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Designing a Large-Scale Federal Greenhouse Gas Offsets Program in the United States: Policy Choices and Lessons Learned from the Clean Development Mechanism and Other Offsets Programs

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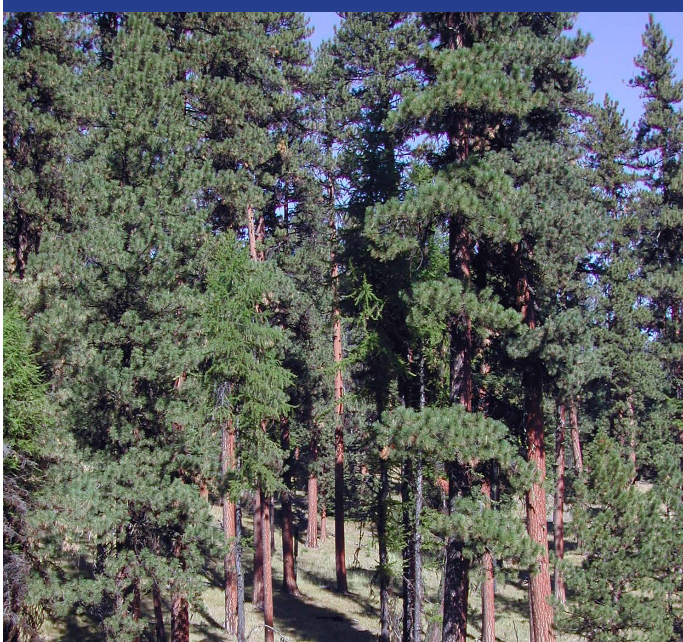
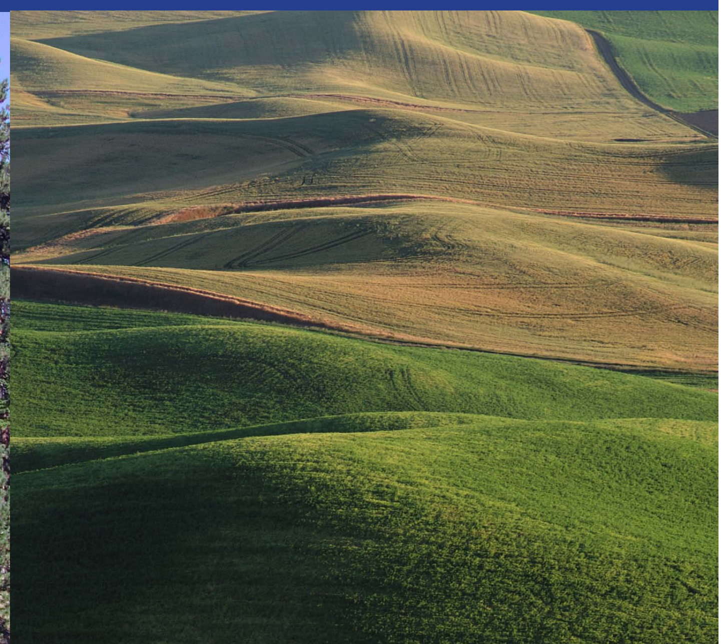




Contents

1 Executive Summary 2
2 Introduction 4
2.1 EPRI Perspective 4
2.2 The Kyoto Protocol and the Clean Development Mechanism (CDM) 4
2.3 Overview of Paper 5
3 Overview of CDM Project Cycle and Institutions 6
3.1 Submission of Project Design Documentation 6
3.2 Methodology Development in the CDM 7
3.3 Validation and Registration 7
3.4 Certification and Verification of Emission Reductions 10
3.5 Issuance of Offset Credits 10
3.6 User Versus Seller Liability 11
4 Delays and Uncertainty in Offset Project Development, Approval and Credit Issuance 12
4.1 CDM Performance and Overview of Causes of Delay and Uncertainty 12
4.2 Causes for Delays and Uncertainties in CDM 13
5 Key Differences Between the CDM and a U.S. Federal Offset Program 15
5.1 Comparing the Offsets Project Cycle in the CDM and in Proposed U.S. Legislation 15
5.2 Different Policymaking Contexts 16
6 U.S. Policy Choices and Potential Impacts on Offset Market Development 20
6.1 Allowing Retroactive Decisions Versus Providing More Certainty 20
6.2 Using Standardized Approaches to Establish Baselines and Additionality 21
6.3 EPA Develops its Own Methodologies and Adopts a Positive List 21
6.4 Determining Leakage on a Regional Basis Rather than on a Project-by-Project Basis. 22
6.5 Creating Confidence in a System of Third-Party Verification 22
6.6 Opting for "Listing" in Lieu of Project Validation 23
6.7 Adopting a Seller Rather than a User Liability Approach 24
6.8 Using a Simplified Approach to Validate and Credit Certain Types of Agricultural Offsets Projects 24
7 Conclusion 25
8 Glossary of Terms 26

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1 Executive Summary

If the United States decides to take broader action in the future to mitigate climate change, policy discussions may once again focus on development of a greenhouse gas (GHG) cap-and-trade program combined with development of a large-scale GHG emissions offsets program. The compliance flexibility offered by these programs, and the economic incentives they create to identify and implement low-cost compliance options, have the potential to reduce significantly the costs to achieve significant emissions limitations. Realizing this potential, however, is not guaranteed. The overall design and key elements of an offset program will have a significant impact on whether a future offsets program can achieve the objective of stimulating investment in activities that create low-cost GHG reductions. Fortunately, the design of a U.S. program can benefit from experience to date with existing offset programs. In particular, U.S. policymakers can draw lessons from the experience of the first large-scale offset program in the world—the Kyoto Protocol's Clean Development Mechanism (CDM). By the end of 2012, the CDM is expected to issue offset credits for approximately one billion tonnes of CO_2-equivalent (CO_2e) emission reductions. This paper evaluates the CDM and other key existing offset programs, and draws lessons from these programs that can help to inform development of a potential future U.S. national or regional offsets program.

Many observers believe the CDM has succeeded in creating significant emission reductions, achieving sustainable development goals, and generating other important benefits. However, the program also has been criticized for several reasons. Some critics have argued that at least some of the emission reductions credited under the CDM are not "real," and are not "additional" because they likely would have occurred even if the CDM did not exist. Proving the additionality of emissions offsets—that is, that they would not have been realized but for the existence of the offsets program and associated carbon-related financial investments—is a central challenge for such programs. In addition, some observers have criticized the inefficient nature of the CDM's project approval process, and delays associated with obtaining necessary project approvals. These delays, and their underlying causes, which are examined in detail in this report, reduced the quantity of offset credits created by the CDM compared to early estimates and the goals of the nations that created the program. This has occurred for two reasons. First, the issuance of offset credits has been postponed from one compliance year to the next, and beyond in some cases. Second, and perhaps more importantly, the CDM's complex project approval process created uncertainties

and risks for project developers that discouraged investment in CDM projects, reducing potential offset supply.

