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Designing Offsets Policy for the U.S.

Principles, Challenges, and Options for Encouraging Domestic and International Emissions Reductions and Sequestration from Uncapped Entities as part of a Federal Cap-and-Trade for Greenhouse Gases

Lydia Olander
With the assistance of Tim Profeta,
Brian Murray, Christopher Galik, and Megan Dawson

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NICHOLAS INSTITUTE
FOR ENVIRONMENTAL POLICY SOLUTIONS
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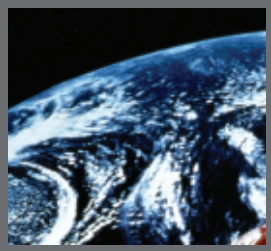



DESIGNING OFFSETS POLICY FOR THE U.S.

PRINCIPLES, CHALLENGES, AND OPTIONS FOR ENCOURAGING DOMESTIC AND INTERNATIONAL EMISSIONS REDUCTIONS AND SEQUESTRATION FROM UNCAPPED ENTITIES AS PART OF A FEDERAL CAP-AND-TRADE FOR GREENHOUSE GASES

By Lydia Olander

With the assistance of
Tim Profeta, Brian Murray, Christopher Galik, and Megan Dawson

Ideas developed with the input and advice of numerous
experts who kindly volunteered their time (See Appendices A & B)

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May 8, 2008

Dear Reader:

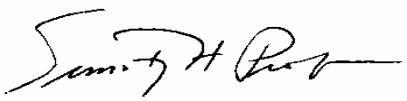
For us at the Nicholas Institute, the document you have before you has been a labor of love. Beginning with the publication of our effort to outline good standards and protocols for greenhouse gas projects in the agricultural and forestry sectors, *Harnessing Farms and Forests in the Low-Carbon Economy*, the Institute has worked to clarify the "rules of the road" for investments in greenhouse gas offsets in a way that balances the need to ensure the offset projects secure real and additional emissions benefits with the need to ensure that investment flows to these valuable projects. As we entered into the ongoing conversation on offsets, we realized that, while there was certainly complexity, there was also an increasing convergence among those involved in the market about what the "rules of the road" should be. This project has been our attempt to record that convergence.

It is critical that a new federal offsets program be sound, providing confidence in environmental and market integrity. To do this we cannot shy away from the complexity, and we cannot shy away from the level of detail needed to provide this confidence. Thus, instead of pretending that offsets present a relatively simple challenge——a claim that will not stand up to the test of our political process—we have tried to demonstrate that sufficient experience and expertise exist to answer these complexities.

In particular, by bringing together numerous experts who have been deeply involved in the market, we have been able to incorporate their knowledge and experience into this proposed design for a federal offsets program. Despite the complexity of offsets and the range of design issues possible, there was significantly more agreement than disagreement among the organizations with whom we worked and consulted in our process (Appendix A & B).

All told, I believe the confluence of ideas was possible because integrity of the offsets "commodity" is critical for everyone who is involved in or cares about offsets. Integrity is essential for the environmental community which is concerned about the integrity of the climate policy and the emissions cap. It is essential for the business reputation of offsets providers. And it is essential for creating a thriving offsets market that can reduce the costs of the policy, making a rigorous cap on emissions possible. As a result, we were able to focus our effort on how to build integrity into a program that is also economically viable and as efficient as possible. We hope we have hit the mark.

Warmest regards,



Tim Profeta
Director, Nicholas Institute

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Preface

Designing an offsets program that creates a tradable commodity that can be used to meet compliance obligations is one of the most complex parts of a climate change policy. Since a voluntary reduction in greenhouse gas emissions or increased carbon sequestration from entities outside the cap can be used to offset extra emissions by a regulated entity, an offsets program will require the government to develop strict scientific standards for measurement, accounting, and verification; clear legal standards to establish a safe investment environment; and sound economic tools for addressing leakage. Since its formation, the Nicholas Institute for Environmental Policy Solutions has pulled together the interdisciplinary resources of Duke University and other experts to tackle these challenges.

In 2007, the Nicholas Institute published a book that demonstrates scientifically rigorous methods for measuring greenhouse gas emission reductions and sequestration from the shifting management of forests and farms.[1] A number of U.S. Senate offices engaged the Institute to develop a domestic forest and agricultural offsets provision, much of which was eventually incorporated into the offsets provision of S. 2191, the America's Climate Security Act of 2007. Seeing how this provision was incorporated into a broader cap-and-trade policy, there was clearly a need for a more comprehensive and coordinated program. With growing concern over domestic and international offsets, it is essential that U.S. climate policies have a sound and workable offsets policy that will instill confidence that environmental and market integrity will be maintained.

Our objective was to develop the framework for a provision to encourage "uncapped" emissions reductions and sequestration that has enough rigor and transparency to meet environmental goals without creating a process so onerous that it discourages participation. This work can apply to any mandatory cap-and-trade policy that allows "uncapped" greenhouse gas mitigation—reductions in sectors that are not covered by the cap—to be used as offsets for emission obligations of capped entities.

This report includes a background paper that describes the critical design elements for such a provision and an example legislative architecture. The architecture is provided as one option or approach for addressing a number of policy details that have not yet been addressed in any of the existing federal or state cap-and-trade proposals. Only by parsing the fine particulars of a legislative proposal were we able to unearth the full complement of policy questions needing resolution. For a shared context we have discussed the resulting proposal as it compares to America's Climate Security Act of 2007 (S. 2191 Lieberman-Warner) that passed out of the Senate Committee on Environment and Public Works in December 2007.

We had the advice of a fantastic and diverse working group of experts who have been engaged in climate policy and the carbon market for over a decade (Appendix A), and the input of numerous other experts, companies, and organizations that have an interest in how uncapped entities will be engaged (Appendix B).

In some places, the example provision represents areas of agreement; in others, it is, at best, a middle ground between opinions expressed by the working group and reviewers. Regardless of the coincidence or distance among participants, this process helped us pose new and critical questions. The report describes the complex issues underlying tradable offsets and the differing viewpoints on a number of issues. In addition, we invited all of the working group participants and reviewers to write a commentary or difference of opinion. The responses we received are included in Appendix C.

[1] Zach Wiley and Bill Chameides, 2007. "Harnessing Farms and Forests in the Low-Carbon Economy: How to Create, Measure, and Verify Greenhouse Gas Offsets." Duke University Press, Durham, NC.

Executive Summary

Numerous and significant cost-effective opportunities for greenhouse gas (GHG) emission reductions and sequestration exist outside of the sectors likely to be regulated or capped in a U.S. federal policy and those sectors subject to regulation abroad. Examples include reforestation, improving agricultural and forest management, reducing deforestation, and capping landfills or manure lagoons to capture and flare or use emissions.

The objective of this project is to help design a U.S. cap-and-trade policy that will encourage greenhouse gas emissions reductions or sequestration from these "uncapped" sectors of the economy and from abroad while preserving the integrity of the cap and avoiding being so onerous that it will reduce participation. The primary principles followed in development of this program are that:

1. Emission reduction and sequestration opportunities not explicitly capped by a mandatory policy (i.e., that are "uncapped") should be encouraged, and
2. Any program to do so must maintain the integrity of the cap (environmental objective) and the market (economic objective).

Additional objectives are to a) reduce the costs of the mandatory program by increasing the flexibility of compliance, b) encourage innovation and accelerated deployment of new technologies and methods in the uncapped sectors, c) ensure a dynamic program that ties incentives to real reductions so that the program does not become an entitlement, and d) align programs with other environmental objectives.

A working group of experts in GHG offsets and policy (Appendix A) worked with the Nicholas Institute to frame these principles and objectives. The group used a detailed discussion of policy design to tease out the critical design questions and suggest solutions. This group's discussion and the input of additional reviewers substantially informed the background paper and example architecture that make up this report.

Background Paper

This background paper covers design issues critical to the development of an offsets policy.

Reductions from uncapped sectors can be encouraged in two ways:
1. by paying for them through the market in a compliance offset market, and
2. by incentives paid for using allowances created by the cap. (One allowance is required for each ton of greenhouse gas emitted in tons of carbon dioxide equivalents).

The term *offset* describes a reduction in emissions or increase in sequestration of greenhouse gases produced by one entity that is used by another entity to offset its own emissions. If done well, an offset does not change the total level of reduction reached under a cap; the reduction is just met in a different sector and location. This is effective because the climate is only affected by the total greenhouse gas burden, not where it comes from. Many mitigation opportunities outside the cap are less expensive than those available to capped entities. If capped entities are permitted to use these lower cost offset allowances to offset emissions, offsets could be the policy lever with the greatest potential for reducing the costs of a cap-and-trade program.

Allocating allowances from within the cap for uncapped activities is an alternative means of encouraging reductions from uncapped entities. The key distinction is that offsets let you achieve the same level of reductions for lower cost, while allocations let you achieve greater reductions for the same cost. Allocated allowances are taken from within the cap and thus represent reductions already required of some entity. If they are used to compensate reductions outside the cap, they can result in

extra reductions beyond the cap, but they will not reduce the costs of a cap-and-trade program. Since allocation can achieve greater reductions than required by the cap, the integrity of reductions achieved through allocation is not as critical as it would be for an offset used to offset the emissions of capped entities.

The first design question is how to encourage "uncapped" mitigation. Our working group suggested that an offsets market and allocated allowances be used in tandem to finance as much mitigation as possible without compromising integrity.

The second question is whether there should be any limit to the use of "uncapped" mitigation to offset regulated entities' obligations. There is a large domestic supply (depending on assumptions, perhaps as much as 1,000 metric tons of CO_2 equivalents per year yr) and an even larger international supply (given similar assumptions, up to 4,000 $MtCO_2e/yr$)[2] because of the large number of uncapped countries.[3] Mitigation through allocation is limited by the total number of allowances and how many are disseminated to capped entities and other stakeholders. Our working group suggested setting aside a small allocation pool as a backup and support for the offsets program. It would finance those uncapped mitigation activities that are not mature enough or appropriate for the offsets program, thus reducing possible risks to the integrity of the offsets market while maintaining support for worthy mitigation opportunities.

Our working group reflected the diversity of opinion on restrictions to the use of offsets. Rather than suggesting an answer, we provide a discussion of the arguments for and against restrictions on offsets to help guide political debate and action. In summary, some feel that restricting the use of offsets for compliance will help protect the integrity of the market if there is any uncertainty that offsets are truly real and additional. Restrictions would also ensure that U.S. energy and manufacturing sectors will make sufficiently large low carbon and energy efficiency infrastructure investments. Others feel offset restrictions will distort the market, increase costs, and leave worthy investments on the sidelines.

Much of the working group's discussions focused on how to ensure the highest degree of integrity in the offsets market. In an offsets market, integrity is critical because the reductions achieved offset emissions obligations from a capped entity. In contrast, reductions achieved through an allocation-based program are in addition to those achieved by the cap and thus errors in accounting will not impact the integrity of the cap.

At least five issues are crucial to the integrity of an offsets program:

- **Certainty** in the measurement and monitoring of emissions reductions or sequestration.
- **Additionality** which is the mitigation expected from a project over and above what would have occurred anyway.
- **Baseline** which is tied to additionality. What should the baseline greenhouse gas profile be for a project, and what is its measurement certainty? The difference between a project's total greenhouse gas change and its baseline greenhouse gas change is often what gets credited.
- **Leakage** is a shift in emissions to another place that negates some or all of the gains of the mitigation project.

[2]Both of these estimates of supply are dependent on the rules governing the creation of these credits, their price, the parallel price of allowances, and for international allowances in particular, how many other countries are drawing from the pool.
[3]EPA Analysis of the Lieberman-Warner Climate Security Act of 2008: S.2191 in 110th Congress (March 2008). Available at http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf.

- **Reversals** of sequestration projects (i.e., subsequent release of stored carbon) must be tracked and compensated.

It is essential that any uncertainties and risks that reduce expected mitigation (i.e., leakage, risk of reversals) be addressed. With sufficient information to quantify and estimate such uncertainties and risks, it is possible to use targeted specific discounts for uncertainty and a risk-adjusted assurance or set-aside mechanism for risk. While this may seem daunting, there are a number of activities likely to be part of an offsets market in the U.S. that are already using accounting procedures and methodologies that address these issues. For example, Clean Development Mechanism projects under the Kyoto Protocol, new standards for the Regional Greenhouse Gas Initiative, and projects in the voluntary market using standards like the Voluntary Carbon Standard and the California Climate Action Registry Protocols are all accounting for these five issues in some manner.

Years of experience in the international and voluntary markets have moved toward the development of protocols and methodologies for measurement and accounting based on an activity type (i.e., capturing and flaring methane from animal waste lagoons, using reduced-tillage agricultural practices) rather than the development of specific methods for each individual project. Enough project-based experience has been gained for numerous mitigation activities to develop standardized methods that would apply across projects of each type and reduce transaction costs for individual project design. This has been the trend in the voluntary market and new State mandatory markets and is suggested for the design of a federal program.

Requiring review and revision of the program can help assess and ensure integrity over time. If it is possible to compare the actual national level emissions and sequestration from uncapped activities to the offset allowances issued, we can roughly assess whether we observe the mitigation expected and credited in the offset program. A national level review is also essential for checking leakage that may occur within national boundaries. Revision also allows the program to evolve. For example, if some activities or forms of emission reduction become common practice, they should be considered business-as-usual and should no longer be counted as additional offsets. Impartial review can also inform Congressional decisions about adjusting imposed restrictions on offsets, depending on whether they have prompted desirable changes in capped sectors and achieved environmental integrity.

Example Architecture

To put the principles and design elements discussed in the background paper into practice, the working group provided guidance in developing example architecture for an offsets program. The working group asked to use S. 2191 America's Climate Security Act of 2007 (Lieberman-Warner), for context in these discussions, but the architecture could be flexibly adapted to other legislation that emerges.

The basic structure of the proposed architecture is outlined below with each of the three main features described.

- Compliance Offsets Program
    - Task Force on Offsets
    - Establishment of the Offsets Program
- Allocation-Based Programs
    - Early-Actor Compensation
    - Outside-the-Cap Mitigation Financing including International Forest Carbon
    - Innovation – Offsets Incubator

- Review and Revision by National Academies of Science
    - Review of Restrictions, Offsets Program, and Allocation Programs
    - Reporting to Congress and Administrator with Recommended Changes
    - Guidelines for Revisions

A ***compliance offsets program*** generates offset allowances (carbon credits) that can be purchased by capped entities to offset emissions. Offset allowances are created by offset projects that have used certified methodologies or technological standards to measure and account for achieved emissions reductions or increased sequestration. These methodologies or standards are activity-based. Once a method or standard is certified, the activity it covers is eligible for the offset program. A short term task force is suggested to help pull together the existing methodologies and standards that international, state, and voluntary markets are using to help government agencies speed the task of developing and certifying methodologies. A process is established for project initiation, review of the project plan, requesting offset allowances for mitigation achieved, verification of this mitigation, and for auditing of projects and paperwork. Three options are outlined for addressing reversal risk in sequestration projects, but only one is detailed in the architecture. The first option requires insurance, assurance, or a buffer set-aside. The second option is to use a publicly held buffer pool for offset allowances set aside to cover the risk of reversals. Both of these tie liability for reversals to the projects which are tracked in a project registry and require compensation for reversals that occur. The third option is also a publicly held buffer pool set aside to cover the risk of reversals. What is different is that the set-aside required for projects is tied to a conservative assumption of risk, which requires a larger set-aside. The buffer is then assumed to be sufficient to fully cover reversals so that no further liability for reversals is apportioned and no government tracking of projects is necessary.

It will take the agencies tasked with creating the offsets program time to develop the rules and infrastructure. And once the rules are in place, it will take additional time for the market to provide an offset supply sufficient to help reduce the costs of compliance in the first years of the cap. Thus, we suggest options for speeding this process and integrating with the existing infrastructure in the regional and state markets. We also suggest that much of the proposed offset language could be pulled out into a separate bill. The structure of the offsets program itself is not a very contentious issue and may be able to move through Congress more quickly. If it does, it would provide the administrative agencies the necessary authority and a coordinated structure for starting to build a strong offsets program as soon as possible.

An ***allocation-based program*** uses allowances that are allocated from the cap-and-trade program as a small backup and alternative support program for the offsets market. Since this allocation would come from a limited pool, its use must be targeted. We suggested the primary use be to support projects with activities that are not fully proven to be effective, have high uncertainty, cause unusual concern about additionality or leakage, or are otherwise not appropriate for an offsets market. Integrity is less critical for allocation-supported mitigation than for offsets because reductions will be supplemental to capped reductions. Only activities not included in the offsets market would be eligible for these programs. This support may help some activities reach the maturity to move into the offsets market. We also suggest a separate targeted program to promote new technologies and methodologies. Getting new technologies developed and deployed often requires more funding to a smaller number of projects for activities such as pilot projects or first-of-a-kind design and engineering. We also suggest using allocation to compensate early actors in offset creation.

A ***review*** of these programs by the National Academies of Science would assess restrictions on offsets and the effectiveness of the offsets and allocation programs. The Academy would report their results and ***recommendations for revision*** to Congress or the Administrator, as appropriate. Since mitigation

projects are long-term investments, the example also includes guidelines for revisions intended to help protect these investments and the viability of the offsets market.

This example architecture and the suggestions in the report depart from or clarify provisions in S. 2191 by

- calling for a task force to help coordinate information on methodologies and standards for the coordinating agencies;
- suggesting ways to speed development of the offsets program by moving a separate bill and/or integrating with other regulatory programs on offsets to ensure sufficient time for market engagement;
- suggesting an alternative approach to setting restrictions on offsets using a national level rather than an entity-level restriction;
- determining the eligibility for the offsets projects by the existence of a certified methodology for that project type (activity-based methodologies);
- drawing a clear boundary between activities eligible for the offsets program and those eligible for the allocation program;
- using allocation as a backup and support program for activities or programs not eligible or appropriate for the offsets market, rather than for specific activities (agriculture and forestry; coal-bed and landfill methane) that overlap with those likely eligible for the offsets market (except for international forest carbon, which is still set aside due to its specific environmental and political importance);
- providing three alternatives for addressing the risk of reversals, two of which require a federal reserve/buffer, with liability for reversals assigned to the project developer or addressed up front with a set-aside sufficient to cover all risk;
- compensating early actors through allocations rather than offsets;
- asking that the National Academies periodically review these programs and make recommendations for revisions to Congress and the Administrator;
- suggesting the development of sector-based program review using national inventories if possible;
- encouraging revisions through Congressional action (restrictions) or Administrative rulemaking (everything else) to help protect the market.

BACKGROUND PAPER

DESIGNING OFFSETS POLICY FOR THE U.S.

PRINCIPLES, CHALLENGES, AND OPTIONS FOR ENCOURAGING DOMESTIC AND INTERNATIONAL EMISSIONS REDUCTIONS AND SEQUESTRATION FROM UNCAPPED ENTITIES AS PART OF A FEDERAL CAP-AND-TRADE FOR GREENHOUSE GASES

Policy objective and principles

Our objective is to help design a policy that will encourage greenhouse gas emissions reductions or sequestration from "uncapped" sectors of the economy, such as agriculture and landfill gas, while preserving the integrity of the cap and avoiding being so onerous that it will reduce participation.

Primary Principles:

1. **Emission-reduction and sequestration opportunities that are not addressed by a mandatory policy should be encouraged.** Even under a stringent cap-and-trade policy, there will be substantial uncapped mitigation or sequestration opportunities in the U.S. If the U.S. follows the model of the Kyoto Protocol and also allows mitigation or sequestration outside the country, the opportunities are abundant. Whatever policy is designed must not be so onerous or restrictive that it discourages these opportunities to help reduce greenhouse gases in the atmosphere.
2. **The program must maintain the integrity of the cap (environmental objective) and the market (economic objective).** To offset emissions obligations of a capped entity, a qualifying activity must provide an additional emissions reduction or sequestration that would not have otherwise occurred as a result of business-as-usual practices. The value of an offset is inherent in it being a verifiable reduction in emissions. Investors will need assurance that each allowance generated by these activities is indeed a true emissions "offset." This assurance will create investor confidence and help to sustain the market.

Secondary Principles:

a) **Reduce the costs of the mandatory program by increasing the flexibility of compliance.** Modeling predicts that offsets will be a very effective way to reduce costs in the U.S. Uncapped reductions can also be encouraged through allocation, which will achieve greater overall reductions but will do so without changing compliance costs.

b) **Encourage innovation and accelerated deployment of new technologies and methods in the uncapped sectors.** New technologies, such as tools to measure soil carbon and to capture methane from hog farms, for example, are under development. We want to encourage uncapped sectors to continue to develop and deploy these new methods and technologies.

c) **Ensure a dynamic program in which incentives are tied to real reductions so the program does not become an entitlement.** As business as usual shifts over time, some activities may no longer provide additional reductions, and other supporting activities in research and education may no longer be necessary or cost-effective. A mechanism is needed to make sure the system is adjusted over time to address these changes.

d) **Align with other environmental objectives.** To the extent possible, the programs developed to use uncapped mitigation opportunities should be coordinated with and complement the numerous existing programs that support environmental objectives. These new programs should not create a barrier to the development of ecosystem services markets and programs.

Policy mechanisms

How can reductions from uncapped sectors be encouraged?
Reductions from uncapped sectors can be encouraged in two ways:
1. by paying for them through the market in a compliance offset market, and
2. by incentives paid for using allowances created by the cap. (One allowance is required for each ton of greenhouse gas emitted in tons of carbon dioxide equivalents).

See Figure 1 (p. 14) for an illustration of these mechanisms.

The value of providing these uncapped reductions would be linked to the market value of greenhouse gases for both mechanisms. In an allocation program, however, distribution of allowances or the proceeds from allowances is not constrained by the market value. In an offset system, if the price of allowances is $15, you will get activities that cost $15 per ton of reduction or less. In an allocation system, the activities could cost more or less than $15 per ton of reduction if distribution is based only on the tons reduced.

What are offsets?
In the realm of climate mitigation markets and policy, the term *offset* describes a reduction in emissions or increase in sequestration of greenhouse gases produced by one entity that is used by another entity to offset its own emissions. For example, an emitting entity (e.g., a coal-fired power plant) can buy allowances stemming from greenhouse gas reductions achieved by a different entity (e.g., a farmer). Under this scenario, a coal-fired utility could emit 100 extra tons of carbon dioxide from its generating plant and still meet its emission target by purchasing 100 offset allowances from a farm that is sequestering the equivalent of 100 extra tons of carbon dioxide in its soil. Offsets are even being used by individuals wishing to compensate for their emissions. For example, presidential candidates can ensure that they are carbon neutral by offsetting the emissions of their campaigning trips by securing offsets through a broker from a municipal landfill or a group of farmers.

In a voluntary world
Without a mandatory climate policy companies or individuals use voluntary offsets as a commitment to addressing global warming, for better public relations, or to promote good will with employees. Those engaged in the U.S. voluntary market are also learning about these markets before the coming federal program, perhaps to be better positioned to shape the coming program and possibly to get credit for early action. The lessons learned in this voluntary market, and the protocols developed for that market, have laid a strong foundation for developing a federal offsets program.

In a mandatory world
Under a cap-and-trade system, some countries, sectors, or emitters are not included under the cap. Diffuse or hard-to-regulate sources, small emitters, and the dispersed forest and agricultural sectors are typically not capped. The policies proposed for the United States follow this model. In countries without mandatory climate policy, which includes the entire developing world, all emissions are currently uncapped. In theory, reductions in emissions from any of these uncapped entities or countries, as well as any increases in sequestration could be used as compliance offsets for emissions by capped entities.

If done well, an offset does not change the total level of greenhouse gas reduction reached under a cap; the reduction is just met in a different sector and location (Figure 1a). This is effective in mitigating climate change because the climate is only affected by the total greenhouse gas burden, not where it comes from.

Uncapped entities can create marketable reductions in greenhouse gas emissions or increases in sequestration of carbon provided that the activity they are undertaking is additional to what would have happened anyway. They can sell the reduced emissions or increase sequestration as offsets, making them a commodity in the system. A capped entity may wish to purchase offset allowances if it is having difficulty meeting the required reductions under the cap, or if the offset allowances are less expensive than making the reductions internally. Estimates suggest that many types of offset reductions are likely to be less expensive than those from entities under the cap. Therefore, their use will help reduce the costs of compliance.

Of course, each offset needs to be truly what its name implies. Because greenhouse gas reductions can be achieved through action at a variety of different points in the economy, there is a risk that what may appear to be an offset is actually just reducing the regulatory obligation of another entity. For example, while an energy efficiency project in a commercial building appears to reduce the greenhouse gases from electricity production, in actuality it will not result in any unaccounted for reductions because those emissions are covered at the utility plant. Any additional rights-to-emit or allowances held by the utility as a result of the energy efficiency project could be sold off to other utilities to allow a commensurate increase in their emissions.

Are offsets a good idea?

Offsets can help bring down the costs of climate change mitigation and can bring flexibility allowing in new activities. However, if there is too much uncertainty about the quantity of reductions provided by an offset, it would be prudent to take a cautious approach when including them for compliance. Either the quality standards for offsets should be set very high, the value should be adjusted erring on the side of overcompensating for this uncertainty to make sure the cap is not damaged, or offset activities should not be allowed. An offset in a mandatory world replaces reductions for a capped entity, so one ton of offset must equal one ton of emissions, or else the integrity of the cap will be damaged.

The current voluntary greenhouse gas emissions markets have been fertile ground for gaining experience in greenhouse gas mitigation, but they have also demonstrated the need for greater transparency and oversight. The absence of a single set of standards has resulted in the creation of numerous fragmented and inconsistent registries and has generated investment uncertainty.

A federally designed offsets market can learn from these lessons by requiring rigorous, standardized, and transparent procedures for offset creation and accounting, thereby enabling it to provide the investment certainty needed to encourage participation and to ensure the economic and environmental integrity of the system.

Using revenue from allocated allowances—an alternative to offsets

Allocation of allowances, or distribution of the revenue generated from selling them, is an alternative way to encourage reductions from uncapped entities. Instead of having the market pay, a federal program pays using value generated by the market. Because allowances are a limited pool, the reductions would be limited as well. This approach can be used when there is too much uncertainty for some activities to be used for offsets or when programmatic support is needed. Reductions produced by entities paid with allocated allowances would be in addition to the reductions required by the cap (Figure 1b). Thus, if the mitigation activities underperform, the cap is not harmed. However, mitigation achieved by these activities will have little direct impact on the costs of compliance since the reductions cannot be used by capped entities to meet their obligations. However, underperformance of these activities can still have indirect cost implications. If the revenue generated by allowances is allocated to these mitigation activities and they underperform relative to other potential uses of these funds that could reduce the costs of meeting the cap (e.g., energy efficiency

programs, R&D), then overall costs of meeting the emissions goals may increase. Therefore, these activities still need to be monitored and evaluated for program performance.

The offsets produced by a number of different activities, such as capturing methane from landfills, are likely to be fairly easy to quantify and are likely to be a good fit for a compliance offset market. Other activities, such as methane emissions from rice cultivation, may be much more difficult to quantify. The more difficult to quantify projects may be better compensated through an allocation that will help support innovation in measurement of these reductions but that will not harm the environmental or economic integrity of the policy or market if they do not produce the expected reductions.

Allocated allowances are a limited resource. If allowances are allocated to the USDA for reductions in uncapped activities, they are not going to other stakeholders. The political fight over the allocation of allowances is going to be a contentious one, and it is not clear that setting aside allowances for uncapped activities will carry the day politically. Since allowances are limited, the question may arise whether supporting uncapped mitigation opportunities is their most effective use. If allocation programs do not provide cost-effective greenhouse gas mitigation, they should probably be reduced over time, allowing that allocation to go toward better uses.

Using allocations will not, in theory, tighten the allowance market because the allocated allowances can be sold into the market. However, if the allowances pass through to small mitigation projects, they may end up being held and not sold. An allocation can come with a requirement that any allocated allowances be sold within a specified period of time (i.e., one year). This mechanism was used in S. 2191 America's Climate Security Act of 2007 for a number of different allocation programs. Alternatively, the allowances can be auctioned by the coordinating agency (e.g., USDA) which can distribute the revenues rather than the allowances to projects. Another way allocations can tighten the allowance market is if activities that might otherwise be good low-cost mitigation opportunities available through an offsets market are moved to or left in an allocation program and kept out of the offsets pool.

Which mechanism should be used and how?

Policymakers may wish to use both offsets and allocations.

1. Offsets could be used where emissions reductions or sequestration can be done in a manner that is clearly additional, with confidence in measurements, leakage estimates, and sufficient compensation mechanisms for reversals.
2. Allocation-based funding could be used as the backup for activities not yet ready for prime time, for activities where additionality is not clear and may never be on a project basis, or where leakage is not certain or too great. Our working group suggested that allocated allowances be focused on mitigation opportunities that are cost-effective and on supporting accelerated deployment and innovation in mitigation and sequestration technologies and methodologies.

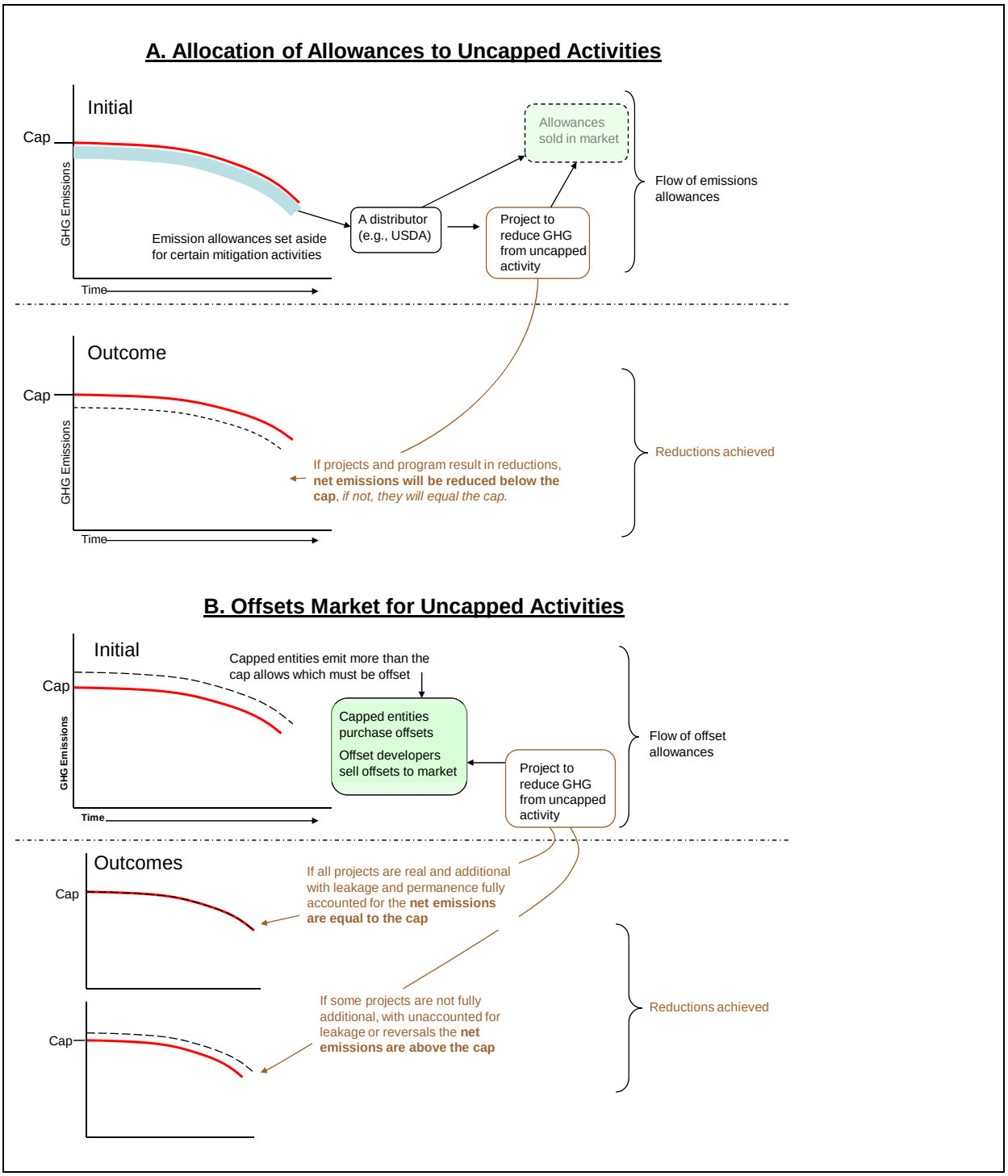

Figure 1. How using (a) allocated allowances differs from (b) an offsets market in relation to the emissions market and the potential impact on the net emissions relative to the cap.

Emission reduction or sequestration opportunities outside the cap

The scientific community has reached the consensus that if atmospheric greenhouse gas concentrations continue to rise, we face the significant probability of human-induced warming exceeding 2°C (3.6°F), bringing a high probability of escalating and dangerous impacts.[4] Globally, 37 developed countries have ratified the United Nations Kyoto Protocol and are required to meet modest reductions by 2012. The U.S. is not one of them. However, the U.S. Congress and many States are considering mandatory climate policies. In particular, the U.S. Congress is considering capping 70%–80% of the nation's emissions, leaving only 20%–30% uncapped. The main proposal under consideration requires cuts of up to 80% of these capped emissions by 2050.

In the developing countries and emerging economies the picture is quite different. Most of these countries do not regulate greenhouse gases, and this is likely to remain the case for some time to come. Figure 2, taken from the IPCC Fourth Assessment Report,[5] shows the extent of the untapped mitigation potential. The Organization for Economic Cooperation and Development (OECD) member countries are primarily regulated under the Kyoto Protocol, while non-member countries are not, leaving far greater than 50% of global emissions mitigation potential untapped in every sector.

