business-as-usual” and residual CO₂ emission



Source: *The Greenhouse Gas Protocol: Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects*, World Resources Institute (WRI) and World Business Council for Sustainable Development (WBSCD), 2007.

GHG emissions reductions must be *real, additional, permanent, measurable and verifiable.*

Example Ag & Forestry Offset Project Types

- **Forests & Grasslands**
 - Afforestation / Reforestation
 - Enhanced forest management
 - Reduced emissions from deforestation and degradation (REDD)
- **Soil Carbon and Agriculture**
 - No till and other conservation tillage practices
 - Avoided N₂O emissions from reduced nitrogen fertilizer
 - Grassland sequestration
- **Methane (CH₄) Destruction**
 - Animal waste digesters



The agriculture and forestry sectors are expected to be the largest sources of domestic GHG offsets

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 (\$/tCO ₂ e)	\$40	\$138

“The cost savings to the economy generated by offsets could be substantial. CBO estimates that 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 Face Technical Challenges & Risks



Source: Courtesy of Sam Sandburg,
USDA Forest Service

- **Additionality**
- **Baselines**
- **Permanence**
- **Leakage**
- Measurement, monitoring and verification (MMV)
- Reduced incentives to invest in low-carbon technologies

**Key challenges
for terrestrial
carbon projects**

These challenges can be addressed, but there will remain an inherent tension between perfect “environmental integrity” and need to develop large-scale offsets.

Offsets in the “Waxman-Markey” Bill

111TH CONGRESS
1ST SESSION

H. R. 2454

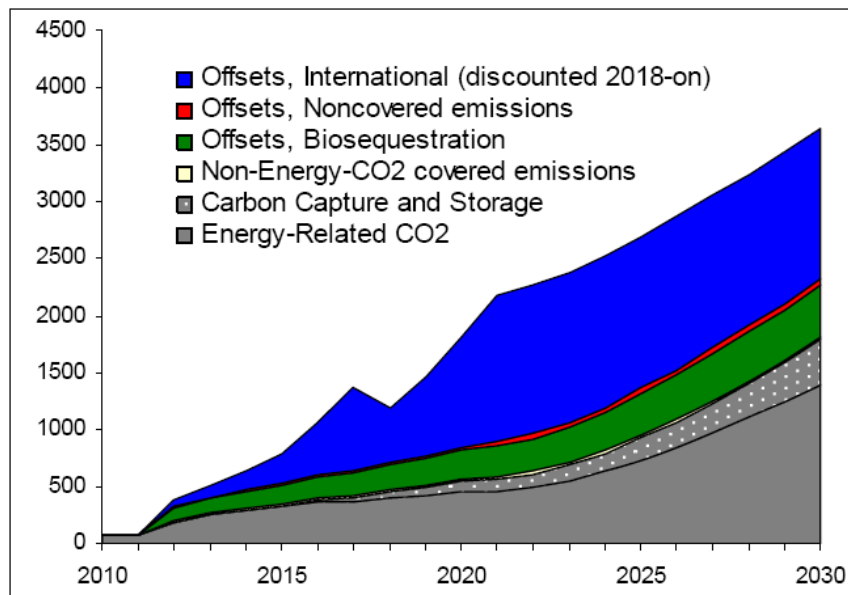
AN ACT

To create clean energy jobs, achieve energy independence, reduce global warming pollution and transition to a clean energy economy.

