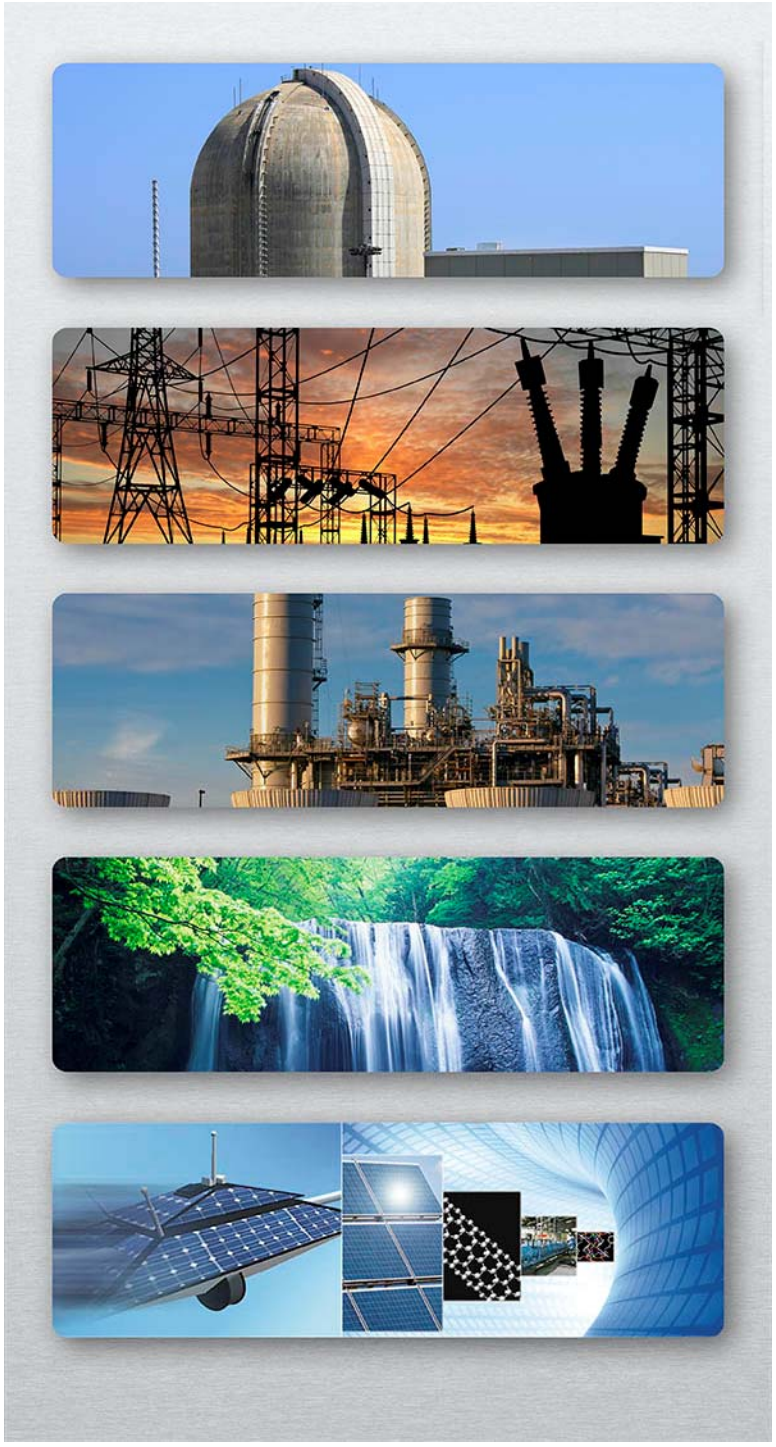

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #11

Creating Nitrous Oxide (N_2O) Emissions Offsets in U.S. Agriculture

Adam Diamant
Senior Project Manager
Global Climate Research Program

November 4, 2011
Washington, DC

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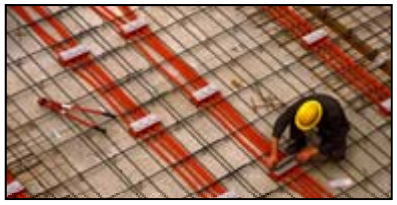
Together…Shaping the Future of Electricity



- U.S. non-profit "501(c)(3)" scientific research consortium founded 1973 to perform objective electricity-related research for the public benefit.
- EPRI has 450+ participants in more than 40 countries around the world. In the U.S., EPRI participants generate more than 90% of electricity delivered.
- Principal locations — Palo Alto, CA, Charlotte, NC and Knoxville, TN