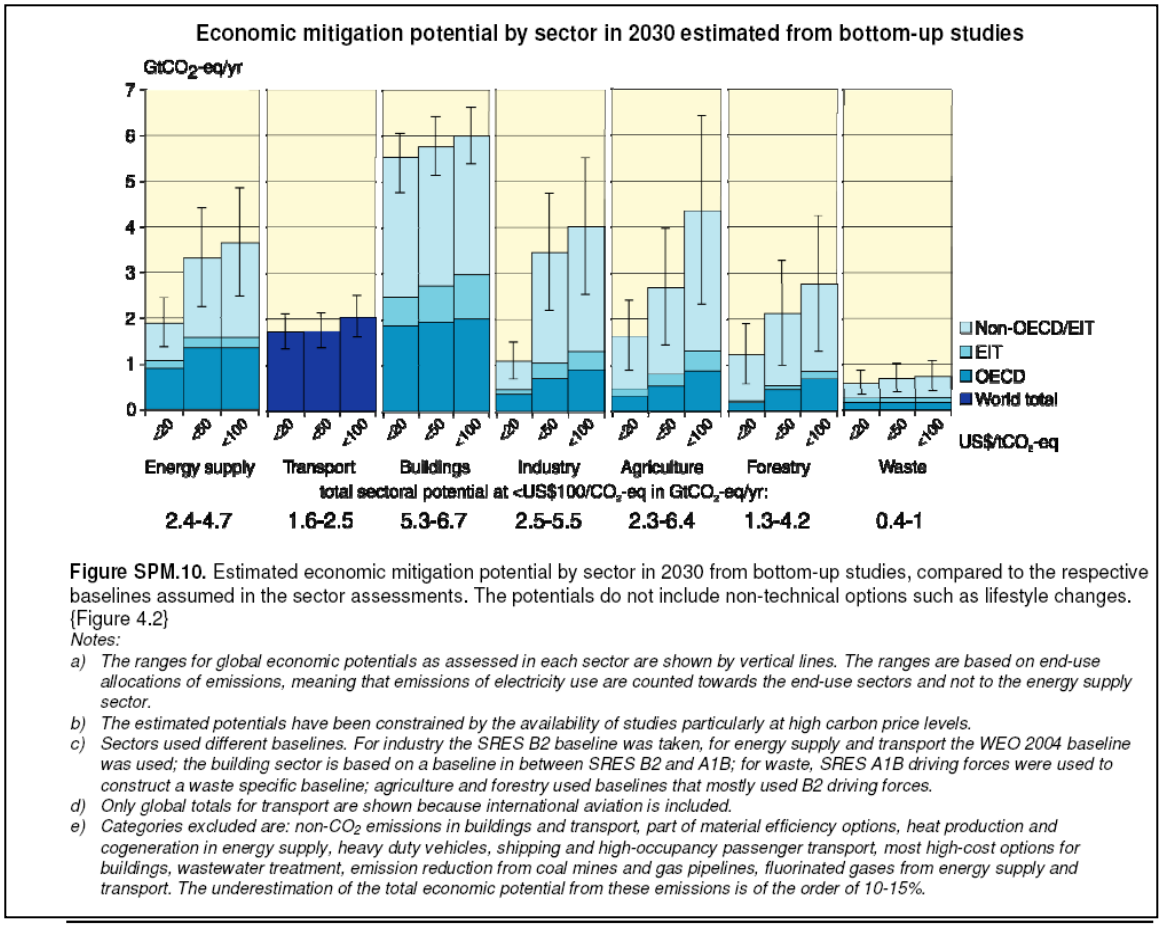

Figure SPM.10. Estimated economic mitigation potential by sector in 2030 from bottom-up studies, compared to the respective baselines assumed in the sector assessments. The potentials do not include non-technical options such as lifestyle changes. {Figure 4.2}

Notes:

a) The ranges for global economic potentials as assessed in each sector are shown by vertical lines. The ranges are based on end-use allocations of emissions, meaning that emissions of electricity use are counted towards the end-use sectors and not to the energy supply sector.

b) The estimated potentials have been constrained by the availability of studies particularly at high carbon price levels.

c) Sectors used different baselines. For industry the SRES B2 baseline was taken, for energy supply and transport the WEO 2004 baseline was used; the building sector is based on a baseline in between SRES B2 and A1B; for waste, SRES A1B driving forces were used to construct a waste specific baseline; agriculture and forestry used baselines that mostly used B2 driving forces.

d) Only global totals for transport are shown because international aviation is included.

e) Categories excluded are: non-CO_2 emissions in buildings and transport, part of material efficiency options, heat production and cogeneration in energy supply, heavy duty vehicles, shipping and high-occupancy passenger transport, most high-cost options for buildings, wastewater treatment, emission reduction from coal mines and gas pipelines, fluorinated gases from energy supply and transport. The underestimation of the total economic potential from these emissions is of the order of 10-15%.

Figure 2. Uncapped mitigation potential globally

[4] H. J. Schellnhuber, Ed., 2006. *Avoiding Dangerous Climate Change*. Cambridge Univ. Press, Cambridge.
[5] IPCC 2007. Fourth Assessment Report, Synthesis Report. Summary for Policymakers. Page 16. http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

Regulated countries are primarily focusing their policies on domestic energy, industrial, and transportation sector reductions. Table 1 provides an overview of what sectors are covered or will be covered in a number of national cap-and-trade programs. As these mandatory programs begin ratcheting down their emissions targets, these reductions get more expensive and difficult to achieve. Mitigation opportunities in uncapped sectors, such as forestry or agriculture domestically, or supporting clean energy alternatives or reduced deforestation in uncapped developing countries, are likely to be cheaper alternatives than progressively deeper cuts in energy sector emissions in developed countries. Mitigation can occur in a different sector or country because the climate is only affected by the total greenhouse gas burden, not where it comes from.

Table 1. Covered entities in countries with mandatory cap-and-trade

	Time Frame		
	Current	**Future**	**Source:**
EU	Electric, Oil Refining, Iron and Steel, Coke Ovens, Industrial Processes	Aviation (Phase II), Forestry, Transportation, and Additional Industrial Processes (Phase III)	http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/35&format=HTML&aged=0&language=EN&guiLanguage=en
UK	Electric and Specific Companies.		http://www.defra.gov.uk/Environment/climatechange/trading/uk/index.htm
Canada		Electric, Oil and Gas, Iron and Steel, Forestry, Mining, Industrial Processes	http://www.ecoaction.gc.ca/news-nouvelles/20070426-1-intro-eng.cfm
New South Wales	Electric		http://www.greenhousegas.nsw.gov.au/
New Zealand	Forestry	Liquid Fossil Fuels (2009), Electric and Industrial Processes (2010), Agriculture and Waste (2013)	http://www.mfe.govt.nz/publications/climate/framework-emissions-trading-summary-sep07/framework-emissions-trading-summary-sep07.pdf

These uncapped or outside-of-regulation mitigation opportunities could increase flexibility in reaching emissions obligations, reduce costs, and engage other countries, thereby helping to advance development objectives. Some of these uncapped mitigation opportunities also bring significant environmental co-benefits such as conserving tropical forests, reducing air and water pollution, and increasing wildlife habitat.[6]

While developed countries are expected to increase mandatory reductions over time, and some emerging economies such as China and India may take on mandatory reductions as well, most developing countries are unlikely to take on mandatory reductions any time soon. International agreements have focused on common but differentiated responsibilities for mitigation among countries due to the large differential between historical and cumulative emissions from developed countries as compared to those from developing countries. Forcing developing countries to have the same type of mitigation requirements has been considered an unfair and undue constraint to their development. Thus, most developing countries will continue to provide opportunities for "uncapped" mitigation.

[6] Robert B. Jackson et al., 2005. "Trading Water for Carbon with Biological Carbon Sequestration." Science 310 (5756); Hongli Feng et al., 2007. "Transfers and Environmental Co-benefits of carbon sequestration in Agricultural Soils: Retiring Agricultural Land in the Upper Mississippi River Basin." Climatic Change 80: 91-107.; Subhrendu K. Pattanayak, et al., 2005. "Water Quality Co-Effects of Greenhouse Gas Mitigation in U.S. Agriculture." Climatic Change 71 (3).

Role U.S. policy can play in encouraging uncapped mitigation opportunities

As the U.S. considers developing its own mandatory climate policy, questions arise over how to address uncapped mitigation opportunities in the U.S. and abroad. In the U.S., the major proposals moving through Congress are cap-and-trade[7] policy proposals that cap similar sectors and thus leave similar mitigation opportunities uncapped. S. 2191 America's Climate Security Act of 2007 (Lieberman-Warner) and S. 1766 Low Carbon Economy Act of 2007 (Bingaman-Specter),[8] provide two different approaches, which are compared in the box to the right.

For Context – Offsets provision in 2 different bills.

S. 2191	S. 1776
15% limit on domestic offsets • Tons reduced or sequestered adjusted to address uncertainty, leakage, and reversals	Unlimited domestic offsets • Specified projects 1:1 (methane from landfills, coal mines and animal waste, and SF6 from electric power systems) • Unspecified projects can have less than 1 credit per ton reduced or sequestered
5% set aside for domestic agriculture and forest sequestration	5% set aside for domestic agricultural sequestration
1% set aside for domestic landfill and coal mine methane	
15% limit on international credits • from capped market of comparable stringency	Presidential discretion for international credits • from capped market of comparable stringency
0% international offsets	Presidential discretion for International offsets, maximum 10%
2.5% set aside for international forest carbon	

Domestic opportunities

Domestically there are a range of dispersed or difficult-to-measure emitting entities that fall outside the proposed cap (uncapped entities), such as landfills, livestock manure management facilities, and wastewater treatment facilities. Sequestration opportunities that are dispersed and burdened by permanence concerns are also uncapped. Examples of these activities include growing more forest, altering soil management practices, and changing agricultural practices to sequester carbon or reduce the emission of methane and nitrous oxide. Geologic sequestration of fossil fuel emissions by capped entities is included as part of their entity-level mitigation accounting in S. 2191. Therefore, it would only qualify for an offset for an uncapped entity like a biomass-fueled facility. Figure 3 shows the emissions and sequestration from a number of the major uncapped entities (based on S. 2191) including, agriculture, land-use change and forestry, landfills, wastewater facilities, and energy process emissions.[9] The data are based on the 2006 EPA inventory.[10] Gross emissions from these

[7] **What is a cap-and-trade system?** Cap-and-trade regulatory schemes attempt to combine traditional regulatory tools with the power of market incentives. Unlike many other regulatory programs that prescribe technologies to lower pollution cap-and-trade programs set a target level for pollution, commonly referred to as a cap, and allow the emitters to determine how to meet the cap. The cap is divided into allowances that permit the holder to emit a specified amount of pollution. Firms must hold allowances at least equal to the amount of emissions they produce. Once the cap is set and allowances are created and allocated, the flexibility of the regulatory mechanism comes into play. Cap-and-trade programs allow regulated parties to buy and sell allocated allowances as they see fit. In this way, a market for the allowances emerges. Variation in emission levels and reduction strategies among firms creates economic efficiency gains because the exchange of allowances is advantageous for both potential buyers and sellers and compliance is generally achieved at a lower cost than without trading.

[8] Kenneth Richards and Stephanie Richards. 2008. "An Analysis of the Leading Climate Change Bills in the United States Senate: S. 2191 America's Climate Security Act of 2007 (Warner-Lieberman) vs. S. 1766 Low Carbon Economy Act of 2007 (Bingaman-Specter)." In Prep. Feb 25, 2008. Draft Report commissioned by Senator Richard Lugar, IN.

[9] S. 2191 contains a provision (s.1204) on natural gas emissions which suggests that process emissions will be considered for inclusion under the cap before the cap comes into force. We have included these emissions in the offset pool, but this may change if S. 2191 moves forward unchanged.

entities in 2006 was around 12.5% of the nation's total emissions; in total around 13% of current U.S. emissions would be outside the cap set in S. 2191. Sequestration primarily from re-growing forests already offsets around 10.5% of the nation's emissions. Emissions from conversion of forest, agricultural, or grass lands to development are partially incorporated into the land-use change and forestry accounting.

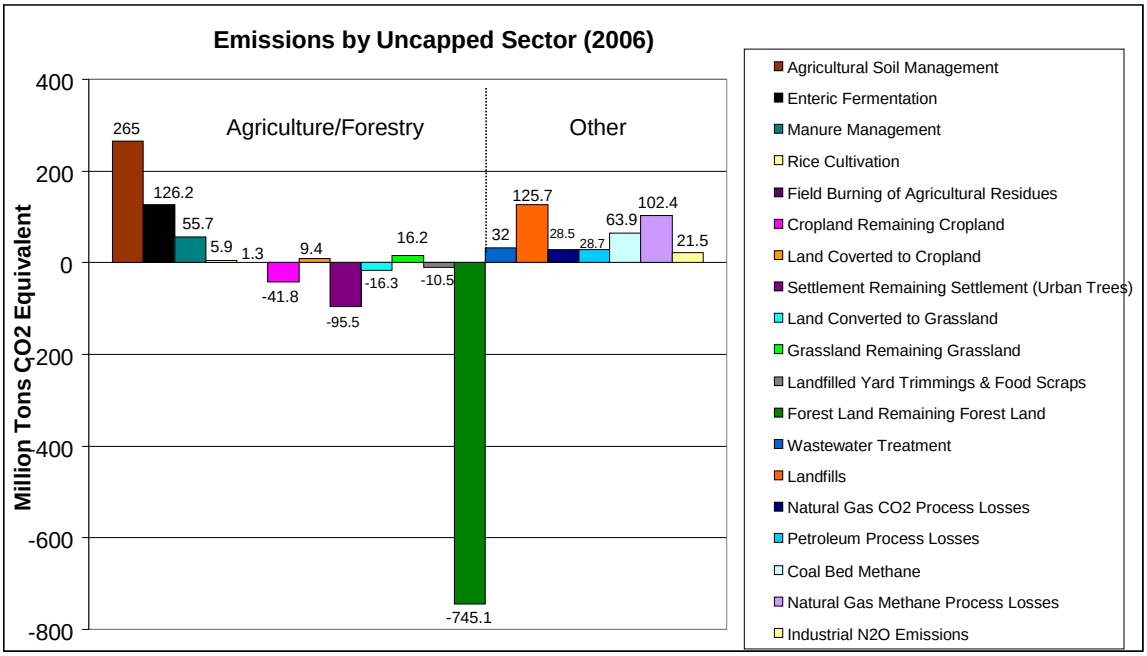

Figure 3. Major emissions and sequestration from uncapped activities in the U.S. (Data from EPA 2006 Inventory)

The largest uncapped domestic opportunities for emission reductions are likely to come from new landfill and wastewater management techniques. Significantly greater than the emissions reductions are the sequestration opportunities on domestic forests and farms. Shifting agricultural soil management toward no-till, lengthening timber rotations, and shifting wood products toward longer use products (furniture rather than paper) will all increase sequestration. Figure 4, taken from a 2005 EPA report on mitigation from farms and forests, shows which activities are available at various prices; for example, at $15, agricultural soil sequestration, forest management, and afforestation are available, and at higher prices afforestation grows substantially.[11] At this price, biofuels also contribute but cannot be counted as an offset because any reduction in fossil fuel use resulting from the biofuel use is counted by an upstream entity.

The modeling for the 2005 EPA report was completed before the 2005 energy bill with its mandate for 7.5 billion gallons of ethanol by 2012[12] changed the demand for corn, and thus the economic drivers

[10] U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*, EPA 430-R08-005 (April 2008), Available at http://www.epa.gov/climatechange/emissions/usinventoryreport.html
[11] U.S. Environmental Protection Agency *Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture*, EPA 430-R-05-006 (November 2005), Available at http://www.epa.gov/sequestration/pdf/greenhousegas2005.pdf
[12] H.R. 6 (109th Congress) Energy Policy Act of 2005 – J.H.R. 6 Title II Sec 203.

for agricultural lands. The 2007 energy bill proposes a new biofuels mandate of 36 billion gallons of ethanol (21 billion of which is cellulosic) by 2022.[13] If land goes toward producing biofuels it is not available for afforestation and may not be viable for reduced-tillage practices. So there will be a trade-off between these different uses of land.

Another critical issue is the prospect of further increases in crop and food prices. At higher carbon prices there will likely be more afforestation, some of which will come from crop and pasture lands. Also, a price on N_2O emissions is expected to result in reduced fertilizer use, which could lower agricultural productivity. And energy prices, a major driver of food costs, will also be higher. Together, these could result in significant increases in food prices. An analysis from 2005 found that at \$25/tonne C (\$6.81/tonne CO_2e), the crop price index increased 2.5%, and at \$50/tonne C (\$13.63/tonne CO_2e), it increased 8.5%.[14] This result definitely needs to be considered in the design of a climate policy. Current bills set aside resources to help low income communities adapt to high prices and other impacts.

As noted above, biofuels will likely be accounted for differently in a cap-and-trade program than the other activities discussed here. They can be used as alternative energy sources and reduce the use of fossil fuels used in power generation and transportation which are counted upstream (at the electric utility or petroleum refinery), thus it would be double counting to also count them as an offset.

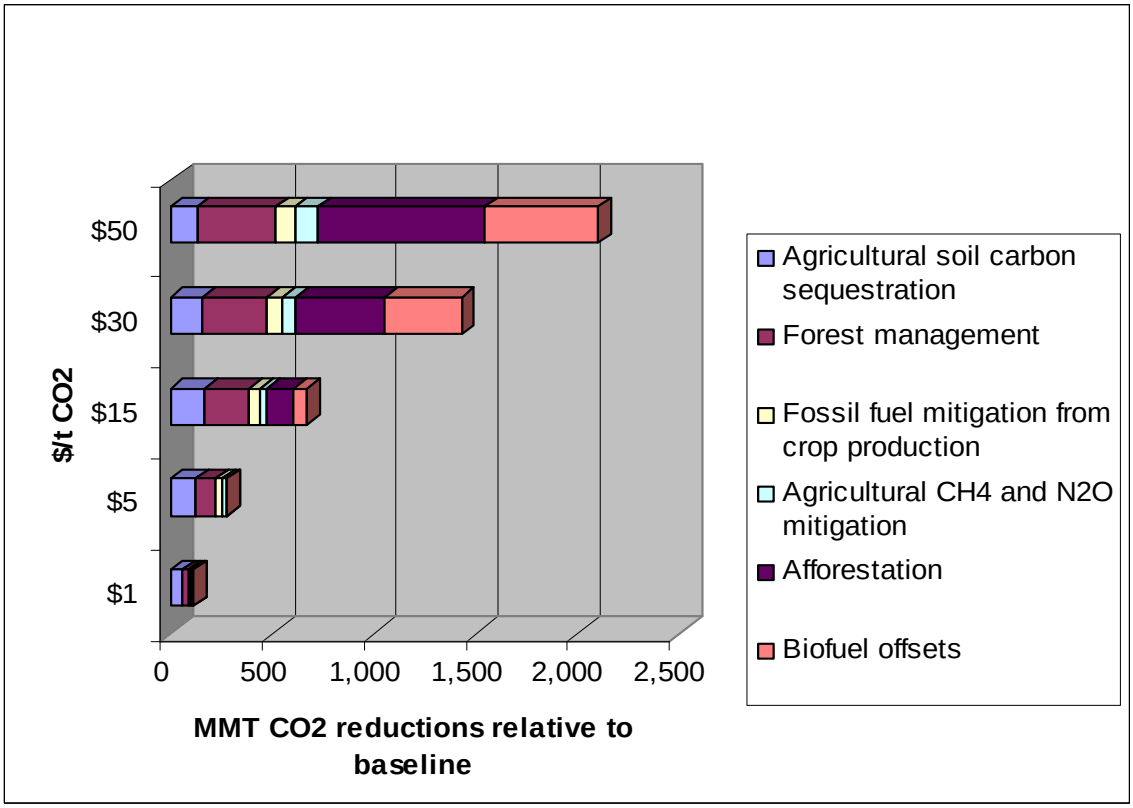

Figure 4. Potential greenhouse gas mitigation from forestry and agriculture in the U.S. at

[13] David Pitt, Associated Press. "US energy bill mandate for corn-free ethanol presents huge opportunity, challenge for industry." Dec 18, 2007. Available at http://www.iht.com/articles/ap/2007/12/18/business/NA-FIN-US-Ethanol-Beyond-Corn.php

[14] S. Pattanayak, B. McCarl, A. Sommer, B. Murray, T. Bondelid, D. Gillig, and B. DeAngelo. 2005. Water quality co-effects of greenhouse gas mitigation in U.S. Agriculture. *Climatic Change* 71:341-372.

various prices. (U.S. Environmental Protection Agency *Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture*, EPA 430-R-05-006, November 2005.)

The U.S. may also wish to look to mitigation opportunities on its public lands. The U.S. government holds around 20% of U.S. timberland area on which 30% of the U.S. timber volume sits. For a sense of potential, halting harvests on public lands could result in up to 60 to 105 million metric tons of CO_2 equivalent ($MMTCO_2$) sequestration per year which would offset around 1.5% of total U.S. greenhouse gas emissions.[15] Another major management issue on public lands that affects GHG emissions and sequestration is fire management.

International Opportunities

In absolute quantity, international opportunities for reduced emissions and increased sequestration are much greater than those found domestically. In addition to the activities that are uncapped in the domestic market in the U.S., such as forestry and agriculture, any reduction in emissions in the energy, transportation or industrial sectors of uncapped countries are potential mitigation opportunities if allowed for compliance in a capped country. In addition, the U.S. could trade with other capped countries.

S. 2191 allows U.S. entities to purchase allowances from other countries facing similarly stringent caps (e.g., EU countries following a stringent post-Kyoto regime) and to use these allowances to meet compliance obligations in the U.S., but these allowances are limited to no more than 15% of U.S. compliance. At first inspection, it may appear that offset credits generated in non-capped countries, for example, those currently being generated in non-Annex I countries under the Clean Development Mechanism (CDM),[16] will play no role in the U.S. market because they are not generated in similarly capped countries. However, because Certified Emission Reductions (CERs) generated under CDM are currently traded to and used for compliance in capped countries, they are essentially interchangeable with "regular" allowances in those countries. If CDM continues to operate in the post-2012 Kyoto Protocol framework, then CERs will remain interchangeable with EU allowances; if those allowances were tradable to the U.S., then CDM credits would essentially be able to work their way indirectly into the U.S. market.

EPA's analysis reflects the indirect entry of CDM credits into the U.S. market as just described, and also reflects the relative cost of abatement across various regions of the world (capped and uncapped) when determining the supply of international allowances into the US market. Their analysis suggests there are enough low cost reductions internationally to supply the U.S. with enough credits to hit the 15% limit. In fact, the analysis shows that international allowances are a major component of U.S. compliance (Figure 5a).[17] Yet due to uncertainty about the costs and allowability of offsets (both international and domestic), EPA also examined scenarios in which the limit on offsets was lifted, and other cases where no offset allowances were allowed at all. Each of these had a dramatic effect on the allowance price and overall economic impacts of a U.S. policy, more than any other policy variable considered. These results, taken together, underscore the notion that international offsets can play an extremely important role in containing costs in the U.S.

[15] Brooks M. Depro et al., 2008. "Public Land, Timber Harvests, and Climate Mitigation: Quantifying Carbon Sequestration Potential on U.S. Public Timberlands." *Forest Ecology and Management* 255:1122-1134.

[16] The Clean Development Mechanism (CDM), which is part of the United Nations' agreements under the Kyoto Protocol, allows developed countries to purchase CDM-certified emission reductions (CERs) from developing countries.

[17] EPA Analysis of S. 2191, *supra* 3.

The analysis shows that international allowances have the potential to dominate the offsets market (Figure 5b). Requiring that a certain proportion of offsets be domestic ensures that domestic offsets will be part of the market even if they are higher cost, although stipulating that a percentage be from domestic sources will drive up the overall cost of compliance.

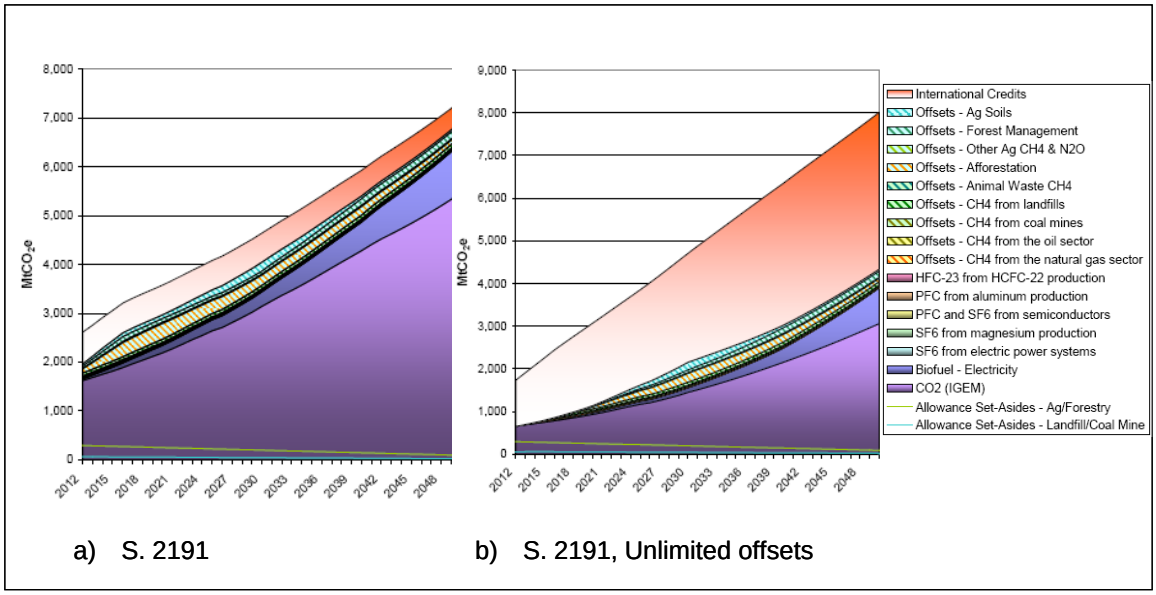

Figure 5. Offsets scenarios modeled for The Climate Security Act S. 2191 a) base case and b) with unlimited domestic offsets and international allowances. EPA Analysis of the Climate Security Act of 2008: S. 2191 (March 2008) Available at http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf.

The CDM is the primary—and until last year, the only—regulatory offsets market. Thus the lessons learned in developing this program are of great value for building a U.S. offsets program. In addition, as discussed above, CERs generated through the CDM will likely trade into the U.S. market through capped markets if the policy is structured as in S. 2191. Thus the integrity of the CERs is of interest.

Based on the number of credits generated to date, the CDM has been dominated by industrial and energy sector activities; in particular, the destruction of industrial gases (HFC-23 and N_2O) (Figure 6a).[18] However, no new HFC projects have been registered since October 2007,[19] and projects in the pipeline such as renewable energy, methane reduction from cement and coal beds, energy efficiency, and fuel switching are expected to grow in importance as industrial gas projects plateau. Based on the number of projects that have been developed, HFC projects represent a small percent of the total number of projects approved under the CDM (Figure 6b). Looking at the projects from this perspective, the CDM has been dominated more by renewable energy and energy efficiency projects than anything else. To date around 125 million CERs or MMT of CO_2e reductions have been registered through CDM; a total of 2.5 billion are expected by 2012.

One concern raised regarding the integrity of energy focused CERs is that it is difficult to tell if large-scale shifts in energy production are truly additional (i.e., would have happened without CDM

[18] UNFCCC CDM Project Statistics, Available at http://cdmpipeline.org/cdm-projects-type.htm
[19] UNEP Risoe CDM/JI Pipeline Analysis and Database, April 1st 2008

funding) when they are in part driven by government initiatives. The CDM addresses this in part by requiring that the projects do not take official development assistance as part of their financing.

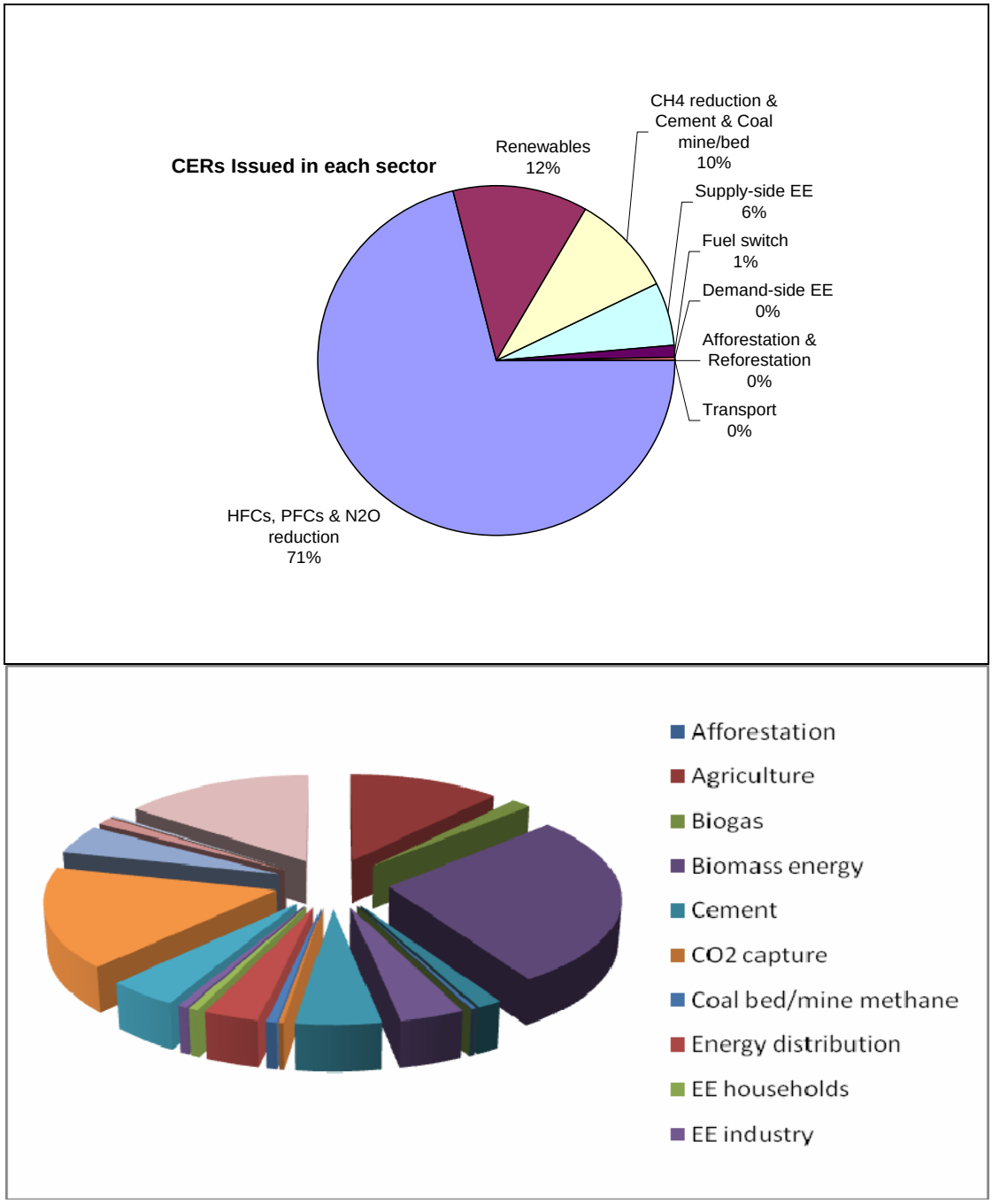

Figure 6. a) Certified emission reductions issued through the Clean Development Mechanism by sector through the end of 2007, and b) Number of projects successfully registered through the CDM by sector through the end of 2007. Based on data from the UNEP Risoe CDM/JI Pipeline Analysis and Database, April 1st 2008.

The CDM has been a valuable learning experience that has resulted in capacity building and transfer of existing technology. It has been recognized as an important way of encouraging developing country participation and improving their ability to track and monitor their emissions. To get this system up and running quickly, the burden of developing "methodologies" (the documents that describe how do a project and quantify its reductions) was placed on project developers. Through the CDM over 100 of these methodologies to quantify emission reductions from project-based activities have been approved by the UN. The CDM has therefore been the primary driver for finding out where and what types of projects exist and for very quickly developing new methodologies and systems that will form the basis of future markets. Had the CDM had taken a more top down-approach where each methodology was designed by the UN itself, they would still be finalizing the rules and methods. Despite all of these positives, some aspects of the CDM design have created inefficiencies that should be addressed as the U.S. designs its own program and considers how to link to the international market and the CDM.

Inefficiencies observed in CDM	Lessons for U.S.
The CDM system of *de facto* approving new methodologies on an individual project-by-project basis increased transaction costs and resulted in an increased investment uncertainty for some activities, particularly forestry projects.[20]	A more standardized approach to methodologies based on broad activity types may prove more efficient.
Requiring each individual project to prove additionality through a series of tests and complicated documentation has proven complicated and unpredictable.	A more standardized and streamlined "benchmarking" approach—one that deems exceeding performance standards or best practices "additional" and credits the project's historical emissions—would be more efficient while still ensuring a high level of rigor and quality.
Temporary crediting for forestry projects used to address permanence also reduces the value of these reductions and undermined incentives for project developers to pursue these projects.[21]	The risk of reversal in forestry and other sequestration projects is probably best addressed without using strict temporary crediting rules as in CDM.
Since projects are measured against some type of business-as-usual baseline, it creates an incentive for countries to avoid new climate-friendly policies that would shift the baseline and eliminate project gains. CDM has addressed this problem by implementing a new policy that climate-friendly programs will not affect baseline and a policy that allows programmatic crediting for climate-friendly national programs.[22]	The U.S. should consider ways to encourage regulations to push climate objectives in uncapped sectors even when those regulations might reduce or eliminate the offset potential of these activities. For example, new regulations on landfill emissions to promote air quality objectives will also produce GHG benefits. These new regulations will make it harder for landfill projects to qualify for offsets because they will now have to go beyond the requirements of these new regulations.

[20] Christina Figueres and Ken Newcome. 2007. "Evolution of the CDM: Toward 2012 and Beyond." Climate Change Capital, white paper.
[21] Neef, Till. (EcoSecurities) "How the CDM is less lucrative in forestry." Powerpoint presentation. Contribution to the side event at COP 13 on "A/R CDM projects stranded? Methodologies and tools that help them fly." 14 December 2007, Bali, Indonesia; World Bank. 2006. "Using Forest Carbon Credits in the Carbon Market Focus on the European Emission Trading Scheme." Summary of the World Bank Technical Workshop, Brussels, March 29, 2006. Kim, et al (2008) provide specific estimates of reduced value due to temporary crediting and payback provisions.
[22] Figueres and Newcome, 2007, *supra* 20.

Inefficiencies observed in CDM	Lessons for U.S.
A more general concern is that if CDM continues as it is now with most projects in China and India, there is an incentive for these countries not to move toward national mandatory programs because they would lose substantial CDM income. Together they are expected to supply 60% of CDM in the projected market for 2008, which is worth approximately $22 billion.	The U.S. should consider the disincentive for activities to move under the cap created by an offsets market. The U.S. may also want to consider how it could engage with the UN and use its market power to try to encourage improvements to the existing CDM program. For developing countries with emissions over a certain threshold, suggested fixes to this disincentive problem include allowing them to join Annex 1 countries (developed countries that have a set cap on emissions) with a slightly inflated emissions cap and with full access to the markets, shifting the ratio to require more reductions per CER credit, or sunsetting CDM.[23]

Internationally there are also significant opportunities in the forest and land-use sector, but these have yet to be tapped. Only one forest project has made it through the CDM process, although 15 are in the pipeline at this time.[24] Forestry projects in the CDM are currently limited, as the mechanism only allows afforestation and reforestation sequestration projects; avoided deforestation is not included. Opportunities in soil, wetland, and grassland sequestration have also not been considered.

At the December 2007 Conference of the Parties for the United Nations Framework Convention on Climate Change in Bali, Indonesia, the parties agreed to place reducing emissions from deforestation and other activities in the forest and land use sector on the agenda for consideration.[25] These mitigation activities were left out of the Kyoto agreements for a number of reasons and are just now being reintroduced into the international discussion. The expectation is that avoided deforestation would be monitored and accounted for at the national-level, rather than at the project-level through CDM.

Tropical deforestation releases up to 20% of global emissions.[26] Avoiding deforestation may be a relatively low cost mitigation measure, and an opportunity to make significant reductions quickly. And these reductions can come with substantial co-benefits. Even including the added costs of inefficiencies in implementation and administration, a moderate market price for greenhouse gases could provide sufficient compensation for the lost economic opportunities of using forests in ways incompatible with mitigation. A simplified analysis of the eight nations with the highest deforestation rates estimates that a 50% reduction in deforestation could cost between 3 and 6 billion US$ each year.[27] Currently S. 2191 includes an allocation set aside for purchasing international forest carbon of 2.5% of allowances. If the price of carbon starts around $20/ton and grows to around $40/ton between 2012 and 2030, a 2.5% allocation of allowances would provide between $2.5 and $4 billion annually over this period. If the methods developed for international forest carbon accounting and enforcement

[23] Kyle Meng. 2007. "Creating a cleaner CDM." *Carbon Finance*. P16-17.
[24] UNFCCC CDM Project Statistics, Available at http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html
[25] UNFCCC COP 13 Bali forest agreement. "Reducing emissions from deforestation in developing countries: approaches to stimulate action." Available at http://unfccc.int/files/meetings/cop_13/application/pdf/cp_redd.pdf
[26] IPCC 2007. "Climate Change 2007: The Physical Science Basis: Summary for Policymakers." Available at http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_PlenaryApproved.pdf
[27] M. Grieg-Gran. 2006. "The cost of avoiding deforestation." Report prepared for the Stern review of the economics of climate change. International Institute for Environmental Development, London.

provide sufficient assurance of environmental integrity, the U.S. could consider allowing international forest carbon as offsets for capped entities in the U.S. market.

It may be necessary to have some limit on international offsets if progress on domestic infrastructure is desired; however, international offsets are winners in many ways. They are the most effective lever to lower costs, and they can provide environmental co-benefits and align with development objectives. Most developing countries still have numerous efficiencies to be gained in their energy, industrial, agriculture and forestry sectors. The developed countries have already achieved many of these efficiencies and thus further efficiencies there may come at a higher cost. In addition, countries with new and rapidly growing energy and industrial sectors have the opportunity to "leap frog" technologies, building high-efficiency or alternative power options instead of the traditional fossil fuel intensive infrastructure. Tapping the lowest cost mitigation opportunities globally can greatly enhance cost-effectiveness if transaction costs remain low.