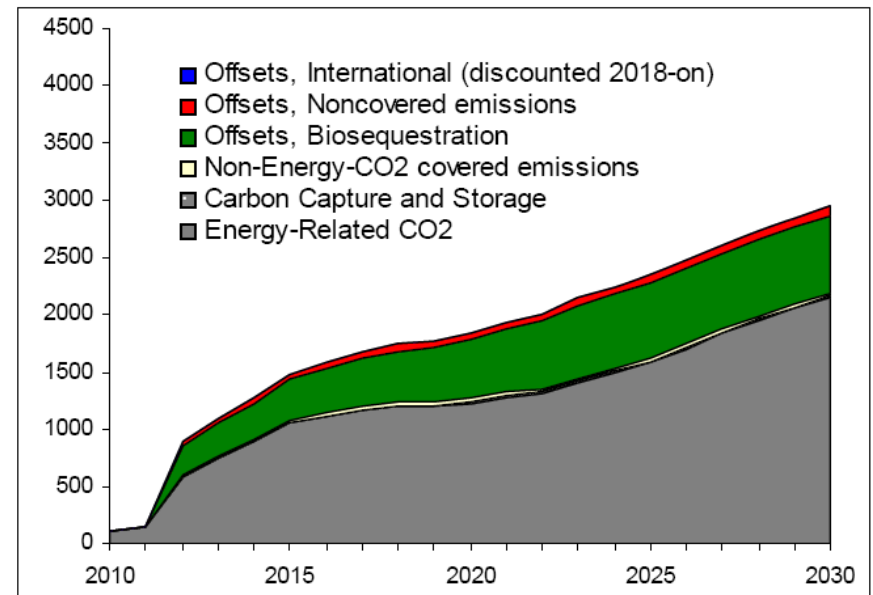
Offsets are a Key Source of Compliance with HR 2454

Figure 4. Sources of Cumulative Compliance in ACESA Main Cases, 2010-2030
(million metric ton CO₂-equivalent)

