

POLICY BRIEF

Treatment of Early Agricultural and Forestry Actors in a Federal Cap-and-Trade

Prepared by the Nicholas Institute for Environmental Policy Solutions, Duke University

Lydia P. Olander
Brian C. Murray

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MITIGATION BEYOND THE CAP

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Early actors are defined as those who engaged in greenhouse gas (GHG) mitigation activities—i.e., emission reductions or carbon sequestration—before the initiation of a mandatory federal cap and associated offsets program (i.e., in the pre-compliance period). The critical question for early actors is whether and how their early actions might be credited in a federal climate policy.

All the major legislative cap-and-trade climate proposals introduced in the U.S. Congress have included some provisions to address early actors, but they have often been unclear as to how the uncapped sectors would be included. While this paper focuses on early actors in what are likely to be the uncapped sectors—agriculture and forestry—many of the issues discussed here are similar for the capped sectors with the key differences of interest described in the text box below and noted throughout the text.

Agriculture and forestry are unlikely to be among the capped sectors in any immediately foreseeable federal climate policy. Thus, these sectors could provide offsets to what will become regulated entities. In other words, new mitigation achieved through forest and agricultural management could be sold and used to offset emissions from covered (capped) entities. All recent major legislative proposals in Congress have included offsets, in part because of the substantial impact they can have in reducing the costs of a stringent cap-and-trade policy. Given the recent engagement of the agricultural community in the legislative process, agriculture is likely to play some part in a federal offsets program.

What is an offset?

Under a mandatory U.S. policy the term *offset* describes a reduction in emissions or increase in sequestration of greenhouse gases produced by an entity outside of the compliance cap that is used by a capped entity to offset its own emissions.

There are two types of early actors in the agricultural and forestry communities. The first type includes entrepreneurial farmers and foresters who have actively changed land management to engage in the early voluntary carbon transactions underway in the United States. The second type includes farmers and foresters who for one reason or another were already engaged in activities that reduce emissions or increase sequestration of carbon. Examples of climate-friendly management activities include but are not limited to using zero (“no-till”) or conservation tillage, using new technology to capture methane for improved animal waste management, and afforesting or reforesting buffers or larger landscapes. Under the right circumstances the reduction in greenhouse gas emissions or gains in sequestration achieved by these management activities can be sold as a commodity in the voluntary market and provide additional income to farmers and foresters. Questions remain under what circumstances farmers and foresters will be able to sell the mitigation realized by these activities in a regulatory market and whether any early (pre-compliance) mitigation realized that was not sold on a voluntary market would be compensated in any way. With a mandatory federal market for offsets appearing more likely and the regulatory guidelines gaining some clarity, agricultural offset producers want to know:

- 1. What will qualify as an early action?**
- 2. Can early actions be eligible for credits after the compliance period starts?** If a project began in the pre-compliance period, will it be eligible for the federal program and qualify for federal offset credits proactively?

3. **Can early actions be credited for pre-compliance activity?** Will the reductions or sequestration that occurred before the compliance period started be compensated in some manner?
4. **Are there ways to compensate for non-additional GHG-mitigating activities?** Some activities may not meet the additionality tests used, but it would be desirable to encourage continued favorable behaviors and discourage reversal of carbon stored in vegetation and soils. How can this be done?

This paper will briefly provide possible answers to these questions based on the evolving discussion among researchers, stakeholders, and policymakers who are wrestling with the design of offsets programs for mandatory cap-and-trade provisions at the national and regional levels.

1. What will qualify as an early action?

Eligibility for early actions is likely to depend on two or three main criteria:

1. When the project occurred – If a project started before climate legislation and offsets were being seriously discussed and before the onset of the voluntary market, they may not be considered eligible as an early actions. The Lieberman-Warner Climate Security Act of 2007, S. 2191¹ (LW) used 1994 as the start date for early actors in the capped sectors. Others may look to the development of the Kyoto Protocol in 1999 as a start date. Many involved in the voluntary market note that mitigation activities outside of what will be capped sectors began around 2002 or 2003 and suggest that this may be an appropriate start date for recognizing early action from these activities (Figure 1).

If a project occurs after the enactment of a mandatory federal policy (e.g., 2009) but before offsets begin being credited for compliance (e.g., 2012), it will likely either qualify as an early action or be merged into the regulated offset program directly. Merging early actors into the regulated offset program can dilute the integrity of the cap slightly, but given the startup time for projects (often around four years) and the desire of capped entities to ensure that sufficient offsets are available in the first years of a compliance cap, it may be a good option.ⁱ It also may help avoid a rush of new post-enactment early actors that could oversubscribe any funds set aside to compensate early actors, including those good actors from the pre-enactment period.