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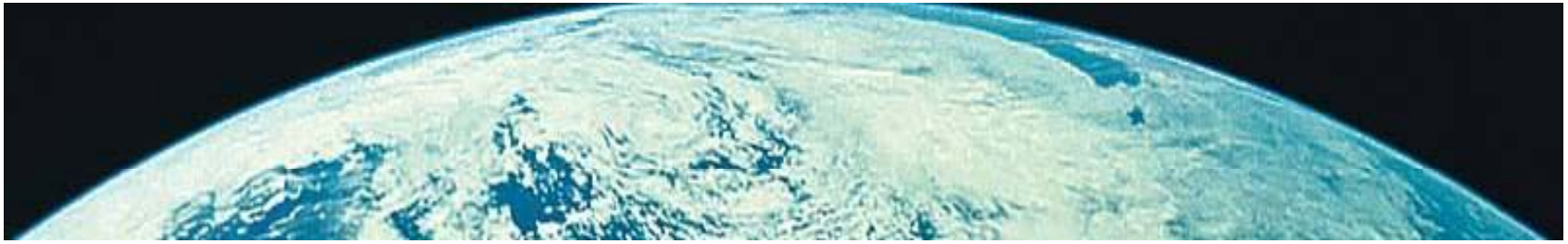
Goals for EPRI's Offset Policy Dialogue

- Inform key constituencies / stakeholders
- Provide a forum for a facilitated discussion
- Build a common understanding of offset system design elements and issues
- Explore new ideas and approaches
- Discuss potential offset mechanisms



EPRI Offsets Workshops

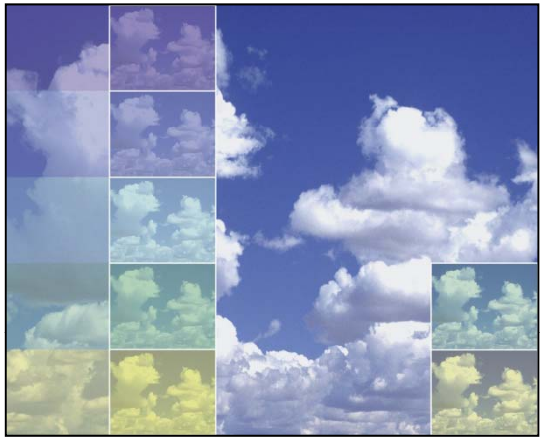
- 2011
  - **W11 - (N_2O Offsets) – November 4, 2011**
  - W10 - California's New Offsets Program
- 2010
  - W9 - Commercial Procurement of GHG Offsets
  - W8 - Offset Development and Approval Processes
  - W7 - "Sectoral" and Scaled-up International Mechanisms
- 2009
  - W6 - "Road Testing" Offset Methodologies
  - W5 - Reduced Emissions from Deforestation and Degradation (REDD)
  - W4 - U.S. Domestic Forestry and Agriculture Offsets
- 2008
  - W3 - Proposed Offset Policy Designs
  - W2 - Additionality & "Supplementarity" Limits
  - W1 - Existing Offset Systems

EPRI Offset Policy Dialogue Participants

- Electric sector
- Finance / Banking
- Agriculture / Forestry
- Oil and gas industry
- Industrial organizations
- Academics / research institutes

- Offset developers / consultants / verifiers / etc…
- Congressional and other legislative staff
- State & federal agencies (ARB, CalEPA, DOE, EPA, USDA…)
- Environmental and other non-governmental organizations (NGOs)
- International participants, including representatives from the United Nations' Clean Development Mechanism (CDM)

11th Workshop Meeting Materials



- Agenda
- Participants list
- Speaker bios
- Background paper:
  "Creating Nitrous Oxide (N_2O) Emissions Offsets in Agricultural Crop Production in the United States"
- Speaker presentations and other workshop materials to be available online at: globalclimate.epri.com

  Direct URL:
  http://globalclimate.epri.com/annual_events__ghg_offset_policy_dialogue.html