In designing the world's first large-scale international offsets program, policymakers and the architects of the CDM did not have the benefit of relying on prior experience in offset policy design. This necessitated a "learning-by-doing" approach. Part of the CDM's learning by doing has involved creating new institutional entities, and changing administrative structures and review processes as the program has evolved. As this paper examines and describes in detail, a number of the problems that prompted such changes are unique to the CDM, and its original design and provenance. However, many of the policy choices and issues faced by the international community when it designed the CDM and established its "procedures and modalities" also can be expected to confront U.S. policymakers if they attempt to design a large-scale offsets program at the federal, regional or state level.

Given significant differences in the policy contexts of a U.S. offsets program and the CDM, U.S. policymakers have an opportunity to design an offsets program that will have greater potential to create large-scale quantities of high-quality compliance offsets at low cost. The CDM was the first program of its kind, and was developed within the context of complex international negotiations involving more than 150 countries at varying stages of development. In contrast, the U.S. policy-making context offers a number of important advantages:

- Key U.S. regulatory agencies like the Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) have experience developing and administering large-scale, complex regulatory programs. Given this, a U.S. program would be less likely to encounter some of the problems encountered in the CDM. In addition, these agencies are staffed with highly qualified professional staff, which was not the case for the CDM, particularly in its earliest phases of operation.
- Development of a U.S. offset program could draw upon prior legislative experience developing successful market-based environmental policies, such as the sulfur dioxide (SO_2) trading program under Title IV of the Clean Air Act (CAA).
- A U.S. program can benefit from a careful assessment of the CDM's experience in the design and early-stage operation of a large-scale offsets program.
- A U.S. domestic offset program also can benefit from the greater homogeneity of GHG emitting activities in the U.S., which may facilitate establishment of specific rules relating to the eligibility of offset projects and measurement of associated emission reductions.
- Finally, a U.S. offsets program also can benefit from the accumulated experience and methodologies of the CDM, U.S. voluntary programs including the Climate Leaders program, and the offset program currently being implemented in California.

On the other hand, experience with the CDM suggests that new issues and challenges are likely to arise in the design and implementation of a U.S. offsets program, as is true for many other public policies. For example, EPA analysis of comprehensive climate change legislation in 2009 concluded that forest management and afforestation offset projects were expected to account for the vast majority of offset credits in a future U.S. federal offset program. However, the complexity of these kinds of offset projects may be at odds with the desire of policymakers to "standardize" key elements of the offset project approval process, such as requirements for demonstrating project eligibility. If requirements and the approval process for forestry projects proves to be onerous and/or unpredictable, U.S. offset supplies may be far lower than the volumes predicted by EPA in its economic modeling of previous U.S. cap-and-trade legislation. Another challenge that will need to be addressed in a U.S. offset program design can be found in California, where a "user liability" approach has been adopted. Under this approach, the compliance party that submits offsets for compliance purposes will be held liable if an offset credit is issued, but later ruled to be ineligible. While this approach is designed to help address concerns related to the environmental integrity of offsets, it also may significantly impact the development of a robust offset market, and increase the costs of compliance with a future GHG cap-and-trade program.

As policymakers weigh the costs and benefits of different approaches to developing an offsets program, the CDM can provide important examples of the impacts that policy choices can have on program performance. One important goal of this paper is to familiarize U.S. policymakers with these experiences to increase the likelihood a future offset program will be developed in a manner that ensures environmental integrity, and achieves the objectives of stimulating investment in GHG emission-reducing activities not covered by a cap-and-trade program and lowering compliance costs.

2 Introduction

The U.S. Congress did not pass a mandatory cap-and-trade program to reduce GHG emissions and address climate change in the 111th Congress, despite passage of an economy-wide program by the House of Representatives in 2009. It is not possible to know if and when Congress may consider this issue again. However, interest in cap-and-trade and GHG offsets may continue because of several dynamics. These include the implementation of new EPA regulations that are expected to limit GHG emissions from large stationary emission sources and mobile sources. Even if a cap-and-trade program is not reconsidered in coming years, some observers believe EPA has authority to incorporate a GHG offsets program within the context of its New Source Performance Standard (NSPS) rulemaking, based on its existing authority under the Clean Air Act. Offsets and emissions trading provisions could provide compliance flexibility and significantly reduce the potential costs of new regulatory programs.

Despite the failure of Congress to enact a mandatory cap-and-trade program, many jurisdictions continue to develop climate policy. At the U.S. state and regional levels, California already has adopted an economy-wide GHG cap-and-trade program along with a comprehensive GHG offsets program, and carbon market activity has begun in anticipation of compliance starting in 2013. In addition, the Western Climate Initiative (WCI)—which currently includes California, Quebec, British Columbia, Ontario and Manitoba—also is likely to start its program in 2013. Internationally, the European Union (EU) is moving forward with plans to implement Phase 3 of the EU Emissions Trading Scheme (EU ETS)—the world's largest carbon dioxide (CO_2) cap-and-trade program covering 27 nations in Europe. Elsewhere Australia, New Zealand, South Korea, Japan and China[2] are in various stages of adopting and implementing economy-wide or pilot-scale GHG cap-and-trade programs with offsets. Meanwhile, the U.S. government continues to participate in international climate negotiations in which national cap-and-trade programs and international offset mechanisms are key elements.

In light of these ongoing domestic and international policy developments, cap-and-trade and offsets will likely be in the policy mix if the U.S. decides to take broader action on climate change in the future. These trends highlight the importance of documenting lessons learned to date related to the design and implementation of offset programs. This ensures these lessons will be available to policymakers when these issues are considered again.

2.1 EPRI Perspective

EPRI member companies have a significant interest in the potential role of GHG emissions offsets in climate change policy. Economic modeling of climate legislation concludes that offsets would be a key compliance instrument and an important source of cost containment. Offsets reduce compliance costs because they increase the supply of abatement options available to meet a given compliance obligation. To date, there have not been many efforts devoted to communicating the lessons learned from the CDM and other key existing offset programs. These lessons can help to inform future policy development and potential impacts of choices that policymakers will confront if the U.S. moves forward to develop a large-scale national or regional offsets program. As climate policy continues to evolve at U.S. federal, state, and regional levels, electric companies will need to play an important role in helping to develop offsets policy, and in communicating the role offsets can play in climate policy. This report[3] is part of EPRI's ongoing efforts to provide timely offset-related information, data, quantitative modeling, and critical analyses to help inform policy and regulatory development.