Perspective from the capped (offset-buying) sectors

The capped sectors can engage in early action in two primary ways:

- (1) by reducing their own emissions, or
- (2) by purchasing mitigation from other entities (for example, through the CCX, or offsets from the voluntary markets or the CDM).

Unlike offset sellers, these capped sector actors are not concerned about eligibility for post-compliance crediting for their early actions because their internal efforts to reduce emissions will fall under the cap post-compliance. They are primarily concerned with pre-compliance crediting for their internal efforts and any offsets they have purchased and banked for future use. These entities would either like to have their baseline adjusted to account for their early actions (i.e., a pre-compliance baseline start date) or to be compensated for early actions including the purchase of early offset credits. Compensation would likely be generated from an allowance set-aside (see more below in section on compensating early actors).

EXCEPTION – If capped sector entities engage directly in offset project development, their interests in ensuring that those projects still generate usable credits overlap with those of the uncapped sectors and offset sellers as discussed in the larger paper.

¹ This start date remained unchanged in the Boxer substitute, S. 3036.

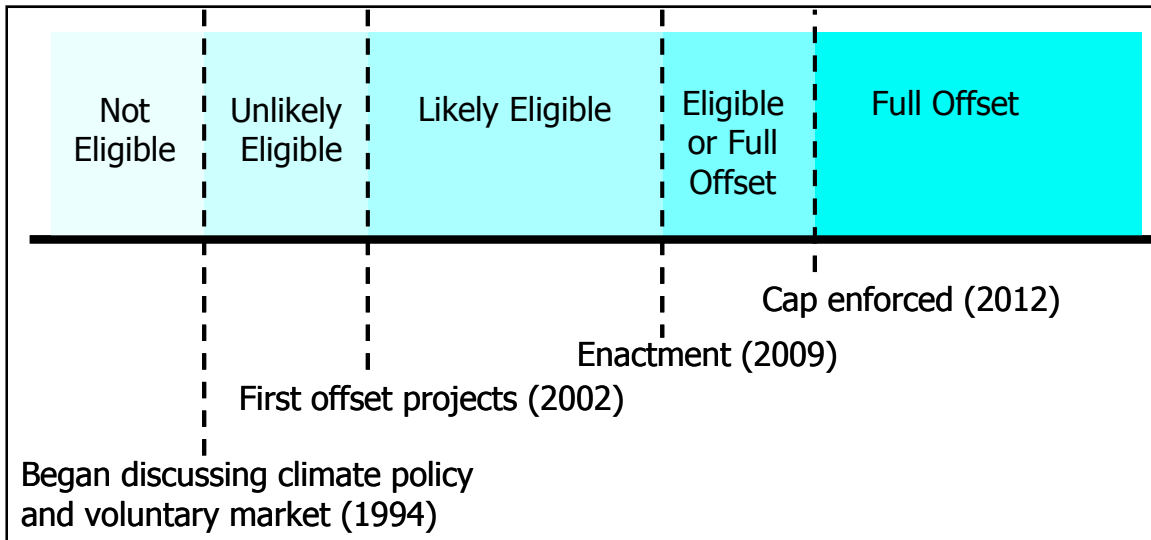


Figure 1. How the timing of a project might affect its eligibility as an early action, which will determine its eligibility for crediting in the regulated market and compensation for pre-compliance actions.

2. Registration status – If a project and the mitigation it achieves are assessed, recorded, and validated, it will be easier to verify the mitigation actions taken, thus making registration a logical requirement for eligibility as an early action.
3. Whether the project was additional² or part of business-as-usual (not mitigation-motivated) operating practices – Depending on how additionality and baseline are determined in a mandatory cap-and-trade program, pre-existing activities—those that started before a specified cut-off date or that have no registered project showing a change in management—may be considered non-additional. For example, consider a wheat farmer who has been using no-till practices for years as his normal operating practice, without the intention of increasing sequestration per se. Different approaches to assessing additionality/baseline affect whether this farmer’s actions would be considered additional.
 - If a project-specific (bottom-up) approach is used (see the circle), the farmer’s actions would likely be considered non-additional because his activity started before the cut-off date selected and he did not register this activity as a mitigation/offset project.
 - If a performance standard approach based on the sector/activity type average practice (top-down) is used