Workshop 11 Goals – N_2O Offsets

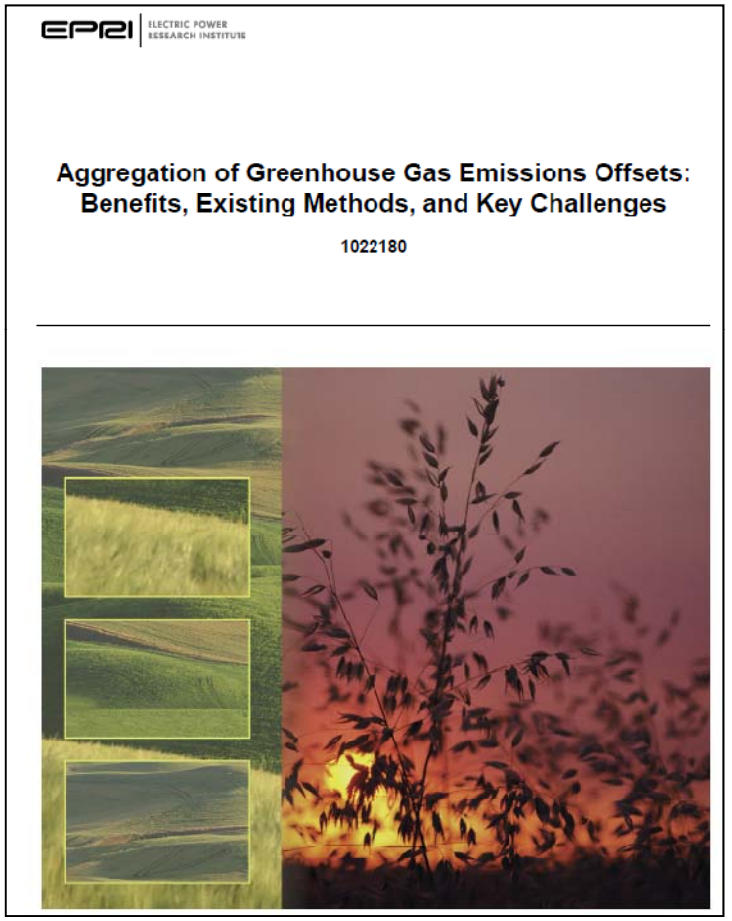
1. Gain better understanding of the potential to reduce N_2O emissions in agricultural crop production.
2. Insight on strengths and weaknesses of different approaches that can be used to quantify N_2O emissions reductions associated with N management activities.
3. Gain an understanding of the key components of existing and evolving N_2O offsets protocols / methodologies.
4. Explore “common practice” N fertilizer management activities.
5. Gain perspectives from the agriculture community about farmers’ willingness to participate in carbon markets and to alter N fertilizer management activities.

2012 EPRI Offsets Workshops

- Offsets Aggregation – Spring 2012
- "Stacking" Offsets – Summer 2012

Key EPRI Offsets Documents

- **Aggregation of Greenhouse Gas Emissions Offsets: Benefits, Existing Methods, and Key Challenges**. EPRI document #1022180 (2011).
- Emissions Offsets: **The Key Role of Greenhouse Gas Emissions Offsets in a U.S. Greenhouse Gas Cap-and-Trade Program.** EPRI document #1019910 (2010).
- Key Issues in **Designing Mechanisms to Reduce Greenhouse Gas Emissions from Deforestation and Degradation (REDD).** EPRI document #1017998 (2009).
- The EPRI Greenhouse Gas Emissions Offset Policy Dialogue: **Description of Key Issues in the Design of GHG Emissions Offset Programs.** EPRI document #1015633 (2008)
- "**A Comprehensive Overview of Project-Based Mechanisms to Offset Greenhouse Gas Emissions."** EPRI document #1014085 (2007).



http://globalclimate.epri.com/results_and_publications__ghg_offset_policy.html

EPRI-MSU N_2O Research Collaboration

Developing GHG Emissions Offsets by Reducing Nitrous Oxide (N_20) Emissions in Agricultural Crop Production