2.2 The Kyoto Protocol and the Clean Development Mechanism (CDM)

Policy-makers designing a U.S. federal and/or regional GHG offset program have the option to consider different programmatic models based on several GHG offset programs developed in the last decade. The CDM—the world's first and largest GHG emissions offset program—remains a key benchmark to compare and assess the operations and performance of other offset programs and development of new ones. For this reason, this paper focuses on the CDM, describes its key program elements and their impacts on offset program performance, and considers experience with this program and associated lessons learned. "Voluntary" offset programs in the U.S. which have been developed more recently, and which differ from the CDM in key areas of their program designs, also are discussed.

The Kyoto Protocol (KP), initially adopted in 1997, created two offsets mechanisms—the CDM and Joint Implementation (JI). Article 12 created the CDM, which was designed to assist participating developing countries to achieve sustainable development, to contribute to the stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, and to assist industrialized countries to achieve compliance with their emission reduction targets. The JI program

created by Article 6 of KP allows industrialized countries, or emitters in those countries, to invest in projects located within other industrialized countries[4] to generate offsets (that is, Emission Reduction Units (ERUs). The CDM has stimulated billions of dollars in investment in offsets called Certified Emission Reductions (CERs), and has leveraged significant additional investment (that is, debt and equity) in the underlying projects that generate these offsets. Many observers believe the CDM has contributed to achieving significant emission reductions in developing countries. However, some critics have argued that many CDM projects are not "additional" because they: (i) would have occurred even in the absence of the incentives created by the CDM; (ii) do not reduce global GHG emissions; or (iii) contribute to the achieving sustainable development goals.

CERs have become a common currency and fungible commodity in the evolving global carbon markets. They can be purchased for compliance by companies that own installations regulated under the EU ETS[5], by countries that are party to the KP, by Japanese companies committed to meeting voluntary targets which they agreed to with the government, and by entities covered under the New Zealand Emission Trading Scheme.

The CDM project development, approval and credit issuance process, or project cycle, is intended to safeguard the environmental integrity of the program, which is based on CERs providing real and permanent GHG emissions reductions relative to business-as-usual (BAU) activities. However, the program also has been criticized for several reasons, including the inefficient nature of its approval process, and the bureaucratic burden it imposes on project developers. The CDM project cycle may result in transaction costs exceeding $100,000[6] per project, and a time commitment of more than two years or longer for some projects to secure official registration—the first step in the CDM offset approval process. Delays in obtaining necessary approvals can significantly reduce the number of offset credits project developers receive relative to their expectations, adversely affecting the financial viability of some projects and market development in general. The causes of such delays in the CDM are particularly important for policymakers to consider in developing a federal and/or regional offset program, and are described and evaluated in some detail in this paper.

2.3 Overview of Paper

The paper utilizes a "lessons-learned" approach. Many offset project developers experienced difficulty working with the CDM, particularly project developers that expected, but did not receive, approval for their projects. Offset buyers who were unable to use certain offsets they contracted for compliance in the EU ETS or in other programs also were dismayed by the operations of the CDM program. Because the CDM was the world's first large-scale offsets program, and imposed minimal restrictions on the types of projects for which offset methodologies could be developed, it sparked a flurry of innovation with regards to potential types of emissions reduction projects, but also experienced "growing pains" associated with a "learning-by-doing" approach. Now that there is a significant amount of experience related to implementing the CDM, as well as some experience implementing voluntary offset programs in the U.S., policymakers in the U.S. have the opportunity to avail themselves of the many lessons to be learned from these experiences. In this manner, a lessons-learned approach can help U.S. policymakers avoid many of the problems experienced by the CDM program—problems which have led many market participants to conclude a different approach is needed to create an offsets program capable of achieving larger volumes of cost-effective emissions reductions. These problems will be critical to avoid, as EPA's economic modeling of cap-and-trade legislation in 2009 and 2010 forecasted that covered entities would have needed as many as one billion tonnes of offsets annually to keep program compliance costs manageable.

Section 3 provides a detailed review of the CDM project development and approval and credit issuance process, and its design elements and institutions. It also provides a brief overview of U.S. voluntary offset programs, and compares these programs' policy choices with those of the CDM.

Section 4 identifies and evaluates the causes of delays and uncertainties in the CDM offset project development, approval and credit issuance processes. It also compares offset program elements incorporated in proposed U.S. cap-and-trade legislation in the 111th Congress with the CDM.

Section 5 provides a comparison of the CDM and U.S. policymaking environments to help provide necessary context to U.S. policymakers for drawing lessons from experience with the CDM. The potential impacts in terms of delaying or facilitating project and market development of several likely programmatic differences between the CDM and a U.S. offsets program also are considered.

Section 6 identifies and describes several key offset policy design, and administrative and institutional design choices that may determine whether a U.S. regional or federal offsets program can achieve its stated objectives. We provide our views as to the impacts of potential design choices on future market development based on CDM experience.

3 Overview of CDM Project Cycle and Institutions

In designing any future U.S. national or regional offsets program, policymakers will confront many policy issues and technical details similar to those confronted by designers of the CDM and other existing offset programs.

Overall, any offset program must incorporate policies, procedures and institutions that address key aspects of program implementation, including:

- Submission of project-related documents for review and approval
- Development of applicable offset methodologies
- Approval of proposed offset projects, including determining a project's "additionality"
- Verification and certification of project-related emission reductions
- Offset credit issuance

Because the CDM was the first large-scale GHG offsets program, it devised its own approach to addressing how offset projects are developed, validated, registered, verified, and issued CERs. This approach has become the standard against which all other offsets programs routinely are compared.

The process by which an offset project moves from inception through the approval process to be issued CERs is shown in Figure 1. Each of the steps in the process is described below.

Rather than covering all of the procedural sub-steps unique to the CDM, the discussion here focuses on key points in the process that may be most relevant to development of a future U.S. program. For each of the approaches and policy choices embodied in these steps, we provide a brief comparison of how several other offset programs also have addressed these key issues. In addition, we review the CDM's approach for addressing the important issue of offset liability, and briefly contrast this with the approach proposed in California's cap-and-trade program.