Additionality/Baseline Approaches

Project-specific (bottom-up) - each project developer asserts a baseline based on the particular circumstances of the project

Performance standard/benchmarking (top-down) – uses more aggregate information for the nation/sector/region in which the project is located to determine a likely baseline for the project in question

² Additionality refers to the extent to which greenhouse gas mitigation benefits are above and beyond what would have occurred in the absence of offset project implementation or in the absence of carbon market incentives. See Nicholas Institute paper on additionality (revision in progress; paper will be available at <http://www.env.duke.edu/institute/offsets.html>).

instead, this same farmer's project may be considered at least partly additional if he is in the minority of wheat farmers using no-till in his region.

- Some combination of these approaches is also possible, where a performance standard approach is used after a cut-off date for projects that were registered.

If an early project or pre-existing activity is considered non-additional given the final regulatory definition of additionality, it is unlikely to qualify post-compliance for the offsets program or pre-compliance for early actor compensation. However, non-additional activities can have substantial GHG mitigation benefits and some type of federal support for the positive outcome of their activities could be considered (see section 4 below for more detail).

2. Post-compliance eligibility: Can early actions be credited once the compliance period starts?

Many land and livestock managers currently engaged or considering engaging in the early voluntary and state or regional mandatory markets are concerned that a strict definition of additionality would hold that any activity or project in place before the compliance period began would not be eligible to receive credit in a federal regulated market even for continued mitigation occurring after the compliance period starts. So, the question is whether a developer that started a project pre-compliance (e.g., in 2005) to generate credits for the voluntary market would be able to sell any new post-compliance credits the project generates (e.g., after 2013) to the new regulated market. This is completely separate from the issue of whether the credits generated prior to the compliance period will be eligible for some sort of compensation once the mandatory program begins (discussed in more detail in the next section).

Encouraging early actors has been an often repeated objective of the developing mandatory programs. To achieve this objective in uncapped sectors such as agriculture and forestry, it will be necessary to allow qualified early projects to be eligible to participate in the regulated offset market; otherwise, they have every reason to wait until the mandatory program begins. Eligibility for early projects in the regulated market means that once the compliance period begins, these early projects would be able to update to the new federal methodologies/protocols, maintain their pre-project baseline if necessary (see below), and sell any new offsets generated (new GHG mitigation achieved after the compliance period begins) into the regulated market.

Setting the baseline for an eligible early action project

How the baseline is set is critical because it is the metric against which any change in GHG mitigation is measured and a project's potential credits are determined. Can a pre-compliance project keep its pre-compliance baseline, or will it need to be adjusted?

A baseline can be project-specific (bottom-up) based on the history of activity on the project lands or facility, or a performance standard (top-down) based on representative performance of the industry/sector for the activity type. If a project-specific baseline is used, project developers are concerned about having to reset their baseline at the onset of the federal program in order to join the mandatory market. For example, suppose a farmer installed new methane capture technology for an early project and then later wanted to join the federal offsets program. If he had to reset his baseline at his current

reduced level of emissions, he would be left with nothing to credit. Some legislative efforts have identified this problem and adjust for it by allowing the pre-project baseline to countⁱⁱ; in others it is unclear how this would be handled.

Current discussion and some of the newer methodologies such as EPA climate leaders and the Voluntary Carbon Standard are shifting toward the use of an industry/sector/activity performance standard to set baseline and determine additionality. Use of this approach in pre-compliance projects may reduce the need to re-adjust baselines significantly for a post-compliance period. If a performance standard approach is used, the baseline will only shift if the industry/sector/activity as a whole (i.e., most wheat growers in the upper mid-west) shifts their practices. It is interesting to note that the performance standard could shift in either direction. For example, if land currently under the Conservation Reserve Program moves back into cropping in the pre-compliance period, new lands being reforested as an offset project could have a lower post-compliance performance standard against which they would be credited.

Below are examples of two project types and scenarios of how baseline might or might not shift as a project moves from an early project into the regulated market given the additionality approach applied.

1. Reduced emissions project

- *Project-specific* – A dairy farm that is a qualified early actor that had installed new digesters to avoid emissions of methane could be allowed to claim its pre-digester level of annual emissions as its baseline, gaining credit for the annual emissions it avoids each post-compliance year.
- *Performance standard* – If the dairy farm was already using a performance standard approach, there may be little or no shift in baseline needed. If instead it has to shift from a project-specific approach, the baseline may shift to reflect the activity across the rest of the dairy industry in the region.