One problem with offsets is the potential for leakage. Leakage stems from the fact that offsets are project-based, so a project that reduces emissions might merely shift emitting activities. Leakage is a concern for all projects, domestic and international. For international projects, leakage entails the following types of emissions shifting: a) within the same (uncapped) sector in the same (uncapped) country; b) within the same sector in another uncapped country; and c) to another sector in the same or another uncapped country (least likely). This undermines the "offsetting" principle. So how can you deal with this? Countries that participate in offsets programs could be required to agree to future targets or caps for the sectors involved in offsets trades in that country, which would ultimately capture leakage within that sector and country. The ultimate objective is to expand the countries and sectors that take on caps, removing opportunities for leakage across countries. Another way to think about this is to consider international offsets as an international early action program; a developer gets credit for emissions below a baseline in years prior to the adoption of a cap, but adoption is expected. It is critical to increase engagement both within and among countries to reduce the potential for leakage.

Further thought needs to go toward how the U.S. encourages the level and type of international participation required and how offsets can be used to support these objectives rather than deter them. This is a critical issue that we did not explore sufficiently to comment on in this report.

Design Elements

This section discusses the core principles followed in developing the example architecture and design elements needed to attain them. We will step through the principles sequentially, and outline all of the design elements of the system that relate to the principle. For context, we periodically provide background on how these issues were addressed in S. 2191 and S. 1766.

Principle #1

1. Emission reduction and sequestration opportunities not addressed by a mandatory policy should be encouraged.

Design Element – Incentive Structure

Our working group suggested a coordinated use of an offsets market and allocated allowances to encourage a full suite of uncapped activities without compromising integrity.[28] This model incorporates many pieces of S. 2191 and other proposals and programs. It contains the following elements:

S.2191 --For context--

S.2191 includes an offsets market with fairly detailed rules and process and some specific allowance allocations for forest and agriculture, landfill and coal bed methane, and international forest carbon. Despite the level of detail on incentives for uncapped activities, there is still significant uncertainty about how these incentives would work together, what would be included in which, and how these decisions would get made.

- **A compliance offsets market** with strong rules to ensure confidence. The compliance offsets market provides reductions in emissions from uncapped sectors and activities that can be used by capped entities to offset their reductions starting in 2012. Offsets are expected to cost less, thereby significantly reducing costs of compliance.[29] Unless they are voluntarily retired instead of used, these greenhouse gas reductions or sequestration from compliance offset projects will not result in reductions beyond those required by the cap because they are used to offset emissions from capped entities.

- **Mitigation project financing** to provide support for uncapped activities that do not meet the criteria for the offsets market. Allowances are allocated as financial support for activities that are project-based, like offsets, but not ready or not appropriate for the compliance market.
  1. The primary objective is achieving as much greenhouse gas emission reduction or sequestration as possible.
  2. The secondary objective is support for activities that are more systemic or programmatic in nature, such as research, method development, building accounting and other tools, outreach and education, and interagency coordination of programs.

- **Offsets Innovation Incubator** to support innovation in and deployment of technology and methodology for uncapped activities.

A number of alternative ideas have been developed for use of the allocation, but the primary objective is expanding mitigation beyond what is viable in an offsets market, and in doing so, supporting activities that are under development.

[28] David Hayes, 2008. "Getting credit for going green: Making sense of carbon 'offsets' in a carbon-constrained world." Center for American Progress. http://www.americanprogress.org/issues/2008/03/carbon_offsets_report.html.
[29] EPA Analysis of S. 2191, *supra* 3.

Design Element – Restrictions on Use of Offsets for Compliance

Some feel that restricting the use of offsets for compliance will help protect the integrity of the market—if there is any uncertainty that offsets are truly additional—and make sure that energy and manufacturing sectors have enough incentive to make necessary changes to infrastructure in the U.S. Others feel it will distort the market, increase costs, and leave worthy investments on the sidelines. Another issue commonly discussed is one of fairness. It is suggested that the developed nations need to reduce their per capita greenhouse gas emissions, allowing developing nations to have some room to increase their per capita emissions and reach a level of development sufficient to provide a reasonable quality of life for their people. Details on common arguments that might have political salience regarding restrictions are described in Box A below.

Our working group and reviewers had divergent views on restrictions. It does not matter where reductions occur for the atmosphere, but it does for the economy.

Some participants contended strongly that a restriction would distort the market and increase the costs of the cap-and-trade program. Given a carefully crafted and mature offsets program with clearly additional projects and leakage accounted for (issues discussed in more detail on page 36-38, concerns about integrity would not be a justified reason for restrictions. Questions and concerns remain about the integrity of the existing offsets programs. However, it is clear we are making significant progress and learning from existing mandatory and voluntary programs.

S. 2191 --For context--

S. 2191 sets restrictions on the amount of domestic and international offsets and international allowances that capped entities can use to meet their obligations annually.

- 15% of a covered entities emissions obligation (compliance submission) can be addressed using ***domestic offsets allowances***
- 15% of a covered entities emissions obligation (compliance submission) can be addressed using ***international allowances*** which are those credits that come from a country with a mandatory cap (e.g. those countries in the EU-ETS). The existing mandatory markets have ratified the Kyoto protocol and thus can and are trading in international offsets through the Clean Development Mechanism and Joint Implementation. However, many of these mandatory markets are limiting trade in these international offsets or Certified Emission Reductions (CERs). Trading with other mandatory markets will indirectly allow some pass-through of international offsets or CERs to the U.S. market depending on the limits that these countries set.
- 0% of a covered entities emissions (compliance submission) can be addressed using direct ***international offsets***. As it now stands international offsets will only enter the U.S. market indirectly through the market of a country with a mandatory cap.

Given the restrictions on domestic offset allowances and international allowances, and the allocation provided to capped sectors in the initial years in S.2191, at most 54% of the capped sector emissions can be met using the combination of offsets and allocation and this drops to 30% once the allocation runs out in 2030. The remaining emissions obligations will have to be met by a combination of borrowing from the future, purchasing allowances sold from allocations or other entities, and internal reductions.

Modeling suggests that most early reductions for capped entities will be primarily achieved through gains in efficiency and offsets. In S. 2191, which has a restriction on offsets and international allowances equal to 30% of emissions, significant increased abatement from the capped sectors takes place at a rapid rate between 2025 and 2035 once grandfathered allowances to major emitters disappear. Changes in domestic energy infrastructure are taking place rapidly at this time.[30] In contrast, with unlimited international offsets, abatement from the capped sectors is only around 50% of the projected abatement achieved with a 30% restriction by 2050, so having unlimited international offsets significantly slows domestic action.

Whether restrictions are placed domestically or internationally, and how large the restrictions are, have very different impacts on the costs of a cap-and-trade policy. Including international offsets has the biggest impact on reducing costs (Figure 7).

[30] EPA Analysis of S. 2191, *supra* 3.

The U.S. will have control over its domestic offsets program and can make midcourse corrections, while the international market is regulated by others, which may suggest a more cautious approach. However, the U.S. can have a greater impact on global atmospheric greenhouse gas concentrations by engaging in international offsets than it can by using domestic offsets alone because the supply of domestic offsets is limited, more expensive and will take time to build up a pipeline of projects.

Whether the concern is integrity or the rate of infrastructure transitions, building an adaptive program that can adjust over time as we observe how the system works seems critical for an issue as integral as the level of restrictions set on offsets and international offsets and allowances. Therefore, we suggest a periodic review provision that provides recommendations to Congress on increasing, decreasing, creating, or eliminating restrictions.

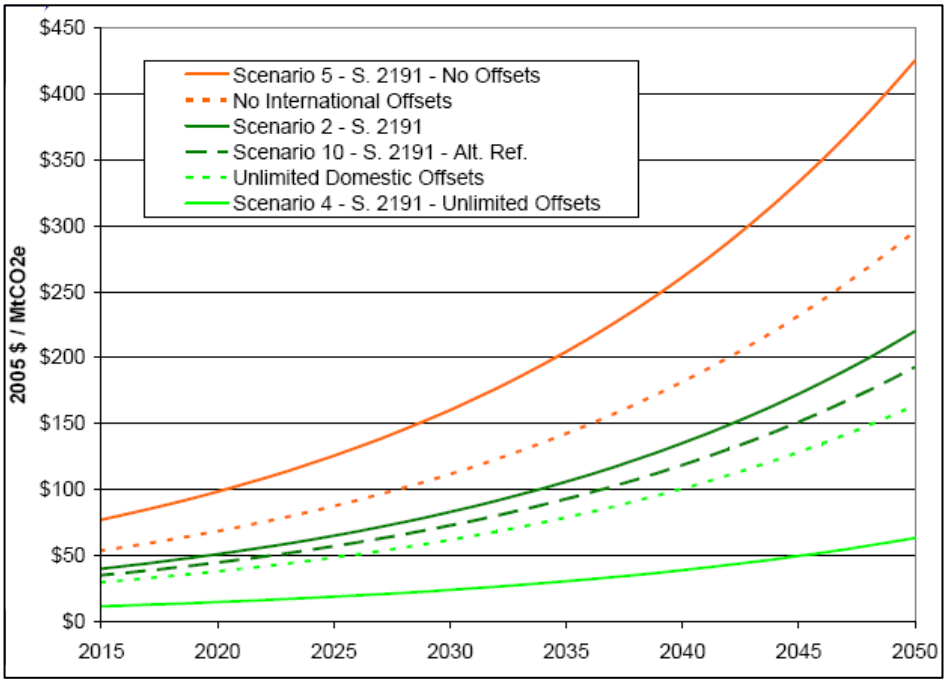

Figure 7. Allowance price for different scenarios of offsets inclusion (Modeling of S. 2191 by EPA)

Box A. Common arguments regarding restrictions on offsets.

This table presents commonly heard and politically relevant arguments. The validity of these arguments needs to be fully assessed, which has not been done here. The purpose of this side-by-side is to lay out the main arguments and provide what relevant information we have to provide context for them.

For Restrictions	Against Restrictions
Restrictions maintain the necessary incentive to make changes to domestic infrastructure. If too many offsets are allowed, the capped entities may not need to make the necessary investments in infrastructure to meet future reductions. In the modeling of S. 2191, under the base case scenario with 30% restrictions, infrastructure changes in the electricity sector begin to occur at a rapid rate between 2025 and 2030. With unlimited domestic offsets and international allowances, the use of international mitigation more than doubles, substantially reducing the need for mitigation by the capped entities. Modeling shows that with a 30% restriction, 2,000 million tons will be reduced in the electricity sector by 2018. In contrast, with unlimited offsets, it takes until 2040 to reach the same level from that sector (Figure 5).[31]	***Restrictions increase costs.*** If offsets are real, additional reductions, then it does not matter whether reductions are achieved through offsets or capped entities; they are achieving the same outcome for the atmosphere. With a clear regulatory requirement, the capped sectors will focus on infrastructure when it makes economic sense to do so; i.e., when the price of offsets begins to rise to the point at which it is more cost-effective to make the changes internally. Unlimited offsets increases flexibility to use the lowest-cost option for mitigation, lowering the overall economic cost. In EPA modeling of S. 2191, in comparison to the base case, which allows 30% of emissions obligations to be met by offsets (domestic offsets and international allowances), having no offsets increased the price by 93%, while unlimited offsets decreased the allowance price by 71%.[32] ***Restrictions distort the markets.*** A quantity restriction can create a price spread between offset allowances and "regular" allowances, with the offset price trading below the regular allowance price. This hinders arbitrage opportunities to equate the prices. Other factors include relative risk of credit performance. If quantitative restrictions caused a price gap in a U.S. offset market, it would not only diminish returns to offset projects relative to an unlimited market, it could raise the price risk for both sellers and buyers, as the price discovery process would likely be more volatile with the fixed restriction in place.

[31] *ibid.*

[32] *ibid.* The EPA analysis of S. 2191 provides bounding runs on offsets: no restrictions, 30% restrictions, full restriction (no offsets), unlimited domestic offsets with limited international offsets, and limited domestic offsets with no international offsets. The modeling runs assume that no additional discounts were placed on offsets. If large discounts are added, they will increase costs of offsets and reduce the cost reductions observed.

For Restrictions	Against Restrictions
Context EPA modeling of the precursor to S. 2191 (S. 280), shows that the price of offsets will remain very low, under $10 a ton, if international cooperation in mitigation is low (e.g., nothing more than Kyoto Protocol-required reductions).[33] If international cooperation in mitigation is substantial, modeling of S. 2191 shows that while offset price is higher, it is still substantially lower than domestic mitigation through offsets or the capped sectors. With unlimited offsets, international offsets dominate and the allowance price (with unlimited offsets, the offsets and allowance price are the same) ranges from $11 to $63 per ton. If allowed to, low-cost international offsets will dominate the market. If there is low international participation, the U.S. could spend $5 to 9 billion annually on international offsets. If there is substantial international participation and higher international offsets prices, the U.S. could spend from $20 up to $40 billion annually on international projects by 2050.[34]	
Restrictions on international allowances avoids having all benefits go overseas. If international offsets are unlimited and it is cheaper to make reductions overseas, we will be transferring significant economic resources and co-benefits—such as new infrastructure, cleaner air and water, and conserved forests—overseas. Restrictions also would help the U.S. take a leadership role in making reductions at home, providing good will to encourage participation by others.	***Restrictions force the use of higher cost options.*** With restrictions, the U.S. cannot choose the lowest-cost option, and will have to use more costly reductions, especially if global participation is low, which keeps global costs low. Higher costs in the U.S. than abroad will make it harder to keep businesses in the country. Restrictions that keep the U.S. from participating in the international offsets market (i.e., CDM) limits opportunities for green jobs in the U.S. and greater deployment of U.S. technologies.
Context There are numerous co-benefits and some potential negative co-effects that are possible outcomes of mitigation activities. It is very difficult to assess the economic impact of these co-effects. Likely benefits include improved air and water quality and conservation of forest and rangelands. Possible negative impacts include greater pesticide use and less water availability in relative arid lands where trees do not naturally dominate land cover.[35]	
	Restrictions limit potential co-benefits The economic benefits of improving air and water quality are likely to be substantial due to their human health impact. In addition, the domestic regulatory burden for air and water quality is growing, making direct costs to polluters and benefits to those mitigating relevant. Internationally, the benefits of reduced deforestation could be substantial for indigenous communities, biodiversity, and other ecosystem services.

[33] U.S. EPA Analysis of The Climate Stewardship and Innovation Act of 2007, S. 280. Available at http://www.epa.gov/climatechange/downloads/s280fullbrief.pdf
[34] EPA Analysis of S. 2191, *supra* 3.
[35] See Subhrendu, et al., 2005, *supra* 6.; Jackson et al., 2005, *supra* 6; EPA Mitigation Potential 2005, *supra* 11.

For Restrictions	Against Restrictions
Context The reason many mitigation activities are not covered by a cap is that they are too dispersed or difficult to measure, making it difficult to determine or track the reductions, which of course also makes them difficult to track as offsets. Through the experiences of the voluntary market and the international offset market (CDM, JI), it is clear that offset projects can be done well or done poorly.	
Restrictions help limit potential environmental risk of low integrity offsets. Despite best intentions, some mitigation activities are likely to be difficult to measure and liability may be difficult to assign. We have seen numerous offsets programs that have had some failure of integrity. The voluntary market has allowed non-additional projects; CDM has also likely allowed non-additional activities.	***We can and should create a program that only allows high-integrity offsets so that no restrictions should be necessary.*** We should only have an offsets system if it can be built with sufficient integrity. Learning and building from the existing successes and failures of the voluntary and mandatory markets, there are numerous ways to build integrity into the system and to require mid-course adjustments and true-ups to ensure integrity. With such a system in place, restrictions should not be needed.
Restrictions are needed since the U.S. has limited control over international activities and policies that affect the integrity of international allowances and offsets. Markets associated with the UNFCCC (including the EU-ETS and CDM) have high uncertainty in the near term given that the next phase of the UNFCCC agreement is due to start in 2012. International offsets are not controlled by the U.S. and take place in uncapped countries, making integrity a much more difficult problem.	***Restrictions are not needed for offsets or allowances that come from countries with programs of equal or greater stringency because integrity should not be an issue.*** If the U.S. is limited to international allowances as described in S. 2191, integrity risk should be low. International allowances are trades with other capped entities, and will have had to pass through a stringent test for the capped country and will be tied to real reductions in the capped country. The direct use of international offsets would be the lowest-cost option. The CDM is overseen by an Executive Board and a number of other UN agencies which ensure quality credits. In addition, the CDM process requires all projects to undergo third-party verification. If the U.S. does not find this oversight to be sufficient, it can create an additional layer of review before projects are allowed in the U.S., or it can become more actively engaged in the CDM process by ratifying Kyoto or its successor and by taking an active leadership role on the CDM Executive Board.

The working group also discussed alternative approaches for imposing quantitative restrictions on offsets. The key differences in these approaches are summarized in Table 2 and are discussed in more detail below. The alternatives are described using the example of a 15% restriction. Regardless of where the restriction is applied, we assume that any offsets that are used must be registered and issued serial numbers by a government agency. This provides the basic accounting system by which the offset limit can be tracked and enforced.

Table 2. Two alternatives for imposing quantitative restrictions: Entity-level and National-level using a 15% restriction as the example.

Point of Restriction	***How it works***	***What it accomplishes***	***Potential Problems***	***Ways to address problems***
Entity-level	At most, 15% of a capped entity's submitted compliance obligations can be met using offset allowances each year.	Ensures that no single capped entity can rely too heavily on offsets allowances; however, there is no limit on capped entities purchasing regular allowances to meet their compliance obligations.	Less economically efficient. Raises transactions costs because transferring the benefits of offsets through the economy to where there is demand will require a greater number of transactions.	
			Due to inefficiencies in the distribution of offsets across the market, the full 15% may not be used in any given year, which raises overall costs to the economy. Increases uncertainty for suppliers.	Create an auction to distribute any unused offsets in a given year.
			Creates some uncertainty regarding the size of the total market for suppliers. Cut-off in demand could lead some offset suppliers stranded without having offset allowances purchased in a given year.	The auction would reduce this uncertainty if unused allowances were to be auctioned, bringing market demand up to expectations that drive the creation of supply.
National-level	The total number of serial numbers issued for offsets allowances will not exceed 15% of allowed national emissions for that year.	Allows allowances to be efficiently allocated to highest bidder. Ensures that all 15% will be used each year if there is sufficient supply and demand.	Cut-off in supply could lead some offset suppliers stranded without receiving issued offset allowances in a given year.	Offsets can be in the queue to be issued for the following year and are likely to be receiving some supporting investment from a brokering organization or capped entity with interested in the created offsets, which will provide financial continuity to suppliers. Administering agency could increase transparency of the annual supply with a running counter on their website.

Entity-level restrictions

Currently under S. 2191, the restrictions are set at an entity level, so that only 15% of a capped entity's compliance obligation (emissions) can be covered by offsets in any given year. Putting restrictions at the entity level requires that capped entities make internal technical changes or rely on allowance purchases from other capped entities rather than rely primarily on offset purchases.

Unfortunately, this type of restriction can constrain the flow of offsets to those with the highest demand. It raises the concern that the restriction is in practice more stringent than 15%, since presumably some entities will not need as much as 15%—or perhaps may not need any at all—and thus may not buy their allowed proportion. These entities of course could purchase offset allowances even if they did not need them, to free up other allowances to sell on the market and use less expensive offset allowances to their benefit. However, if the transaction costs are too high, this may not be productive for the buyer, who may leave these offset allowances on the table unused. This extra trading to redistribute benefits will increase transaction costs, reducing economic efficiency and possibly increasing the costs of the overall cap-and-trade program for the economy; if offsets are left unused in a given year, it will have an even greater effect on overall costs.

One option to address this concern is to expand trading opportunity under entity-level restrictions. An administrative agency could set up an ex post auction for unused allowances from the previous year. This process would only be needed following a year where (a) not all 15% of allowed offset allowances were used and (b) there were 15% or more offset allowances available. The auctioned offset allowances could be tagged to distinguish them from other offset allowances and could be used by a capped entity in addition to its 15% annual limit in the following year.

Another concern could be that if not all entities purchase their 15%, the demand for offset allowances could be lower than expected. However, in this approach there need not be constraints on the release of extra offset allowances from the registry; thus these could be purchased and banked for future use. Thus more than 15% might be purchased whether or not they are used for compliance in that year.

In summary, entity-level restrictions will distribute offsets among entities, but they may also (a) create uncertainty in demand, as less than the full allotment of allowed offset allowances may be used, (b) reduce efficiency and increase transactions costs, and, as a result of both of these, (c) somewhat reduce the economic benefits of the offsets program. While an auction can help ensure full use of offset allowances and bring down program costs, it also significantly increases the administrative complexity of this option.

National-level restrictions

The second alternative is to have an aggregate restriction across all capped entities at 15% of the national emissions cap,[36] which will go down over time as the cap tightens.[37] This can be administratively simple, requiring the administrator to issue serial numbers for offset allowances up to

[36] To ensure that these approaches are comparable, it is necessary to clarify that in either case the allowable offsets are 15% of emissions, not 15% of the cap. This is the approach used in S. 2191. Emissions are equal to the cap plus offsets (E=C+O). If offsets are 15% of emissions, then E=C+(0.15*E), which means E= C *1.176. In S. 2191 the cap in 2012 is equal to 5775 million allowances, so emissions would be 6791 million tons of CO_2e. 15% of this would be 1019 million offset allowances. In entity-level restrictions, the offset allowances submitted by capped entities at the end of the year should be equal to or less than 1019 million. For national level restrictions, the administering agency would issue at most 1019 million offset allowances.

[37] Alternatively, you could keep the offset limit fixed at some quantity, such as 750 million metric tons per year, which starts off a little less than 15%, but by 2050 is quite a bit more.

15% of emissions for a given year. This method should result in greater gains from trade, economic efficiency, and lower transaction costs, and should ensure that the full 15% are used if there is sufficient demand from the capped entities. If supply grows to a point that it exceeds 15% of a year's emissions, which will be declining over time, some offset suppliers will not be issued allowances in that year but will have to wait until the following year. The administrator will need to track incoming petitions by date to keep a waiting list of petitions to consider for offset allowances for the next year's 15%. While an offset developer may not receive offset allowances in a given year, this should not stop the financial support and purchasing of offsets under development by entities laying claim to the offset allowances once they are certified. So, given the trends in the current market, it would seem that many suppliers should have sufficient consistent support even if they are not issued allowances in a given year.

In summary, national-level restrictions are administratively straightforward and are likely more efficient. If it is acceptable to have some entities using more than 15% offsets, and perhaps even 100% offsets in some years, this would appear to be the better approach if the total aggregate used across the economy is no more than 15%.

Principle #2

The program must maintain the integrity of the cap (environmental objective) and the market (economic objective).

Background on Integrity Considerations

A number of uncertainties arise in tracking and accounting for emissions reductions and sequestration increases from outside-the-cap activities. This is due in part to the nature of the activities that remain uncapped, but also because the activities are typically counted at the project level and do not encompass the entire sector.

These measurement, tracking, and accounting issues are critical in an offsets market in which the reductions achieved are used to offset emissions obligations from a capped entity and are integral to the integrity of the system. In contrast, reductions achieved through an allocation-based program are in addition to the cap; thus errors in their accounting will not impact the integrity of the cap, but may erode public trust in the system.

1. Measurement and Monitoring

A cap is designed to be administratively simple, tracking sources of emissions where the measurement and accounting are easiest; i.e., electric power at the generator, transportation fuels at the refiner, and industrial emissions at the smokestack. The primary reason certain domestic activities are not under the cap is that they are too dispersed or difficult to measure, making it difficult to determine or track the certainty of reductions. These problems of course carry over into the development of an offsets market in which reductions in these same activities are still dispersed or difficult to measure.

However, the issue of measurement and monitoring is a relatively straightforward one to address. Determining how much and where measurement and monitoring is needed can be done by assessing variability in the parameter being measured (e.g., variability in carbon content of forest stands). Based on the characteristics of this parameter the number and frequency of measurements needed to bring the uncertainty down to an acceptable level can be determined. This type of assessment can be done for forestry and agricultural projects using the methods and techniques available today,[38] and they may also be improved by new technologies and tools under development.[39] It can be expensive to have sufficient measurement and monitoring, but it is quite doable.

Because these projects are voluntary and are counted at the project level rather than accounted for across the whole sector, new issues arise, such as how to determine baseline and additionality and how to estimate and address leakage.

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[38] Zach Wiley and Bill Chameides 2007, *supra* 1.

[39] Examples: Many new measurement technologies are being developed. Information available at http://www.casmgs.colostate.edu/insider/vigview.asp?action=2&titleid=524; and there are a couple accounting tools under development. Reforestation Afforestation Project Carbon On-line Estimator (RAPCOE) is available at http://ecoserver.env.duke.edu/rapcoev1/; and USDA COMET VR tool for estimating carbon sequestration from various agricultural practices is available at http://www.cometvr.colostate.edu/

2. Baseline

A baseline is the point of reference for determining the effects of a policy or project. It answers the question "effect relative to what?" Baseline emissions or sequestration are what is expected to occur without a policy or project (hypothetical), and are compared to the outcome from the policy or project to determine effectiveness.[40]

In the Kyoto Protocol a historical reference period—annual emissions in the year 1990—was used as the baseline for gauging future performance. A country's target emissions reductions and its success in reaching the target were determined relative to this baseline. For example, the U.S. target was to reduce its emissions 7% below 1990 levels by 2012.

For a project, a baseline is the net greenhouse gas emissions or carbon sequestration on a project's lands or facilities that would have occurred in the absence of the offset program. For example:

- Where a new technology reduces or avoids emissions, the baseline can simply be the emissions at the facility when using the standard existing technology or a performance standard X% below the industry-wide average emission rate for this activity.
- The baseline can be based on a historical reference period; i.e., emissions or sequestration over the last X years from the entity or facility (provided that the period is a representative one).
- For forest and agriculture sequestration projects, historical reference periods projected forward in time or the initial standing carbon stock are the simplest methods and are commonly used, but they could mask recent changes in management that would affect emissions or sequestration in the absence of the project. An alternative is to assume that the baseline emissions or sequestration would have been changing (e.g., the technologies would evolve or forest would continue to grow and sequester more carbon over time without a project) and thus the reference is a dynamic trajectory of what would have happened in the absence of the project or policy.[41]
- The basic concept in all of these is that the changes in emissions or sequestration that result from a project are measured against the business as usual or some level more stringent than the business-as-usual emissions or sequestration.

While perhaps not perfectly accurate, the methods for determining baseline can be simple, transparent and relatively difficult to manipulate for many activities. For other activities, baseline can be more complicated and the errors and concerns about manipulation greater. Tools and standardized methods for determining baseline are being developed.[42]

3. Additionality

Additionality is a test to ensure that projects result in an overall reduction in greenhouse gas emissions or increases in sequestration that would not have occurred without an offsets program. Additionality is the critical element in determining whether an offset project will result in new emission reductions or sequestration and thus is real and can be used to offset reductions from a capped entity. Lack of additionality has been a critical issue in the voluntary market and has been

[40] Kenneth Richards and Krister Andersson. "Research: The Leaky Sink: Persistent Obstacles to a Forest Carbon Sequestration Program Based on Individual Projects." *Climate Policy 1* (2001) 41-54.

[41] For biological sequestration, projects can measure control plots on the same land where no project is taking place and use the trajectory of carbon sequestration or emissions reductions on the controls as the baseline.

[42] For example: RAPCOE *supra* 39.

repeatedly addressed by media reports[43] suggesting that a number of projects have been funded that were already underway or likely would have occurred anyway.

Credits are generated for emission reductions or sequestration accomplished by a project beyond those estimated in the baseline, as long as they are determined to be additional. While additional can simply equal observed emissions below or sequestration above the baseline, there are other measures that might provide a better test since determining a baseline can be difficult and subject to error.

There are a number of tests of additionality that have been proposed and are being used in the current markets. Table 3 includes illustrative examples of these tests taken from Trexler et al. (2006).[44] Some tests will be better at targeting additional projects than others depending on the activity type. And most projects should be able to pass more than one test. The tests that are used need to be transparent, straightforward, and difficult to manipulate. How well these tests do at filtering out non-additional projects will depend on the balance between stringency and participation and may only be fully assessed retrospectively.[45]

Table 3. Example additionality tests

Additionality Test	General Description
Legal or Regulatory	Better than any required actions.
Technology	New technology, not the business-as-usual is used.
Barriers	Implementation barrier that is not faced by the alternative action.
Common Practice	A practice better than common practice, better than business-as-usual is used.
Initiation Date	Must be initiated before set date. Test often used in combination with another.
Performance Benchmark	Better than pre-determined benchmark of emissions or sequestration.

If the methods for measuring emissions, determining baseline, and testing additionality are standardized and difficult to manipulate, we would expect error to balance out with as much positive error (inducing more mitigation than credited) as negative (less mitigation than credited). However, since these are voluntary programs there is likely to be a self-selection bias where those most likely to gain are those most likely to participate. If those most likely to participate are also

[43] For example: David A. Fahrenthold. "Value of U.S. House's Carbon Offsets Is Murky: Some Question Effectiveness of $89,000 Purchase to Balance Out Greenhouse Gas Emissions." *Washington Post*. Monday, January 28, 2008; Page A01.
[44] Trexler, Mark C. et al., (2006) "A Statistically-Driven Approach to Offset-Based GHG Additionality Determinations: What can we learn?" *Sustainable Development Law and Policy* 6: 30 (2005-2006); World Resource Institute for IETA, "Expanding Global Emissions Trading: Prospects for Standardized Carbon Offset Crediting" (2007); and Gillenwater, Michael. August (2007). "Redefining RECs (Part 2): Untangling certificates and emission markets." Discussion Paper, Available at http://www.princeton.edu/~mgillenw/REC-OffsetPaper-PartII_v2.pdf.
[45] *Ibid.*

those most likely to be non-additional, this would likely push toward negative errors with less mitigation than expected. There is concern that the more we try to reduce these negative errors with a very high bar for certainty and additionality—making projects expensive and lowering participation—the more we push out projects that would have been additional.[46] This calls for a principled but pragmatic approach.

4. Leakage

"Leakage" is the shifting of activities that generate emissions to areas not included in the measured area of a policy, regulation or offset project. This can result in a smaller net reduction in overall emissions than expected.

At the project level, leakage usually occurs when an offset project reduces the supply of a good, displacing production, and thus greenhouse gas emissions, to another location. One example of where leakage is likely to be a problem is where the offsets market reduces the availability of forest land to produce a market commodity (such as by restricting timber harvesting, harvesting feedstock for biofuels, and clearing for agriculture or urban development), thereby causing resource scarcity. For example, when a landowner decides to generate offsets by setting aside timberland from harvesting, one effect is that the availability of timber is reduced, creating scarcity in the market, and raising demand for timber harvested outside of the project area. This increased demand may lead to an increased rate of timber harvest outside of the project area, diminishing the net reductions in carbon emissions.

The more inclusive the offsets program is, the less leakage there is likely to be. For example, in an example of programmatic leakage potential for forest carbon sequestration in the U.S., if only afforestation is included in a national offsets program, initial economic modeling suggests leakage of around 24%; however, if forest management, despite its more complicated accounting, is included as well, net leakage essentially disappears.[47]

Accounting for leakage in a domestic offsets program and adjusting credits accordingly can maintain the environmental and market (value) integrity of offsets. Leakage can be estimated based on elasticities of supply and demand for associated products and regions[48] or by developing a lookup table of predicted leakages with a national economic model that includes all the relevant sectors and is updated periodically to incorporate any significant economic or policy drivers that would alter the system. An example of such a model is the FASOMGHG model that was used in the EPA report on mitigation potential of the forest and agricultural sectors.[49] A similar approach could be used for other sectors using economic sector-based models that capture the effect of changes in technology by one component of the sector (those that adopt low-GHG technologies) on total market supply and demand, activity shifting within the sector, and the resultant emissions leakage.[50]

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[46] See Trexler et al., 2006, *supra* 44 and Juan-Pablo Montero (1999). Voluntary Compliance with Market-Based Environmental Policy: Evidence from the U.S. Acid Rain Program. *The Journal of Political Economy* 107 (5): 998-1033.

[47] EPA 2005 GHG mitigation in U.S., *supra* 11. (These leakage estimates are just illustrative. These models are currently being updated to address changes initiated by the biofuels mandate and to consider the implications of a voluntary and thus partially inclusive program.)

[48] Zach Wiley and Bill Chameides 2007, *supra* 1.

[49] *Ibid*; See tool for FASOMGHG, Available at http://agecon2.tamu.edu/people/faculty/mccarl-bruce/papers/503.pdf. For a full list of EPA Climate Modeling tools, see http://www.epa.gov/climatechange/economics/modeling.html.

[50] Kuosmanen, Timo, Dellink, Rob and Vöhringer, Frank, "A Proposal for the Attribution of Market Leakage to CDM Projects" (2004). HWWA Discussion Paper No. 262.

Leakage is not only a problem for offsets; it is an issue for climate policy overall. If the U.S. caps emissions, but industries move overseas rather than reducing emissions, our mitigation impact is reduced. If the U.S. purchases offsets from the forest sector in one country, but that same country increases its use of fossil fuels, or another country cuts its forests since the timber market shifted to them, there is less overall gain to the environment. The more countries that are bound to national reductions, or at least national accounting, the less of an issue this becomes.[51] Thus the multilateral and UN negotiations to engage more countries are critical at all levels. Another option is to create a separate allowance obligation on importers in order to even the playing field by putting carbon prices on goods coming from countries that do not engage in climate policy that are equivalent to the costs associated with the U.S. system.[52] The success of this strategy will depend on evolving WTO rules.

5. Permanence

Projects that sequester carbon are subject to the loss of this carbon, whether through intentional management decisions (harvesting or tillage) or unexpected natural occurrences (fire, infestation, etc.). Sequestration projects produce offset allowances that can be sold for profit when they are gaining carbon. However, when a reversal occurs and carbon is released from a sequestration project, the loss must be compensated in order to maintain integrity of the system.

6. Project- versus Activity-Based

Project-based methodologies are those in which the accounting relies more on project-specific analysis and data with a baseline set more within the context of that project than based on standard practices for that activity. A project-based approach requires less information about the activity broadly but requires more information specific to the project. This is less work for the regulators in developing the methods, but more work and for the verifiers and valuators, who need to have greater expertise and more time to judge the value of the project.

In contrast, activity-based methods take into account the emissions or sequestration levels of other similar entities that undertake the same activities. An example would be a performance standard based on current average emissions or standard practices for a given technology or process throughout an industry. For this activity, a project's baseline could be set at or at X% above the industry performance standard with all reductions or sequestration greater than this credited. An activity-based approach requires that an assessment of the activity broadly (i.e., across the industry or sector) to assess an appropriate measure that would be incorporated into the activity methodology. The idea is to develop credible protocols that rely on automatic determination against performance standards and other criteria, like the EPA is beginning to do with its Climate Leaders program.

Our working group preferred that the U.S. use an activity-based rather than a project-based approach for project accounting for simplicity, transparency, and hence market certainty.

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[51] Lydia Olander and Brian Murray, "A New Opportunity to Help Mitigate Climate Change, Save Forests, and Reach Development Goals." Nicholas Institute Paper for UN Foundation (July 2007). Brian Murray and Lydia Olander, "A Core Participation Requirement for Creation of a REDD market." Nicholas Institute Policy Brief (May 2008). http://www.env.duke.edu/institute/pb-redd.pdf

[52] Joost Pauwelyn, "U.S. Federal Climate Policy and Competitiveness Concerns: The Limits and Options of International Trade Law." Prepared by the Nicholas Institute (April 2007); Profeta, Tim. Statement to the Senate, Subcommittee on Private Sector and Consumer Solutions to Global Warming and Wildlife Protection of the Committee on Environment and Public Works. Economic and International Issues in Global Warming Policy, Hearing, July 24, 2007. Accessed: 04/8/08. Available at http://www.nicholas.duke.edu/institute/carboncosts/Profeta_testimony.pdf.