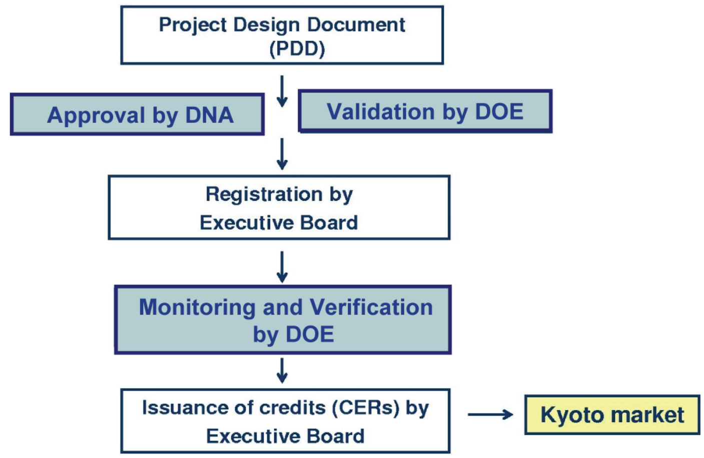

Figure 1 – CDM Approval Process (Source: Point Carbon[7])

Many of the particular causes of delays and uncertainties discussed below are specific to the CDM, and may not arise in a U.S. federal or regional offsets program. However, given the nature of offset systems, and the challenging tradeoffs inherent in designing and implementing them, different types of unanticipated delays and uncertainties are likely to arise in a U.S. program. To realize the benefits of an offset program, it will be important for policymakers to understand the tendency for delays and uncertainties to arise and to try to minimize them in the future design of a program, using the CDM experience as a guide.

3.1 Submission of Project Design Documentation

As shown in Figure 1, the process of reviewing and approving an offset project in the CDM begins with preparation and submission of project documentation by the project developer. In the CDM, this documentation is called a Project Design Document (PDD). The PDD includes detailed information on the proposed project activity, and the baseline and monitoring methodology, including the plan for monitoring, reporting and verification (MRV). (The baseline and monitoring methodology must be an already-approved methodology for the project to be eligible to be considered for validation, or a new methodology must be developed and approved first.) The PDD provides the basis for subsequent decisions on validation, registration and verification of the project. The PDD also must include the project proponents' choice of a crediting period for the project—that is, the amount of time a registered offset project is approved to generate offset credits.

Prior to seeking validation of a project in the next step, project proponents must obtain written approvals for the project—including an affirmation the project will contribute to sustainable development in the host country—from the host country government's relevant regulatory agency, known as the Designated National Authority (DNA).

3.2 Methodology Development in the CDM

In every offset program, a "methodology" is required to estimate an eligible project's GHG emissions baseline—that is, the "without project" emissions level against which the project's emission reductions are measured—and for monitoring these reductions over time. The CDM uses a project-by-project approach to approving offset methodologies (and for additionality determinations, as discussed below), and is open to consideration of new methodologies. If a project proponent wishes to use a new baseline and monitoring methodology,[8] it can propose one as part of its draft PDD. The new methodology is submitted via a Designated Operational Entity (DOE) to the UNFCCC Secretariat. A DOE is an independent, third-party auditing, accounting or engineering firm accredited by the CDM Executive Board (EB) that is hired by project developers to validate projects prior to registration (that is, approval of a project as an eligible CDM project activity that can create CERs), and verify emission reductions after registration.

The UNFCCC Secretariat assesses the methodology and forwards its views to the CDM Methodologies Panel (Meth Panel) for its consideration. After a multi-step review process, the Meth Panel prepares and forwards its final recommendation and draft reformatted methodology (which is made publicly available) to the EB, which considers the proposed new methodology at its next meeting.[9] If the new methodology is approved, it is made publicly available, and the DOE may proceed with validating the project activity and submitting the PDD for registration. In addition to providing this review function, the Meth Panel and EB also develop consolidated baseline and monitoring methodologies based on existing approved methodologies. This often is done to expand a methodology's applicability to other related projects, which in theory should lead to further project development and the creation of more offsets.

At the meeting of signatories to the Kyoto Protocol (the "COP/MOP") in Cancun at the end of 2010, the Parties requested the CDM to develop "standardized" baselines to facilitate offset project development. In theory, the use of standardized baselines would simplify the calculation of emission reductions and additionality determinations.

3.2.1 Methodology Development in Other Offset Programs and U.S. Legislation

In addition to the CDM, a number of offset programs operating in the so-called "voluntary" market in the U.S. and internationally provide important experience and examples for design approaches that could be used in a compliance-quality U.S. offsets program. The offset protocols adopted by the State of California for its mandatory cap-and-trade program were derived from protocols originally developed by the non-profit Climate Action Reserve (CAR). Approaches taken in these voluntary programs and a mandatory program in New South Wales, Australia are highlighted briefly below. Additional details on these programs are provided in a companion EPRI publication.[10]

The approach to methodology development used by the Verified Carbon Standard (VCS)[11] is similar to the CDM in that methodologies are proposed by project proponents rather than developed by the program itself. In contrast, the New South Wales Greenhouse Gas Reduction Scheme (GGRS)[12] identified eligible projects types on a so-called "positive list" at the start of the program, and established appropriate methodologies by regulation. Other programs such as CAR,[13] the American Carbon Registry (ACR),[14] and the Chicago Climate Exchange (CCX)[15] develop methodologies internally, with differing levels of input provided by expert external advisors and other stakeholders. ACR and VCS also allow proponents to use certain existing methodologies (for example, CDM methodologies), or to propose new or modified methodologies for approval. In all cases, methodologies are reviewed in a public consultation and scientific peer review process.[16]

In the U.S. context, a "positive list" approach to identifying eligible offset types was incorporated into GHG cap-and-trade legislation debated in Congress in 2009 and 2010. Specifically, the American Clean Energy and Security Act (H.R.2454, also known as the "Waxman-Markey bill"), which was passed by the House of Representatives in June 2009, and the American Power Act (that is, the "Kerry-Lieberman" bill), a draft climate-energy bill introduced by Senators Kerry and Lieberman in May 2010, each incorporated a requirement that the EPA and the USDA develop methodologies for, and periodically update the list of, eligible offset types.[17]

3.3 Validation and Registration

The next major step in the offset project approval process is the formal review and approval of the project, as shown in Figure 1. In the CDM process, before the project can be approved—or registered—the PDD

first must be validated by a DOE. Project proponents contract directly with approved DOEs, who must be accredited by the EB for the specific sector in which the project activity is to be undertaken.

The DOE posts the PDD on a website for comments from stakeholders and non-governmental organizations (NGOs), reviews the PDD and the comments, and determines whether the project can be validated based on the PDD's consistency with all CDM requirements. These include, but are not limited to, additionality, requirements in approved baseline and monitoring methodologies, and monitoring, verification and reporting requirements.

If a DOE grants a positive validation opinion, it submits a request for registration to the EB along with the PDD and host country approval letter. Registration is the formal acceptance by the EB of a validated project as a CDM project activity, and is the prerequisite for verification and certification of emission reductions, and issuance of CERs for the project activity.