2. Sequestration project

- *Project-specific* – A wheat-growing farm that is a qualified early actor that shifted to no-till management to increase sequestration of carbon could claim its pre-no-till trend of sequestration as its baseline, gaining credit for annual sequestration increases above this trend each post-compliance year.
- *Performance standard* – If the wheat farm was already using a performance standard approach, there may be little or no shift in baseline needed. If instead it has had to shift from project-specific approach, the baseline may shift depending on the trends in sequestration across the rest of the wheat growers in the region.

3. Pre-compliance compensation: Can early actors be credited for reductions generated before the compliance period?

It is uncertain whether pre-compliance uncapped activities will be compensated in a federal offsets program. Most major legislation introduced in the Senate specifies compensation for early capped actors; some includes uncapped actors as well.ⁱⁱⁱ The capped sectors are primarily addressed by setting aside funding (allocated allowances) to compensate them. The uncapped sectors are addressed in two ways—either by setting aside funds for compensation or by letting the early credits from pre-compliance mitigation

trade directly in the regulated offsets market. Some new legislation introduced in the House does not explicitly credit early activities in the uncapped sectors,^{iv} but the latest proposal from the House Energy and Commerce Committee does.^v While the critical issue for many early actors in the uncapped sectors is eligibility and the adjustment of baseline for post-compliance period crediting, offset developers and early actors in the capped sectors would also like recognition for pre-compliance reductions.

This section covers the key factors affecting how mitigation achieved by early actors in the pre-compliance period might be credited and the primary policy mechanisms that can be used for crediting.

Factors that may affect crediting

1. Registration status – If the mitigation project and what it achieves is assessed, recorded, and validated, it will be possible to determine how much early credit is deserved.
2. Clear ownership status – Ownership for offset credits will have to be clearly documented, either through registration or legal contracts. If an offset has been sold, the buyer, rather than the seller, will hold the credits and whatever value they might have. However, if the buyer has used and redeemed/retired the offset in a binding program such as the Chicago Climate Exchange (CCX) or the Regional Greenhouse Gas Initiative (RGGI), it will likely be ineligible for compensation from the new program.
3. Accounting methodology used to assess and register the mitigation project – Not all accounting methodologies are equal. Certain standards—such as those developed for the new regulatory programs developing under the Regional Greenhouse Gas Initiative (RGGI) or the California Clean Air Registry (CCAR); those developed by EPA’s climate leaders program; or ideally those as rigorous as the eventual federal standards—could receive preferential status in how they will be treated and whether they will be recognized in a federal program.
4. The type of activity – It is still unclear which activities will be eligible for a federal offsets program under a mandatory climate policy. While manure management and afforestation/reforestation seem likely to be eligible for offsets, other activities with more difficult accounting issues, such as reduced tillage practices and forest management, may take longer to bring on board. If an activity is not in the regulated offsets program, it is unlikely that it will receive recognition for pre-compliance reductions.

Policy mechanisms for crediting pre-compliance reductions

There are two primary mechanisms for pre-compliance reductions under discussion and in use in the legislative proposals introduced to date. They are often used in combination.

1. Setting aside proceeds from the selling of allowances (auctioned or allocated) to compensate early actors for their good deeds. Allowances are the rights to emit greenhouse gases for capped entities (1 allowance = right to emit 1 ton of CO₂).

2. Allowing unsold credits produced by early actors directly into the federal offsets market. This only applies to early offset credits, not to early reductions by the capped sectors.