Design Element – Require Integrity at Offsets Program Rather than Across the Whole Cap

One question is where to put the adjustments to maintain integrity. Do you adjust the entire cap to true-up any losses that occur through the offsets system? One could accept a lenient and leaky system in which offsets were not expected to be perfect but participation was high and the error acceptable because the cap would be adjusted to account for this. While it would increase participation in offsets and lower their cost, lowering the costs to the economy, the requisite ratcheting down of the cap to cover losses through offsets would then increase costs to capped entities and the economy. This spreads liability for offset error across the whole system, rather than focusing the incentive for improvement on those who can improve offset quality. The critical question is whether as a political and practical matter it would be possible to adjust the cap to compensate for openly lax offset rules. Since this is unlikely it may make more sense to be more stringent on the supply side. As a result, our working group focused the correction on the offsets system.

Design Element – Building in the Precautionary Principle

There are many ways to build integrity into the offsets system, but the basic principle is to be conservative in issuing offsets allowances so that any error or leakiness—any risk in the system—is covered by the extra sequestration or reduction required.

When there is not sufficient information regarding uncertainties and risks, broad-brush trading ratios have been used to provide a conservative estimate. Trading ratios have been used in water quality trading,[53] whereby a best management practice, such as a 10-foot riparian buffer scored as providing 3 tons of pollutant reduction, can be used to offset 1 ton of pollutant from a point source. This 3:1 trading ratio ensures that if average riparian buffers in the watershed are only 50% effective, the pollutant load is offset and is even being reduced 16% below compliance levels. Trading ratios can be general across a wide range of activities if it is not clear how to differentiate their effectiveness. However, they can place so much burden and cost on sellers of projects—reducing their profits by half or more—that participation is greatly reduced. They can also be unfair, with better projects in practice being penalized for the bad ones.

With sufficient information to quantify and estimate such uncertainties and risks, it is possible to use targeted specific discounts or adjusted assurance mechanism for each inherent uncertainty or risk. This is the alternative discussed by our working group and used in our example architecture. This is also the method used by S. 2191. In this case, with sufficient information, we can use appropriate adjustments for each type of uncertainty or risk.

Specific activity-based methodologies or technology standards (e.g., afforestation or methane capture from hog lagoons) could include standardized methods for

- designing monitoring and measurement;
- estimating and adjusting for measurement uncertainty (if any);
- determining baseline and adjusting for uncertainty in baseline;
- estimating and adjusting for leakage (if any); and
- estimating and accounting for permanence risk (for sequestration projects).

[53] To N. Nguyen et al., July 2006. "A Guide to Market-Based Approaches to Water Quality." Report for USDA; Suzie Greenhalgh and Paul Faeth. 2001. "Trading on Water: Trading can be a cheaper answer to water quality problems, creating a win-win solution for all." *Forum for Applied Research and Public Policy* pp 71-77.

[Example methodologies based on protocols from VCS, CCAR, and EPA Climate Leaders are outlined in Appendix D.]

The adjustments or discounts would be project-specific but based on standardized methods for each activity type. They should use conservative accounting for uncertainty around each of these factors. In order to use this more targeted and specific approach, methodologies will need to be tested by experts in order to assess their validity. In addition, methods need to be easy to use and relatively difficult to manipulate. In our example architecture, we suggest that each methodology or standard be tested by 3 independent actors on the same project. If the resulting emission reductions or sequestration determined in these independent assessments are within 5 or 10% of each other, the methods would be considered sound. Each methodology could be tested for a few different projects within that activity type.

While this may seem daunting, there are a number of activities likely to be part of an offsets market in the U.S. that are already using accounting procedures and methodologies that address these issues.

If adjustments are overly conservative, sellers will be penalized; if they are not conservative enough, the integrity of the cap could be damaged. Adjustments used in methods and standards can and should be revised as we gain better knowledge on effectiveness or risk, ensuring integrity and fairness of the system over time.

Design Element – Stringency and Participation

To ensure integrity, our working group suggested that a project will need to:

- follow a certified methodology which might require obtaining new data, using standard data, and standardized tools as much as possible;
- accept discounts to the value of offsets based on the uncertainty and risk of the project;
- obtain third-party verification for projects and for the issuing of allowances;
- buy insurance or provide assurance for any permanence risk; and
- wait for government approval.

While this seems like an onerous process, it largely reflects what is occurring now in a voluntary market with buyers paying much lower prices than we expect in a mandatory market. It is also taking place without the support the government could provide in creating standardized tools. Given this, it would seem that a higher price and greater support would result in significant gains in participation, even though it is a fairly rigorous process.

Experience from the private voluntary market suggests that this level of stringency will not eliminate participation, but it may reduce participation from less cost-effective activities. One way to help reduce transaction costs is to develop standardized measurement and accounting tools[54] and a standardized process. Another way to increase participation is information sharing—

[54]See RAPCOE tool, *supra* 39; COMET VR tool, *supra* 39; EPA's AgSTAR FarmWare 3.1 analytical tool that computes biogas energy production and the economic benefits of methane recovery manure management systems. Available at: http://www.epa.gov/agstar/resources/handbook.html.; CCAR's Forestry Sector Protocol Tool uses standardized equations and lookup tables to assess forest carbon, available at http://www.climateregistry.org/resources/docs/protocols/project/forest/Forest_Sector_Protocol_Version_2.1_Sept2007.pdf; IPCC tool to estimate soil carbon stock changes due to grazing displacement (leakage tool).

making sure potential project developers know about the opportunity and have trustworthy and knowledgeable resources, such as agricultural and forestry extension services, to help them through the process. These are important roles for the agencies implementing and supporting offsets.

Design Element – Addressing Permanence Risk

The following four issues need to be resolved when addressing permanence risk for forestry and agricultural projects. We do not discuss permanence risk for geologic carbon sequestration, which could also be an offset in some cases.

1. Who is liable?

If liability for a reversal risk stays with the project developer, it provides an incentive for those responsible to continue its management in ways that reduce reversal risk. It also places a substantial potential financial risk on project developers who will be responsible, all at one time, for the loss of sequestration that accumulated over many years. For projects that have low profit margins, this could eliminate their participation. However, there are public and private options for managing financial risks that are already being used in the private market. The other concern about having liability remain with the project is that project developers, which can be anyone from an individual landowner to a regional aggregator, may go bankrupt or disappear, leaving no viable responsible party to compensate a loss. One approach to address this is to require some kind of insurance, assurance, or set-aside (buffer) be held by a third party.

If liability transfers with an offset allowance instead of remaining with the project, the risk spreads out over the buyers who tend to be larger, more financially secure entities that could handle the risk. However, it also removes incentives for project developers to avoid reversals. This could be addressed through the market, whereby the price a buyer would be willing to pay for an offset allowance would be tied to its potential reversal risk and may require insurance coverage for those that have high risk. A major concern about this method is that an offset allowance for a sequestration project with high risk may not be of equal value to one of low or no risk, depending on what kind of insurance the projects hold. If all offsets allowances are not of equal value, market liquidity is reduced, and public confidence in offset allowances may be reduced as well. In contrast, if liability remains with the project developer, the offset allowance remains unencumbered and all offset allowances would be of equal value to the buyer.

Another approach based on the new Voluntary Carbon Standard (VCS) removes the issue of liability by addressing the non-permanence risk up front by placing a proportion of offset allowances from each project (based on the assessed risk of reversal) into a set-aside buffer or reserve pool. To make this approach work, short term projects (with less than 20-year management plans) must be excluded. Accounting for potential risk is based on the risk factors present and how well the project's management plan addresses these. Reversals that are planned (e.g., periodic timber harvesting) are captured in the management plan and accounted for when credits are issued. And any unforeseen losses (whether deemed intentional or not) are covered by the conservative set-aside (buffer). In this approach the project developer (seller) and offset

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http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp4/IPCC_Tool/Instructions_Tool.pdf;
EPA GasSTAR program has a suite of tools available to calculate methane reductions from oil and natural gas processes, available at: http://www.epa.gov/gasstar/resources.htm.

(buyer) are unencumbered by the risk of future reversals, and fungible, permanent carbon credits (Voluntary Carbon Units) can be issued.

The primary concern about this method is whether this buffer or reserve pool will be sufficient to cover the reversals that do occur. This may depend on the robustness of the market and thus the depth and diversity of the offsets pool, as well as the potential for a large-scale reversal through either a large scale natural disaster (e.g., drought and fires across a large portion of the country) or shifts in policy that make alternative uses of land much more financially attractive (e.g., continuing biofuels mandates increasing the price of corn). While this might result in a failure of the buffer, it might also cause a market failure and bankruptcies with the other approach if project developers and aggregators cannot meet their obligations to compensate for reversals. To help mitigate such risk, the VCS approach includes a mechanism for "truing up" the buffer withholding values based on the periodic assessment of the actual project pool performance and changing external risks (e.g., pressures from natural disasters and land opportunity costs).

2. What kind of compensation will be required for reversals?

If the integrity of the system is to be maintained, all sequestration projects should be required to fully compensate for reversals, whether they are intentional or acts of nature. Ideally, projects would store carbon in perpetuity, but for most practical purposes this cannot be required. Our working group suggested that in principle full compensation for any reversal within 100 years of project start should be required, whether or not it was an intentional loss.

If the project is accountable, a project developer can end a project at any time by compensating if a full or partial reversal results from project termination. Developers can purposely design temporary projects where the costs of compensating for reversals are built into the business plan.

If risk is conservatively addressed up front through a compulsory set-aside buffer, no compensation is required—the buffer is expected to cover it.

3. How to track reversals over time?

While it is unavoidable that sequestration projects with reversal risks bring extra administrative oversight needs, it is important to make the administration as simple and inexpensive as possible.

Having the liability stay in the hands of the project simplifies tracking by separating the allowances, which can move freely across the economy, from the projects which are tied to a physical entity. In other words, if the project developer is the responsible party, it is not necessary to track every offset allowance to its original project and to call these allowances in from all who hold them if there is a reversal. With project-based liability, a separate registry of projects will be needed to track reversals and compensation. With this approach, project reversals need to be reported and compensated even if a project is no longer sequestering carbon and no longer being issued allowances. Our working group suggested requiring projects report if they have a reversal. Periodic auditing can check for unreported reversals. If a project is found with an unreported reversal, it could be required to compensate for double the actual reversal. All projects submitting petitions for issuance of new offset allowances could also have to report and prove compensation for reversals.

If the alternative approach with the upfront set aside is used, no tracking is necessary, since the buffer is expected to cover all losses. This is the option with the least administrative burden.

4. What are the options for managing financial risks?

There are a number of different ways to manage financial risk while maintaining environmental certainty. These approaches pool the reversal risks of individual projects by assessing a risk premium on each project. Risk can be estimated for each project to ensure a fair distribution of costs across projects. These estimates should be conservative to ensure sufficient coverage of the risks. Pooling reduces the landowner's individual risk of financial loss from accidental reversal. Several approaches could be considered, defined by who bears the risk.

1) Project aggregator: Projects could be conservatively discounted based on risk. In other words, the project landowner would receive less than a one-to-one credit from the aggregator for each ton sequestered or reduced, but then the risk and liability is transferred to the project aggregator. This approach to risk management works better when projects are aggregated in a diverse portfolio because it allows the developer or aggregator to pool risk across projects more efficiently. Project aggregation is common in the voluntary market for agricultural sequestration due to the relatively small amounts of carbon at stake on a per acre or per project basis.

2) Private third-party: Risk-pooling could be extended further by involving third parties who manage risks through insurance contracts, financial instruments, reserve requirements, or other well-established vehicles used to manage risks from other commodities. These mechanisms will reduce the net payment to the landowner while sustaining the expectation that full losses will be covered.

3) Public shared-liability plan: A shared-liability system is one in which every allowance at risk of reversal pays a small percentage (at a level related to assessed risk) into a national or regional shared-liability fund (offset allowance reserve or buffer) that will be available to all projects.

The pooling or set-aside of a portion of offset allowances into a buffer or reserve is a method followed by the Voluntary Carbon Standard (VCS) and RGGI that is also being used by many aggregators in the voluntary market. When a shared reserve of this kind is used, the quantity of allowances set aside must be sufficient to comfortably cover potential reversals.

Another question is whether intentional reversals will be handled differently than unintentional reversals caused by acts of nature. For example, intentional reversals could be required to compensate fully, while unintentional reversals could compensate partially. How this pool is used will determine the proportion set-aside necessary. A critical question is whether it is possible to distinguish intentional and unintentional losses in any meaningful way. This may only be possible if projects are tied to a long-term management plan.

Our working group and reviewers suggested three options to consider for mitigating risk (see Table 4). In summary, these approaches are:

A. Requiring that every project have some form of insurance, assurance, or buffer set-aside, but not specifying what it would be or how it would work. This would favor market-based solutions to managing risk rather than the publicly managed option above.
B. A government-managed offset allowance reserve (buffer) to fully cover when a responsible party cannot be found and partially cover unintentional losses. For unintentional losses, the buffer would have to be replaced, but the remainder of the project compensation would come out of the pool. Full compensation would be required for intentional losses.

C. A government-managed offsets allowance reserve (buffer) based on the VCS approach in which risks of reversals are conservatively estimated based on the required minimum 20-year management plans and project-specific risk characteristics. This risk assessment determines the portion of offset allowances each project must set aside in the buffer to cover potential losses. In total, the pooled buffer resulting from all land-based projects (agriculture and forestry) is assumed sufficient to cover any reversals that may eventually occur. No tracking of projects or future compensation is required.

The example architecture only details one of these approaches, alternative B.

Table 4. Three alternative approaches for addressing risk of reversals.

	Alternative A	Alternative B	Alternative C
	Flexible Mechanism	**Federal Buffer with Compensation**	**Federal Buffer no Compensation (VCS)[55]**
Liability	Project/project developer liable	Project/project developer liable	No liability
Allowances	Offset allowances unencumbered	Offset allowances unencumbered	Offset allowances unencumbered
Tracking	Project registry	Project registry	Project registry
Program verification	National inventory	National inventory	National inventory
Risk Management	Projects must have third-party insurance, assurance agreement, or private buffer set aside sufficient to cover entire project	Portion of offset allowances set aside in EPA-held pooled buffer	20-year-minimum management plan required. Portion of offset allowances set aside in EPA-held pooled buffer
Amount of assurance or set-aside	Relative to risk of project	Relative to risk of project	Relative to risk of project
Compensation	Full compensation for reversals	Full compensation for reversals (*Could require partial compensation whereby unintended reversals would only have to replace part and the remainder would be cancelled from the buffer*)	If not petitioning or verifying for additional offset allowances then the project's buffer credits are cancelled
End Date	Could be 100 years	Could be 100 years	NA

[55] Voluntary Carbon Standard, 2007. Guidance for Agriculture, Forestry and Other Land Use Projects. Available at http://www.v-c-s.org/docs/AFOLU%20Guidance%20Document.pdf

	Alternative A	Alternative B	Alternative C
	Flexible Mechanism	**Federal Buffer with Compensation**	**Federal Buffer no Compensation (VCS)[56]**
Benefits	*Full flexibility*	*Provides a reserve to compensate for project reversals where there is bankruptcy or owner is untraceable*	*Administratively easy – No tracking necessary, only periodic verification to ensure buffer is sufficient. Provides compensation if owner bankrupt or untraceable.*
Difficulties	*Significant administrative oversight needed*	*Significant administrative oversight needed* *May be difficult to distinguish intended from unintended*	*Fairness – Those that intentionally reverse project 'get away with it'* *Integrity – With no compensation required, will the buffer be large enough? Periodic truing up of buffer requirements may address this.* *Too burdensome – Because no compensation is required from reversals, the buffer set aside has to be quite conservative. Can this result in buffer requirements so large it stifles participation?* *However, VCS analysis indicates that typical medium-risk projects will only lose about 3–10% of their total discounted carbon revenues under such a buffer approach.[57]*

Design Element – Third-party Oversight

Third-party expert oversight is used for most if not all of the existing offsets, voluntary or mandatory. ***The working group*** sees it as a critical part of any federal program. There are two steps in the offsets process that use third party oversight:

1. Validation of new project plans to assess how they evaluate additionality, baseline, and other key initial parameters.
2. Verification of emissions reduction and increases in sequestration achieved before allowances can be issued.

To provide good quality and trustworthy oversight, a sufficiently rigorous accreditation process will be necessary to ensure that the verifiers have the needed expertise. Since suppliers (project developers) and buyers (capped entities) have similar objectives, and verifiers are paid by these actors to approve their projects, there is concern that this could lead to collusion among buyers and sellers and pressure on the verifiers, resulting in manipulation of the market. The auditing process (below) can audit the work of the verifiers, providing a check on their work and mechanism for uncovering and possibly punishing collusion and manipulation.

[56] Voluntary Carbon Standard, 2007. Guidance for Agriculture, Forestry and Other Land Use Projects. Available at http://www.v-c-s.org/docs/AFOLU%20Guidance%20Document.pdf

[57] See Appendix A in VCS AFOLU Guidance Document, available at www.v-c-s.org

Design Element – Auditing and Enforcement

To instill confidence in the market and assure integrity of the system, periodic spot checking through auditing and examination of projects is necessary. Auditing is a major part of the national program for water pollutant management. The National Pollutant Discharge Elimination System Compliance Inspection Program may be a useful model with which EPA already has experience. The primary concerns about this program that should probably be considered when developing one for an offsets program are that (1) the agency overseeing the program must have sufficient resources, personnel, and time for auditing and (2) penalties should be linked to actual harm (i.e., mitigation that did not occur or was reversed).

Audits need to assess whether methodologies are used correctly, whether third-party verification and validation are providing the independent and expert review of projects as intended, and whether reversals are going unreported or uncompensated. Summarized results of these audits for each part of the process should be periodically made available to the public.

Even if there is no direct federal oversight of third-party verifiers, sufficiently frequent audits should pick up any patterns of manipulation or fraud by verifiers and this information could be shared with the public. Since integrity of the offsets are critical to the buyers and the sellers of offsets and to many non-governmental groups there is also likely to be significant private information-sharing regarding the quality of verifiers. And if this is not considered sufficient, accreditation of verifiers could be revoked for bad actors.

Design Element – Review and Revision

In designing any new program, it is critical to build in the ability to adjust and improve the program as we learn. Any revisions imposed through administrative rule-makings would need to consider the investment certainty needed by project developers to avoid hampering the market.

Our working group discussed five different aspects of the program that need to be reviewed and revised regularly.

1. *Restrictions on offsets*
   The primary reasons stated for placing restrictions on offsets are to ensure that domestic abatement and necessary infrastructure changes in industrial, energy, and transportation emissions are addressed and to limit potential damage if some offsets are not real and additional. If the program is successful in transforming our infrastructure and is producing high quality offsets, it may be beneficial to remove or reduce restrictions if they are keeping low-cost options out of the market or excluding activities we would like to support.

2. *Offsets program functioning, methodologies, leakage estimates, and risk premiums*
   The offset program should be reviewed and updated to ensure that it is meeting its objectives. For example, it is important to assess whether the certification of methodologies is progressing efficiently or if the process is creating a barrier to new activities. In addition, to achieve real reductions in greenhouse gases for outside-the-cap activities, the program will need to update its additionality criteria, baselines, and leakage adjustment as the country moves forward. For example, if most landfills in the U.S. have been capped and it has become law in most states to do so, the program should no longer consider this an additional activity to be compensated through offsets or allocation. The key issue is to design a dynamic system that regulates away the "low-hanging fruit" once early movers have been properly incentivized and higher rates of penetration

are being achieved. However, it is critical that existing projects have investment certainty and will not have their accounting criteria updated until their next crediting period. The crediting period suggested by our working group and reviewers was 7 to 10 years. It will also be necessary to assess the project registry, reported reversals, and unreported reversals (caught by audits) to determine whether estimates of risk are sufficient or overly conservative.

3. *National level accounting and true-up*
   All Annex 1 countries that are part of the UN Framework Convention on Climate Change, including the U.S., are required to provide national-level accounting of greenhouse gas emissions, which can include forestry and land-use change if desired. When forestry and land-use change provide an overall sink, they tend to be included, as is the case for the U.S. Since 1990, the EPA, with the help of the USDA, has compiled this annual national inventory.

   It may be possible to compare expected mitigation from offsets allowances issued to mitigation observed in the national inventory for these uncapped sectors. Such a comparison would have to account for any activities that could have a significant impact on emissions or sequestration that were taking place outside of the offsets market. If the accounting is sufficiently accurate, the U.S. could use the national inventory as an opportunity to assess whether domestic outside-the-cap mitigation was progressing as desired. For example, if our leakage is much greater than we expected with timber extraction shifting across the country, we may not see the full mitigation expected for credits which were issued. However, if the discounts applied for uncertainty or leakage are larger than needed, we might see more mitigation than expected. This can help gauge the success of the offsets program, allowing adjustments as appropriate. It would be worth assessing whether it is possible to increase the accuracy of the national inventories and detect the impact of an offsets program. EPA modeling of S. 2191 predicts that from 2012 to 2050, domestic afforestation and forest management offset projects will total between ~130 at the outset to a high of ~390 million metric tons of CO_2 equivalents.

4. *Allocation program effectiveness*
   Allocation can be used in a number of ways related to outside-the-cap mitigation: to provide some support for activities that are not eligible for offsets; to provide programmatic support for research, education activities, and tool-building; and to provide compensation for early actors and perhaps for a last-resort true-up reserve. For those programs directed toward current and future mitigation, it would be helpful to know how cost-effective they are in increasing mitigation and to see how many of the allocated allowances are being used. If they are cost-effective and are using all the allowances, perhaps extras from elsewhere could be shifted here; if they are not cost-effective or if not all allowances are being used, they should be shifted elsewhere.

5. *International forest carbon*
   International forest carbon was singled out for inclusion because of its potential for emissions reductions and the potential for low-cost activities that may bring substantial co-benefits that align with other international development and biodiversity objectives. Since some of the activities that may be included—such as avoided deforestation and forest management—have not been a robust part of any mandatory or voluntary market, and because national-level accounting of forestry and land-use in these countries is a new pursuit, it will be essential to take stock of these programs to make sure they are achieving the desired objectives.

Design Element – Transparency

Transparency is essential for confidence in an offsets market. With suppliers (project developers) and buyers (capped entities) having similar objectives, and verifiers being paid by these actors to approve their projects, there is concern that this could lead to collusion among buyers and sellers and manipulation of the market. There is also concern that, even if all actors are acting in good faith, the methods and verification will not be sufficient. Transparency can be achieved by ensuring that the program is designed with input from the public, that as much as possible information in project and allowance registries are available to the public, and that auditing information and periodic reviews and revisions of the programs are available to the public.

Secondary Principles

Most of the design elements needed to support these secondary objectives for outside-the-cap mitigation are discussed above as part of the primary objectives. Below, we will connect those already-discussed elements to the objectives they support and add any missing details.

Reduce the costs of the mandatory program by increasing flexibility of compliance using outside-the-cap mitigation opportunities

Modeling of S. 2191 shows that offsets are the policy option that has the greatest overall impact on the cost of the cap-and-trade program (Figure 7). The difference between no offsets and allowing restricted offsets as currently written in S. 2191 (15% domestic offsets and 15% international allowances) results in around a 50% reduction in the cost of an emissions allowance; eliminating all restrictions results in an additional approximate 50% reduction in cost.

Offsets provide a pool of lower-cost mitigation opportunities that capped entities can use to meet their emission reduction obligation by increasing the flexibility of the program and adding more mitigation options. The less restrictions are placed on offsets, the more the costs of the cap-and-trade program will be reduced. As long as the primary objectives are being achieved—global atmospheric greenhouse gas reductions, the necessary transition in energy, industrial, and transportation infrastructure in the U.S., and the integrity of the offsets market—restrictions should be avoided.

Encourage accelerated deployment and innovation in mitigation and sequestration in the uncapped sectors

Offsets and allocation as part of a federal program can provide additional incentives to motivate better greenhouse gas management in uncapped activities. Offsets would provide these incentives through a competitive market in which the benefits and profits will vary, hopefully providing greater incentive for cost-effective mitigation that might push deployment of and innovation in mitigation techniques. For those projects that cannot be part of an offsets market, an allocation can provide resources for these activities to attempt new techniques and potential move into what may be a more lucrative offsets market.

Ensure a dynamic program in which incentives are tied to real reductions so the program does not become an entitlement

Since the objective of the offsets and allocation programs described in this report is to mitigate greenhouse gas emissions, it is essential that these programs result in real reductions. Some likely eligible activities for the described offsets and allocation programs may face higher prices on some essential inputs. For example, increased fertilizer and fuel prices are expected to be a problem for many farmers. While it may be desirable to help those affected, in this case help farmers address these higher prices, this should be done explicitly in a program designed to address hardship created by the climate policy. There are a number of allocation-based programs already set up to do this. It should not be implicitly embedded in the offsets or allocation programs; doing so could confuse the intent and hence the ability to evaluate success of these programs.

Alignment with other environmental programs and objectives

There are numerous existing programs to support domestic environmental objectives such as the Conservation Reserve Program (CRP) and Environmental Quality Incentives Program (EQIP).[58] A number of these include improved agricultural and forest management or restoring agricultural lands back to forests or wetlands. All of these activities can result in carbon sequestration. Questions remain as to whether a project that takes place on lands under one of these other federal incentive programs would be eligible for an offsets or allocation market. Certain activities overlaid on these programs may be considered additional, but others may not.

Some of these federal programs provide multiple benefits. It will be important to consider the impact an exclusionary approach might have. If project on lands under another federal incentive program are excluded from a climate linked offsets or allocation program that is of higher value, they are likely to shift out of the other program toward the climate programs. If the activities that are eligible for offsets are different from those which supported other environmental benefits, such as water quality benefits and wildlife habitat, then those other benefits may be lost. It is important that such trade-offs be considered and addressed before any final decisions are made regarding exclusions.

One way to think about these multiple benefits in potential coordination of the existing federal incentive programs and a new climate offsets or allocation program is in terms of ecosystem services and bundling of those services. For example, the Wetland Reserve Program could be split into two tracks where project that are engaged in the climate offsets or allocation programs can receive partial funding if they are promoting other environmental benefits that would be in addition to the offsets and allocation profits. Leaving the door open for this stacking or bundling may be important for the development of ecosystem services markets and programs, which are a promising new tool for furthering environmental objectives and avoiding negative co-effects of single-objective environmental programs.

Given the current structure of S. 2191, it is difficult for the U.S. to impose other environmental objectives on international offsets it would purchase through other capped markets since they are likely a step removed from the activities which produced those offsets. If the U.S. decides to engage directly in the international market for CERs through the CDM or some other mechanism developed post-Kyoto (e.g., REDD), it may wish to consider how to address potential environmental and social co-effects for these international projects. The U.S. could limit the types of projects allowed in its market if there were particular concerns, or it could ask for "green" labeling of CERs, which could open the door for socially and environmentally responsible investing and transparency to concerned parties, and could also open the door for bundling value if extra payment were provided for CERs that guaranteed positive rather than negative co-effects.

[58] For a full list see Table 8, page 39 in Kenneth Richards, R. Neil Sampson, and Sandra Brown. 2006. *Agricultural and Forestlands: U.S. Carbon Policy Strategies.* PEW Center on Global Climate Change. http://www.pewclimate.org/global-warming-in-depth/all_reports/ag_forestlands

Other Elements of the Proposal

Who should administer?
EPA will most likely play a primary role in administering any cap-and-trade system for the United States and thus it is essential that they be involved in any programs for outside-the-cap mitigation that tie into the compliance market for emissions. However, the activities with the greatest potential for mitigation in the U.S. fall under the jurisdiction of the USDA,[59] which may already have substantial infrastructure and expertise in place through the National Resource Conservation Service, Extension Services, and the Farm Service Agency.

Financial Support for Increased Agency Responsibilities
New agency responsibilities may include:

- designing the regulations for the offsets and allocation programs,
- certifying methodologies and technology standards,
- final review of petitions for project initiation and for issuance of allowances,
- managing allowance registry and project registry for sequestration projects,
- managing reversal reporting and ensuring appropriate compensation,
- managing a reversal reserve (if that is the selected method for reversal risk management),
- direct verification or accreditation of third-party verifiers,
- auditing project paperwork as well as site visits and direct measurement,
- rulemaking for revisions, and
- managing allocation programs and coordinating these with existing federal incentive programs.

These responsibilities will likely be heavy at the outset of the program, and will remain significant for the day-to-day management of what could be a very large program. Even if domestic offsets were limited to 15% of compliance obligations, as currently written in S. 2191, a modest price for offsets could translate to tens of billions of dollars transacted in the offset market.[60]

Initiating and Integrating the Offsets Market in Time for the Cap
If the basic structure of S. 2191 is used, it presents a very short timeline (4 years) for developing the offsets program and the infrastructure, hiring staff, certifying methodologies, accrediting verifiers, and clarifying how early actors will be credited, and for the market to create a sufficient supply of offsets projects to help dampen the initial program costs. See the timeline on page 61.

Our working group and reviewers considered a number of ways to try to address this.

- The first suggestion was, if possible, to pull out the provisions for the regulatory design of the offsets program and attempt to pass this separately and as soon as possible. This would start development of the regulations and sort out the certification of methods and accreditation of verifiers that would initiate if a cap-and-trade program is signed into law. There is relatively little in the regulatory design provision that should be contentious; in fact, there seems to be widespread support from potential buyers and sellers and from the environmental community for having sufficient time to design a good program.

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[59] EPA annual inventory (*supra* 10), EPA assessment of S. 2191 (*supra* 3), EPA assessment of S. 280 (*supra* 33), and EPA report on GHG mitigation (*supra* 11).
[60] With a 15% restriction on offsets, given a \$10/ton of CO_2e price per offset allowance transactions for offsets would be \$12 billion in 2012 dropping to \$3 billion by 2050. But the price is expected to go up over time. At \$30/ton by 2050 the financial flow is maintained at around \$11 billion.

- Regardless of whether the early provision is possible, our working group suggested that a task force including representatives of all the relevant agencies, state and regional offsets markets, and experts in the voluntary markets could help sort through the existing methods, protocols, and standards to provide carefully vetted and organized input into the federal methodology process to speed the process.
- It may be possible to take advantage of the existing methodologies and standards being used in yet another manner to facilitate market development. The federal program could allow methodologies and protocols being used in State or regional regulatory programs like RGGI and CCAR, that meet general federal standards to be certified and allowed directly into the federal program.[61] Those projects using qualified methods could transition directly into the federal market. Over time (perhaps a 5-year process) the projects would be expected to transition to federal methods and make adjustments where necessary to harmonize and standardize the system.

Encouraging International Actions

International engagement in greenhouse gas mitigation is critical. Providing early opportunities for developing countries to engage in mitigation can result in environmental, economic, and political benefits for the U.S. If developing countries, particularly the large emitters, do not take on mandatory reductions in the next decade, it will be impossible to avoid dangerous levels of climate change.[62] Leakage of emissions to other countries is a significant concern, but it will also be solved by engaging other countries in tracking and reduction emissions.

One way to initiate engagement is through international offsets such as those in the CDM. The existing CDM program under the Kyoto Protocol allows developed countries to pay for emissions reductions in the energy, industrial, and transportation sectors and for some sequestration in the forestry sector. Rather than taking a number of concerns regarding the integrity and future of the CDM as a reason to disallow international offsets permanently, Congress may wish to build a system that assesses these concerns and tries to improve upon this first attempt, either by accepting a subset of activities that prove acceptable or by providing additional or different guidelines for projects acceptable to the U.S. Alternatively, Congress could provide allocation funding (outside the cap and thus not at risk to undermine the integrity of the cap) for those activities of greatest interest.

In particular, due to the importance of international forest carbon for emissions reductions and the potential for low-cost activities that may bring substantial co-benefits that align with other international development and biodiversity objectives, our working group was supportive of including it in an allocation program at the outset. Many were also interested in considering international forest carbon for the offsets market if the accounting and enforcement mechanisms are sufficient.

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[61] Experience from the VCS suggests that a gap analysis to compare a methodology to the VCS guideline methodology takes about 3 months. (Personal communications. Ken Newcombe at Duke University 4-21-08)

[62] H. Damon Matthews and Ken Caldeira 2008. Stablizing climate requires near-zero emissions. *Geophysical Research Letters* 35.; Schmittner, Andreas, et al. (February 2008) Future changes in climate, ocean circulation, ecosystems, and biogeochemical cycling simulated for a business-as-usual CO_2 emission scenario until year 4000 AD. *Global Biogeochemical Cycles* v.22; Prasad Kasibhatla, *et al*.(September 2007) "G8 Leadership is Critical to Curbing Energy-Related CO_2 Emissions." Prepared by the Nicholas Institute, Duke University. Policy Brief, Available at http://www.nicholas.duke.edu/institute/g8plus5.pdf.

Encouraging Early Actors

S.2191	**S.1776**
Gives allocated allowances to capped entities that have carried out mitigation before enactment Allocates 5% in 2012 4% in 2013 3% in 2014 2% in 2015 1% in 2016 (then zero) Distributed based on real reductions Projects from uncapped entities can be sold as offsets in the mandatory market if they are registered and not used (i.e., they are banked)	Gives allocated allowances to any entity that carries out a mitigation project before the initial allocation Allocates 1% out to 2020 *Fewer total allowances in S.1776* Distributed based on real reductions

Numerous companies have been engaged in early actions to reduce their greenhouse gas emissions. These good citizens have done this for many reasons, but one of these was the hope that they would receive some compensation for taking the risk, being a leader, and testing the system. These early actions have been extremely important in helping the U.S. learn through experience and proof of concept. It seems fair to provide some compensation to companies that are now covered by the cap and to those who conducted activities outside the cap and have not sold or used them. However, it is important to ensure that this compensation does not compromise the integrity of the cap, overburden those required to administer the program, or muddy the development of the new program.

Our working group suggested that some compensation for early actors could be provided through a temporary allocation to preserve the integrity of the cap and clearly separate the new mandatory program from the pre-compliance period. In addition, the criteria established by those handling the distribution of this allocation pool should be clear and simple and based as much as possible on the quality of the mitigation. If there are entities that disagree with the categorical criteria selected, the burden should be on them to petition for a review and prove themselves worthy of allocation funds. This creates a filter through which good projects that were left out would be willing to take the extra steps to become qualified, but those that are not would not go to the trouble, helping to reduce the administrative burden.

The primary concern with such a model is that there will not be enough allocation to compensate all early actors such that one ton of mitigation equals one allowance. If this is the case, early actors would get compensated at a lower rate, some proportion of an allowance for each ton of mitigation performed. While this may not be ideal, our discussions did not produce a better alternative.

EXAMPLE ARCHITECTURE

DESIGNING OFFSETS POLICY FOR THE U.S.

PRINCIPLES, CHALLENGES, AND OPTIONS FOR ENCOURAGING DOMESTIC AND INTERNATIONAL EMISSIONS REDUCTIONS AND SEQUESTRATION FROM UNCAPPED ENTITIES AS PART OF A FEDERAL CAP-AND-TRADE FOR GREENHOUSE GASES

OUTLINE EXAMPLE ARCHITECTURE

- Definitions
- Compliance Offsets Program
    - Task Force on Offsets
    - Establishment of the Offsets Program
- Allocation-Based Programs
    - Early-Actor Compensation
    - Mitigation Financing including International Forest Carbon
    - Innovation – Offsets Incubator
- Review and Revision by National Academies of Science
    - Review of Restrictions, Offsets Program, and Allocation Programs
    - Reporting to Congress and Administrator with Recommended Changes
    - Guidelines for Revisions

Notes:

(1) S. 2191 America's Climate Security Act of 2007 (Lieberman-Warner) was used for a common context

(2) The following example is not a consensus of the working group. Rather it is at best a middle ground that sometimes selects one option when others might suffice, and other times presents multiple viable options.

(3) While most of these example provisions would probably be pulled together under one subtitle, the early actor provision would probably remain linked to provisions for the capped entities even though it would now include language allowing banked offsets to be included.