3.3.1 Additionality Determinations

A key consideration that must be addressed under any offset program and project approval process is additionality. A GHG emission reduction project designed to create offsets is considered to be "additional" if the emission reductions created by the project activity would not have occurred but for the implementation of the project and the incentives created by the offset program. This means that the project activity creating the offsets would not have been implemented under BAU. In general, there is no analytic method that can be used to definitively "prove" the additionality of a proposed offset project, which is why this remains perhaps the most contentious issue in the project cycle.

The CDM has adopted a project-by-project approach to determine additionality, in which each project must demonstrate its additionality based on tests that consider the project's specific circumstances, rather than a standardized additionality test, such as a performance standard. Generally speaking, offset projects must demonstrate their additionality in the CDM using:

- An investment test (often referred to as a financial additionality test); *or*
- A barrier test; *and*
- A common practice test.

If a project is deemed to meet the requirements of two tests—either 1 or 2, and test 3—and if the PDD demonstrates that CDM was considered seriously as part of the undertaking of the project activity, the project is considered to be additional under the CDM. These three tests are described below.[18]

Investment Test: In an investment test, the project developer must demonstrate that if revenue created by the project's offset credits was not available, the project would not be financially feasible, or its rate of return would not be attractive. This approach assumes CERs created by the project are a decisive reason to undertake a proposed project. It assumes the project would not be viable or attractive in the absence of the revenue created by the sale of offsets.[19]

Barrier Test: A barrier test considers whether there are significant barriers to implementing an offset project—such as local resistance to new technologies—in the absence of revenue from GHG reductions. If such barriers exist, and only can be alleviated through the crediting of offsets under CDM, the project is assumed to be additional. The barrier test applied by the CDM requires that at least one realistic alternative to the project must not confront these barriers for the project to be additional. This approach assumes GHG reductions are decisive for the project to be able to overcome existing barriers.

Common Practice Test: This test typically compares the emissions performance of the project to "common practice" technologies or activities in the relevant sector and region. If the project does not show the activity to be undertaken is not widespread in the sector (that is, BAU) and/or the project can achieve greater emission reductions than other technologies/activities, it is assumed that emission reductions were not a decisive reason to undertake the project. Consequently, the project is not considered to be additional. The CDM's application of this test differs somewhat. It identifies other technologies/activities operating in the region that are similar to the proposed project activity, and considers whether those activities faced barriers or enjoyed benefits that are not applicable to the project to make an additionality determination.

3.3.2 Project-Based Versus Standardized Approaches to Additionality and Baselines

Project-based approaches to making additionality determinations such as the CDM's approach often are contrasted with "standardized" approaches. As described by the Offset Quality Initiative,[20] standardized approaches "credit reductions on the basis of uniformly applicable criteria."[21] These include performance standards (for example, emission rates, energy use rates, market penetration rates), and technology benchmarks (for example, specific technologies in certain sectors and locations that are automatically deemed additional). It is important to note that a standardized approach can mean several things, and may not necessarily be highly streamlined or simple. For example, some approaches for determining baselines and additionality may be described as "standardized," yet still require project developers to provide a significant amount of project-specific data.

3.3.3 Approaches to Additionality Utilized by Other Offset Programs and in U.S. Legislation

In recognition of the challenges inherent in determining additionality on a project-specific basis, other programs have attempted to establish more streamlined additionality tests than the CDM. For example, CAR uses standardized additionality requirements and baselines. It requires projects to demonstrate that emission reductions are not required by law and go beyond BAU or common practice, but does not require proof of financial additionality. Other programs, such as VCS and ACR, provide the CDM's multi-pronged additionality test as one option, but provide other options to demonstrate additionality, such as an approved performance standard. The Regional Greenhouse Gas Initiative's (RGGI)[22] offset program and other programs also address additionality through eligibility requirements and baseline definitions designed to screen out many non-additional projects.

The U.S. Congress also signaled its interest in standardized approaches for determining additionality in provisions contained in cap-and-trade legislation debated in the 111th Congress. The Waxman-Markey bill called for the EPA to develop a standardized methodology for determining additionality. It also called for a standardized methodology for establishing activity baselines for different offset types, reflecting a conservative estimate of BAU emissions or practices.[23] The Kerry-Lieberman draft bill included provisions on additionality similar to those in the Waxman-Markey bill, and allowed the USDA to establish temporal baselines "that may reflect a continuation of practices in place prior to the adoption of the offset project" for domestic agricultural or forestry projects.[24]

3.3.4 Leakage and Permanence

For afforestation and reforestation (A/R) projects, leakage and lack of permanence are particular concerns that most offset programs explicitly consider and attempt to address. Leakage refers to potential increases in emissions outside of the offset project boundary resulting from the project. In the CDM, leakage for these project categories is calculated based on approaches incorporated in accepted baseline and monitoring methodologies.

To address impermanence[25] related to forestry projects, the CDM adopted a temporary crediting approach for A/R projects.[26] Project participants may choose to be issued temporary CERs (tCERs) or long-term CERs (lCERs). Temporary CERs expire at the end of the commitment period following the one in which they were issued, and lCERs expire at the end of the crediting period for the project.[27] In addition, if the project generates more emissions than sequestration due to the loss of trees, for example, tCERs or lCERs will not be issued until the project activity results in net sequestration.

When retired tCERs and lCERs expire, they must be replaced by other "Kyoto compliance units," such as CERs, ERUs or Assigned Amount Units (AAUs)[28]. For this purpose, national emissions registries must have tCER and lCER replacement accounts in which valid "Kyoto units"[29] are canceled to replace expiring tCERs and lCERs. It should be noted that only 18 A/R projects have been registered under the CDM as of December 31, 2010—compared to approximately 2,700 registered projects in total as of that date.[30] This comparatively small interest in developing A/R projects is likely due in part to the significant discount assigned to temporary credits, and the eventual need to replace them at unknown future prices.

Other programs have opted to issue permanent rather than temporary offset credits for terrestrial sequestration projects, and to address impermanence using other approaches. For example, CAR and NSW GGRS both require projects to demonstrate sequestration will be maintained for 100 years. ACR mandates a 40-year minimum project term for projects with a risk of impermanence, beginning on the project start date, but does not propose that 40 years is "permanent." Instead, ACR states that it relies on assessment and mitigation of all unintentional and intentional reversals to make these offsets effectively permanent and fungible with other offsets. CAR, VCS and ACR also require projects to set aside a portion of total offsets—to be determined based on a variety of factors—in a reserve or buffer pool to address potential reversals. CCX required a fixed 20 percent of project offsets be set aside for this purpose.