Policy Options for Compensating Pre-Compliance Reductions		
	Allocation/Set-Aside	Merge into Offsets
What's needed from the program	Does this policy option address this need?	
Maintaining the integrity of the cap	Yes Could provide compensation for agriculture and forestry mitigation without harming the integrity of the cap. However, it does cost money.	No Strictly speaking, no. If the mitigation occurred before the cap, it is not additional.
Sufficient support to cover all early actors (While desired by some, this may not, and perhaps should not, be required.)	Maybe Given a stringent cap like Lieberman-Warner (over 80% of all emissions capped), an allocation of a few percent over the first 5 years (total ~850 million metric tons) is likely sufficient to cover all registered domestic early actors. The current voluntary and CCX markets make up around 60 million tons of transactions in 2007 ^{vi} (all transactions, not just offsets). If we use this as an indicator of registered projects and assume 60 million tons of offsets created to date and a steady increase of 60 more every year until 2012, the total offsets created will be around 320 million tons, still leaving funds for other early actions to be compensated.	Depends Given predicted demand for offsets there would be sufficient buyers. But there are two caveats: (1) Would there be regulatory restrictions to protect integrity (as described above) which would limit the pre-compliance credits that could be used as offsets in the mandatory program? (2) Would the offset buyers be held responsible for the risk of bad projects and thus avoid riskier (e.g., less documented) pre-compliance credits?
Support for non-additional good actors	Maybe Using allocated/auctioned funds does not risk the integrity of the cap, so they could be used for non-additional activities if there are sufficient funds. (See Section 4)	No Would damage integrity of cap.
Supplying enough offsets in the early years of the cap to meet demand and help contain costs	No No offsets created.	Maybe Some are considering a limited exception from additionality (i.e., for 1 to 2 years) to allow sufficient offset supply before the initiation of the cap. Some protection for other aspects of integrity would also be needed to ensure that only those projects that meet the requirements of the mandatory market are allowed in.

4. Support for avoiding emissions and maintaining non-additional mitigation benefits

A critical issue for land-based sequestration is permanence.³ Primarily offsets programs credit new increases in sequestration, but we also want to maintain the existing stored carbon rather than see it re-emitted to the atmosphere. The developing state and regional

³ For more details, see the paper *Addressing Impermanence Risk and Liability in Agriculture, Land Use Change, and Forest Carbon Projects* by Brian Murray and Lydia Olander.

programs, CCAR and RGGI, are developing avoided conversion (avoided emissions) protocols for forests for their offsets markets. This type of approach could perhaps also be used for agriculture where maintaining already sequestered carbon is the critical issue. At this point these protocols are in the early stages of development and have not been fully tested. It is unclear whether they will have strong additionality requirements, and if so, whether this will leave many landowners with sequestered carbon out of the program. One possibility is that these avoided conversion protocols will be developed and incorporated into a federal program, thereby creating an opportunity for the offsets market to help prevent the release of existing carbon stored on farms and in forests. However, if these protocols are not considered strong enough or do not incorporate a wide enough breadth of landowners due to concerns about additionality, set-aside or other government funding could be used.

If an activity which is avoiding emissions (as noted above) or continuing to sequester carbon is considered non-additional, it will not be eligible to merge with a federal offsets program, receive offset credits in the post-compliance period, or receive early actor credits. Nonetheless, it could—and perhaps should—be compensated for its positive benefits through allocated set-aside funds or other government programs. Many actors with non-additional activities may need financial support if we want them to maintain their mitigating activities and to continue storing their previously sequestered carbon instead of switching to new crops and new management that would bring in a greater profit but negate the climate benefits. These non-additional activities would not be allowed into the offsets market because doing so would damage the integrity of a cap and weaken the climate outcome of the overall policy. However, allocated set-aside funds and other government support can be used without damaging the cap and weakening the climate outcomes of a cap-and-trade; such support may be needed if we wish to maintain these ongoing activities with positive environmental effects. (This is only an issue for the uncapped sectors; for capped activities, regulation will ensure continued emission reductions.)

In the following example we consider maintaining support for continuing non-additional mitigation only (i.e., we do not consider avoided emissions from stored carbon). If we make the rough assumption that the pre-compliance non-additional market level of reduced tillage is 100 million acres^{vii}, with around one-third in continuous reduced tillage, and the rest in rotational tillage, given a relatively high rate of sequestration—0.8 tons of CO₂/acre/year for continuous reduced tillage^{viii} and an assumed average of 0.2 tons of CO₂/acre/year for land in rotation—we are looking at 40 million tons of CO₂/year of ongoing sequestration. (This is a gross accounting and does not take into account emissions from these farms.) However, it is unlikely that all of the acreage currently practicing continuous or rotational no-till would be registered or verified as such, reducing the amount that would likely qualify for early action credit. For forests, baseline sequestration is much greater, with net sequestration of 745 million tons of CO₂ in 2006 (EPA 2008). A 1% allocation per year out of a stringent Lieberman-Warner-type cap would start at around 60 million allowances per year and decline over time. While covering non-additional sequestration in the agricultural sector is relatively easy, it is hard to imagine fully compensating (one ton for one ton⁴) all ongoing sequestration in the forestry sector, even with the substantial funding a cap-and-trade may bring, but some compensation

⁴ Ton-for-ton compensation for maintaining ongoing mitigation alone (not including supporting already stored carbon) could require an allocation of as much as 13% of the cap.