Basic



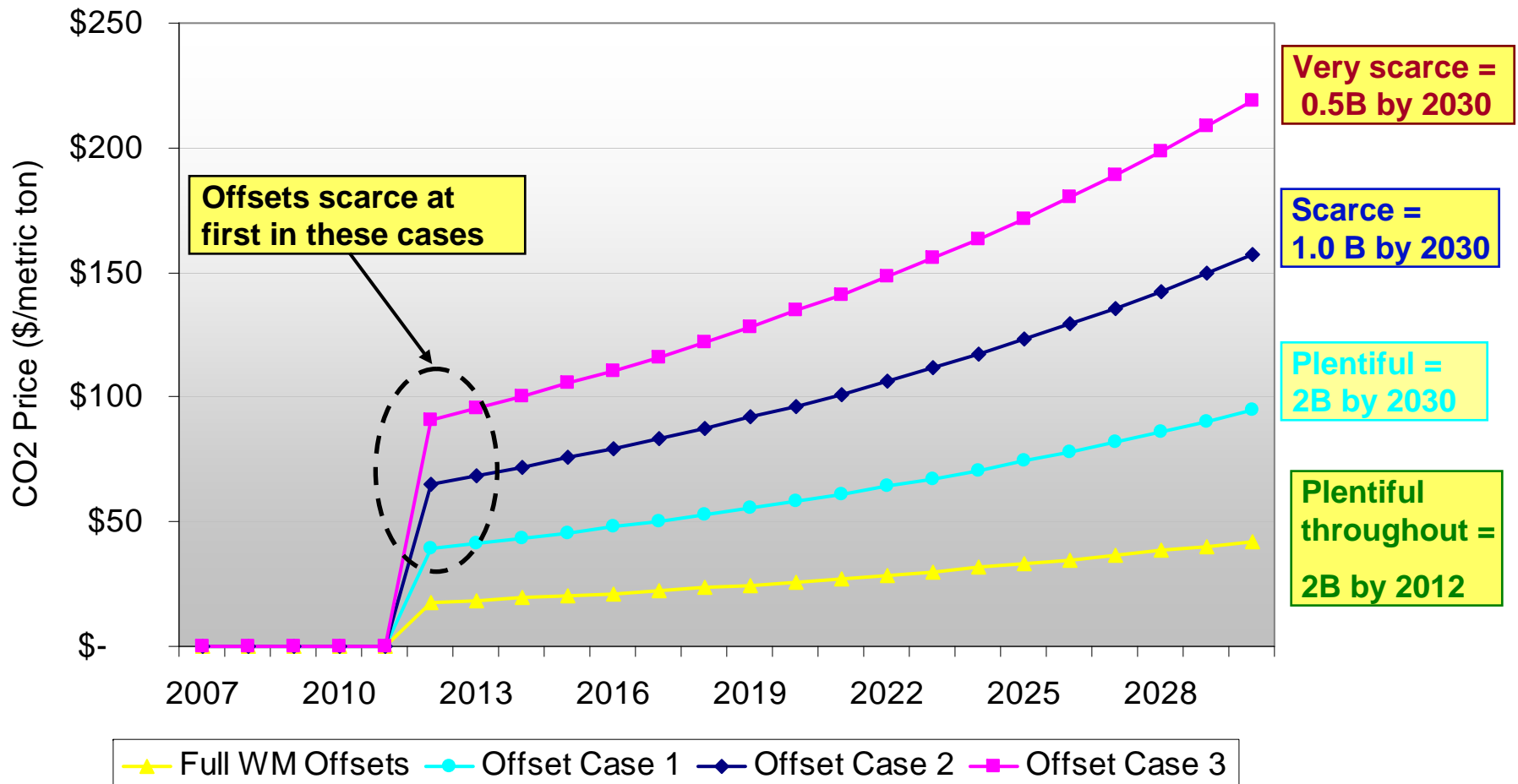
No International / Limited



“...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.)

NEMS Results Shows Sensitivity of CO₂ Price to Availability of Offsets

NEMS CO₂ Price Path to Meet Abatement Target

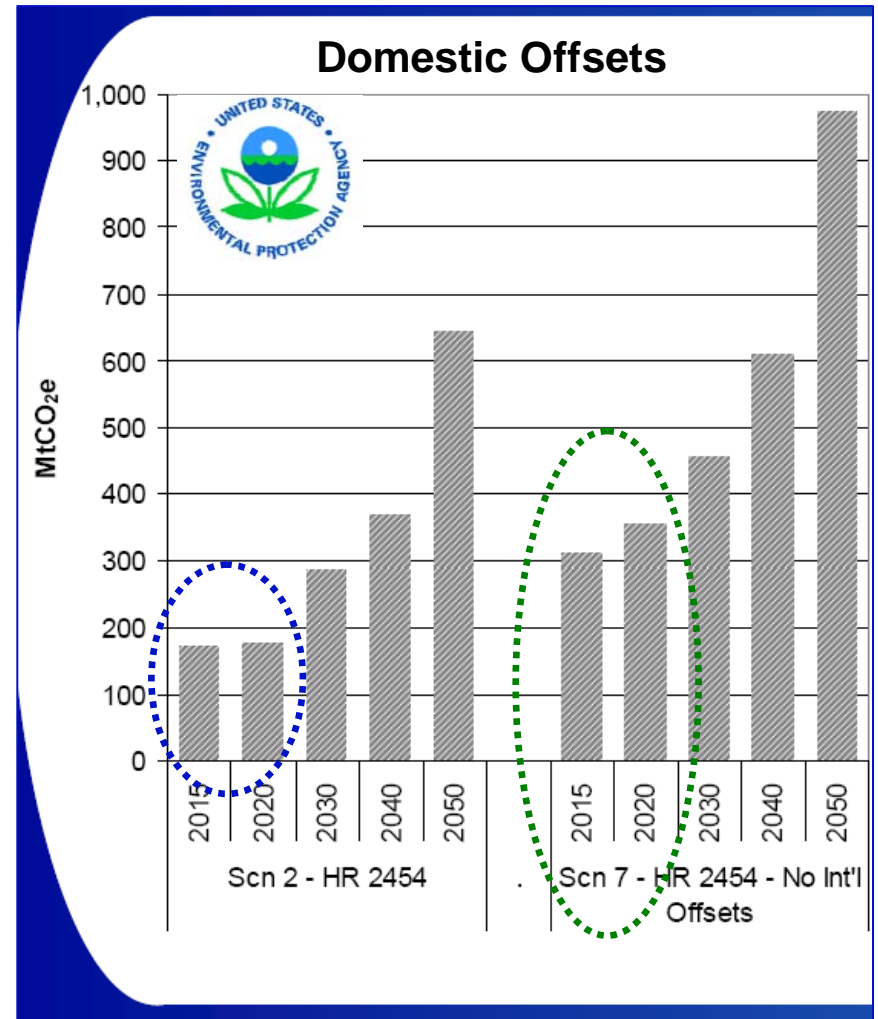


*Supplemental analysis funded by PacifiCorp, a subsidiary of MidAmerican Energy Holdings Company

Domestic Offsets in HR2454: Will Enough Come in the Near Term?