The Waxman-Markey bill and the draft Kerry-Lieberman bill both would have permitted permanent offsets to be issued for sequestration projects.[31] The period for which sequestration would need to be maintained was not stipulated in these bills, and would be left to agency discretion and determined through regulations.

3.4 Certification and Verification of Emission Reductions

After a CDM project is registered, the project developer implements (or continues implementing) an offsets project, monitors emission reductions, and initiates a process that ends with a request for issuance of CERs. Project proponents must monitor emission reductions consistent with the monitoring methodology and registered monitoring plan included in the PDD, contract with a DOE to perform a verification, and submit a monitoring report. Verification is the review and ex-post determination of the monitored emission reductions attributable to the project during the verification period.

Based on the verification report, the DOE certifies, in a certification report, that the project achieved the verified amount of emission reductions that would not have occurred in the absence of the project, and the project has been implemented as described in the registered documentation. The DOE submits the verification and certification reports to the EB in a form to request issuance of CERs.

3.4.1 Other Approaches to Third-Party Validation and Verification

CAR, ACR and CCX all adopted approaches to third-party verification of emission reductions that are similar to the CDM in that independent third parties generally are responsible for validation and/or verification, and are hired by the project proponent.

CAR uses a streamlined "listing" process to determine project eligibility. Verification of emission reductions (which incorporates validation in the CAR program) is undertaken by approved, ISO32-accredited verifiers (commissioned by project proponents) through a standardized report uploaded online to CAR. If verification is approved, CAR issues offset credits called CRTs.

Under the VCS, the VCS Association (VCSA) does not review projects, but instead sets standards by which VCS-approved entities can assess projects. Validations and verifications by VCS-approved validators and verifiers (commissioned by project proponents) are checked for completeness by approved VCS registries when project proponents submit projects for registration and/or request issuance of VCS-issued offsets, called VCUs.

In the NSW GGRS, the program administrator has the prerogative to determine the frequency of verifications based on its own assessment of risk. In addition, while GGRS is similar to other programs in that third-party auditors are commissioned by project proponents, the GGRS program establishes contractual terms ensuring that auditors' primary duty of care is to the program administrator, rather than the project proponent. Some observers have suggested that an approach in which the third party is responsible to the program administrator rather than the project developer may reduce potential for conflicts of interest.

3.5 Issuance of Offset Credits

After monitored emission reductions from a project have been reviewed and approved, a project developer can initiate the final step in the process—requesting issuance of offset credits. Under the CDM, once the UNFCCC Secretariat receives the request for issuance from a DOE, it performs an enhanced completeness check. In theory, the process should take no more than 30 days (7 days for completeness check and 23 days for information and reporting check). If the request is complete, and no additional information from the DOE and project developers is required, it is published on the UNFCCC website for 28 days. If no request for review is received during the 28 day period, the EB instructs the CDM Registry Administrator to issue the specified number of CERs corresponding to the specified monitored time period.

3.5.1 Other Approaches for Offset Credit Issuance

Like the CDM, CAR, ACR and CCX all issue offset credits through a central program administrator. In contrast, VCS offsets are issued by three approved VCS registries after the registries perform a completeness check of the third-party verification. However, the VCS Project Database, which sits at the core of the registry system, generates offset serial numbers and ensures uniqueness of both projects and the associated offset credits. In the NSW GGRS, offset producers can register their own offset certificates on-line, depending on their accreditation.

Under both the Waxman-Markey bill and the draft Kerry-Lieberman bill, EPA and USDA would develop procedures regarding review and approval of an offset project approval petition—that is, rules comparable to those relating to registration of a project under the CDM.[33] The Kerry-Lieberman draft bill would allow EPA and USDA to allow third parties accredited and randomly audited by EPA and USDA to make recommendations regarding petitions.[34] Both bills required an offset project developer to submit a verification report prepared by an accredited third party verifier.[35] This requirement suggests the verifier would be contracted by the project developer, although the bills did not expressly stipulate this.

3.6 User Versus Seller Liability

3.6.1 Liability in the CDM

The policy design choice of "user liability" (aka "buyer" liability) versus "seller liability" or "verifier liability" relates to which entity will be held responsible for replacing an offset credit if it is issued and later found to have been subject to fraud or malfeasance or otherwise invalidated.

In the CDM, offset liability is addressed in large part through contractual arrangements between offset buyers and sellers, which allocate various risks of non-delivery or ineligibility of CERs. The allocation of risk regarding non-delivery affects the price of "primary" CERs (that is, CERs that are sold directly by the project owner to a buyer, and which typically do not carry a guarantee that they will receive approval from the CDM EB and be usable for compliance). In addition, Emission Reduction Purchase Agreements (ERPAs) in primary CER transactions typically include a "reasonable and prudent operator" clause. Under this clause, a seller who commits fraud would be subject to liquidated damages provisions or some other penalty in the ERPA with the buyer. Finally, some contracts between sellers and DOEs may hold the seller liable if it makes fraudulent misrepresentations in project documents provided to DOEs.

If CERs are invalidated, the EB may hold liable the DOE that validated the project or verified the emissions reductions if it is found to have been at fault. There is a "decision" in the Marrakech Accords (the detailed implementing "regulations" of the CDM[36]) stipulating that if the CDM EB determines there are "significant deficiencies" in a validation, verification or certification report by a DOE which has been suspended by the EB, and if a subsequent review by another appointed DOE concludes excess CERs were issued, the suspended DOE is liable for replacing the excess CERs.[37] In taking this approach, the CDM appears to have taken a "DOE liability" approach. However, to date, no CERs ever have been invalidated by the EB, and no DOE has been required to replace CERs once they have been issued. This lack of a precedent has created uncertainties regarding whether an offsets buyer or seller can be held liable for CERs after they have been issued.

To address these uncertainties, the EB proposed to adopt procedures that could make a DOE responsible for replacing excess CERs if there is any deficiency[38] in the report that may have led to the issuance of excess CERs.[39] This proposal has raised concerns among DOEs and others that this approach does not take the intent or degree of negligence into account, and that it could result in DOEs withdrawing from participating in the CDM due to economic risk. As of this writing, the EB has been given approval by the COP/MOP to amend its proposal, taking into account the views of stakeholders, and to adopt a procedure to address "significant deficiencies in validation or verification reports."[40, 41] The CDM Accreditation Panel (AP) currently is working on the proposal, but it is not clear when the proposal will be completed.