KEY

New from NI staff, working group members, or reviewers

Options for addressing permanence

Same as S. 2191 America's Climate Security Act of 2007 (Lieberman-Warner)

DEFINITIONS (based on those in S. 2191)

(1) ADDITIONAL; ADDITIONALITY.— The terms "additional" and "additionality" mean the extent to which reductions in greenhouse gas emissions or increases in sequestration are incremental to business-as-usual (with no GHG incentives) for the project entity.

(3) BASELINE.— The term "baseline" means the greenhouse gas flux or carbon stock scenario of what would have occurred under business-as-usual—i.e., in the absence of the GHG offset project.

(4) BIOLOGICAL SEQUESTRATION; BIOLOGICALLY SEQUESTERED.— The terms "biological sequestration" and "biologically sequestered" mean—

(A) the removal of greenhouse gases from the atmosphere by biological means, such as by growing plants; and

(B) the storage of those greenhouse gases in the plants or related soils.

(16) LEAKAGE.— The term "leakage" means—

(A) a significant unaccounted increase in greenhouse gas emissions by a facility or entity caused by an offset project, as determined by the Administrator; or

(B) a significant unaccounted decrease in sequestration that is caused by an offset project, as determined by the Administrator.

(20) OFFSET ALLOWANCE.— The term "offset allowance" means a unit of reduction in the quantity of emissions or an increase in sequestration equal to 1 carbon dioxide equivalent at an entity that is not a covered facility, where the reduction in emissions or increase in sequestration is eligible to be used as an additional means of compliance for the submission requirements established under section 1202.

(21) COMPLIANCE OFFSET PROJECT.— The term "compliance offset project" means a project that reduces emissions or increases sequestration of greenhouse gases from sources or sinks that would otherwise not have been covered under the cap.

(22) PROJECT DEVELOPER.— The term "project developer" means an individual or entity implementing an offset project.

(25) REVERSAL.— The term "reversal" means an intentional or unintentional loss of sequestered carbon dioxide to the atmosphere in significant quantities, as determined by the Administrator, in order to accomplish the purposes of the Act in an effective and efficient manner.

(27) SEQUESTERED AND SEQUESTRATION.— The terms "sequestered" and "sequestration" mean the capture, permanent separation, isolation, or removal of greenhouse gases from the atmosphere, as determined by the Administrator.

Compliance Offsets Program

The program will need strong rules to ensure integrity and confidence. Our working group suggested that it should only include activities that can meet acceptable criteria that guarantee real reductions. An offsets market provides reductions in emissions in uncapped sectors that can be used by capped entities to offset their reductions starting in 2012, which will significantly reduce the costs of mitigation. Offset reductions will not result in additional emissions reductions beyond those required by the cap unless they are voluntarily retired.

The offsets program will be the primary program for including outside-the-cap mitigation. It is significantly larger than any allocation set-aside, even with a 15% restriction on offsets that is suggested by S. 2191.

Task Force on Offsets

- The Task Force is suggested to help coordinate efforts across agencies that are involved as well as to bring in the expertise of the state, regional, international, and voluntary markets and academics.
- The intent of the Task Force is to accelerate the process of method and standard development and certification by pulling together the best existing methods and standards from the agencies and from the state, regional, and voluntary markets. The Task Force is also asked to provide guidance on the maturity of these methods and standards to help distinguish those that can possibly be certified with little change from those that need further development.
- There is concern that a Task Force will slow progress, delaying the development of regulations. We suggest, if at all possible, that the agencies initiate this process with their existing authorities. Or that Congress, in the event that a mandatory program cannot pass this year, put this forward as part of a smaller bill that initiates this advisory process and the initial rule-setting processes as soon as possible. (There are other areas of implementation that need similar early process, like CCS liability.)
- See discussion of options to speed the development of regulations, certified standards, accredited verifiers, and other steps necessary to initiate the offsets market which were discussed on p52.

EXAMPLE ARCHITECTURE
TASK FORCE

(1) Congressionally established offset task force should include two designated officials from each of the following agencies; EPA, USDA, Treasury, Fish and Wildlife, DOE, USAID, State Department, and 13 non-federal government experts from State, regional, international (CDM), and voluntary offsets registries or markets,.

(2) The Task Force is given six months to provide guidance to the Administrator on the development of the federal offsets program.

(3) This guidance shall include:

a. Nominating existing or developing new activity specific methodologies that are of sufficient rigor to be considered for certification. The suggested methodologies should clearly describe how additionality and baseline are measured, how measurement certainty is addressed, how permanence risk is assessed, how leakage is accounted for, and how potential overlap with emissions counted elsewhere in the system are determined. They should be capable of passing the criteria of independent reproducibility established in the guidance for EPA implementation (described in the next section).

b. The consideration for nomination should include an expert review of past performance for methodologies based on the criteria identified in 3(a).

c. Based on the appearance of sufficient methodologies or standards, and the level of emissions reductions or sequestration potential suggest a list of activity types that should be included in the first round implementation of the offsets program.

d. Activity types to be considered should include but are not limited to:

   i. landfill methane use projects;
   ii. animal waste or wastewater methane digestion, combustion, or use projects;
   iii. coal mine methane capture, flare, or use projects;
   iv. afforestation and reforestation;
   v. forest conservation and sustainable forest management resulting in an increase in forest stand volume;
   vi. soil sequestration through tillage and other practices;
   vii. restoration of native grassland;
   viii. carbon capture and geological storage (CCS) for emissions not covered by the cap;
   ix. unregulated and uncapped fuel cycle efficiency activities;
   x. composting of municipal solid waste to avoid methane production; and
   xi. reductions from entities in sectors which include covered facilities but where the entity does not qualify as covered facilities under Sec ().

e. A list of activities that should be excluded from domestic offsets due to other negative impacts (such as replacing native forest with plantations of fast growing non-native trees).

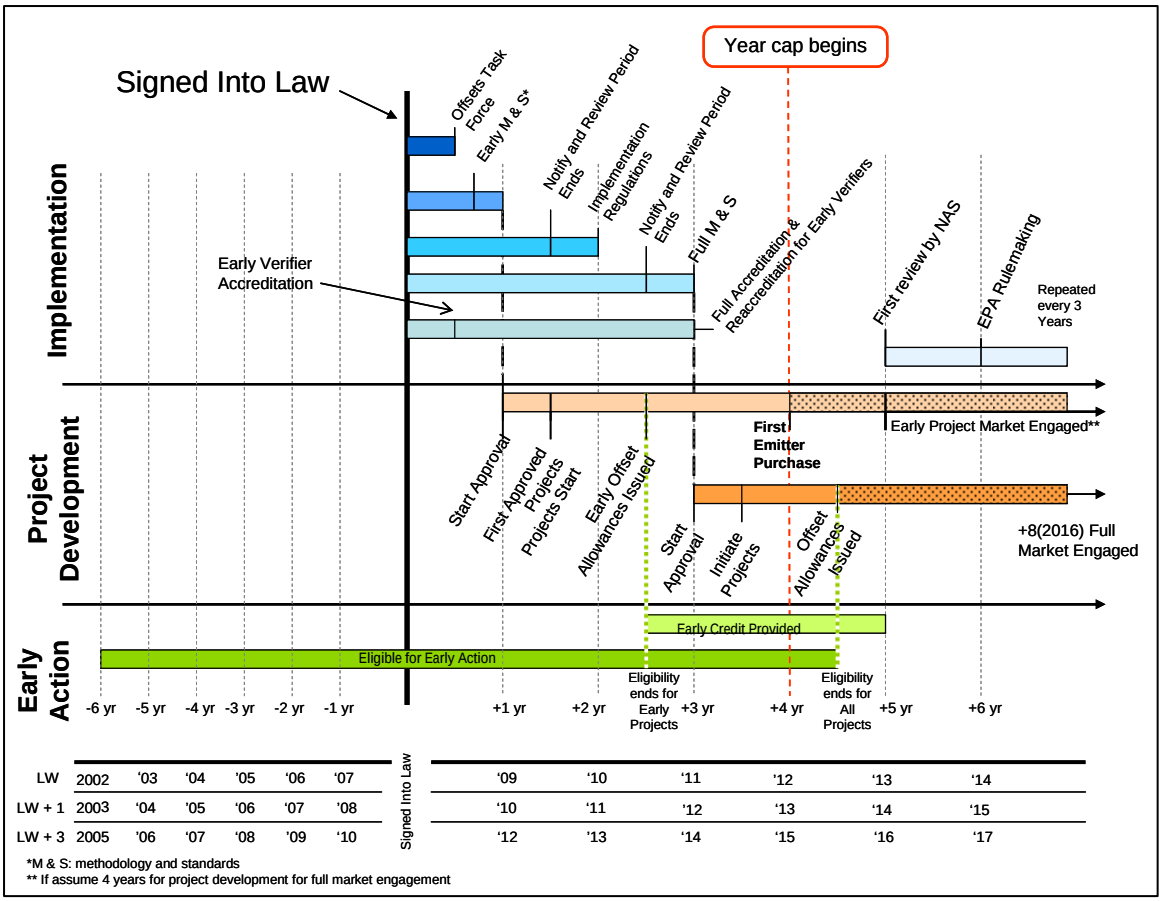
f. A list of activities that are not yet ready for an offsets program due to uncertainties in methodology, but that could provide substantial mitigation and should receive support for research, innovation, and deployment in the Mitigation Financing and Incubator Program.

(4) The Administrator shall make the Task Force report available to the public within one month of its submission to the Administrator.

Establishment of the Offsets Program

This section is to establish the certified methodologies for offsets and to guide the implementation of a sufficient process for verification and tracking offsets and reversals.

- The vast majority of outside-the-cap mitigation opportunities in the U.S. are under the jurisdiction of the USDA (see Figure 3, p.18), suggesting that a coordinated EPA/USDA regulatory process would be ideal.
- A few of the sections included below have language excerpted and edited from Title II, Subtitle D S. 2191.
- We use a per-entity restriction structure based on S. 2191 for simplicity. An alternative discussed in the background paper is to use an aggregate restriction across all entities (p. 32). If this approach were used, an entity's use of offsets would be unlimited. The limitation would be set where offset allowances are entered into the registry (Section 7). The administrator would only be allowed to issue serial numbers for the number of allowances allowed by the restriction in the given year.
- To provide some certainty in the offsets market, projects need some guarantee that their baseline and accounting will not change every year. In this example, we suggest a guaranteed crediting period of seven years at their approved baseline before any changes could be required. Some other participants suggested that a ten-year guarantee would be preferable. If it makes a significant difference to market development, it may be preferable to use the longer crediting period. In CDM, a seven-year crediting period is used for projects that are planning on renewal, while a ten-year crediting period is used for those that will not renew.
- Capped entities would prefer to have offsets available at the onset of the cap to help them meet obligations and reduce costs. Because of the difficulty of establishing a strong offsets program with sufficient review in a short period of time, we propose a multiple-step implementation process. On page 52of the background paper we provide additional suggestions to address the needs of developing the offsets program quickly.
- Multi-step implementation process presented in this example:
  - Year 1 – A limited early-offset program that contains only the most mature activities will be started. These activities will have methodologies or standards set within one year of passage. For example, these early activities may be those using new unproven technology or those qualified under an existing State mandatory program.
  - Year 2 – The regulatory process (reporting, verification, auditing) will be designed and implemented within two years of passage.
  - Year 3 – The full offsets program will begin with the certification of methodologies and standards that require further work by the administering agencies. These will be certified and begin initiating projects within three years after passage.



- Sequestration projects must address the issue of permanence. If a project experiences a reversal (release of sequestered carbon), it is essential that that loss be addressed to maintain the integrity of the cap. We discussed three different ways to do this. In all of these, liability does not transfer with the offset allowances, leaving it unencumbered with no more risk than an emissions allowance. This is different from S. 2191. We used Alternative B in the example architecture for simplicity, but are not recommending that approach over the others. The language relevant to Alternative B is highlighted by using this alternative font color.
  - Alternative A provides as much flexibility as possible, requiring only that lost carbon be replaced through insurance, assurance, a buffer, or any other mechanism they establish. When we consider a range of possible projects—geologic sequestration in addition to forest and agriculture, for example—this flexibility might be valued, and the market would likely find ways to pool the risk through insurance or buffers. The difficulty with this method is that it requires that the EPA track project developers for cases of enforcement. If a project is sold or transferred, and the responsible party cannot be found and offsets cannot be replaced, there is a risk that the emissions cap may be exceeded for a given year or years.
  - Alternative B uses an offsets reserve that is held by the EPA to cover the pooled risk. In this option, every sequestration project has to determine its reversal risk and its associated proportional set aside based on that risk. This set-aside is simply taken off the top of any issued allowances for that project and held in a reserve by EPA. If there is a reversal, the full amount is taken from the reserve, and the project developer will need to replace the amount of allowances taken from the reserve. This approach could require full replacement for intended reversals and partial replacement (perhaps only the set-aside) amount for those with

unintended losses (acts of nature). This would make it less burdensome on project developers that suffer from an unplanned loss, but would require a more conservative set-aside to ensure sufficient buffer. This approach may provide a backup plan for reversals where project developers or their assurance option no longer exist or are no longer viable, which is a significant issue for the long time spans of these programs.

- Alternative C also uses an offset reserve held by the EPA to cover the pooled risk. However, in this case, a 20-year-minimum management plan is required for projects and a very detailed assessment of risks, including the risk of both unintentional and intentional reversals. Intentional reversals are assessed by considering the potential economic drivers (i.e., opportunity costs) given current trends. A conservative set-aside based on this risk assessment is required because no replacement is required. If a project has too much risk, it will not be allowed. Under this approach, no compensation is required, so projects do not need to be tracked, which greatly reduces the administrative burden. This approach is based on the new Voluntary Carbon Standard (VCS) protocol. However, three issues of concern arise with this approach:
  (1) *Fairness*. Are irresponsible project developers "let off the hook" because their losses are covered by others in the pool?
  (2) *Integrity*. With no compensation required, will the buffer be large enough? The VCS uses a truing up mechanism in which they adjust the required set-asides if the buffer is being depleted.
  (3) *Low participation*. Because no compensation is required from reversals, does the buffer set-aside need to be so conservative that it will stifle participation? The VCS assessment suggests that average medium risk projects will see a 3-10% set aside.

These approaches are also described side-by-side in Table 4 on page 45.

- **EXAMPLE ARCHITECTURE**
  ESTABLISHMENT OF THE OFFSETS PROGRAM
  Alternative Means of Compliance. – Beginning with calendar year 2012, the owner or operator of a covered entity may satisfy up to X percent of the total allowance submission requirement of the covered entity under section [] by submitting offset allowances generated in accordance with this subtitle.

(1) ELIGIBILITY AND EXCLUSIONS

a) Projects are eligible for the offsets program if the activity type to which they belong has a certified methodology.
b) Emissions reductions or sequestration that affects the emissions obligations of another entity (upstream) are not eligible for offsets.

(2) REQUIREMENTS FOR METHODOLOGIES

a) Methodologies developed under the guidance of the appropriate agency (those activities under the jurisdiction of the USDA will be managed by the Secretary of Agriculture and those under the jurisdiction of the EPA will be managed by the Administrator) shall include:
   1. An evaluation of potential double-counting in which the greenhouse gases reductions by a project or part of a project will be accounted for elsewhere in the system for an emissions obligation or be supported through an allocation program.
   2. A delineation of project boundaries, based on acceptable methods and formats.
   3. Scientifically acceptable procedures (and certified tools) for monitoring and quantifying changes in greenhouse gas emissions or carbon sequestration for projects that fall within the activity type methodology or standard. These should include a procedure for determining associated uncertainty and a description of site-specific data to be used in monitoring and quantification.
   4. Scientifically acceptable procedures or certified tools for establishing a baseline, preferably a business-as-usual scenario based on the best data available, for projects that fall within the activity-type methodology or standard, and a scientifically acceptable procedure for estimating uncertainty associated with determination of baseline.
   5. Tables (or certified tools) that provide a threshold of uncertainty for quantification of emissions reduction or increases in sequestration and for baseline estimation above which no emissions reductions or sequestration will be compensated. (To address concerns that this may exaggerate the uncertainty discount, project developers could be allowed to petition for different uncertainty factors if they can demonstrate this through advanced measurement methods on the project.)
   6. The acceptable test, or combination of tests, for determining additionality for projects that fall within the activity type methodology or standard.
   7. The Administrator (in coordination with the Secretary of Agriculture) shall, for each eligible activity type, specify clear and objective criteria for projects that will, in the best judgment of the Administrator, serve to make eligible only those projects that are additional. Such criteria may include:
      - *Performance benchmark*. The project activity must perform at a rate (methane emissions per ton of hog waste stored, for example) that is lower than a benchmark defined by the Administrator.
      - *Regulatory*. The project activity is not required by existing government regulations or commonly accepted industry (sector) standards as determined by the Administrator.
      - *Technology-Specific*. Technologies are predetermined by the Administrator to be additional or eligible.

- *Common practice*. The project activity must utilize technologies or practices that are not in common use (e.g., 85th percentile above mean or better) within a particular jurisdiction or industry as defined by the Administrator.
- *Initiation date*. The project activity must be initiated by a certain date to be determined by the Administrator.
- *Financial*. Revenue from the sale of offset allowances can be shown to contribute to the financial viability of the project and the project is not the least-cost alternative, as defined by the Administrator. This test cannot be used exclusively, but must be used to corroborate one of the others.

8. Must use certified methods or look-up table to account for leakage and adjust (discount) for leakage.
9. For sequestration projects, an assessment of reversal risk and description of activities that are being done to limit this risk, if any.
10. For land-use land use change projects (forestry and agriculture), determine whether the offset project petition indicates a significant deviation over the ten-year period prior to project initiation and adjust the project discount/baseline accordingly or exclude the project.
11. Reporting protocol for the issuance of allowances for emissions reductions or sequestration.

b) Methodologies must meet the following criteria of Independent Reproducibility:[63]

1. Each offset activity type methodology must be tested by three independent expert teams on at least three different projects that cover the range of possible projects within that activity type. For each project tested, the result in emissions reductions or sequestration from the three expert teams for that same project must be within 10% of each other.

(3) CERTIFYING METHODOLOGIES FOR EARLY OFFSETS PROGRAM

a) Taking into account the recommendations of the offsets Task Force (if there is one), not later than one year after passage, the Administrator shall promulgate regulations authorizing the certification of existing proven methodologies from State or regional offset programs that are used for regulatory compliance. The methodologies and standards must clearly contain the procedures and meet the criteria established in Section 2 above for the compliance offset market.

b) The Administrator shall publish proposed regulations within nine months after passage, notify the public, request comment, and revise.

c) The Administrator shall authorize use of certified methodologies and standards for the early offsets program by one year after passage.

(4) CERTIFYING METHODOLOGIES FOR FULL OFFSETS PROGRAM

a) Not later than three years after passage the Administrator shall promulgate regulations authorizing the certification of compliance offset activity methodologies that contain the procedures and meet the criteria established above (Section 2, page 63).

b) All methodologies and standards certified for the early offsets program shall be tested to ensure they meet the guidance established in the newly certified Federal Methodologies and Standards. If they do not, they will be adjusted to meet them during the first five years after the full offsets program is launched.

- Early offsets projects already approved and initiated that used a methodology that required adjustment will have to make changes to their Monitoring and Quantification plan (Section 11, page 61) accordingly. Early projects will keep all already-issued

[63] Richards and Andersson, 2001, *supra* 40.

allowances and do not have to re-initiate and gain approval for the project plan, but they will have to show that the necessary adjustments have been made before any further issuance of offsets allowances.

c) The Administrator shall publish intended regulations 2.5 years after passage, notify the public, request review, and revise.

d) The Administrator shall authorize use of certified methodologies and standards for the full program by three years after passage.

(5) PETITION PROCESS FOR ADDING NEW CERTIFIED METHODOLOGIES

At any time, the Administrator can accept petitions for the development of new methodologies, and must assess them for certification, provided that the Administrator, in coordination with the Secretary of Agriculture, determines that they have sufficient potential to meet required criteria.

The Administrator, in coordination with the Secretary, shall have the authority to:

a) Assess new methodologies to determine whether they include the necessary elements and pass the required criteria;

b) Certify a methodology if it meets these requirements; and

c) Allow those activities covered by the newly certified methodologies to be eligible for the compliance offsets program.

(6) PROCEDURES FOR THE ESTABLISHMENT OF A COMPLIANCE OFFSET PROGRAM

The Administrator shall promulgate regulations authorizing the initiation of offset projects and the issuance of offset allowances.

a) Public notification. No later than 1.5 years after passage, regulations described in this section shall be published and available for public comment.

b) Final regulations will be promulgated within 3 years of passage.

c) Regulations shall establish:

1. A frequently updated list of eligible activity types for the offsets program based on those that have certified methodologies;
2. Clear rules for ownership and transferability of ownership of offset allowances;
3. Clear requirements for project registration and tracking;
4. Procedures for project initiation and approval;
5. Procedures for sequestration projects with significant deviations in land use in 10 years prior to initiation (project adjustments or exclusion);
6. Procedures for third-party verifier accreditation and for third-party verification that ensures that offsets represent real, verifiable, additional, permanent, and enforceable reductions in greenhouse gas emissions or increases in sequestration;
7. Procedures for issuance of offset allowances; and
8. Procedures for tracking permanence (reversals) and compensation for reversals.

(7) OFFSET REGISTRY

a) The allowance registry in the parent bill shall include offset allowances and assign a unique serial number to each offset allowance issued under this section.

b) An offset allowance registered in the Registry under this subtitle shall be linked to

1. The project initiation petition and approval notice;
2. The third-party verification report submitted prior to issuance of allowances and the approval notice;
3. For sequestration projects, the last, if any, reversal certification submitted;
4. Subject to the requirements of this subtitle, any other information identified by the Administrator as being necessary to achieve the purposes of this subtitle.

Information demonstrated to be commercially sensitive or proprietary can be removed from public records if the Administrator deems they are not essential to demonstrating the quality of the offset. All information will be maintained in the private records.

(8) ISSUANCE OF OFFSET ALLOWANCES

Offset allowances shall be issued to the project developer, unless otherwise specified in a legally-binding contract or agreement.

- OFFSET ALLOWANCE.— An offset allowance generated pursuant to this subtitle may be sold, traded, or transferred on the condition that the offset allowance has not been retired or canceled;
- SEQUESTRATION OFFSET PROJECTS.— In addition to the above requirements, project developers of sequestration projects are responsible for reporting of reversals to the Offset Reserve Registry unless otherwise specified in a legally-binding contract or agreement.

(9) ACCOUNTING PERIOD

Offset allowances will accrue in yearly increments, which can start at the date of project initiation approval. Each year (or at any greater interval) offset projects can be issued compliance offsets allowances for verified and certified reductions or increases in sequestration.

- Projects will be guaranteed a crediting period of 7 years at their approved baseline (*Some preferred a 10-year crediting period. See page 60 for discussion*).

(10) VERIFIER ACCREDITATION

EARLY ACCREDITATION.— Not later than six months after the date of enactment of this Act, the Administrator in coordination with the Secretary shall promulgate regulations establishing an expedited process for accreditation for third-party verifiers that have no conflicts of interest, which will accept existing credentials deemed sufficient by the Administrator on a temporary basis. (We assume this could include those certified for State or regional programs like RGGI and CCAR.)

FULL ACCREDITATION.— Not later than three years after the date of enactment of this Act, the Administrator in coordination with the Secretary shall begin full accreditation of third-party verifiers that have no conflicts of interest, which will include any tests deemed necessary by the Administrator and Secretary. Early accredited verifiers must get re-accredited through the full accreditation process within 4 years after the date of enactment of this Act to maintain accreditation.

PUBLIC ACCESSIBILITY.— Each verifier meeting the requirements for accreditation in accordance with this paragraph shall be listed in a publicly accessible database, which shall be maintained and updated by the Administrator.

(11) PROJECT INITIATION AND APPROVAL

a. PROJECT INITIATION AND APPROVAL TIMING.— A project developer
   1. may submit a petition for offset project initiation and approval at any time following the effective date of regulations promulgated; but
   2. the Administrator may not register or issue offset allowances until the petition for initiation is approved and until after the emission reductions or sequestrations supporting the offset allowances have actually occurred.

b. OFFSET PROJECT INITIATION PETITION PROCESS.— A project developer shall submit a

petition to the Administrator, consisting of

1. A monitoring and quantification plan

PLAN RETENTION.— The plan must be retained by the project developer for the duration of the offset project.

PLAN REQUIREMENTS.— The Administrator, in conjunction with the Secretary of Agriculture, shall specify the required components of a monitoring and quantification plan, including

a) a description of the offset project, including activity type;
b) for sequestration offset projects, documentation of land use in the ten years prior to the initiation of a project;
c) an indication of which certified methodology will be applied to the project and why the project is eligible to use that methodology;
d) an assessment of reversal risk based on the certified methods and resulting set aside for the sequestration offset reserve;
e) a description of procedures for use in managing and storing data, including quality-control standards and procedures, such as redundancy in case records are lost;
f) subject to the requirements of this subtitle, any other information identified by the Administrator or the Secretary of Agriculture as being necessary to meet the objectives of this subtitle.

2. A third-party validation of the monitoring and quantification plan

OFFSET VALIDATION.— A validation report for an offset project shall be completed by a verifier accredited in accordance with Section (14.2)

SCOPE OF VALIDATION.— The Administrator shall specify the required components of a validation report, including

a) Whether the information, data and documentation contained within a monitoring and quantification plan are sufficient for the analysis required by the certified methodology;
b) Any errors, omissions, or disagreements with the quantification plan of net emission reductions or increases in sequestration; uncertainty estimate; determination of additionality; calculation of leakage; assessment of reversal risk and required set-aside.
c) If it is a sequestration project, whether the land use information is sufficient to track past land use for the required ten-year period and if there is a significant deviation as described in Section (2.a.10).
d) Any potential conflicts of interest between a verifier and project developer; and
e) Any other provision that the Administrator considers to be necessary to achieve the purposes of this subtitle.

c. APPROVAL AND NOTIFICATION.—

IN GENERAL.— Not later than 6 months after the date on which the Administrator receives a complete petition and verification report, the Administrator shall

a) determine whether the monitoring and quantification plan satisfies the applicable requirements of this subtitle;
b) notify the project developer of the determinations under subparagraphs (A) and (B);

APPEAL.— The Administrator shall establish mechanisms for appeal and review of determinations made under this subsection. The appropriate agency will have X months to respond to an appeal before the project is allowed by default.

(12) OFFSET RESERVE FOR REVERSALS

IN GENERAL.— The Administrator shall establish an Offsets Reserve and Offsets Reserve Registry to guarantee that all offset project reversals are fully compensated.

REQUIREMENTS. The Administrator shall withdraw the required set-aside of offset allowances proportional to risk as designated in the Offset Project Initiation Petition for all sequestration projects applying for offsets allowances. These set aside offset allowances shall be—

a. subtracted from the offset allowances issued to the project developer unless otherwise specified in a legally-binding contract or agreement;
b. held by the Administrator in the Offsets Reserve;
c. registered in the Offsets Reserve Registry by the Administrator; and
d. replaced by the project developer or owner in the case of an intended reversal (as specified in next section).

REMOVAL FROM THE RESERVE.— In the case of a project reversal, the Administrator shall remove offset allowances from the Offsets Reserve and cancel them to fully account for the tons of greenhouse gases that are no longer sequestered.

INTENDED REVERSALS.— Project developers with intentional reversals as determined by the Administrator must fully replace allowances taken out of the reserve due to the reversal with

a. an equal number of offset allowances or
b. a combination of offset allowances and emission allowances equal to the unmitigated intentional reversal.

UNINTENDED REVERSALS.— Project developers with unintended reversals as determined by the Administrator must partially compensate for the reversal with

a. a number of offset allowances equal to those set aside in the Offsets Reserve for the project or
b. a combination of offset allowances and emission allowances equal to this set-aside.

(13) TRACKING REVERSALS

Reversal Certification.— *(This was Sec 2406 in LW)*

IN GENERAL.— The Administrator shall promulgate regulations requiring the submission of a reversal certification for any partial or complete reversal event during the same year as the reversal event regardless of whether new sequestration and offset allowances are being requested or not.

REQUIREMENTS.— A reversal certification submitted in accordance with this subsection shall state—

(A) when an unmitigated reversal occurred, and
(B) the quantity of each unmitigated reversal.

ACCOUNTABILITY FOR REVERSALS.— Liability and responsibility for compensation of a reversal of a registered offset allowance shall lie with the project developer unless otherwise specified in a legally-binding contract or agreement.

ENFORCEMENT.— If a project with a reversal fails to report or to replace allowances in the reserve for over one year, the contractually responsible party or project developer will be required to provide two times the compensation required.

EARLY PROJECT TERMINATION.— A project developer may cease participation in the domestic offset program established under this subtitle at any time, on the condition that any registered allowances awarded for increases in sequestration have been compensated by the project developer through the submission of an equal number of any combination of offset allowances and emission allowances.

(14) ISSUANCE OF ALLOWANCES

1. In General.— After successful completion of the petition process for offset project approval and after the emission reductions or sequestrations supporting the offset allowances have actually occurred, offset allowances may be claimed for net emission reductions or increases in sequestration annually, once the project developer has submitted the following:
   a. A third-party verification report and
   b. If ownership has changed hands, legally binding documentation of current project developer and reporting responsibility.

2. Third-party verification.

OFFSET VERIFICATION.— A verification report for issuance of allowances from an offset project shall be completed by a verifier accredited in accordance with Section (10).

SCOPE OF VERIFICATION.—The Administrator shall specify the required components of a issuance verification report, including

a. A quantification of emissions reductions or sequestration increases using the reporting protocol required in the certified methodology;
b. The quantity of allowance offsets to be set aside for the Offsets Reserve for sequestration projects;
c. Whether the information, data, and documentation used for monitoring and quantification were according to the project plan and sufficient for the analysis required by the certified methodology;
d. Any errors, omissions, or disagreements with the quantification of net emission reductions or increases in sequestration; uncertainty estimate; determination of additionality; calculation of leakage; or assessment of reversal risk;
e. For sequestration projects, documentation that no reversals have occurred, or those that have were accounted for and compensated; and
f. Any other provision that the Administrator considers to be necessary to achieve the purposes of this subtitle.

3. Registration and Awarding of Offsets.—

IN GENERAL.— Not later than 90 days after the date on which the Administrator receives a full submission with complete verification report, the Administrator shall

(A) determine whether the offsets satisfy the applicable requirements of this subtitle; and
(B) notify the project developer of that determination.

AFFIRMATIVE DETERMINATION.— In the case of an affirmative determination under paragraph (1), the Administrator shall

(A) register the offset allowances in accordance with this subtitle; and
(B) issue the offset allowances.

APPEAL AND REVIEW.— The Administrator shall establish mechanisms for the appeal and review of determinations made under this subsection. The appropriate agency will have X months to respond to an appeal before the project is allowed by default.

a. EXAMINATIONS. (sec 2407 LW)

Regulations. — Not later than two years after the date of enactment of this Act, the Administrator, in conjunction with the Secretary of Agriculture, shall promulgate regulations governing the examination and auditing of offset projects.

Requirements.— The regulations promulgated under this section shall specifically consider

(1) principles for initiating and conducting examinations;

(2) the type or scope of examinations, including—

(A) project reporting and record-keeping, including verification;

(B) project site review or visitation; and

(3) the rights and privileges of an examined party; and

(4) the establishment of an appeal process.

Reporting. — Periodically, a summary of the audits and their results should be made available to the public.

b. ENVIRONMENTAL CONSIDERATIONS (Sec 2410. LW)

(a) Coordination to Minimize Negative Effects.—In promulgating regulations under this subtitle, the Administrator, in conjunction with the Secretary of Agriculture, shall act (including by rejecting projects, if necessary) to avoid or minimize, to the maximum extent practicable, adverse effects on human health or the environment resulting from the implementation of offset projects under this subtitle.

(b) Report on Positive Effects.—Not later than 2 years after the date of enactment of this Act, the Administrator, in conjunction with the Secretary of Agriculture, shall submit to Congress a report detailing—

(1) the incentives, programs, or policies capable of fostering improvements to human health or the environment in conjunction with the implementation of offset projects under this subtitle; and

(2) the costs and benefits of those incentives, programs, or policies.

(c) Coordination to Enhance Environmental Benefits.— In promulgating regulations under this subtitle, the Administrator, in conjunction with the Secretary of Agriculture, and the Secretary of Interior shall—

(1) act to enhance the adaptive capability of natural systems, increasing resilience to climate change. This should include, but is not limited to, supporting biodiversity, native species, and lands management that foster natural ecosystem conditions; and

(2) coordinate this provision to the extent possible with existing programs that have overlapping outcomes to maximize environmental benefits.

(d) Use of Native Plant Species in Offset Projects.— Not later than 18 months after the date of enactment of this Act, the Administrator, in conjunction with the Secretary of Agriculture, shall promulgate regulations for the selection, use, and storage of native and nonnative plant materials—

(1) to ensure native plant materials are given primary consideration, in accordance with applicable Department of Agriculture guidance for use of native plant materials;

(2) to prohibit the use of Federal- or State-designated noxious weeds; and

(3) to prohibit the use of a species listed by a regional or State invasive plant council within the applicable region or State.

Allocation-Based Programs

Supplemental funding through programs supported by allocation of allowances can be used to complement the offsets program in a number of ways, including

(1) Compensation for early actors;
(2) Support for mitigation activities that cannot meet the stringent criteria of the certified methodologies, but should be supported for their mitigation potential; and
(3) Support for innovation and development of technology, development of accounting and measurement tools, and outreach and education.

In general, the programs outlined in the following sections are less detailed and more descriptive than those in the previous sections.

- Allowances allocated for these uses will not be available for grandfathering (allocating back to the emitters) or auctioning to support other programs. Thus, the amount of allowances to be allocated in this manner is limited and they can be at risk during a floor debate.
- Any emissions reductions or sequestration increases that occur in response to allocation support are not used to offset the cap; thus, any reductions would be in addition to the cap, enhancing environmental benefit. Since the emission reductions are in addition to those required by the cap, if the reductions are not completely real or additional, they will not hurt the integrity of the cap.
- Reductions supported through allocation do not contribute to lowering the compliance costs of capped entities, because they cannot be used by capped entities to meet their obligations.

Allocation Distribution

S. 2191 Lieberman-Warner Bill	NI Example (one option)
5% Agriculture and Forestry	5% Mitigation Financing Program
1% Coal Bed and Landfill Methane	3% International Forest Carbon
2.5% International Forest Carbon	0.5% Innovation Program

Early Action

Offset early actors can be included with the capped sector early actors using the same allocation set-aside. In this example, if offsets were used by a capped entity, they would be part of that entity's early activities. Only unused or banked offsets should be eligible for early-action compensation as offsets. If they are used by a capped entity, they will be counted for that capped entity.

- We have based our new ideas for including offsets on the S. 2191 early actors provision and have not changed any of the language that refers to the capped sector which we did not see as part of our mandate for this project.
- The purpose is to provide early action compensation for pre-implementation banked reductions or sequestration of greenhouse gases that are not held or owned by capped entities through the allocations already set aside for early action by capped entities.
- To address concerns that determining who should get compensated could be complicated and administratively burdensome—the voluntary registries have been varied—we suggest that the EPA set simple criteria by registry and by activity type to determine what will be eligible for compensation. Others would have to petition for compensation.
- Many of our working group participants felt it would be unfair not to provide early action credit, while others felt that it would consume administrative resources that would better be used for forward action. Our group was uncomfortable providing support as far back as 1994, and suggested a date ten years before the cap, which in this case would be 2002.
- The below is an expansion of the early actor allocation in S. 2191 America's Climate Security Act of 2007 (Lieberman-Warner).
- It would be valuable to assess whether the current allocation for early action is sufficient if crediting of banked offsets is included along with credits for capped entities early action. In the current voluntary market, most offsets are used. But in a pre-compliance market, once the potential for early crediting is clear, a significant pool of offsets might be banked, helping to build the pool available for post-compliance, but also taking up some of the allocation original set aside for capped entities alone.