(less than one ton of compensation for each ton mitigated) may be possible.⁵ If we also wanted to support continued storage of carbon already sequestered, even more funding would be needed. Because the scale of stored carbon is so large, funding to maintain it would be spread thin. Therefore we must use limited resources wisely and effectively to encourage continuing existing mitigation activities and maintaining storage in the agriculture and forestry sectors.

5. Summary

Treatment of early actors is a critical and at times contentious part of the climate policy discussion. Fairness suggests that parties who have been good actors thus far not be penalized for their good deeds by being left out of the opportunity for compensation in a compliance regime. But efficiency and system integrity require that payment be focused on activities and emission reductions incremental to what was being done anyway, at least in the case of an offsets program, which is the primary vehicle being proposed for agriculture and forestry in an economy-wide cap-and-trade program. Since early action may run counter to the additionality criterion, this creates a conflict between fairness and efficiency in determining their appropriate treatment in climate policy.

As policymakers sort out this issue, it would be helpful for them to frame their decisions in the following dimensions:

1. **What will qualify as an early action?** Will this be determined by when the project started, whether it was registered, whether it is deemed additional, or some combination of these?
2. **Can early actions be eligible for credits after the compliance period starts?** Or will they be precluded from eligibility altogether in the compliance program? Or will some subset of early actions (e.g., those activities started by 2002) be eligible?
3. **Can early actions be credited for pre-compliance activity?** Whether or not they are eligible for post-compliance credits, might they be granted credits for the reductions that they took before the compliance period started?
4. **Are there ways to compensate for non-additional GHG-mitigating activities?** Are there provisions in the policy to pay early actors for their good actions, while recognizing that this is non-additional and needs to remain outside the offset system?

The focus of this paper has been on actors in uncapped sectors (farmers and forest landowners), but it is important to recognize that early action is also critical in capped sectors, as capped entities that began to take preemptive action against GHGs early on might otherwise be punished for those actions if they lower their baseline emissions and give an advantage to their competitors who did not take early action and thus have an easier target to hit. Policymakers may wish to treat early actors in capped and uncapped sectors consistently across the board or clarify reasons for doing things differently in different sectors.

⁵ To illustrate a potential funding stream for ongoing sequestration in U.S. farms and forests: If there are 850 million tons CO₂ of ongoing sequestration per year and the government compensates for 10% of this (85 million tons), it will need 1.5% allocation from a LW-type cap. For a 1,000-acre farm at a \$15/ton price in year one, at 10% compensation, the farm would receive \$1,500 each year. In later years, if the carbon price is around \$50/ton, the farm would receive \$5,000 each year.

6. References

- ⁱ Olander, Lydia. 2008. *Designing Offsets Policy for the U.S.* Nicholas Institute for Environmental Policy Solutions, Duke University. Available at <http://www.env.duke.edu/institute/offsetpolicy.pdf>.
- ⁱⁱ H.R. 6316 Climate MATTERS Act of 2008 (Doggett) [19 June 2008]. 110th Congress.
- ⁱⁱⁱ S. 2191 Lieberman-Warner Climate Security Act of 2007 [18 October 2007] and S. 1766 Low Carbon Economy Act of 2007 (Bingaman-Specter) [11 July 2007].
- ^{iv} H.R. 6186 Investing in Climate Action and Protection Act (Markey) [4 June 2008] and H.R. 6316 Climate MATTERS Act of 2008 (Doggett) [19 June 2008].
- ^v Discussion Draft Bill House Energy and Commerce Committee [7 October 2008].
- ^{vi} Capoor, Karen and Philippe Ambrosi. 2008. "State and Trends of the Carbon Market 2008." World Bank Institute, Washington, D.C.
- ^{vii} Conservation Technology Information Center. 2006. 2006 Crop Residue Management Survey. Available at <http://www.conservationinformation.org/pdf/2006CRMSurveySummaryLoRes.pdf>.
- ^{viii} U.S. EPA. 2005. "Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture." Available at http://www.epa.gov/sequestration/greenhouse_gas.html.

the Nicholas Institute

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for more information please contact:

Nicholas Institute for Environmental Policy Solutions
Duke University
Box 90328
Durham, NC 27708
919.613.8709
919.613.8712 fax
nicholasinstitute@nicholas.duke.edu

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