3.6.2 User Liability in the California Offsets Program

Offset-related liability issues recently have received increased attention as a consequence of the California Air Resource Board's (ARB) proposed regulation to implement the California cap-and-trade system.[42] ARB's modified rules[43] state that it will invalidate an offset credit that it has already issued under the following circumstances:

- If a project's "Offset Project Data Report" (which is comparable to a PDD in the CDM) "contains errors that overstate the amount of GHG reductions or GHG removal enhancements by more than five percent."[44]
- If the project "was not in accordance with all local, state, or national environmental and health and safety regulations during the Reporting Period for which the ARB offset credit was issued."[45] If offset credits had been issued for the same project and the same time period as those for which ARB offset credits had been issued.[46]
- In an offset credit is invalidated, then the entity that retired or currently holds the offset (i.e. the buyer/user/covered entity) would be held responsible for replacing the invalidated offset credits.[47]

ARB's user liability approach has raised concerns among some offset market participants that it could negatively impact the development of the California offsets market.[48] Specifically, under this approach compliance buyers will need to undertake additional due diligence on projects and incur additional costs because they could be held liable if offset credits are invalidated. Due diligence costs may increase, as each marketed offset may be subject to additional due diligence by each potential buyer. Each time an offset is re-sold, this due diligence process could repeat itself, significantly raising transaction costs for offsets in the program. Primary offsets may be re-sold, or "turned over," several times before they are used for compliance. If we consider the evolution of the secondary CER market as a rough proxy for offset "turnover" in the future of the CA offsets market, we can expect California offsets to turn over as many as four or more times in the market before they are submitted for compliance purposes.

There are also concerns that a buyer liability approach would affect the market for "secondary offset" credits which already have been issued. In the CDM market, secondary offsets are attractive to buyers because they typically are priced at a discount to emissions allowances, but only have marginally greater risk, in part because they typically are sold by creditworthy sellers who guarantee delivery of a valid compliance instrument. In the California program, the requirement that buyers must replace invalidated offsets could jeopardize the viability of a secondary offsets market, as would the likelihood that higher-risk projects would gravitate to secondary market exchanges in which the seller is anonymous and therefore cannot be assessed by a prospective buyer. Increased risks in the secondary market could motivate some buyers to forgo buying offsets in favor of higher-priced allowances, thereby increasing the costs of the cap-and-trade program overall.

ARB has tried to address some aspects of these concerns over buyer liability. For example, in its modifications to its proposed rule, ARB included a provision that establishes an 8-year statute of limitations after which ARB would not be able to invalidate an ARB offset credit.[49] During this 8-year period, two verification bodies would review all project documentation, as they must be rotated once every six years. The requirement to ensure review by two verification bodies appears to have provided ARB with sufficient confidence that all potential problems with offset projects would be identified. In addition, ARB has proposed to provide greater specificity regarding particular situations that could result in offsets invalidation, adopt formal procedures related to offset invalidation including an appeals process, and provide a longer period of time for covered entities to replace invalidated offset credits. While these provisions have been welcomed by market participants, market participants continue to voice serious concerns over the user/buyer liability approach.

3.6.3 Approach for Liability in Other Offset Programs and U.S. Legislation

In general, while offset programs typically put significant emphasis on the level of quality control they require before an offset can be issued, the topic of how to address liability in cases of offset credit invalidation has received little attention in offset program documents. To the extent this topic is addressed in existing U.S. voluntary offset programs, the focus appears to be on verifiers' responsibilities. For example, the VCS program holds validation and verification bodies liable for any over-issuance of offset credits in accordance with provisions in the agreement they sign with the VCSA.[50] CAR requires a verification body to replace offsets credits up to their $4 million required amount of professional insurance if the verification body is responsible for errors, gross negligence, willful misconduct or fraudulent activity resulting in the issuance of offset credits that do not meet program requirements.[51] However, the circumstances under which a buyer or seller could be liable for replacing issued offsets are not directly addressed. Neither the Waxman-Markey bill nor the Kerry-Lieberman bill appears to have directly addressed the issue of buyer, seller or verifier liability.

4 Delays and Uncertainty in Offset Project Development, Approval and Credit Issuance

4.1 CDM Performance and Overview of Causes of Delay and Uncertainty

The CDM project pipeline and expectations about the quantity of CERs that would be created have evolved and changed over time as the program has evolved and matured. As of July 1, 2011, the United Nations Environment Programme's (UNEP) Risoe Centre estimated that 1.09 billion tons of CERs would be issued by the CDM by the end of the first Kyoto commitment period in 2012.[52] Estimates were significantly higher in earlier years of the program, before it became clear the CDM process was not adequate to issue the forecasted volumes of CERs. For example, in March 2008, the UNEP Risoe Center estimated 1.8 billion CERs likely would be issued by the end of 2012.[53] These reduced estimates for offset issuances are based in part on lower-than-expected rates of project registration. The first CDM project was registered on November18, 2004, and by the end of 2010 there were 2,703 registered projects. This figure represents less than 50% of the 5,760 active projects in the CDM project "pipeline" at the end of 2010. Furthermore, among registered projects, only 30% (844 projects) have been issued CERs, representing only 15% of all active projects in the pipeline. The low number of registered projects and issuances is a reflection of delays in validation,[54] registration and issuance.

A number of factors contributed to the delays that have occurred in reviewing and approving CDM projects and issuing offsets, as discussed in greater detail in Section 4.2. In general, the CDM's project-based approach in which it assesses the additionality and eligibility of each project on a "ton-by-ton" basis is very time- and resource-intensive, inefficient, and does not seem capable of effectively being applied to a large number of projects to generate a large supply of offset credits. Additionality determinations also involve difficult judgments by the EB, which consists of members with very different cultural and regulatory backgrounds and expertise, and requires a two-thirds majority vote to adopt decisions.

4.1.1 Learning by Doing, and Impacts on the CDM Project Pipeline

The novelty and orientation of the CDM has led to a "learning-by-doing" approach that prioritizes the immediate application by the EB of rules reflecting its latest thinking and decisions over regulatory certainty for project developers and the offset market generally. In some cases, the EB has even applied new policies and procedures retroactively that adversely affected offset projects that previously were validated. Overall, this approach became characterized by frequent changes to program rules to which project proponents had to adapt, as well as changes in CDM institutions and their roles.

From the start of the program through 2007, the EB and other administrative bodies also appear to have deviated from their formal program mandates. For example, CDM rules do not provide the EB the mandate to carry out assessments of requests for registration or of requests for issuance,[55] nor do they stipulate who carries out such assessments because this function falls within the mandate of DOEs. However, this situation did not prevent the EB from undertaking this function. Likewise, the UNFCCC Secretariat is mandated to support the EB, but the EB has expanded the Secretariat's role, requesting it to undertake the review of documentation submitted with every request for registration and issuance, and to become more involved in the appraisal of requests for registration or issuance, and of the response to reviews.