EXAMPLE ARCHITECTURE
EARLY ACTORS

1. Allocation.
Not later than 2 years after the date of enactment of this Act, the Administrator shall allocate to owners or operators of covered facilities that emit greenhouse gas, in recognition of actions taken since January 1, 1994, that resulted in verified and credible reductions in greenhouse gas emissions, and to owners of offsets projects in recognition of actions taken since January 1, 2002 (10 years before cap), that reduce emissions or increase sequestration

a. 5 percent of the emission allowances established for calendar year 2012;
b. 4 percent of the emission allowances established for calendar year 2013;
c. 3 percent of the emission allowances established for calendar year 2014;
d. 2 percent of the emission allowances established for calendar year 2015;
e. 1 percent of the emission allowances established for calendar year 2016;

2. Distribution.

a. In General.— Not later than 2010, the Administrator shall establish, by regulation, procedures for use in distributing, to owners and operators of covered facilities and other facilities or entities that emit or sequester greenhouse gases, emission allowances allocated under section ( ).
b. Consideration.— The procedures established under subsection (a) shall provide for consideration of verified and credible emissions reductions or sequestration registered before the date of enactment of this Act under—
   1. the Climate Leaders Program, or any other voluntary greenhouse gas reduction program of the United States Environmental Protection Agency and United States Department of Energy;
   2. the Voluntary Reporting of Greenhouse Gases Program of the Energy Information Administration;
   3. State or regional greenhouse gas emission reduction programs that include systems for tracking and verifying the greenhouse gas emissions reductions and sequestration and were used for a regulatory purpose; and
   4. Other voluntary registries or programs.
c. Eligibility.— For reduced emissions or sequestration of greenhouse gases that took place outside a capped entity—
   1. Reductions in greenhouse gases that were purchased or retired are eligible for the purchasing entity; and
   2. Reductions that were not purchased, but were in practice unsold are eligible for the offset project developer.
d. Distribution Limit.— Not later than 4 years after the date of enactment of this Act, the Administrator shall have distributed all emission allowances allocated under Section ().
e. Procedures for Distribution.— Considering the advice of the Task Force the Administrator shall
   1. Produce a list of registries and activities within those registries for which it will provide a set distribution of allowances and set discounts if deemed necessary, considering:
      a) the methodologies for measurement, additionality, leakage, reversals, and tracking used in the registry;
      b) the best estimate of real greenhouse gas reduction or sequestration for that project; and
      c) verifiable documentation on intent to create emissions reductions for pre-compliance or voluntary markets with a third party verification of baselines, additionality, and measurement.

2. Develop a petition process by which projects owners or operators can request a project review to pursue a distribution greater than the standard provided the registry in which the project was registered;
3. The Administrator's decision on petitions is final.

f. The Administrator shall report to Congress regarding its methods to distribute the early actor allocation.

Mitigation Financing Program

- The objective is to provide financial support for activities that have not reached maturity for the offsets program but still provide significant greenhouse gas mitigation. This is a backup option to make sure that some resources are available for all mitigation activities whether they have the maturity and certainty for an offsets market or not.
- Continued project-level support may help with methods development, deployment, and cost-effectiveness so that some activities could move into the offsets market over time.
- The 5% allocation for domestic activities would provide ~$5–8 billion annually, and the 3% allocation for international forest carbon would provide ~$3–5 billion annually based on a price ranging from $20 to $40 per ton CO_2e from 2012 to 2030. As activities move into the offsets market, more funding will remain for other activities.
- If offsets are restricted, the price for offset allowances will be less than for regular allowances because demand will be restricted for the offset allowances, pushing demand to the regular allowance market and driving those prices up. If this is the case, allocated allowances will be more valuable than offset allowances.
    - If the mitigation financing program plans to provide comparable support to the offsets market and not greater, a simple adjustment formula will be needed to allocate emissions allowances that are comparable to offset allowances.

$$\text{X tons of } CO_2e \text{ Sequestration or Reduced Emissions} \times \frac{\text{Value of Offset Allowances}}{\text{Value of Allowances}} = \text{Allocated Allowances for Distribution}$$

$$\text{Example: } 300 \text{ tons} \times \frac{\$10/\text{Offset Allowance}}{\$30/\text{Allowance}} = 100 \text{ Allowances}$$

    - Since these are not offset reductions and are outside the cap, there is no need to support them only at a one-to-one ratio of allowances to tons reduced. If these are higher cost activities that we hope to mature, they could be supported with a greater than one-to-one ratio.

- In S. 2191, the international forest carbon allocation is set up to fund only real reductions. We have used the same model here. It could be set up as a grant program or market for verified reductions. It requires a national sectoral baseline, and it provides incentive for GHG reductions or sequestration through a market-like mechanism, which could spur learning and innovation in developing marketable reductions.

EXAMPLE ARCHITECTURE
MITIGATION FINANCING PROGRAM

1. Allocation.— Not later than April 1, 2011, and annually thereafter through calendar year 2049, the Administrator shall allocate 5 percent of the Emissions Allowance Account for the following calendar year domestically and 3 percent internationally for real reductions in greenhouse gas emissions or increases in sequestration.

[S. 2191 has a 5% allocation for forest and agricultural sequestration. This would be approximately $5–8 billion per year from 2012 to 2030 at $15 per ton. S. 2191 as passed by committee has a 2.5% allocation for international forest carbon. A 3% allocation would be approximately $4 billion per year from 2012 to 2030 at $15 per ton. For context, the Stern report showed for 8 countries with the greatest deforestation rates that it would cost $5–15 billion per year to reduce deforestation by 50%]

2. Exclusion.— Activities excluded from the allocation-based programs include
   a. activities that are covered by the cap, and
   b. activities that are eligible for the offsets program.

3. General Support.— The Secretary of Agriculture shall receive funding to coordinate
   a. An offsets handbook (as in S. 2191 Lieberman-Warner),
   b. Other outreach and education materials and programs on offsets and allocation programs, and
   c. Development and deployment of measurement and accounting tools for offsets and allocation programs.

4. Domestic Project-Based Support Program.— In coordination with the Secretary of Agriculture, the Administrator shall
   a. Establish, by regulation, a program under which allowances may be distributed to entities that carry out projects or programs that achieve real, verifiable, additional, and permanent reductions in greenhouse gas emissions or sequestration determined to the extent possible given the limitations of the methodologies and tools available for these activity types;
   b. Certify protocols or best management practices for each activity type by which emissions reductions or increases in sequestration will be quantified and monitored and the acceptable methods for determining additionality for each activity type to the extent possible within three years of passage and continue to certify protocols and practices for each activity type the Administrator deems appropriate for this program;
   c. Designate a process by which permanence will be promoted;
   d. Describe data reporting necessary/desired from these projects to assess their impact on greenhouse gas mitigation and cost effectiveness, and to document their contribution to other environmental and health benefits; and
   e. Distribute allowances to projects based on
      i. Estimated project emissions reductions or sequestration; and
      ii. Secondarily (if the allocation pool is not sufficient to cover all projects) by the cost-effectiveness of the activity.

4. SUPPORT FOR INTERNATIONAL FOREST CARBON ACTIVITIES
(As is in LW) Subtitle H—International Forest Protection
FINDINGS. SEC. 3801.
Congress finds that—
(1) land-use change and forest sector emissions account for approximately 20 percent of global

greenhouse gas emissions;
(2) land conversion and deforestation are 2 of the largest sources of greenhouse gas emissions in the developing world, amounting to roughly 40 percent of the total greenhouse gas emissions of the developing world;
(3) with sufficient data, deforestation rates and forest carbon stocks can be measured with an acceptable level of uncertainty; and
(4) encouraging reduced deforestation and other forest carbon activities in other countries can—
(A) provide critical leverage to encourage voluntary developing country participation in emission limitation regimes;
(B) facilitate greater overall reductions in greenhouse gas emissions than would otherwise be practicable; and
(C) substantially benefit biodiversity, conservation, and indigenous and other forest-dependent people in developing countries.

DEFINITION OF FOREST CARBON ACTIVITIES. SEC. 3802.
In this subtitle, the term "forest carbon activities" means—
(1) activities directed at reducing greenhouse gas emissions from deforestation and forest degradation in countries other than the United States; and
(2) activities directed at increasing sequestration of carbon through restoration of forests, and degraded land in countries other than the United States that has not been forested prior to restoration, afforestation, and improved forest management, that meet the eligibility requirements promulgated under section 3804(a).

DEFINITION AND ELIGIBILITY REQUIREMENTS. SEC. 3804.
(a) Eligibility Requirements for Forest Carbon Activities. —Not later than 2 years after the date of enactment of this Act, the Administrator, in consultation with the Secretary of the Interior, the Secretary of State, and the Secretary of Agriculture, shall promulgate eligibility requirements for forest carbon activities directed at reducing emissions from deforestation and forest degradation, and at sequestration of carbon through restoration of forests and degraded land, afforestation, and improved forest management in countries other than the United States, including requirements that those activities be—
(1) carried out and managed in accordance with widely-accepted environmentally sustainable forestry practices; and
(2) designed—
(A) to promote native species and restoration of native forests, where practicable; and
(B) to avoid the introduction of invasive nonnative species.
(b) Quality Criteria for Forest Carbon Allocations.— Not later than 2 years after the date of enactment of this Act, the Administrator, in consultation with the Secretary of the Interior, the Secretary of State, and the Secretary of Agriculture, shall promulgate regulations establishing the requirements for eligibility to receive allowances under this section, including requirements that ensure that the emission reductions or sequestrations are real, permanent, additional, verifiable and enforceable, with reliable measuring and monitoring and appropriate accounting for leakage.

INTERNATIONAL FOREST CARBON ACTIVITIES. SEC. 3805.
(a) In General.—The Administrator, in consultation with the Secretary of State, shall identify and periodically update a list of countries that have—
(1) demonstrated capacity to participate in international forest carbon activities, including—
(A) sufficient historical data on changes in national forest carbon stocks;
(B) technical capacity to monitor and measure forest carbon fluxes with an acceptable

level of uncertainty; and

(C) institutional capacity to reduce emissions from deforestation and degradation;

(2) capped greenhouse gas emissions or otherwise established a national emission reference scenario based on historical data; and

(3) commenced an emission reduction program for the forest sector.

(b) Additionality.—

(1) REDUCTION IN DEFORESTATION AND FOREST DEGRADATION.— A verified reduction in greenhouse gas emissions from deforestation and forest degradation under a cap or from a nationwide emissions reference scenario described in subsection (a) shall be—

(A) eligible for distribution of emission allowances under this section; and

(B) considered to satisfy the additionality criterion.

(2) PERIODIC REVIEW OF NATIONAL LEVEL REDUCTIONS IN DEFORESTATION AND DEGRADATION. —The Administrator, in consultation with the Secretary of State, shall identify and periodically update a list of countries described in subsection (a) that have—

(A) achieved national-level reductions of deforestation and degradation below a historical reference scenario, taking into consideration the average annual deforestation and degradation rates of the country and of all countries during a period of at least 5 years; and

(B) demonstrated those reductions using remote sensing technology that meets international standards.

(3) OTHER FOREST CARBON ACTIVITIES.— A forest carbon activity, other than a reduction in deforestation or forest degradation, shall be eligible for distribution of emission allowances under this section, subject to the quality criteria for forest carbon activities identified in this Act or in regulations promulgated under this Act.

(c) Recognition of Forest Carbon Activities.—With respect to countries other than countries described in subsection (a), the Administrator—

(1) shall recognize forest carbon activities, subject to the quality criteria for forest carbon activities identified in this Act and regulations promulgated under this Act; and

(2) is encouraged to identify other incentives, including economic and market-based incentives, to encourage developing countries with largely-intact native forests to protect those forests.

Offsets Incubator

The objective is to have a targeted program to support research, tool development, technology innovation, and deployment for outside-the-cap mitigation activities. This would include programmatic support for development of new tools, methodologies, technology standards, and research on new measurement and technology, as well as targeted support for new and emerging technologies/activities subject to address barriers to deployment. This support could focus on small number of selected projects for first of a kind support and provide a small amount of supplemental funding to help new technologies/activities engage in market for a limited period of time.

EXAMPLE ARCHITECTURE
OFFSETS INCUBATOR

1. Allocation—. Not later than April 1, 2011, and annually thereafter through calendar year 2049, the Administrator shall allocate and distribute **0.5** percent of the Emission Allowance Account for the following calendar year for use in carrying out activities that support innovation in emissions reduction and sequestration for activities outside the domestic cap and the offsets markets. (0.5% of allowances is from around $500 up to $800 million per year from 2012 to 2030 based on a allowance price of $20 to $40 over the same period.)
2. Support for Innovation.— The Administrator shall establish programs that use allocation support for the following:
    a. Acquisition of New Data, Improvement of Methodologies, and Development of New Tools for Designated Offsets Activity Types. The Administrator, in conjunction with the Secretary of Agriculture, shall establish a comprehensive field sampling and pilot project program to improve the scientific data and calibration of standardized tools and methodologies used to measure greenhouse gas reductions or sequestration and baseline for uncapped activity types that are likely to provide significant emissions reductions or sequestration.
    b. Targeted Support for Development and Deployment of New Technologies.
    c. The Administrator shall establish a program for development and deployment of new technologies and methods in greenhouse gas reductions or sequestration for uncapped activities. Activities would be selected based on their potential emissions reductions or sequestration (and a market penetration review). Funding would provide support for a select number of projects to cover research on technological other barriers, prototypes, first-of-the-kind risk coverage, and initial market barriers. Funding for selected activity types would be limited and dependent on forward progress.

Review and Revision

The intention is to review the program designed to encourage outside-the-cap emissions reductions and sequestration to better allocate resources and coordinate programs. We wanted to avoid creating another board or cross-agency institution, so we have designated the National Academies of Science as the reviewers and recommenders for the program.

The review is an opportunity to assess whether the program is maintaining the desired environmental and market integrity, and to make adjustment if it is not. In particular, we suggest a comparison of expected mitigation from offsets allowances issued to mitigation observed in the national inventory for these uncapped sectors. Of course, such a comparison would be rough and would have to account for any activities that could have a significant impact on emissions or sequestration that were taking place outside of the offsets market to factor that into the assessment. Even though it is rough, the U.S. could potentially use the national inventory as an opportunity to assess whether outside-the-cap mitigation was progressing as desired and to make revisions to the program and/or use an allocation set aside to true-up expectation with national estimates. It is unclear whether the existing inventory would be of sufficient accuracy for this use or would need to be further improved. It is a question we are currently exploring.

An allocation set aside for a "true-up" reserve would have to be pulled from elsewhere. One idea would be to borrow from the future in the allocation set aside for outside-the-cap mitigation. Another would be require more conservative issuance of offset allowances for those project types at fault until the system is back in balance. This idea is in its early stages and is not written in to the example architecture below.

The review and revision includes (a) restrictions/limits on a domestic offsets program, international allowances, and international offsets; (b) the offsets program, including the certified methodologies and standards and tools used to estimate leakage; (c) the integrity of the offsets program in comparison to national level inventory; and (d) the cost-effectiveness and impact on driving innovation and deployment of the allocation programs.

EXAMPLE ARCHITECTURE
PERIODIC REVIEW AND REVISION

a. **Timing of Review** — 3 years after initiation (2015) and every 5 years thereafter.

b. **Review to be conducted by National Academies of Science**

c. **Review of restrictions on domestic offsets, international allowances, and international offsets** shall include an assessment of
   i. the uncertainty and additionality of domestic offsets, international offsets, and international markets;
   ii. the impacts of changing the restrictions on the market and the economic costs of the program;
   iii. the interaction with the cost management efforts of the Carbon Market Efficiency Board;
   iv. the impacts on deforestation in foreign countries; and
   v. the progress covered entities are making in reducing emissions from their covered activities.

d. **Review of eligible projects in the offsets program** shall include an assessment of
   i. Whether new methodologies are being developed and certified by EPA effectively;
   ii. Whether certified methodologies for offsets projects are sufficient – shall include an assessment of success of the certified methodologies used for each eligible activity type based on past performance of the program including the protocols for measurement, monitoring, additionality, leakage, and permanence.
   iii. Whether certified leakage model and the leakage estimates and adjustments for those activities most affected by leakage have been sufficient to maintain the integrity of the cap and are being revised sufficiently to address changes in critical economic drivers.

e. **Review integrity of offsets program—national-level accounting**
   i. Use the national emissions inventory which is compiled by the Administrator every year to assess the impact of the offsets program on outside-the-cap mitigation;
   ii. Consider activities occurring outside those driven by the offsets market that would significantly impact the emission or sequestration occurring outside the cap; and
   iii. Compare the observed national inventory for outside-the-cap activities adjusted by any outside-the-offset-market activities to the expected mitigation based on issued offsets allowances.

f. **Review of allocation programs that support emissions reductions or sequestration for uncapped activities** shall include an assessment of
   i. Whether Mitigation Financing and Innovation support programs for domestic activities and international forest carbon have led to (a) cost-effective reductions in greenhouse gas emissions or increases in sequestration and (b) innovation in quantification and monitoring; and
   ii. Whether discounting of distributed emission allowances distributed through the International Forest Carbon Program to some foreign countries is warranted.

g. **Report and public comment period –** The National Academies of Science shall
   i. Issue a draft report of the review for public comment by March of the review year;
   ii. Provide 3 months for comments; and
   iii. Address public comments and submit final report within additional 3 months.

h. **Guidance on Reporting and Revision**

i. For changing the restrictions on the amount of domestic offsets, international allowances, and international offsets allowed – The National Academies of Science shall submit a report to Congress recommending any needed revision of the restrictions based on the outcome of the review.

ii. For revised baselines,
   a. The National Academies of Science shall submit a report to the Administrator recommending new rule making.
   b. The Administrator shall review and consider recommendations, give public notice, and initiate rule-making
      1. All offset projects in these classes initiated after public notification will be given one year after notification before they must use the new baseline, while
      2. Projects in these classes already initiated will have (7 years) at the current baseline before having to adjust calculated reductions based on the new baseline.

iii. For activity types previously in the federal offsets program that would benefit from a sectoral cap – The National Academies of Science shall- submit a report to the Administrator regarding their recommendations.

iv. For methodologies the National Academies of Science shall submit a report to the Administrator recommending improvements to the program.

v. The Administrator shall consider recommendations, and provide notice and initiate rule making to revise and improve methodologies for eligible offset projects.

vi. For allocation-based programs the
   a. National Academies of Science shall submit a report to the Administrator recommending improvements to the programs.
   b. The Administrator in coordination with the Secretary of Agriculture shall consider recommendations, provide notice and initiate rule making to revise and improve Mitigation Financing and Innovation support programs as necessary to produce
      1. cost-effective reductions in greenhouse gas emissions or increases in sequestration,
      2. innovation in quantification and monitoring, and
      3. significant health, environmental, or international development co-benefits.

vii. For allocation to international forest carbon projects the
   a. National Academies of Science shall submit a report to the Administrator recommending suggested discounts.
   b. The Administrator shall consider recommendations, provide notice and initiate rule making.

Discount. — If, after the date that is 10 years after the date of enactment of this Act, the National Academies of Science determines that foreign countries that, in the aggregate, generate greenhouse gas emissions accounting for more than 0.5 percent of global greenhouse gas emissions have not capped those emissions, established emissions reference scenarios based on historical data, or otherwise reduced total forest emissions, the Administrator may apply a discount to distributions of emission allowances to those countries under this section. (from SEC. 3806. REVIEWS AND DISCOUNT.)

APPENDIX A: WORKING GROUP PARTICIPANTS

Members of the working group engaged in a series of conference calls and reviewed paper drafts to discuss different design issues for this program.

Please Note
Some participants may not be serving in their official capacity and thus they are not representing the views of their organization. Participation in no way indicates an individual's or organization's support of this report.

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Please Note
Some participants may not be serving in their official capacity and thus they are not representing the views of their organization. Participation as a reviewer in no way indicates an individual's or organization's support of this report.

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APPENDIX C: ADDITIONAL PERSPECTIVES

Working group participants, reviewers, and some others that were consulted on this project were invited to provide a perspective discussing the views of their organizations on this report and example architecture and on offsets in general.

The following organization provided perspectives that are included in this appendix:

- Business Council for Sustainable Energy
- Carbon Offset Providers Coalition
- Coalition for Emission Reduction Projects
- EcoSecurities
- The Pacific Forest Trust
- Union of Concerned Scientists
- World Resources Institute

The Business Council for Sustainable Energy
Perspective on

Designing Offsets Policy for the U.S.: Principles, Challenges, and Options for Encouraging Domestic and International Emissions Reductions and Sequestration from Uncapped Entities as Part of a Federal Cap-and Trade for Greenhouse Gases

By

Lydia Olander, the Nicholas Institute for Environmental Policy Solutions, Duke University

The Business Council for Sustainable Energy (BCSE or 'the Council') appreciates the opportunity to provide a perspective on the Nicholas Institute paper on "Designing Offsets Policy for the U.S." The Council appreciates the background and expertise the Nicholas Institute brings to the congressional debate about how to design a workable, effective offset program. The Council commends the Institute for its work with the authors of S.2191, the Lieberman-Warner Climate Security Act, to include a domestic offset program in the framework of the legislation.

The Business Council for Sustainable Energy is a broad-based coalition that represents companies and trade associations in the energy efficiency, renewable energy and natural gas industries. Members include power developers, equipment manufacturers, independent generators, retailers, green power marketers, and gas and electric utilities, as well as several of the primary trade associations in the renewable energy, energy efficiency and natural gas industries.

The Council and its members have been working consistently with state, federal and international policymakers on market-based measures to reduce greenhouse gas emissions since its inception in the early 1990s. The coalition supports the establishment of market-based programs for clean energy technology innovation and deployment, economic efficiency and enhanced energy security.

For more information about the Council, please visit: www.bcse.org

The ability for entities to generate and purchase offset allowances is an essential feature of a market-based approach to reducing greenhouse gas (GHG) emissions. Under a compliance offset program, covered entities are permitted to help meet their obligation to reduce GHG emissions by purchasing offset allowances generated from projects or activities that fall outside the scope of an emissions cap. This flexibility provides covered entities with the ability to achieve needed emission reductions at the lowest cost. While the Council encourages covered entities to undertake internal emission reduction activities such as deploying renewable energy and energy efficiency to the greatest extent possible, our members recognize offset purchases as an important complementary tool to help covered entities manage compliance costs, widen the scope of environmental benefits and lower economic costs for energy consumers.

By creating the market opportunity to generate offset allowances and by providing covered entities with the ability to purchase offsets, the U.S. can more quickly and cost-effectively reduce GHG emissions across a broad spectrum of the economy. In addition, an offset program promotes the deployment of valuable existing clean technologies that reduce emissions, and facilitates additional and positive environmental, social, and economic benefits.

As with other aspects of market-based initiatives to address climate change, the details and structure of a federal compliance offset program will play a critical role in determining successful implementation, as well as achieving desired GHG emission reductions. The Council believes that ensuring the environmental integrity of offset allowances is essential in order to meet desired emission reduction levels. Real and additional offsets must be the standard for program integrity.

Independent, third-party monitoring and verification requirements are also necessary to ensure that GHG emission reductions are delivered.

Leveraging the experience of our members in renewable and low-carbon energy generation, clean energy technology, and project development, the Council respectfully offers the following thoughts regarding the Nicholas Institute paper, and our thoughts regarding the structure and architecture of an offset program within the context of a greenhouse gas cap-and-trade program.

Of note, as a diverse business coalition, not all Council members endorse or take positions on the set of proposals listed below.

1. Approved, verifiable offset allowance purchases made prior to enactment of federal legislation should be eligible for early action credit

The Council offers the following perspective on the issue of early action credit that is addressed in the Nicholas Institute paper.

Rewarding the efforts of covered entities that purchase offset allowances prior to implementation of a mandatory federal program sends clear market signals to facilitate development of projects that reduce GHG emissions. It also provides an incentive for covered entities to reduce emissions as soon as possible, even *before* implementation of a mandatory program.

To recognize early action, the Lieberman-Warner legislation contains provisions to allocate allowances to covered entities which have made voluntary reductions in GHG emissions under established voluntary programs outlined in the legislation. The Council supports this early action allowance allocation, or early action credit; however, the Council believes the legislation needs to be expanded. Specifically, the Council believes that, in addition to allocating allowances to entities that have made voluntary reductions entity-wide, the legislation should be amended to state that covered entities which have purchased and retired offset allowances under a voluntary offset program deemed eligible by the Administrator should also be eligible for early action credit.

To provide certainty about which offset allowances may qualify for early action credit, the legislation should be further amended to direct the Administrator to consider offset allowances purchased and credibly retired under existing voluntary offset programs.

The Council recommends that the Nicholas Institute look to Pacific Gas & Electric's ClimateSmart™ voluntary offset program as a model of the type of program that is working to reduce greenhouse gas emissions in advance of a mandatory program.

2. Approved offset projects should be eligible to generate offset allowances for a guaranteed crediting period

The Nicholas Institute paper recommends crediting projects for a 7 year period (pp. 78) at the initial baseline before having to adjust calculated reductions based on a new baseline. The Council offers the following perspective.

Approved projects should be given the flexibility to generate offset allowances for either a defined 10-year period on the basis of a fixed, ex-ante baseline and initial additionality assessment, or for a 7-year crediting period with the option to apply for renewal. In the case of forestry offset allowances, projects should be credited for, at minimum, a 30-year period. Approved projects should accrue offset allowances on an annual basis. This accrual should occur at the end of each year that a project undergoes successful, independent verification of its performance.

The Clean Development Mechanism (CDM) under the Kyoto Protocol maintains a workable approach in which offset projects are allowed to generate credits for a multi-year, yet limited period of time. Similar crediting approaches have been adopted under the Regional Greenhouse Gas Initiative and the California Climate Action Registry. Based on these existing approaches in regulatory and voluntary offset programs, the Council believes that the legislation should be

amended to clarify that approved offset projects be allowed to generate offset allowances on the basis of a multi-year crediting period. The Council recommends that project sponsors be allowed to choose either a one-time 10-year crediting period, or to choose a 7-year crediting period, after which they may re-apply to the Administrator for crediting. In the case of forestry offsets, projects should be credited for, at minimum, a 30-year period.

A 10-year crediting period is critical to some projects to enhance project revenue and enable project developers to secure valuable debt financing for projects, while a 7-year, renewable crediting period may be more workable for other types of projects. In the case of forestry, a longer crediting period reflects the nature of these projects as requiring an extended investment of time in order to generate long-lasting emission reduction benefits.

3. Review and approval of an offset project's additionality and emissions baseline should only occur once per crediting period

To meet GHG emission reduction requirements, offset allowances must be generated by projects outside of the cap that adhere to rigorous standards that ensure that the emission reductions achieved are real, independently verified, permanent, enforceable, transparent, and additional. The terms "additional" and "additionality," refer to the extent to which reductions in GHG emissions, or increases in sequestration, are incremental to business-as-usual practices.

The Council supports the need to periodically review and update approved offset project types, and the methodologies for determining the project baseline and method of calculating emissions reductions. This is important to ensure that offset allowances continue to be generated from activities that would not have happened under a business-as-usual scenario. There are a variety of factors that can be used to determine the additionality of offsets, such as performance standards and "tests" set forth in the World Resources Institute's Greenhouse Gas Protocol for Project Accounting and the United Nations Framework Convention on Climate Change's Tool for the Demonstration and Assessment of Additionality (Version 03). The Council supports implementation of pre-approved standards (performance and/or project-based, as appropriate) for projects and activities that promote certainty for offset project developers, as well as administrative efficiency and transparency within the regulatory system.

To foster development of offset projects, investors must have the confidence that approved projects will be eligible to generate offset allowances for a multi-year period and that an additionality determination made at the time of approval *remain* valid for that period. There will be a significant deterrent to investment in, and the development of offset projects, if, in the course of annual emission reduction verifications, a project may also be subject to being invalidated as the result of a baseline re-assessment. Project developers and covered entities will be deterred from investing in projects that annually run the risk of being disqualified for offset allowance generation, since these many of these projects rely partially upon the revenue from the sale of offset allowances over time to be financially attractive.

The rationale behind the approach of assessing additionality once in the course of a fixed crediting period is that over the course of an offset program, as projects are developed and new practices emerge over time, the additionality of certain project types or activities may change. For example, governments may enact new laws requiring practices that were not previously required. And as technology emerges and business-as-usual practices evolve, project types that were once qualified to be additional may no longer be additional. This is a sign of progress within an offset program, and it is balanced by the fact that offset projects are bound by a limited crediting period. This approach ensures that approved offset projects can benefit from the confidence that offset allowance generation is possible over a guaranteed time period, and ensures that the environmental integrity of the program is preserved, as well.

4. Projects that reduce emissions from any uncovered sources within a covered facility – sources that are not included as part of a covered facility's emissions inventory – should be eligible to generate offset allowances.

Without the ability for covered entities to generate offset allowances from these uncovered sources, these emissions – such as fugitive emissions from natural gas pipelines – will go unmitigated. In addition, by allowing covered entities to generate offset allowances from uncovered sources, the market will benefit from the learning experience associated with such project and technology implementation, and may help to make it more feasible to include such sources of emissions in covered facilities' emissions inventories at a later date.

5. Verified, high-quality international offset allowances should be eligible for recognition within an offset program, regardless of the location they are generated

The Nicholas Institute paper does not address the issue of international offsets from the Clean Development Mechanism (CDM). The Council offers the following perspective on the use of credits under the CDM.

Entities covered under a cap-and-trade program should be able to use international offset allowances or credits, such as those recognized under the CDM of the Kyoto Protocol, toward their GHG emission reduction compliance requirement.

Council members believe that a federal market-based approach to addressing climate change should be linked to other domestic and international market-based programs that incorporate an offset program, provided they are deemed to be of high-quality and environmental integrity. Addressing climate change is a global challenge and emission reduction activities that occur within and outside U.S. boundaries generate equally valuable environmental benefits.

As currently drafted, S.2191 requires that international offset allowances be "issued by a foreign country pursuant to a governmental program that imposes mandatory absolute tonnage limits on greenhouse gas emissions." As drafted, this provision would exclude the use of Certified Emission Reduction (CER) credits issued under the CDM. CERs are generated in developing countries that do not have mandatory tonnage caps on GHG emissions. CER credits are universally recognized as high-quality offset credits that represent real, additional, verifiable and permanent emission reductions and which also help to promote sustainable economic and environmental development in countries throughout the world.

Having access to CER credits generated under CDM will play a significant role in reducing compliance costs for covered entities, which will help contain costs for the U.S. economy as a whole. While allowing the use of CERs for compliance purposes should not be construed as a substitute for engaging developing countries in emission reduction commitments, such effort will continue to build the market for emission reductions throughout the world, and will serve as a bridge to engaging developing countries in making future reduction commitments. In addition, many projects developed under the CDM employ technologies and equipment manufactured in the U.S. The CDM market serves as a valuable international business market for U.S. companies, while at the same time facilitating transfer and deployment of clean technologies around the world.

6. There should be maximum flexibility for covered entities to use offset allowances to meet compliance obligations

A robust offset program provides incentives for deployment of GHG emission reduction projects and activities outside capped sectors, expanding the reach of the program and minimizing overall compliance costs for the economy as a whole. Recent analyses, including from the Environmental Protection Agency (EPA), support this conclusion. For example, EPA's analysis concluded that if no international or domestic offsets of any kind were allowed, allowance prices would increase by 92% compared to S.2191 as written. Allowing the unlimited use of domestic offsets alone can reduce the prices of allowances by 26% compared to S.2191 as written, and allowing the unlimited use of domestic offset allowances and international credits can reduce allowance prices by 71% compared to S.2191 as written.

Considering the value of the cost containment benefits of offsets, the Council recommends designing a program that promotes broad use of offset allowances to achieve compliance under a federal climate change program. While our members have differing views on the overall percentage of offset allowances that covered entities should be allowed to use, Council members believe that covered entities should have the flexibility to decide how to design their offset portfolio, whatever percentage Congress ultimately allows. In other words, capped entities should have the flexibility to choose whether, and in what proportion, offset allowances are purchased from domestic and/or international sources, provided such offset allowances meet high-quality standards established by the Administrator. The Council also believes international offsets should include both international emission allowances and project-based credits such CERs. Compliance costs will be contained to the greatest extent possible if covered entities are provided with maximum flexibility to choose how to design their portfolio of offset allowances.

**

Independent of federal action on S.2191, Congress should promote market certainty by immediately authorizing the development of the rules, oversight, and accounting mechanisms of a federal compliance GHG offset program.

The Council believes the Nicholas Institute proposal to establish a task force to begin designing the framework for a domestic offset program is worthy of merit. Since offset projects can take years to design and develop, covered entities and consumers will benefit if the federal government can begin establishing the rules, oversight and accounting mechanisms of an offset program. The federal government can learn and build upon significant work accomplished to date internationally under the CDM; under the federal EPA Climate Leaders Program; from regional programs such as the Regional Greenhouse Gas Initiative and the Western Climate Initiative; and from state programs such as the California Climate Action Registry.

Regulatory uncertainty is one of the largest obstacles to new investments in low-carbon and clean energy technology projects. Companies want to develop new offset projects, but are deterred by uncertainty with respect to the types of projects and methodologies that will be recognized under a future federal compliance program. Companies that expect to be regulated under a future climate change program want to begin to support offset project development by purchasing offset allowances, but want the assurance that their purchases made today will be recognized in some manner under a future federal program.

Developing the rules, accounting and oversight mechanisms of an offset program that could be incorporated into a federal climate change regime is not contingent upon passing cap-and-trade legislation such as S.2191. The U.S. could get a significant head-start on reducing GHG emissions from sectors outside of a future cap by initiating a process to formally begin designing the structure and rules of an offset program. The Council would be pleased to leverage the vast experience of its members on offset issues and work with the Nicholas Institute and with members of Congress to further develop this concept.

Comments of the Carbon Offset Providers Coalition on the

April 8, 2008 Working Draft of the

Nicholas Institute for Environmental Policy Solutions' White Paper

Designing Offsets Policy for the U.S.: Principles, Challenges, and Options for Encouraging Domestic and International Emissions Reductions and Sequestration from Uncapped Entities as Part of a Federal Cap-and-Trade for Greenhouse Gases

The Carbon Offset Providers Coalition (the "COPC") appreciates the opportunity to provide a perspective on the April 8 Working Draft of the "Designing Offsets Policy" white paper (the "Paper"). We appreciate the great effort the Nicolas Institute has made and applaud their contribution to the discussion of how to design a U.S. offsets program. What follows are our comments on selected aspects of the Paper. Our silence on other elements of the Paper should not be construed as an endorsement or rejection of those elements.

* * *

About the COPC. The Carbon Offset Providers Coalition comprises companies that are leaders in the carbon offset market, including those involved in financing, producing, generating, providing, aggregating and/or marketing greenhouse gas (GHG) emission reductions for sale as offsets in existing and emerging voluntary and compliance GHG emission trading markets. We offer the following comments based upon our members' experience operating within these markets, including the collective experience from hundreds of offset projects in nearly all 50 states here in the U.S. and abroad that have achieved the reduction of millions of tons of greenhouse gases.

* * *

Exclusion of Energy Efficiency and Renewable Energy from Carbon Markets (draft p. 13). The Paper notes but does not address a critical shortcoming of S. 2191 that is a separate issue from outside-the-cap emissions reductions and offsets, but should be noted. Because under S. 2191 all emissions from natural gas, transport fuels, and coal powered electricity are covered "upstream" at the point of production, rather than "downstream" at the point of energy use, any downstream activity that reduces fossil fuel consumption may not generate carbon offset credits to help pay project costs. This means that critical mitigation options, including energy efficiency, renewable energy, fuel switching, biofuels, transportation and green building projects could be entirely excluded from regulatory and voluntary carbon markets. An important source of project finance will be cut off, and the ability to leverage the capital, initiative, and innovation of carbon

investors, entrepreneurs and downstream energy users – those best positioned to drive efficiency and renewables – will be lost.

Providing downstream projects with access to carbon markets will accelerate emission reductions, minimize energy price increases, and foster innovation and initiative where it is needed most. This can be achieved by awarding downstream "Green Energy Allowances" to projects that reduce fossil fuel use or increase low-carbon energy supplies. So long as these allowances are assigned from planned auction or allocation pools, the total number of allowances will be constant, and overall emissions will stay below the capped amount.