Key Peer-Review Publications

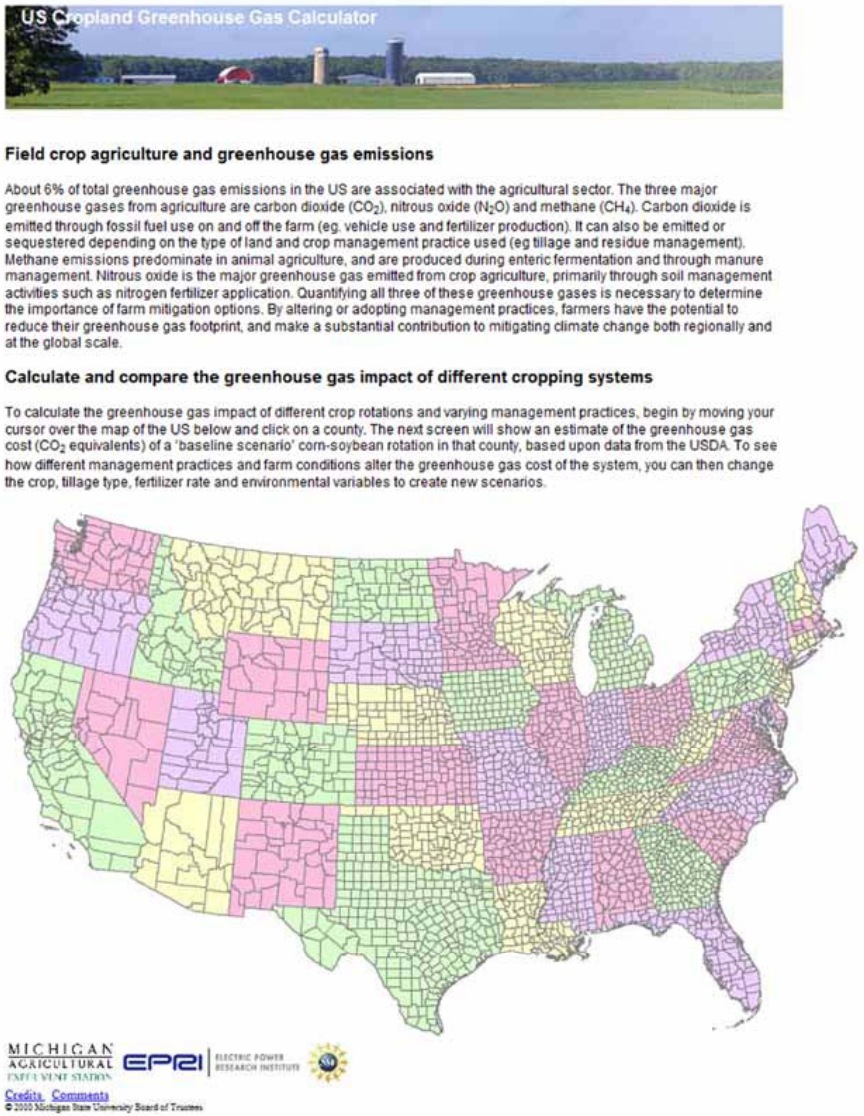
1. Hoben, J.P., R.J. Gehl, N. Millar, P.R. Grace, and G.P. Robertson. 2011. Non-linear nitrous oxide (N_2O) response to nitrogen fertilizer in on-farm corn crops of the US Midwest. *Global Change Biology* 17:1140–1152.

2. Grace, P., G. P. Robertson, N. Millar, M. Colunga-Garcia, B. Basso, S. H. Gage, and J. Hoben. 2011. The contribution of maize cropping in the Midwest USA to global warming: A regional estimate. *Agricultural Systems* 104:292-296.

3. Millar, N., G.P. Robertson, P.R. Grace, R.J. Gehl, and J.P. Hoben. 2010. Nitrogen fertilizer management for nitrous oxide (N_2O) mitigation in intensive corn production: an emissions reduction protocol for US Midwest agriculture. *Mitigation and Adaptation Strategies for Global Change* 15:185-204.

4. C.P. McSwiney, Bohm S., Grace P., Robertson G., 2010. Greenhouse Gas Emissions Calculator for Grain and Biofuel Farming Systems, *Journal of Natural Resources Life Science Education* 39:125–131.

MSU Web-based Decision Support System: N_2O GHG Calculator



- N_2O calculator allows offset project developers, electric companies, and others to quantify potential N_2O offsets and identify the best locations to implement them.
- Calculator makes use of existing USDA and other data.
- Provides comparative CO_2e "costs" of N_2O, soil carbon change, fuel, and fertilizer;
- Allows comparison of different scenarios based on crop, tillage, and fertilizer decisions

www.kbs.msu.edu/ghgcalculator

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Status of MSU-EPRI N_2O Offsets Protocol

- Verified Carbon Standard (VCS)
  - Public comments (completed)
  - 1st Validation (completed)
  - 2nd Validation (ongoing)
- American Carbon Registry (ACR)
  - Public comments (completed)
  - Peer review (ongoing)
- Now under consideration as part of the Australian Carbon Farming Initiative (CFI)

Thank You for Participating

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