- Relatively **small potential**
- EPA estimates **only ~170MtCO₂e annually** through 2020
- Largest sources are **forest management & afforestation**
- **LFG, CMM, NatGas** offsets not available due to proposed NSPS
 - Could add ~130MtCO₂e
- 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.

EPRI-MSU Phase 2 “N₂O Offset” Project

Moving from Field Studies to Offset Projects

Developing GHG Emissions Offsets by Reducing Nitrous Oxide (N₂O) Emissions in Agricultural Crop Production: Phase 2



Row crop ecosystems, such as this corn crop in the United States, contribute about 50% of anthropogenic N₂O emissions. N₂O offset projects could be an important component of an GHG emission reduction compliance strategy for power companies.

PID #1020331

- Increase the suite of options available to electric companies to offset GHG emissions.
- Create a verified methodology to credit GHG emissions offsets derived from reduced nitrogen fertilizer use in crop production.
- Develop and implement a pilot demonstration N₂O GHG emissions offset project on a farm.
- Demonstrate a way for electric companies to create GHG emissions offsets in collaboration with customers in agricultural communities.

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

- Large potential, but challenging to implement!
 - “Sectoral” offsets
 - Offsets issued by an “international body” (e.g., CDM)
 - Reduced Emissions from Deforestation and Degradation (REDD)
 - EPA-administered international offsets program
- All four categories are problematic!!!

It is very difficult to see how international offsets can yield 1.5 GtCO₂/year as allowed in HR 2454, particularly at the “low” prices assumed by EPA.

Key GHG Offsets Insights

1. Important “bridge” to a low-carbon future.
2. Offsets are critical to CO₂ cost containment, can achieve GHG reductions in **uncovered sectors and regions** and **encourage innovation**.
3. There is an inherent conflict between perfect “environmental integrity” and need for rapid development of large-scale offsets.
4. Massive offset **supply envisioned by HR 2454 will be difficult to realize near term (2012-2016)**, so CO₂ prices could rise to force gas/coal fuel switching.

Key GHG Offsets Insights

5. Although the supply of offsets is likely to be limited in the near term; virtually all U.S. domestic offsets are **expected to be generated in the agriculture and forestry sectors**
6. New designs & approaches are needed to **scale-up offsets** to a meaningful level.
7. Offsets can help to **“link” existing and evolving carbon markets** around the world.

EPRI Offsets Materials Online @ <http://www.epri.com/globalclimate>



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Greenhouse Gas Offset Policy Dialogue

EPRI's Greenhouse Gas Emissions Offset Policy Dialogue informs key constituencies about experience to date with offset policies and provides a forum for participants, representing a wide variety of stakeholders and perspectives, to discuss important elements of possible future offset policies. As part of the Dialogue, EPRI sponsors a series of one-day workshops to explore and discuss key topics related to the design and implementation of domestic and international GHG emission offset programs.

Details

Contact: Adam Diamant – (510) 260-9105 or adiamant@epri.com

Materials

The latest dialogue materials will be posted here when available. Presentations and other materials can be viewed in the [Dialogue Archive](#).

- July 30, 2009 – EPRI GHG Emissions Offsets (Workshop 6)
- May 13, 2009 – Reduced Emission from Deforestation & Degradation (REDD) (Workshop 5)
- February 19, 2009 – U.S. Domestic Agriculture & Forestry Offsets (Workshop 4)
- November 20, 2008 – Emerging Offset Program Designs (Workshop 3)
- September 10, 2008 – Additionality (Workshop 2)
- June 26, 2008 – Existing Offset Programs (Workshop 1)

[View results and publications related to GHG Offset Policy research.](#)



Thank You

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