This solution addresses the limitations of complementary price-based and top-down approaches (noted below). It is a truly carbon-weighted market-based mechanism that provides long-lasting and predictable support to the most efficient technologies and projects. Rather than relying on top-down picking of winners, it achieves key benefits by rewarding the initiative, innovation and investment of utilities, manufacturers, builders, transportation providers and consumers:

- *Cost control.* By helping ensure "efficiency comes first", Green Energy Allowances can accelerate emissions reductions at lower energy prices. Energy users, such as manufacturers, can mitigate rising costs by taking actions that qualify for allowance revenues as a complement to energy savings. Such early adopters of best practices also drive down technology costs and help disseminate information, accelerating their adoption as common practice across the economy.
- *Behavior modification.* Rather than the across-the-board "automatic" support provided energy users from other allowance allocation pools, "Green Energy Allowances" are held out to those changing behavior beyond business as usual. In addition, utility and energy providers' ability to derive revenue from downstream efficiency projects will provide incentives beyond rate decoupling, and help ensure "efficiency comes first."
- *Environmental integrity.* Because the total number of allowances will not be increased, emissions will not exceed those envisioned by the cap and pressure to transform the energy infrastructure shall be maintained.

In the absence of carbon finance incentives, improvements in energy efficiency and renewables will depend on three different drivers, all of which have significant limitations:

- *Rising energy prices.* Due to the relatively low share of energy in most companies' total expenditures, as well as split incentives, financial and institutional barriers, price has historically been a relatively weak driver of efficiency (see e.g. Nicholas Institute's *Convenient Guide for Climate Change Policy* re: barriers). Without carbon finance, energy prices will need to rise higher to achieve comparable reductions, imposing unnecessary economic burdens and potentially generating opposition to climate action.
- *Top-down incentives and mandates.* S. 2191 includes allowance and auction revenue allocations that may be used to promote efficiency and renewables but could be re-purposed for more than a dozen now-authorized uses or unforeseen budgetary demands. Moreover, top-down programs are not known for driving downstream innovation or beyond-compliance best practices.
- *Bi-lateral contracts.* In theory, upstream covered entities could pay downstream energy users to reduce use. However, this is uncertain as it runs counter to upstream business models, and most energy is transacted via "many-to-many" distribution systems rather than bi-lateral contracts. Moreover, downstream users would be dependant on upstream players' initiative, capital allocation and pricing power.

There are several ways downstream Green Energy Allowances could be incorporated in the current structure of S. 2191. As one example:

- Add a new subtitle G "Green Energy Allowances" to Title II (Cost Containment)
- Provide a certification, approval, verification and registry process similar to the existing offset program; qualifying projects could be defined via both a positive list and performance standards based on MWh or CO2e metrics
- To maintain market certainty and predictability, the amount of downstream Green Energy Allowances should be flexible to respond to the level of qualifying projects submitted
- Green Energy Allowances could be debited from the subsequent year's total allowance pool and taken "off the top" before other allocations are made

Policy Mechanisms and Role of U.S. Policy (draft p. 12). The following statement in the draft Paper may be misleading or misconstrued: "In a country with a mandatory cap and trade policy, small emitters…are typically not capped. The policies that are being proposed for the United States are the same...In theory, reductions in emissions from…these uncapped entities…could be used as compliance offsets for emissions from capped entities."

In many cases, the policies being proposed for the U.S. differ in the point compliance. Under S. 2191 most energy end-users, regardless of size, will be uncapped entities. However, they will be unable to generate compliance offsets from reduced fossil fuel use to help fund and motivate energy efficiency or renewable energy projects for the reasons discussed under "Exclusion of Energy Efficiency and Renewable Energy from Carbon Markets," above.

Domestic opportunities (draft pp. 17-18). The following statement in the draft Paper may be misleading or misconstrued: "…Figure 3 shows the emissions and sequestration from a number of likely uncapped entities (based on S. 2191) including…industrial facilities with below 10,000 tons of emissions."

Under S. 2191, any industrial facility, regardless of facility emissions, will not be subject to GHG compliance obligations for facility emissions, except for facilities emitting >10,000 tons HFC/year from the production of HFC or using >5,000 tons coal/year. However, most industrial facilities, regardless of facility emissions, will not be able to capture carbon benefits and revenue from energy efficiency or renewables, as discussed under "Exclusion of Energy Efficiency and Renewable Energy from Carbon Markets," above.

Compliance Offset Market (draft p. 24). The following statement in the draft Paper may be misleading or misconstrued: "…greenhouse gas reductions or sequestration from compliance offset projects will not be additional reductions beyond those required by the cap." In fact, offset project reductions are additional to reductions required by the cap. That's why they may be used to offset covered emissions that exceed the cap while achieving the environmental objective of the cap.

Mitigation Project Financing and Offset Innovation Incubator (pp. 24, 71-76). The concept of offering per-ton "Mitigation Project Financing" or per-project "Offset Innovation" incentives for emission reduction activities that do not yet meet the stringent requirements of "compliance offsets" should be considered. However, this approach raises several concerns:

- Promising offset project types could become permanently stigmatized as non-compliance grade. To avoid this, maintenance of these allocation-based offset programs must not divert resources from the process (delegated to USEPA) of reviewing and approving new compliance offset project types and methodologies as rapidly, efficiently and effectively as possible

- Adds administrative complexity and ambiguity
- May perpetuate fiction that offsets do not represent real or meaningful emissions reductions by creating a second tier of offsets that are perceived as "B-grade"
- Requires re-allocation of allowances from other applications targeting energy emissions
- Objectives may also be addressed via DOE and/or USDA programs funded by auction proceeds

Limits on Offset Use for Compliance (draft p. 26). COPC supports a limit of 50% domestic offsets and 30% international offsets or credits to balance the needs of cost containment and capped sector abatement, and in acknowledgement of political realities.

Offset Cap at Entity vs. Economy Level (draft p. 28). An economy-wide cap has the advantage of potentially allowing facility use of offsets to be averaged (or traded) to ensure offsets are employed to the full extent allowed by the regulation. However, , care must be taken not to introduce uncertainty and complexity that would dampen offset sales, especially given that long-term planning is done at the facility level. For example, what assurance would a prospective buyer have that offsets purchased do not exceed an economy-wide cap and may be used to meet compliance obligations? The added layer of complexity in tracking such sales may undermine any theoretical efficiency.

Precautionary Principle and Permanence Risk (draft p. 34-37). We support integrity in offset accounting. However, projects that can demonstrate emissions reduction performance superior to standard trading, reserve or discount ratios must have a process to apply for the higher volume of offsets actually generated and earned. Moreover, any standard ratios must be flexible and adjusted to reflect new knowledge of actual performance, reversal risk, etc. As discussed below, another approach that must be considered is to leave such decisions to the marketplace, and ensure integrity through a point-of-compliance true-up process.

Certified Methodologies (draft p. 36 and 59). To foster ongoing innovation, there must be a mandated process to review new proposed methodologies on a regular basis, provide timely feedback, and approve appropriate methodologies via a transparent process at the agency level. On the whole, it is preferable to delegate the details of such a process to the implementing executive agency(ies).

Reversals and Reserves (draft pp. 37-41, 56). The Paper modifies S. 2191's current definition of "reversal" to remove the significance test. This is highly impractical, as forcing project developers to monitor and account for such *de minimis* reversals would waste administrative and private resources without commensurate environmental benefits.

Each of the 3 reversal options depicted place the risk of unreserved reversals on the project developer, rather than the offset buyer. At a minimum, the option of reversal liability residing with the offset buyer should remain on the table. This is an important and complex issue that should be explored and resolved by the administering agency, rather than within the legislation.

If a project developer reversal liability approach is used:

- The cap may be at risk if reversals exceed reserves and the project developer defaults.
- EPA must track contractual liability shifting, which is burdensome and could embroil EPA in legal battles over contract interpretation.
- Because uncertainly is difficult to quantify, reserves will tend to be overly conservative, and will thus undermine the financial incentives for offsets.

- Any pooled reserve would require good projects to subsidize risky projects, penalizing more conservative projects.
- Project developers should be refunded unused reversal reserves offsets at the end of the crediting period; otherwise offsets should simply be retired or cancelled.
- Any reserve levels must be reviewed regularly and allowed flexibility to adjust based on increased knowledge of reversal probabilities.
- Offsets from different project types are fully fungible in the market.

Under a point-of-compliance reversal liability approach:

- The risk of reversal is tied to the offset allowance itself and adjusted at the point of compliance (i.e., the covered facility purchases and submits an offset allowance to be recorded in its compliance account).
- Since all offset allowances are uniquely numbered, if EPA receives a reversal report (or no report) from a third-party verifier, EPA will simply debit the allowance (or portion if a partial reversal) from the covered facility's account; the facility would be required to cover the shortfall.
- Reversal risk, obligation to cover, or other legal remedies can be handled privately through market contracts between buyers, sellers, or intermediate buyers (including with insurance or other third-party risk mitigation) without EPA involvement; this is a simple, transparent approach that poses no risk to the cap or unnecessary administrative burden.
- The market may more effectively evaluate, diversify and price reversal risks (analogous to risks now covered by traditional insurance markets) than can EPA, since regulatory agencies usually take the most conservative approach to risk and reserves.

Additionality and Baseline Definition (draft pp. 49, 57). Alternative B's reference to "existence of a market" is troublesome as it could be misconstrued to require complete reliance on a financial additionality test. Such a test is subjective and impossible to establish with certainty, and ignores very real investment, institutional and technological barriers to implementation and the need to establish objective standards for baselining. For these reasons, Alternative A is the best option and can be refined by EPA at the regulatory stage. Also, citing a single author (Gillenwater) may create problems with later agency interpretation, especially since this is a paper on RECs, not offsets

Task Force on Offsets (pp. 51-55). While maintaining high offset quality is a priority, we have a number of concerns relating to the function and organization of a "Task Force":

- While the Task Force concept may be workable as an advisory group (e.g. existing EPA science advisory committees), inserting such a group in the rulemaking process will add another layer of complexity that could derail the rulemaking timeline and market development.
- Selection of Task Force members might be criticized for conflict of interest or favoritism.
- Although having other agencies (USDA, DOE) coordinate with EPA is a good idea, there should not be separate rules from each. A better approach would be naming a lead agency (e.g., EPA) to consult with others. Alternatively, joint agency rulemaking could cover the certification process, with each agency focused on offsets within its expertise.

"Positive List" of Acceptable Project Types and Methodologies (p. 52). While the Positive List implied on p.52 is a great idea that should be pursued, development of this list should not wait until a Task Force sorts through the options, and relevant agencies adopts their recommendation. It is possible to provide much more specificity *now* as to certain types of projects that should qualify as "compliance offset" projects, subject to passing additionality tests at the time of implementation. For some types, there are years of experience and well-established methodologies from voluntary and international markets. To speed implementation of these

projects, it is important for the *legislation itself* to specify these project types as eligible to earn "compliance offsets" and to direct the relevant agencies to promulgate standards and methodologies for those project types *as soon as possible* after enactment. Of the list of activity types provided on page 52 of the Paper, we believe the following types fall into this category:

- Landfill methane use projects;
- Animal waste or wastewater methane digestion, combustion, or use projects;
- Coal mine methane capture, flare or use projects;
- Afforestation and reforestation;
- Carbon capture and geological storage (CCS) for entities outside the cap; and
- Composting of municipal solid waste to avoid methane production

Requirements for Methodologies and Technology Standards (draft pp. 56-57). There are several issues with this section that should be addressed:

- Undefined terms: the Paper incorporates a number critical terms that are undefined and may cause problems when the function of these terms is debated. These include "stable stock", "scientifically acceptable", and "uncertainty threshold".
- Discounting: the concept of discounting is troublesome, as it implies degrees of integrity. The program will work better if only ton-for-ton reductions are recognized, and risk of failure or reversal is dealt with at the point of compliance, as discussed above.

Crediting Period (draft p. 60). We agree that a sufficient crediting period is essential to project planning and investment requirements, and should be at least 10 years.

Project Approval (draft pp. 60-61). The processing and approval times at the agency level should be significantly shortened to keep pace with market needs. For example, approval after a complete petition and verification report is received should be no more than 90 days (3 mos.).

Early Action (draft p. 67). COPC believes the current approach in S. 2191 of separately covering early action by covered (Sec.3201) and non-covered facilities (Sec.2408) is preferable. It would be better to allow any early adopter offsets that can pass rigorous criteria to trade in the offset pool, rather than being subject to the same limited pool of early action allowances tapped by covered entities. In addition, discounts based on registry will be problematic to implement, will add an additional layer of complexity, and will engender debate and concerns of partiality if an agency or task force is given the power to favor particular registries.

* * *

The COPC appreciates this opportunity to review and provide comment on the Paper. We credit the thoughtful approach and substantial research reflected in the effort of the Nicholas Institute and the Working Group.

COPC Members

Perspective of the Coalition for Emission Reduction Projects
on

Designing Offsets Policy for the U.S.:
Principles, Challenges, and Options for Encouraging Domestic and International Emissions Reductions and Sequestration from Uncapped Entities as Part of a Federal Cap-and-Trade for Greenhouse Gases

by
Lydia Olander, the Nicholas Institute for Environmental Policy Solutions, Duke University

The Coalition for Emission Reduction Projects (CERP) appreciates the opportunity to provide a perspective on the "Designing Offsets Policy" paper (hereafter the "Paper").

About CERP. The mission of the Coalition for Emission Reduction Projects is to educate policy-makers and the general public about the benefits of using offset allowances from domestic and international greenhouse gas (GHG) emission reduction projects as a means for regulated entities to meet their compliance obligations under a U.S. federal GHG regulatory program. The CERP brings together leading companies from the energy, financial services, and emissions reduction project development sectors. For more information about CERP, including a list of members, please see our website at www.uscerp.org

The CERP does not endorse or oppose the Paper, but we believe it outlines some important modifications to the legislative architecture for offsets currently set forth in the Lieberman-Warner Climate Security Act of 2008 (S. 2191). What follows are our comments on selected aspects of the Paper. Our silence on other elements of the Paper should not be construed as an endorsement or rejection of those elements.

Two-tiered approach. In its most significant set of recommendations, the Paper outlines a two-tiered approach on domestic offsets, in which some types of offset projects are in a "compliance offsets program" and other types are "allocation based program." Projects in the former category are eligible to earn offset allowances, which are additional to the cap. Projects in the latter category draw from a set-aside of allowances from within the cap. The architecture calls for establishment of an advisory Task Force that would provide recommendations to the relevant agencies on what types of projects should be in which category in the early years of the program – with the possibility that project types can migrate from the "allocation based program" to the "compliance offsets program."

CERP sees a number of problems with this proposal. First, as the Paper recognizes, offset projects offer substantial opportunities to lower the costs of compliance with a cap-and-trade program. The implications of offset limits and policies on compliance costs were recently underscored by the EPA analysis of S. 2191.[2] As the Paper notes, EPA's

[2] *See* EPA, "EPA Analysis of the Lieberman-Warner Climate Security Act of 2008: S. 2191 in 110th Congress" (March 14, 2008), available at www.epa.gov/climate.

analysis of different offset policy scenarios for S. 2191 showed that having unlimited offsets would increase allowance prices by 71%, while allowing no use of offsets would increase allowance prices by 93%. In this light, CERP has great concerns with an approach that potentially forces a wide variety of project types into the "allocation based program" because projects in those categories would not contribute to moderating the costs of the cap. In effect, they would not be "offset projects" under the EPA analysis and the outcome for compliance costs would be closer to the scenario in which domestic offset projects may not be used for compliance at all. Put another way, there are very high costs to putting various types of projects "under the cap" rather than making them eligible to earn offset allowances.

Another inherent problem raised by the proposed two-tier approach is that "allowances" are usually worth more than offsets since they are issued by a regulatory body, and are drawn from within the cap (and therefore represent less risk for a buyer since they directly draw down from the total purse of "on-system" reduction opportunities). Therefore, giving "allowances" for emission reduction project types that are riskier and therefore more susceptible to failure essentially means giving more value to projects that are probably less valuable (or at least have less guaranteed return on investment). This also creates a perverse incentive for developer of such projects to resist "graduating" them to offset status, since offset allowances would be worth less per credit than allowances from within the cap.

To be sure, the Paper suggests that the "Task Force" process would sort out project types that have "sufficient rigor" and therefore could be considered "compliance offset projects," and then make recommendations to the relevant agencies. Furthermore, the Paper specifies a finite period (6 months) for these determinations. However, one of the major concerns for CERP members is that the process of development of offset rules and procedures could take a significant amount of time, even under the best of circumstances. The last two decades of experience shows that regulatory agencies honor statutory deadlines more in the breach than in the observance . CERP is very concerned that delays in developing offset program rules will hinder development of projects and their use for compliance by covered facilities in the early years of the program, resulting in substantial added compliance costs. Even if the statute itself were to specify which types of projects were "compliance offsets," it likely will take some time for the relevant agencies to develop standards and methodologies for those project types. Therefore, the Paper's proposal, which inserts the Task Force process into the middle of this timetable, risks very costly delays.

Finally, we believe that is possible – indeed imperative – to provide much more specificity *now* as to the types of projects that should be "compliance offset" projects. The current draft of the Paper appears to conclude that the starting point for deliberations is that there is uncertainty surrounding *all* project types, until the Task Force sorts through it and the relevant agencies adopt or reject their recommendations. In fact, for several types of projects, there are several years of experience, well-established methodologies (more than 100 have been developed under the Clean Development Mechanism alone), and a fairly clear understanding of what is "additional" and what is not. These types of projects already meet the "sufficient rigor" test for environmental integrity. For all of the reasons cited above, CERP believe that is important for the *legislation itself* to specify these project types as eligible to earn "compliance offsets" and to direct the relevant agencies to promulgate standards and methodologies for those project types as soon as possible after enactment. Of the list of activity types provided on page 52 of the Paper, we believe the following types fall into this category:

- Landfill methane use projects;
- Animal waste or wastewater methane digestion, combustion, or use projects;
- Coal mine methane capture, flare or use projects;

- Afforestation and reforestation projects;
- Carbon capture and geological storage (CCS) projects for emissions not covered by the cap; and
- Composting of municipal solid waste to avoid methane production

To this list, CERP also would add reduce sulfur hexafluoride emissions from transformers, and projects that reduce fugitive methane emissions from natural gas pipelines, as well as a variety of project types with approved CDM methodologies not currently identified by the bill.

Accordingly, it is CERP's view that S. 2191 should: (1) include these types of projects on a "positive list;" (2) clarify that projects in these categories are "compliance offsets" eligible to earn offset allowances, and (3) direct the relevant agencies to develop standards and methodologies for these types of projects on an expedited basis.

The Clean Development Mechanism. We are puzzled as to the total omission of offsets from the Clean Development Mechanism in the Paper's offsets architecture. In the view of CERP, there are three fundamental rationales for allowing regulated entities to use Certified Emission Reductions (CERs) for compliance: (1) cost containment; (2) diplomatic engagement; and (3) environmental integrity.

Cost Containment. Currently, the only international credits recognized under S. 2191 would be those from a country with an emissions cap; however, CERP believes that such credits (e.g., allowances from the European Union Emissions Trading Scheme) are likely to be more expensive than allowances under the S. 2191 program.

In this light, the recent EPA analysis of S. 2191 reinforces the severe cost implications of closing off a U.S. cap-and-trade program to international offsets from the CDM. As discussed above, EPA evaluated a range of offset scenarios. In particular, the EPA concluded that, if international credits are not allowed – or are more expensive than U.S. allowances (as EU ETS allowances already are forecasted to be[3]) – and the limit on use of domestic offsets remains at 15%, then allowance prices under the S. 2191 program *will be 34% higher*.

The Paper notes a concern that relaxing limits on use of international offsets will relieve pressure for needed changes in U.S. energy infrastructure. We believe this claim is overstated, for a number of reasons. First, it assumes a binary choice between no use of offsets and unlimited use of offsets, yet these are not the only design options. Second, it assumes that allowance prices are the only mechanism to promote infrastructure changes, but this is not the case; S. 2191 already includes other, more targeted incentives for technology including substantial funding drawn from allowance auction revenues, and bonus allowances for carbon capture and sequestration. Third, maintaining overly high allowance prices could *impair* technology development if such prices result in general harm to the economy and sources of capital.

Thus, foreclosing use of CDM credits under a U.S. program risks imposing unnecessarily high costs on the U.S. economy and consumers.

Diplomatic Engagement. The CDM is *the* primary climate change policy for engaging developing countries at this time, and is effectively the world's only "common currency" for

[3] See New Carbon Finance. "US Carbon Politics." North America White Paper—February 2008.

emission reductions.[4] Developing country governments have established programs for the review and approval of projects located in their countries. Thus, providing a window to the CDM within U.S. cap-and-trade legislation would offer an opportunity for U.S. outreach to and engagement with these countries. Among other things, it could be the "carrot" to complement the "stick" of the provisions in S. 2191 addressing importation of energy-intensive goods from countries that are failing to adopt limits on their emissions. These diplomatic advantages of the CDM – and the diplomatic costs of closing a door to the CDM – are not sufficiently weighted in the Paper.

Environmental Integrity. It is the view of CERP that there are numerous existing and potential emission reduction projects in developing countries that can meet the highest U.S. standards for environmental integrity. In particular, the CDM has now registered 1000 projects, approved over 100 baseline methodologies, and establish rigorous protocols for monitoring and quantification. It has been the world's principal GHG offset project system for several years now. Indeed, emerging programs in states and regions in the United States have learned from and built off of the CDM model.

As with a new regulatory program of *any* kind, the CDM has had to learn from early mistakes. Recent reports cite detail the growing pains of the CDM. However, these reports also make clear that learning and reform is underway. The CDM Executive Board has recently instituted significant reforms, including a greater centralization of the process of reviewing projects and annual reduction activity, and development of programmatic and sectoral designs. Thus, the United States will be able to draw upon the experience of an institution that has reached a level of maturity. Furthermore, with the involvement of the United States, the CDM could continue to improve its performance.

For these reasons, CERP strongly recommends that the offsets architecture of S. 2191 be modified to allow covered facilities to use CERs for compliance purposes.

Definitions. CERP has the following comments on the Paper's recommended modifications to the definitions in S.2191:

- "Compliance offset project": CERP supports the more precise definition of "compliance offset project," which makes clear that the project must address emissions from activities not already covered by the cap. This is an improvement on the current definition of "offset project" in S. 2191, which leaves ambiguous whether offset projects could include activities that reduce emissions at entities that are not "covered entities," but nevertheless are reached by "upstream" regulation. In our view, such projects should not be considered "compliance offset projects."

- We note that the Paper retains the S. 2191 definition of "Project Developer" as an "individual or entity implementing an offset project." In the S. 2191 architecture for offsets, and in the Paper's modifications to that architecture, the "Project Developer" has key roles. The Project Developer is the entity to which allowances are issued and is also the entity that bears liability for certain events. In particular, the architecture deems the Project Developer as the "owner" of the allowances.

  Based on the experience of our members with offset projects, CERP sees problems with defining a Project Developer as an "individual or entity implementing an offset project," and then further providing that this entity "owns" the resulting allowances. Reliance on

[4] Environmental Data Services "The ENDS Guide to Carbon Offsets 2008." April 2008.

this approach likely would force the EPA and/or USDA to wade into legal disputes among individuals and entities about what constitutes "implementation" and what individual or entity is really responsible for such implementation. The agencies might have to sift through a whole network of contracts to determine the ultimate "owner" of the offset allowances.

Here, we believe that the Paper could benefit from the experience of the Clean Development Mechanism, which requires participating entities to designate in their project paperwork what entities are participants in the project ("Project Participants") and also what entity will communicate with the CDM Executive Board about the accounts to which credits should be issued ("Focal Point"). That way, the Executive Board can rely on the filed paperwork for the project, rather than involving itself in disputes among entities. Furthermore, the Executive Board never has to determine what entity actually "owns" the credits. Instead, it simply issues credits as directed by the designated Focal Point.

To this end, we recommend modifying the architecture to mandate that project proponents identify a "Project Representative" in their project petition, and to further provide that the Project Representative receives the potential benefits and bears the potential liabilities that the Paper and S. 2191 currently assigns to the "Project Developer." In addition, instead of designating an "owner," the architecture simply should provide that the Project Representative has the sole authority to inform the agency, on behalf of all entities involved in the project, the account(s) to which to issue any offset allowances for the project.

Crediting Period. We appreciate the addition of a guaranteed crediting period for projects at their approved baseline. However, we recommend adopting the approach in the Clean Development Mechanism, under which entities can choose either a fixed ten year period or a seven year period, which can be renewed for up to two more seven year periods.

Long-term certainty on cash flow for offset projects is critical. In particular, a longer guaranteed crediting period also helps attract debt financing, which is a substantial component of making these projects economically viable. Since the infrastructure for offset projects can last 20-30 years, 10 years of guaranteed offset generation can make a big difference. In the view of CERP, a 10 year crediting period strikes the right balance between investment certainty, and the need to ensure environmental integrity. We further recommend providing the ability to petition for a renewal of a project's crediting period – with an assessment of the baseline – at the end of the period.

Domestic Forestry. We generally applaud the direction of the Paper's recommended modifications to S. 2191 for addressing the risk of reversals in domestic forestry projects.

The current approach in S. 2191 provides that, in the event of a reversal in a forestry project, the buyers of offset allowances from the project must return a corresponding quantity of allowances and otherwise "compensate" for the loss. In the experience of CERP members, this "buyer liability" approach would not be workable. It would impose on buyers a risk they cannot readily assess or manage, and thereby deter investment in this promising area of offset activity.

Based on the experience of our members, Alternative B or C would be preferable to Alternative A. We are in the process of evaluating the merits of these two approaches. (See p. 39 and p. 55).

However, we also note that the language on reversals and compensation for reversals appears to apply generally to *all* offset projects (p. 62). Yet, reversals only are relevant for projects involving sequestration.

Also, our members were confused by the concept of "compensation." Assuming the establishment of a buffer of offset allowances, would not the buffer provide all of the needed "compensation"? We are confused as to why there is a requirement on top of the buffer for compensation.

We respectfully request clarification on these points in further modifications to the architecture.

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Once again, CERP appreciates this opportunity to review and provide comment on the Paper. We applaud the thoughtful approach and substantial research reflected in the effort of the Nicholas Institute and the Working Group. Please do not hesitate to contact us with any questions or for further discussions.

CERP Members

American Electric Power
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Dominion Resources
Econergy
EcoSecurities
El Paso Corporation
Environmental Credit Corp
Equator Environmental
First Climate
Leaf Clean Energy Company
MGM International
Stark Investments

Perspective of EcoSecurities
on the
8 April 2008 Working Draft of

Designing Offsets Policy for the U.S.:
Principles, Challenges, and Options for Encouraging Domestic and International Emissions Reductions and Sequestration from Uncapped Entities as Part of a Federal Cap-and-Trade for Greenhouse Gases

By

Lydia Olander, the Nicholas Institute for Environmental Policy Solutions, Duke University

EcoSecurities has appreciated the opportunity to contribute to this paper in a variety of ways, both directly as part of the working group process, and indirectly through comments submitted by the Coalition for Emission Reduction Projects (CERP) and the Business Council for Sustainable Energy (BCSE). CERP and the Business Council have also submitted separate "Perspectives" documents on behalf of EcoSecurities and the other members of the groups, and we fully endorse their comments. We have thus focused our perspectives document on other issues which we believe merit consideration.

Our perspective on the issue of offsets, particularly as related to this paper, can be summarized in three main points:

1) We believe the paper's treatment of international offsets generated under the CDM does not adequately reflect the actual performance of the Mechanism to date, and understates the opportunities that exist to reform the Mechanism on an ongoing basis in the future.
2) Acknowledging that international offsets have an important role to play in a U.S. cap and trade system, this paper represents two significant missed opportunities: to provide U.S. policymakers with a substantive description of concerns about the CDM, and to offer suggestions about how to structure U.S. climate policy to address those concerns while leveraging the CDM's benefits.
3) Offsets can provide cost-containment and learning benefits, but must be deployed in a way that maintains the integrity of the cap. Some suggested uses of offsets in the paper that not only fail to offer cost containment, but also create perverse incentives that could undermine the cap.

I. Examining the Paper's Treatment of the CDM

As noted in the paper, the majority of international offset opportunities currently come from the Clean Development Mechanism (CDM), which is part of the United Nations' agreements under the Kyoto Protocol. The CDM "allows developed countries to purchase CDM certified emission reductions (CERs) from developing countries."

While the paper addresses several important issues with respect to offsets in general, the specific characterization of the CDM is too brief. As we approach a re-negotiation of the Kyoto Protocol, the CDM has come under increasing scrutiny, and this paper echoes many of the current criticisms without examining them or proposing solutions. Instead, the paper is uneven and at times simply inaccurate in its treatment of the CDM. Some valid criticisms are overlooked, while others are mischaracterized.

HFC-23

The paper raises the point that the CDM to date has been dominated by industrial and energy sector activities; in particular the destruction of industrial gases (HFC-23 and N_2O). However, we are pleased to see that the paper acknowledges that no new HFC projects have been registered since October 2007,[5] and projects now in the pipeline such as renewable energy, methane reduction from cement and coal beds, energy efficiency and fuel switching are expected to grow in importance as industrial gas projects plateau. Although HFC-23 projects are often raised as an example of the "failure" of CDM because of its focus on a small pool of high GWP gases, it is important to note that based on the number of projects that have been developed, HFC projects represent an extremely small a percent of the total number of projects approved under the CDM (Figure 1). Looking at the projects from this perspective, the CDM has been dominated more by renewable energy and energy efficiency projects than anything else. To date around 125 million CERs or MMT of CO_2e reductions have been traded through CDM with 2.5 billion expected by 2012. We commend the paper's author for noting this evolution of the application of the CDM.

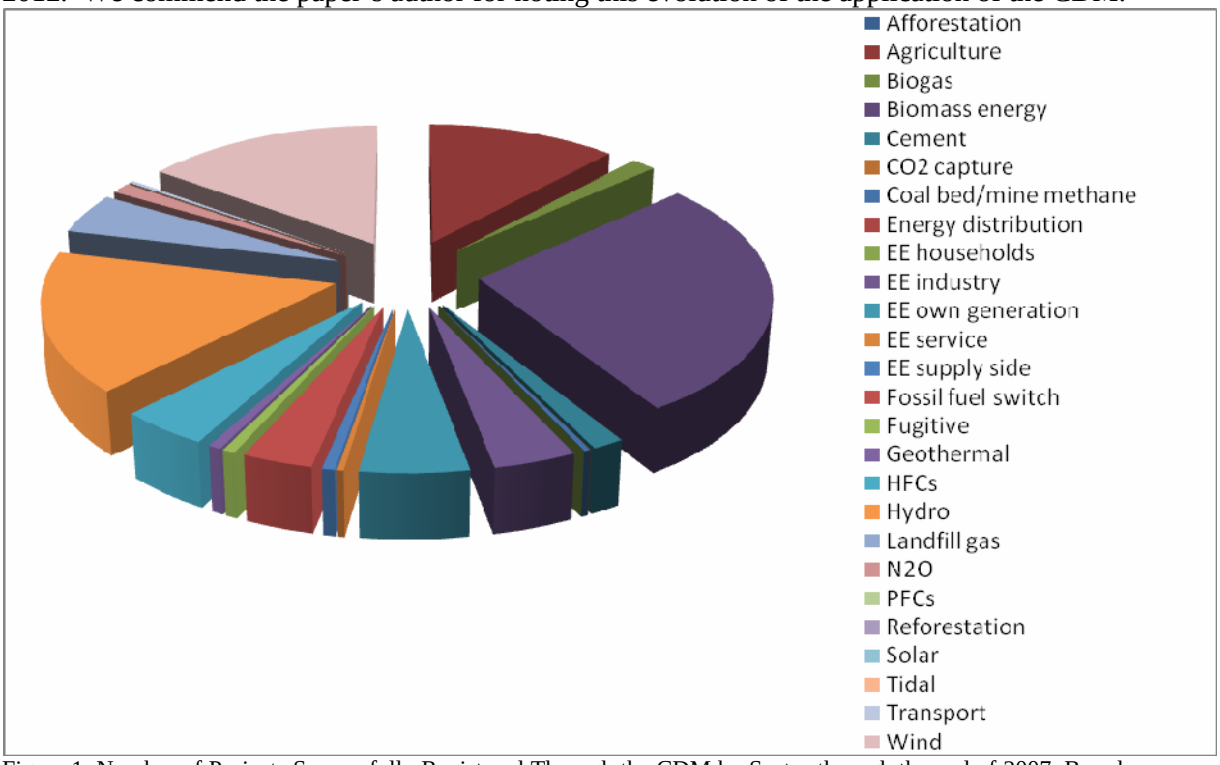

Figure 1. Number of Projects Successfully Registered Through the CDM by Sector through the end of 2007. Based on data from the UNEP Risoe CDM/JI Pipeline Analysis and Database, April 1st 2008.

Methodological Inefficiencies

We agree with the paper's assertion that "the CDM system of approving new methodologies on an individual project-by-project basis increased transaction costs and resulted in an increased

[5] UNEP Risoe CDM/JI Pipeline Analysis and Database, April 1st 2008.

investment uncertainty for some activities, particularly forestry projects." However, this is not a fatal flaw to the system, and is already being addressed through both the consolidation of existing methodologies, as well as the creation of "programmatic CDM," whereby credits are given for clusters of many activities of a given type, rather than on a project-by project basis.

Methodological inefficiencies are also a potential problem for a domestic system, and therefore, many stakeholders have recommended a more streamlined performance-standard or "benchmarking" approach to offset crediting. Benchmarks use best practices to deem projects as "additional" and give credits based on the difference from average historical emissions or common practice. While performance-based methodologies are only as environmentally effective as their design demands (since a benchmark could be set too "low" or too "high"), they are largely believed to provide a more efficient approach to offset crediting, while still ensuring a high level of rigor and quality. This is because the benchmark is established across the board, e.g. for all projects of a given type, and thus the appropriate level of stringency is set based on a one-off policy decision that reflects society's desired environmental outcome, not a case-by-case judgment call that changes based on each project's individual idiosyncrasies.

Disincentives for Economies in Transition to Move Under the Cap
The paper notes that, "a more general concern is that if CDM continues as it is now with most projects in China and India, there is an incentive for these countries not to move toward national mandatory programs because they would lose substantial CDM income."

Acknowledging this concern, it is important to recognize the critical role the CDM has played in encouraging participation of these countries in pursuing emission reductions at all, to date. Arguably, few reductions would have been made in India and China in the absence of the Mechanism. Furthermore, the CDM has created, both politically and technologically, a transition path towards mandatory caps by building the clean infrastructure in these economies in transition, and by helping improve their ability to track and monitor their emissions. To the extent that the CDM is perceived as successfully having promoted technology transfer and cleaner development paths in China and India, it also provides a compelling case that undercuts their historical arguments against binding targets. In other words, while the CDM may not give them an *incentive* to move towards mandatory targets, it may undermine one of their largest bargaining chips against accepting them in post-2012 Kyoto negotiations.

It is also worth remembering that the CDM represents an important political compromise (proposed by Brazil, modified by the U.S., and supported by China) from the original Kyoto negotiations that helped bring many important developing countries to the negotiating table. The compromise reflects a core tenet of Kyoto: "common but differentiated responsibilities." Looking forward to an uncertain post-2012 future, we are certainly in a much different place than we were 11 years ago when Kyoto was signed. At the same time, the core principles reflected in the CDM compromise still represent a political reality that must be dealt with, and while transitioning countries like China and India to binding targets should be a priority, there are other countries that are not currently in such a position (nor are they likely to be in the foreseeable future).

