Developing GHG Emissions Offsets by Reducing Nitrous Oxide (N_2O) Emissions in Agricultural Crop Production

Project Opportunity

Row crop ecosystems, such as this corn crop in the United States, contribute about 50% of anthropogenic N_2O emissions.

- Increase the breadth of options available to electric companies to offset their GHG emissions in response to potential future carbon constraints.
- Demonstrate an innovative approach to creating cost-effective, widespread, and large-scale GHG emissions offsets.
- Develop and demonstrate a way for electric companies to create GHG emissions offsets in partnership with customers in agricultural communities.

This project will investigate an innovative approach to developing large-scale, cost-effective greenhouse gas (GHG) emissions offsets that could be implemented across broad geographic areas of the U.S. and internationally.

The tools and information developed in this project will broaden the GHG emissions offset options available to electric companies, and can serve as a mechanism to develop and strengthen partnerships with the agricultural communities that they serve.

Drivers and Trends

While debate continues nationally and internationally about how to respond to global climate change, it is becoming increasingly clear that U.S. electric companies may face future carbon constraints that could require them to substantially reduce or offset their greenhouse gas emissions.

Nitrous Oxide (N_2O) is a significant greenhouse gas that contributes to global climate change. Each ton of N_2O emitted into the atmosphere is equivalent to emitting 296 tons of CO_2 in its global warming potential. Therefore, offset projects that reduce even relatively small amounts of N_2O emitted into the atmosphere can have a proportionately larger effect on reducing radiative forcing associated with climate change than similar changes in CO_2 emissions. This sensitivity to small changes provides a strong impetus for including N_2O and other non-CO_2 GHGs in the development of effective GHG mitigation strategies.

Project Summary

This project has five primary objectives:

1. Determine the technical potential and economic cost to offset GHG emissions by reducing N_2O emissions in agricultural crop production across representative soil and crop types in the U.S.
2. Confirm, through field testing, that N_2O flux can be reduced substantially by decreasing the amount of nitrogen fertilizer applied to cropland with little or no loss in crop productivity.

3. Develop more robust computer simulation models that can be used to predict the relationship between N_2O flux and crop yields. Identify and describe specific quantitative modeling parameters that can be used with a Web-based carbon calculator to predict N_2O flux across major cropping systems and soil and climate regimes in the U.S. Existing models do a poor job of predicting day-to-day N_2O fluxes that are critical to predicting the GHG emission reduction benefits associated with N_2O emissions abatement projects.
4. Identify, describe and analyze socio-economic factors that may encourage or inhibit farmers from participating in N_2O emissions reduction projects, and identify approaches to overcome potential farmer reluctance to participate.
5. Identify incentives needed to encourage farmers to change cropping practices to achieve N_2O reductions. This will be done by conducting quantitative analysis in conjunction with discussions to be held with farmer focus groups now being established under an existing National Science Foundation-funded project.

Deliverables

EPRI will produce a series of Technical Updates or peer-reviewed journal articles that summarize the activities undertaken as part of this project and the quantitative and qualitative results and conclusions obtained.

Benefits of Participation

By demonstrating an innovative approach to creating cost-effective, widespread, and large-scale GHG emissions offsets, this project is designed to increase the breadth of options available to electric companies to offset their GHG emissions in response to potential future carbon constraints.

Electric companies with substantial GHG emissions can benefit from participation in this project because it may increase GHG emission offset options available to them. EPRI members, including electric cooperatives and public utility districts, that provide electric supply to agricultural producers and farm communities, also will benefit from this project because it highlights a way for electric companies to partner directly with these communities to reduce GHG emissions.

Cost of Project

The estimated cost to complete this project is $900,000 over three years. EPRI member companies that fund any Environment program can use Tailored Collaboration (TC) funds for up to half of their contribution. For each TC participant, the minimum cost for participating in this project is $25,000 per year, with $25,000 matched by EPRI, for a total of at least $50,000 per year. Companies that have not purchased any EPRI Environment program may co-fund this project for a minimum of $50,000 per year. Participation for all three years is strongly recommended.

Project Status and Schedule

This project is expected to begin in April 2006 and continue through 2008.

Who Can Participate

Any company, public agency, or nonprofit institution can participate in this project.

Contact Information

For more information, contact the EPRI Member Resource Center at 800.313.3774 (askepri@epri.com).

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