II. Benefits of Engaging with the CDM

Allowing credits generated from CDM projects provides the most effective opportunity for cost containment for the U.S. While no offsets, international or domestic, should be considered as an end unto themselves, they are a valuable way to reduce address climate impacts, create incentives for all to act, and achieve the most reductions at the least cost. Because there is the growing

possibility that new drafts of S 2191 America's Climate Security Act of 2007 could include international project-based credits, it is important that policymakers have a full understanding of the risks and opportunities presented by engaging with the CDM.[6]

International Engagement and New Markets for US Technology
International project-based credits, or CERs, engage developing countries and help build their capability to participate in the global response to climate change. For example, India and China have significant domestic wind and solar energy industries that may well not have developed in the absence of the financing provided by the CDM. They can also provide export and relationship-building opportunities for U.S. businesses in clean technologies, finance and management. A recent UN report[7] shows that 14% of technology and 10% of knowledge transferred through the CDM is currently U.S.-based; this could grow significantly with direct U.S. engagement in the market.

Furthermore, concerns about the CDM would be best addressed in the U.S. by active engagement with the system. As noted by Michael Wara and David Victor, "The United States, were it to become a major buyer of CERs, could play an important role in advocating for these and other reforms. It might do this by pushing for change both at the CDM EB and at meetings of the Conference of the Parties to the UNFCCC. It could also exercise significant influence by simply refusing to allow the use of CERs from projects it deems suspect."[8] This type of engagement by the European Union has pressured the CDM to tighten hydroelectric dam eligibility rules, by disallowing CERs from hydro projects that don't meet the requirements of the International Commission of Large Dams (ICOLD).

Early Liquidity in a Compliance US Carbon Market
International offsets can also provide an effective way of making offsets available at the onset of the cap. As noted in the paper, "Capped entities would like to have offsets available at the onset of the cap to help them meet obligations and reduce costs. Because of the difficulty of establishing a strong offsets program with sufficient review in a short period of time, we propose a multiple step implementation process." In year 1 the document suggests, "A limited early offset program that contains only the most mature activities will be started." A much more effective mechanism for achieving this end would be allowing the use of CDM credits, which have already been verified by an independent 3rd party and certified by the UN. There is a pipeline of these credits available and allowing their use under a U.S. system would provide needed liquidity in the early years before capped entities can make the large infrastructural shifts necessary to achieve their caps, and before a domestic offset pipeline is significant enough to provide the cost containment that will be necessary to ease the transition to a low-carbon economy.

Cost-Containment
Explicitly allowing use of emission reduction credits from developing countries would help contain exposure of U.S. consumers to possible carbon price spikes while also boosting the ability of developing countries to adopt domestic emissions management systems. To make clear here, the Lieberman-Warner Bill (S.2191) currently does not allow international project based credits from developing countries, only international "allowances." An international allowance would come from another cap and trade system like the EU ETS, whereas an international offset would

[6] Point Carbon. "New version of Lieberman-Warner may include CER provision." 9 May 2008 <http://www.pointcarbon.com/article28179-882.html?articleID=28179&categoryID=882>.
[7] Seres, Stephen. "Analysis of Technology Transfer in CDM Projects." December 2007.
[8] Michael W. Wara and David G. Victor. A Realistic Policy on International Carbon Offsets. PESD Working Paper #74, April 2008.

come from the UN-sanctioned CDM. If only international allowances are permitted for use in the U.S., there will be no cost-containment benefits from their use because these credits -- which generally sell for a 25% premium vis a vis CERs (CDM offsets) -- are very likely to be more expensive than our own domestic allowances, and therefore they would not be available for use in the U.S.

Though Lieberman-Warner currently prohibits the use of international offsets, recent research indicates that an expansion of the program will be necessary to help manage the compliance costs associated with implementing a U.S. cap-and-trade program. A recent analysis by the EPA notes that, "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% compared to the bill as written."[9] In contrast, allowing CER use would decrease costs 34% while allowing their unlimited use would further decrease costs 26%. Another recent study by New Carbon Finance (NCF) indicates that under Lieberman-Warner, a carbon price of $40-$50 is likely by 2020. The NCF report concludes that allowing 15% international offsets could save the US economy up to $145 billion (or $480 per person) annually.

III. Offsets versus Allowances for Early Action

Currently the paper recommends providing allowances to reward early action. We agree with the general sentiment of this recommendation, but would recommend awarding offsets, rather than allowances for these early reductions.

"Early action" reductions credited from within the cap do not provide strong enough incentives to pursue these opportunities and do not reduce the overall costs of the bill or contribute to cost-containment. Also, since the allowance pool would be set at a given percentage of the total cap, projects would have to compete with each other for a finite set of allowances.

Rewarding the efforts of covered entities that generate or purchase reductions prior to implementation of a mandatory federal program sends clear market signals to facilitate development of projects that reduce GHG emissions, and serves as an incentive for covered entities to reduce emissions as soon as possible, even *before* implementation of a mandatory program. Therefore, rather than allocating allowances to entities that make early on-site voluntary reductions entity-wide, covered entities which have purchased and retired offset allowances under a voluntary offset program deemed eligible by the Administrator should also be eligible for early action credit.

[9] US ENVIRONMENTAL PROTECTION AGENCY, EPA Analysis of the Liebermann-Warner Climate Security Act of 2008, S. 2191 in 110th Congress, March 2008.

The Pacific Forest Trust
Additional Perspective

The Pacific Forest Trust was very pleased to take part in this dynamic group effort led by the Nicholas Institute for Environmental Policy Solutions. We commend the great amount of work and thought that was put into addressing these challenging issues around cap and trade design. We also appreciate the inclusion of domestic and international forest activities in the proposed revised legislative architecture. Given our specific experience with forest and climate policy and market development, we would like to offer a few more thoughts in closing.

As we search for solutions to global warming, it is crucial to take a broad view inclusive of all of the world's significant sources and sinks of greenhouse gases. We must identify actions that can be readily implemented to both reduce emissions of greenhouse gases and increase their removal from the atmosphere. In this respect, forests provide a unique and powerful opportunity to do just that.

Globally, forests represent around 20 to 25% of all CO2 emissions each year—the second largest source of CO2 after fossil fuel combustion (historically, this number was 40 to 50%). In the United States, we are also seeing renewed trends of forest loss: Each year we convert nearly 1.5 million acres of forestland to other uses, mostly to development. In addition, our existing forests store less carbon on average than they could naturally.

By reducing forest conversion, restoring depleted carbon stocks, and reforesting formerly forested land, the U.S. could dramatically enhance its ability to reduce emissions and reabsorb CO2 from the atmosphere. One estimate puts the potential at 1 to 1.5 billion tons of additional CO2 reductions each year over the next 50 years—a quarter of our current annual 6 billion tons of CO2 emissions.

If done right, with strong standards to ensure environmentally sound reductions that are real, additional, verifiable, permanent and enforceable, offsets are one way to begin to engage the forest sector. An offset program may also help both landowners and administrators gain experience with forest carbon accounting and monitoring, in preparation for an approach that moves beyond project-by-project reductions from the forest sector.

In recognition of forests' major impact on overall levels of atmospheric CO2, we do suggest that U.S. climate policy take a broader programmatic approach to the forest sector. With the potential gains, but also the potential losses of forest carbon, a system is needed to incorporate the forest sector into the overarching, national economy-wide accounting used to implement any "cap." This cross-sector accounting, utilizing life-cycle analysis, is critical for addressing leakage within the forest sector and across to other sectors such as energy and transportation. This is especially true given the further potential for forests to provide alternative energy feedstock and low carbon fuels.

Integrating the forest sector into national cap and trade design more holistically will allow the flexibility to address our forests at the landscape level. We would be able to apply a suite of strategies to reach national goals, understanding that the best strategy in one region might not be the best in another. An integrated system also helps us to more effectively achieve synergistic goals—ensuring environmentally sound development of bioenergy (without sacrificing natural ecosystems), facilitating smart growth, and increasing the adaptive resilience of our forestland base in the face of climate change.

There is certainly much work left to be done, as expeditiously as possible, to ensure we arrive at the best policies for climate and forests. The Pacific Forest Trust looks forward to continued efforts and discussion with the Nicholas School and other collaborators over the coming months. Together we have great hope for creating a brighter, greener, and cooler future.

Perspective on the Nicholas Institute Report *Designing Offsets Policy for the U.S.*

Doug Boucher and Chris Busch
Union of Concerned Scientists
April, 2008

UCS has very much appreciated the opportunity to participate in the process as well as to add this comment on the final version of the report. Without implying any position for or against elements we don't mention here (i.e. silence does not imply either consent or opposition), we would like to add some brief points:

- We support many elements of the report. In particular, we are pleased that the report supports increasing the allocation for International Forest Protection to 3.0% of allowances (current p. 66). We are also glad that the report makes it clear that both offsets and mechanisms for additional funding (e.g. allowance allocations or auction proceeds) are important policy tools; that they have different, complementary advantages and therefore that the climate change bill should include both (i.e. "both/and", not "either/or"). Figure 2 (current p. 14) is a good graphical illustration of the difference between these two kinds of options. Offsets are a funding mechanism to capture reductions and, generally speaking, these are not unique reductions that cannot possibly be achieved in any other way.

- In the debate about whether or not to establish quantitative limits on offsets (current p. 25). we are clearly in favor of such limits. An overly permissive offset policy could allow further technological lock-in to high GHG emitting capital. Such lock-in would increase the cost of deeper future reductions. While we recognize the global warming pollution is an economy-wide problem, and we recognize the particular importance of averting continued tropical deforestation in the global context, we also view innovation in key sectors such as energy and transportation as critical. By prioritizing innovation in these key sectors, we can reduce the future cost of global warming solutions, provide the world the necessary innovations to manage emissions in a way that enhances our standard of living, and benefit in the process from greater exports in the surging global clean technology market.

  In fact, we are concerned that the dual limits of 15% of emissions (not of emissions reductions) for both international and domestic offsets, could allow emitters to delay the necessary investments in transforming technology for many years. Under the Lieberman-Warner bill as it currently stands, the total quantity of allowances does not fall more than 15% below its initial (2012) value until 2021, and doesn't reach 30% below until 2029. Thus emitters, by buying offsets, could delay any changes in their emissions levels for a decade or more.

  Our view is that the right frame for thinking about quantitative limits on offsets is the amount of reductions that the program seeks to achieve. Moreover, we support limiting offsets to a modest fraction, much less than half, of reductions, in order to ensure meaningful technological progress.

  Though we strongly support quantitative limits on compliance offsets, we also believe that the continued development of a robust and credible voluntary system is crucial. People and firms who want to go beyond the mandated minimum level of climate action should have a reliable means for doing so.

- Crediting "early action" all the way back to 1994 for allocations is clearly non-additional (current p. 68). Future policies, no matter how innovative, can't change the past. Providing credits for actions taken more than 15 years before the bill even comes into force stretches the definition of “early” beyond reasonable limits. The point is not to reward past virtue, but to incentivize it in the future.

- The issue of leakage, more specifically the shifting of emissions from within the boundaries of offsets projects to outside of them, has yet to be adequately managed and is resistant to sufficient treatment in a cost effective way at the project level. A useful step forward to ensuring that offsets are contributing to declining emissions in the sector being targeted is to require monitoring the targeted sector to ensure that emissions are being reduced not just within the confines of project boundaries but in the sector as a whole (as suggested in the “Review and Revision” section, current p. 76). This would also lay the groundwork for future inclusion in the cap.

World Resources Institute Perspective

The World Resources Institute (WRI) appreciates this opportunity to provide its perspective on this proposed design for U.S. carbon offset and mitigation financing programs. In general, WRI believes the draft architecture described in this document is sound and worthy of consideration. We offer the following observations on specific elements of the architecture and comments on where we think the design of these elements could be improved.

International Offsets

The inclusion of international offsets in a U.S. carbon offset program could have many benefits, as noted in the background paper. The most effective and least-cost option for the United States to access international offsets would be through the Clean Development Mechanism (CDM), which has already been established under the United Nations Framework Convention on Climate Change. Over the last 10 years, a vast amount of work and investment has gone into developing the institutional structures and procedures necessary for a credible international offset system under the CDM. In 2007, the market created by the CDM produced around $12 billion in transactions, and over 1,000 CDM offset projects are now currently approved and registered. The CDM is expected to deliver over two billion tons of CO_2-equivalent reductions by 2012. The potential value of this system to the United States should not be underestimated. Among other things, the CDM affords:

- A set of over 110 fully vetted and road-tested methodologies for estimating baseline emissions and conducting monitoring and verification for a wide range of different project activities.
- A registry system and international transaction log for tracking information about projects and monitoring offset credit trades.
- A system of offices in nearly 100 developing countries responsible for reviewing and approving offset projects.
- A system of internationally accredited companies and organizations competent to review, validate, and verify offset projects around the world.

As a global carbon offset program of unprecedented size and scope, the CDM has not been without its flaws and growing pains. Some of the more serious concerns include:

- The CDM may have certified significant numbers of non-additional projects.[10] The CDM Executive Board has begun to address this issue through more rigorous application of additionality rules.[11]
- CDM procedures have been cumbersome and inefficient. This has been addressed in part by creating more professional staff dedicated to reviewing project applications. There are still some ways in which project review could probably be improved, streamlined, or standardized.[12]

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[10] Schneider, L., 2007. *Is The CDM Fulfilling Its Environmental And Sustainable Development Objectives? An Evaluation Of The CDM And Options For Improvement*. Oeko-Institut e.V., report prepared for World Wildlife Fund.
[11] Ibid.; Ball, J., 2008. "Up in Smoke: Moguls Take a Hit in the Carbon Market," in *Wall Street Journal*, April 15, 2008, pp. 14-15.
[12] Schneider, L., 2007, *supra note* 1; and Broekhoff, D. 2007. *Expanding Global Emissions Trading: Prospects for Standardized Carbon Offset Crediting*. Report prepared for the International Emissions Trading Association, Geneva. http://www.ieta.org/ieta/www/pages/getfile.php?docID=2730

- The CDM has worked better as a cost-containment mechanism than a "clean development" mechanism. CDM investment has largely gone to projects with low cost and high quantification certainty in countries with favorable investment climates. It has bypassed some poorer countries, and in the eyes of some observers has under-invested in energy sector projects with the highest "sustainable development" potential. This trend may be changing as low-cost opportunities are exhausted, the scope of the market expands, and new rules for crediting "programs of activities" help to reduce transaction costs for some project types.

None of these concerns are serious enough that they should preclude U.S. involvement in the CDM. Financially and politically, it would not make sense for the United States to "reinvent the wheel" and develop a separate, parallel international offsets program. The CDM is also not a static system that the United States would have to take or leave. To the contrary, it is likely that U.S. engagement with the CDM would be beneficial for both parties, with U.S. knowledge and resources able to address some of the CDM's shortcomings and improve it over time.

Mitigation Financing Program

The goal of this proposed program is laudable, but its design will probably require some further thought and consideration. In particular, since this program addresses non-offset reductions from outside the cap, it is not necessary or even practical to support them at a one-to-one ratio of allowances to tons reduced. Candidate projects may have higher or lower per-ton costs than the going rate for allowances, and it is unrealistic to expect that the administrator of the program will be able to discern the cost-effectiveness of individual projects or activities. A superior approach would be to hold an auction soliciting bids for reductions (perhaps every 5-10 years), and allocate funds from the sale of allowances to qualifying projects according to the winning bids.

Also, it is not clear on what basis certain activities might be designated for inclusion in the mitigation financing program, but not in the offsets program. It appears the same general criteria (real, verifiable, additional, and permanent) would be applied for eligibility and quantification under both programs. Standard protocols and methodologies would be also required under both programs. With such similar requirements, inclusion in one program or the other would seem to be arbitrary. It would help if there were some clearer indication of what types of activities should belong in each program, or how decisions about these designations might be made.

Standardized Approaches to Baseline and Additionality Determinations

Standardized methods for estimating baseline emissions and determining the additionality of offset projects are generally preferable to project-specific methods. Standardized methods apply common emission factors and assumptions to projects of the same type, and minimize the level of subjective judgment required to make determinations about baselines and additionality. Standardized methods can reduce transaction costs for project developers, alleviate uncertainties for investors, and increase the transparency of regulatory decisions.[13]

Nevertheless, standardized approaches may not be sufficiently credible or accurate for certain kinds of project activities. In particular, they may be difficult to apply to many types of forestry and land-use projects. To maintain the integrity of an emissions cap, the baseline for any offset project must approximate the emissions or sequestration that would have occurred in the absence

[13] Ibid., Broekhoff, D., 2007.

of an offset market (a.k.a. the "business as usual" scenario).[14] Some standard methods proposed to estimate baselines (e.g., stable stock or flux) will therefore be appropriate only if they happen to produce an estimate in line with "business-as-usual" projections. The central criterion for any baseline methodology should be that it is a reasonable predictor of "business as usual."

With respect to standardized additionality determinations, the approach described in the draft architecture is reasonable in calling for the establishment of "objective criteria" that serve to exclude non-additional projects. Such criteria should arguably not include an assessment of the financial viability of a project, which would necessarily be project-specific and subjective.

Discounting of Credited Reductions

The draft architecture calls for discounting the number of offset allowances received by projects in proportion to the uncertainty associated with quantifying their emission reductions or removals. It is not clear why discounting would be necessary. A simpler and less arbitrary approach would be require the use of lower bound estimates for project sequestration, and upper bound estimates for baseline sequestration (e.g., within a 95% confidence interval). The reverse would apply to estimates of project and baseline emissions. Such an approach would generate conservative estimates of project removals/reductions and maintain an incentive for improving measurement accuracy, while avoiding the need for arbitrary discounts.

For many types of projects, uncertainty associated with baseline conditions may be much higher than the uncertainty associated with actual measurements of sequestration or emissions. Baseline uncertainty will also lead to unavoidable uncertainty about leakage. It may be very difficult to quantify this type of uncertainty in ways that do not seem arbitrary (or impossible to prove empirically).

Verification Procedures and Responsibilities

The auditing and verification procedures called for in the draft architecture generally seem reasonable. Verifiers should be required to "check the math" of any reduction or sequestration claim made by project owners. Verification should also be conducted by entities without a financial or competitive stake in the outcome of their reviews. This may require a system that randomly assigns qualified verifiers to projects, and remunerates verification using general program funds, perhaps collected through fees paid by project owners.

Establishment of the Offsets Program

The draft architecture calls for a graduated approach to establishing an offsets program, with "a limited early offset program that contains only the most mature activities" but without a full review system in place. It is not clear how this early program would function credibly without a formal regulatory process in place from the beginning. A better approach would be to establish a full process upfront that allows recognition of several project types with fully-developed methodologies. More methodologies could then be added as time goes on, and adjustments to any methodology could be made as necessary based on review and evaluation. This is the approach followed by most carbon offset programs established to date.

[14] For a general discussion of baseline requirements, see the WRI/WBCSD *GHG Protocol for Project Accounting*, available at www.ghgprotocol.org.

Where eligible projects are started prior to the initiation of the program, crediting should be allowed for reductions achieved between the start date of the project and the date of its formal registration. If appropriate, the administrator of the offset program could indicate established methodologies that are likely to be approved once the program begins full operation, but no offset allowances should be issued prior to formal registration of a project, subject to a full verification process.

Early Action Allocations

Early action allocations for offsets should be given to projects that followed approved methodologies, not on the basis of where the projects and their reductions are registered.

Review and Revision

It is not clear how review of the national inventory would be used to monitor the integrity of the offset program in anything other than a very rough manner. The national inventory will reflect only changes in actual emissions and sequestration levels, not the effects of offset projects against counterfactual baselines. As noted in the text, comparisons would need to account for activities that significantly affect sequestration and emissions outside of the offsets market – *and* estimate what their impacts would have been in the absence of an offset market. The effects of such baseline activities on national-level emissions may become increasingly difficult to assess the longer the offsets market is in existence. A national inventory review would be unlikely to reveal anything beyond very large violations of integrity, which would probably be detectable more quickly through other types of program evaluations.

APPENDIX D: EXAMPLE METHODOLOGIES

For those readers who are not familiar with the methodologies and protocols that have been developed for the CDM, State, regional, and voluntary markets, we provide three examples:

- An afforestation, reforestation, and re-vegetation protocol taken from the Voluntary Carbon Standard.
- A landfill protocol taken from the California Climate Action Registry
- A manure management from Biogas protocol from EPA Climate Leaders

These examples are intended to provide a sense for the type of information that is required in the existing methodologies which may be the basis for those developed for a federal market.

VCS Protocol for Afforestation, Reforestation, and Revegetation Projects

Voluntary Carbon Standard: Guidance for Agriculture, Forestry and Other Land Use Projects. 19 November 2007. Available at http://www.v-c-s.org/docs/AFOLU%20Guidance%20Document.pdf

http://cdm.unfccc.int/methodologies/ARmethodologies/approved_ar.html

Project Eligibility

- Minimum of 20 years/maximum of 100, crediting starts after planning/preparation.
- Timber harvest projects account for carbon loss in the risk analysis process.
- Must demonstrate the project area was not deforested specifically to generate credits prior to initiation of a project.
  - Project developer must provide proof to the verifier that the land had been cleared and used for a land-use common in the region
  - Clearance must have taken place at least ten years prior.

Additionality

Must pass one of the three below

1. Project Test:
   Step 1: Regulatory Surplus
   Step 2: Implementation Barrier
   - Investment
   - Technological
   - Institutional

   Step 3: Common Practice
2. Performance Test (a business-as-usual standard, i.e. the project emissions are below what the VCS Program has deemed standard for the product, service, sector or industry)
3. Technology Test (project is on the list of VCS approved as being additional, those where they have passed the project test and are approved on a case by case basis)

Baseline establishment -

2 methods are available; must use IPCC guidance or a CDM methodology

- Example: CDM combined tool for proving additionality and baseline. Projects must provide credible alternative land uses for comparison, including at least:
  - Continuation of pre-project land use.
  - Any forestation occurring project site (either occurring naturally or to comply with regulations).
- Project should utilize the best historical data on land cover as well as any other records (mitigation programs, state inventories, etc.), information on the natural history (natural fire patterns, cropland usage, etc.) and any other credible socio-economic conditions to identify credible alternative land use scenarios.

Risk Analysis

- Verifiers assign 1 of 4 categories for qualitative risk class: low; medium; high; or unacceptably high/fail.
- One of the categories for qualitative risk class are assigned and project is evaluated using the following criteria:
  - Project longevity/Commitment period
  - Ownership type (NGO/established conservation agency, rented or tenanted land, owner-operated private land or uncertain user rights)

VCS Protocol – continued

  - Technical capability (proven technologies with ready access to relevant expertise, or ineffective technologies)
  - Financial capacity (demonstrated backing from reputable institutions or no external financing)
  - Management capacity (previous project experience with or without on-site management teams)
  - Future income (whether appropriate management plan and financial analysis is available)
  - Future/current opportunity costs (alternative land uses unlikely to occur vs. competing land uses to become more attractive in the future)
  - Endorsement of project or land-use activity by local or national political establishment (yes, no, future endorsement likely?)
- Another methodology is available to determine risk, combining qualitative and quantitative accounting methods in a lookup table in the back of the AFOLU VCS guide.
- For harvesting projects, verifiers can evaluate risk based on both incentives to replant in rotation forestry or rotation length; and in economic, legal or regulatory incentives to continue maintaining forest beyond crediting time.
- Buffer table- For projects with high risk, buffer ranges are 40-60%; for medium risk projects, a 20-40% buffer is the default; and for low risk projects, a 5-20% buffer range is the default.
  - Financial withholding is calculated using the total (life of the project) discounted carbon revenue, rather than Net Present Value. (see Appendix B)
  - Risk analysis is to be reevaluated periodically, to be determined by developers in order for project to sell more of the buffer credits. This is not mandatory, but if after 5 years, project isn't verified, half of buffer credits would be cancelled. After another 5 years, all are cancelled.

Leakage-
- Use CDM methodologies such as Fossil Fuel Leakage tool; Project/Site Preparation Loss Tool.
- There is no CDM tool to account for displacement of logging activity.

Project Measuring and Accounting
- Carbon pools included:
  - Required: above ground wood and belowground biomass.
  - Optional: aboveground non-woody biomass, litter, dead wood, soil and wood products can be excluded if it leads to conservative carbon estimates.
- Monitoring net emissions reductions and sinks must follow the IPCC guidance for A/R projects, or approved CDM methodology;
  - Example: a tool that uses standard equations from IPCC literature to calculate whether a change in carbon stocks (sinks, increased emissions, etc.,) for a project is significant.
- Emissions from biomass burning during site preparation;
  - Example: CDM tool uses standard equations from IPCC literature to calculate emissions from loss of vegetative biomass (i.e. live vegetation being cleared, burned or decaying as a result of clearing of brush, etc.). Project Developer can use conservative default data from IPCC literature, national inventories, published peer-reviewed studies, or direct field measurements to account for project preparation activities.

VCS Protocol- continued

- Emissions from fossil fuel combustion; direct (i.e. mechanical and vehicles) and indirect (third party vehicles not directly used by project).
  - Example: CDM tool uses standard IPCC formula to estimate onsite and offsite fossil fuel emissions associated with a project.
- Direct emissions from the use of synthetic fertilizers;
  - Example: CDM tool to estimate nitrous oxide emissions from synthetic fertilizer application using standard IPCC equations.
- For harvesting projects, a different accounting system is used.
- To reduce cost of carbon monitoring, for projects where good growth tables are available and there is a high tree survival rate, carbon stocks of above-ground biomass can be conservatively estimated for the following projects types:
  - Plantations-developers must demonstrate 90% seedling survival two years after planting and may use national or regional volume or biomass tables for the lowest site class plantations for the species planted. (if not available, natural regeneration tables can be substituted)
  - Natural Regeneration-developers may use national or regional tables for lowest site class natural regeneration for species planted. (if not available-plantation tables may be used but 10 yrs must be added to the age of the stands)
  - Developers can use higher site class yield tables if they can demonstrate, through measurement that the trees are behaving as expected for the higher class.
- Quantifying emissions sources approved methodologies are A/R CDM methods. Projects can use the approved projects under the program or develop their own. They must fulfill these obligations if they are to develop their own:
  - justify the list of emissions sources to be considered and tested
  - justify the exclusion of other emissions sources
  - prove that they have assessed and managed all significant using CDM tools.

CCAR Landfill Protocol

Landfill Project Reporting Protocol, CCAR. Version 1.0 (Nov 2007) Available at: http://www.climateregistry.org/resources/docs/protocols/project/landfill/Landfill_Project_Reporting_Protocol_v1.0_Nov.07.pdf

Project Eligibility

- Must be a landfill gas control system for *capturing and combusting methane gas* (fate of gas could be combustion on-site, offsite or used to power vehicles).
- Only closed flares if using that technology
- No fugitive emissions included in project emissions.

Additionality

- Meets Performance Standard, uses a practice-based method: is the gas collection and combustion system required by any law? No - considered additional; Yes - not additional.
- Above Regulatory requirements
    - New combustion projects at unregulated landfills or
    - Projects at landfills already doing combustion for regulatory compliance must be separately operated and monitored to distinguish the 'additional' reductions from those required for compliance.

Baseline

- All uncontrolled methane emissions are assumed to be released as the baseline scenario.
- The methane that would be oxidized by bacteria in the soil of uncovered landfills is subtracted from the baseline (about 10%) since those emissions reductions would have occurred without the project.
    - Landfill cover systems incorporating synthetic liners do not have to subtract the methane oxidation rate.
    -

Leakage –Leakage is not expected to result from this type of project.

Project Measurement and Accounting

- Monitoring
    - Hourly measurement directly meter rates of continuous gas flow preferred
    - Weekly methane concentration can be calibrated, an uncertainty discount rate of 10% is required
    - Monthly accounting can be done (for projects starting between 2001- end of 2007) an uncertainty discount rate of 20% is required.

CCAR Landfill Protocol - continued

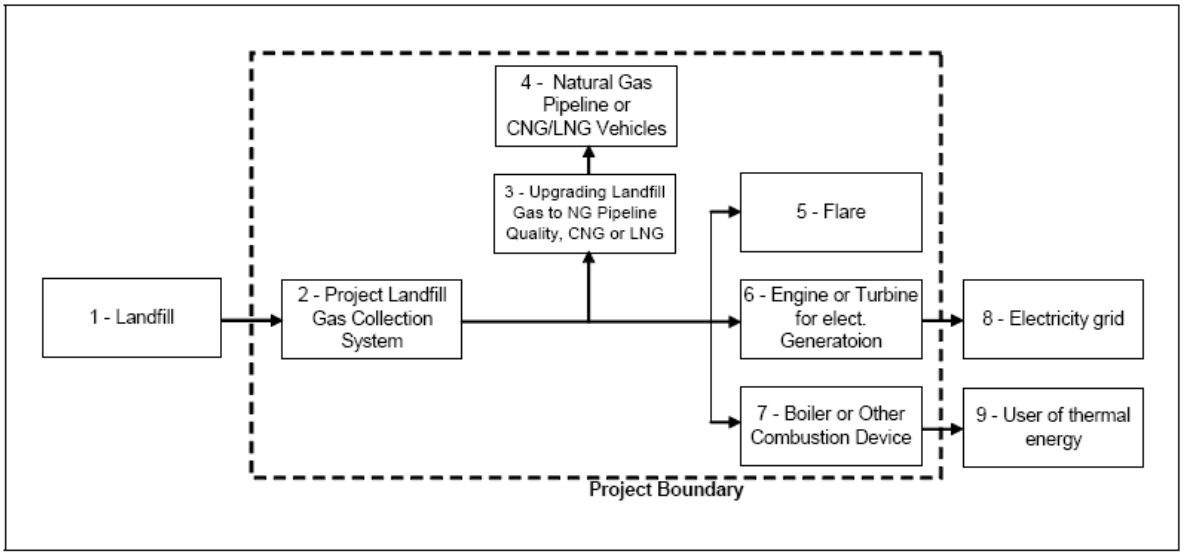


Figure 1 All emissions and reductions of GHG within the project boundary that must be included in project accounting. More specific details available on these GHG sources are in the draft protocol for landfills (CCAR) page 11, figure 1.

- Biogenic emissions, those from combustion, are not included because they are considered comparable to those that would have been emitted from decomposition of this waste if left alone.
- Project GHG emissions reductions calculation method:
  - the total amount of uncontrolled methane collected from the landfill and combusted by the project landfill gas control system, minus
  - the portion of methane oxidized in the baseline scenario, minus
  - carbon dioxide emissions from fossil fuel consumption, minus
  - methane emissions from incomplete combustion of natural gas if applicable, minus
  - indirect carbon dioxide emissions from the use of electricity from the grid, if applicable, minus
  - the effective radius of influence adjustment, if applicable, minus
  - the discount factor to account for uncertainties associated with the project monitoring equipment.
- More information on specific accounting requirements is available in the Protocol.

Reporting Parameters

- Initial project information that must be submitted before a project can register reductions include (but are not limited to):
  - Landfill Type (sanitary, controlled, open dump)
  - Size (acres or hectares of designated area for waste placement)
  - Capacity (Cubic meters or tons)
  - Open and closed (or projected) dates
  - Description of any regulatory framework in place pertinent to project
  - Other forms included are: Pre-existing landfill gas control system information and landfill gas utilization information.

CCAR Landfill Protocol - continued

- Annual report submitted through CARROT Online reporting tool to calculate annual emissions (spreadsheets calculations used until the online version becomes available for Landfill projects).
- 5 years of records must be kept for a variety of information outlined in the Protocol.
- Registration of reductions are available for 10 years or until regulatory compliance is required (and can claim credits until the date of regulation implementation).

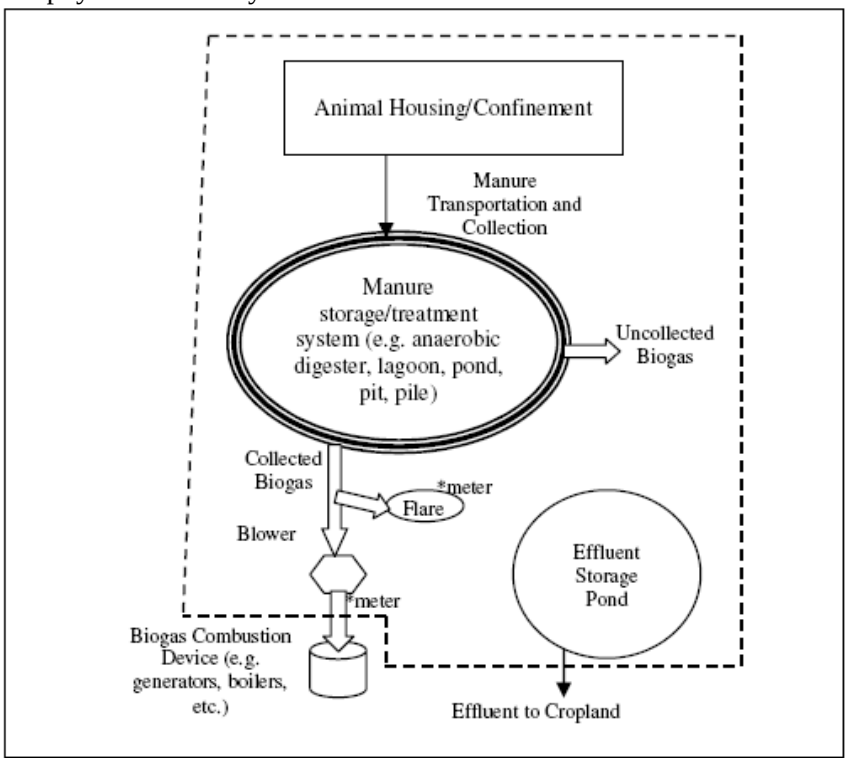
EPA Climate Leaders

Manure Management through Biogas recovery systems Methodology

U.S. EPA Climate Leaders Greenhouse Gas Inventory Protocol: Offset Project Methodology for Managing Manure with Biogas Recovery Systems. April 2008. Version 1.2 Available at: http://www.epa.gov/stateply/documents/resources/draft_landfill_offset_protocol.pdf

Project Type:

- Anaerobic digester to collect and convey methane to a flare or gas utilization project.
- Boundary assumes that all the methane collected enters the combustion device from the physical boundary below:



Additionality

- Regulatory Test (federal, state and local)
- Performance Threshold- Uses a practice-based approach. Is the dairy/swine operation currently collecting and combusting methane? no-additional, yes-non additional

Baseline

The manure management system in place prior to the project is the baseline. In order to account for changes in animal populations, the baseline must be re-established annually based on the system originally in place. (using equations on pages 10-12).

There are 5 possible original systems:

- Conventional anaerobic lagoon
- Slurry storage tanks and ponds
- Deep pit storage
- Solid storage
- Pasture and Rangeland

EPA Climate Leaders - continued

Leakage
Not expected to result in leakage.

Project Measurement and Accounting:
- Direct emissions from CH_4 and N_20
- Emissions from CO_2, CH_4, and N_20 resulting from electricity associated w/ project
- Combustion during the construction process
- and transportation of manure specifically related to the project
- emissions from fuel use to assist and maintain flare operation
- does not include CO_2 from the manure b/c it is a biogenic source (sequestered, resulting in no net emissions)
- CH_4 from leaking valves or digester cover are included
- Seasonal fluctuations: average animal population (accounting for age and weight classes variations) calculated annually.

Reductions
- Can use AgSTAR FarmWare 3.0 to calculate methane production from the digester project.
- Tool outlined in the protocol, section: Calculating Actual Project Reductions.(pages 14-17)

Monitoring
- Must monitor regulatory requirement changes
- Direct measurement or modeling (prefer to model N_20 and monitor CH_4)
    - Direct Measurement:
        - Continuous metering (gas flow and concentration) with instrument
        - or monthly sampling (gas flow rate, methane concentration, temperature and pressure used to calculate amount combusted)
    - Modeling: use same protocol equations to calculate baseline emissions, using actual data on animal populations for each animal. Minimum done annually and each time a variable could have changed.

the Nicholas Institute

The Nicholas Institute for Environmental Policy Solutions at Duke University is a nonpartisan institute founded in 2005 to engage with decision makers in government, the private sector and the nonprofit community to develop innovative proposals that address critical environmental challenges. The Institute seeks to act as an "honest broker" in policy debates by fostering open, ongoing dialogue between stakeholders on all sides of the issues and by providing decision makers with timely and trustworthy policy-relevant analysis based on academic research. The Institute's staff leverages the broad expertise of Duke University as well as public and private partners nationwide.

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