These changes in mission occurred for several reasons, including the EB's lack of resources and competence, and its lack of trust in the DOEs. Related problems include an increased number of requests for review at the times of registration and issuance, a lengthy completeness check process, frequent changes in policies and guidelines, and a lack of transparency and consistency in the decision-making process. All of these issues, as well as project developers' lack of capacity to keep up with changing CDM requirements, resulted in significant delays in the approval process. The effects of these problems can be seen in the CDM project pipeline today.

As a result of these factors, the share of projects the EB reviewed prior to registration increased from fewer than 10% to almost 60% between 2005 and 2008, as shown in Figure 2. It now takes up to three years for a project to move through the CDM review and approval process, from submission of the PDD to issuance of CERs. In addition, the EB has reviewed approximately 700 projects that applied for registration each year in 2008, 2009 and 2010.[56] This performance suggests that if the U.S. adopts a project-based rather than standardized approach to additionality and related issues, a U.S. offset program could encounter significant difficulty reviewing the 1,000–2,000 projects per year that may be needed to create one billion tons of domestic offsets annually as proposed in recent proposed Congressional legislation.[57]

The following discussion describes various causes of delays and uncertainties in the offset project development, approval and credit issuance processes in the CDM, and how they led to delays in the project approval cycle and adversely impacted offset supplies.

4.2 Causes for Delays and Uncertainties in CDM

4.2.1 Increased Number of Requests for Review at Registration and Issuance

The EB's increased involvement in the appraisal of projects requesting registration and issuance led to an increase in the number of requests for review, a lengthier approval process, and additional guidance for DOEs and project participants to address in the process. Once the EB became more involved in the appraisal of requests for registration and issuances—effectively second-guessing the work of DOEs—increases in requests for review of registration and issuance requests occurred, and the registration and issuance processes became lengthier.

As shown in Figure 2, the number of requests for review at registration reached its peak by 2008. At that point, it seemed a request for review had become a standard part of the project approval process. Many of these requests can be understood as the result of the EB trying to strike a balance between continuity (that is, allowing the program to proceed within its then-current set of rules) and responding to criticism regarding the program's environmental integrity.[59]

By 2008 the majority of the requests for review at registration mainly were due to retroactive application of decisions, additionality and baseline scenario identification,[60] and proof of CDM consideration, as discussed below.

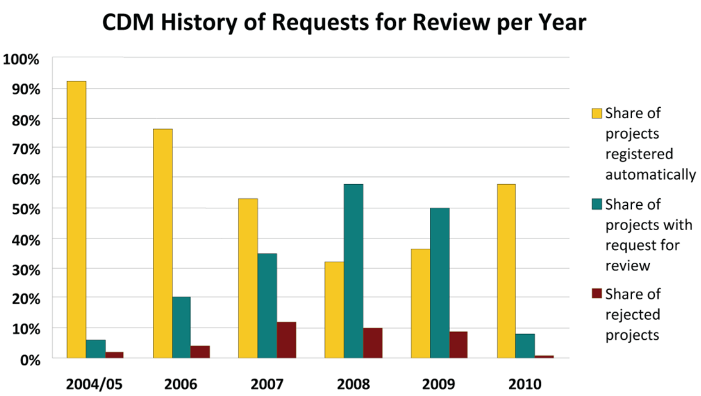

Figure 2 – CDM History of Requests for Review per Year (Source: UNEP Risoe[58])

Retroactive Application of Decisions

Through the end of 2007 and 2008, a number of requests for review were caused by the application of guidance, decisions, rules, and tools that were not available at the time the projects in question were validated.[61] This retroactive application of decisions led to unnecessary delays.

Additionality

Demonstrations of additionality using the different tests have been the single largest trigger for requests for reviews, and a major cause of delays in the project approval process. The investment test and the common practice test triggered the greatest number of requests for review at registration. As of the end of 2010, there had been 1,226 requests for review since 2004, of which 67% cited investment test issues, among others, and 85% cited common practice test matters, among others. Approximately 40% of the projects with requests for review at registration that were related in part to the application of the investment test have been rejected to date.[62]

In the requests for review, the EB typically questions the DOE's validation of the assumptions used for the investment test. In particular, the requests for review typically relate to projects using the "benchmark analysis" for the investment test. The benchmark analysis compares the project's internal rate of return (IRR) or net present value (NPV) against a core business indicator. The EB guidelines[63] require such benchmarks to be derived from government sources, estimates of financing costs and required return on capital, company internal benchmarks, or any other indicator justified by the project developer. However, the choice of the source for the benchmark is left to the project developer's discretion. Moreover, there is no guidance on the particular sources to be used for the input values used in the analysis. Project developers are required to demonstrate their analysis and the inputs used were valid at the time of the investment decision. Thus, the selection of the IRR and the values to be used are highly subjective. The EB requires the DOEs to get substantial evidence to support the assumptions, but does not provide guidance on the type of evidence that is acceptable. Despite the DOEs' efforts to provide information to support their validation of the assumptions, the EB has continuously questioned the validity of the inputs used in the investment test. In many cases, the questions are redundant, and appear to reflect the lack of capacity of the EB and the Secretariat to understand the investment analysis.

As for the common practice test, the EB has not been able to reach consensus on comprehensive guidelines for assessing common practice. Therefore, the common practice test continues to be a prevalent cause for requests for review.

4.2.2 The EB's Lack of Trust in DOEs

The EB continuously has expressed concerns regarding the quality of DOEs' work, and these concerns have been reflected in the increase in requests for review at registration, and in suspensions of leading DOEs.[64] In an attempt to address these concerns, the EB instituted an enhanced completeness check and created the Review and Issuance Team (RIT). The increasing scrutiny of DOEs' work has had negative effects on the validation process, and created backlogs with respect to the time it takes to assess registration and issuance requests.

This oversight has continued despite the EB's approval of a Validation and Verification Manual for use by DOEs. This document compiles all the guidance and requirements for registration and issuance, and guides DOEs on how to assess compliance with constantly evolving guidelines and policies. While this document was welcomed by many, it is vague and leaves much to DOEs' interpretation. As a result, projects are vulnerable to requests for review in which the EB questions the extent to which the DOE has followed the manual.

The increasing scrutiny of DOEs' work has strained their resources at a time when they are struggling to retain staff. As a result of these trends, delays have occurred in the DOEs' validation and verification of projects, particularly the former. Originally, the validation process was envisioned to take approximately 100 business days. Based on an analysis of the CDM pipeline produced by UNEP's

Risoe Center, the authors estimate it takes an average of 14 months for a project to go through the validation process. It is not expected that the length of this process will be reduced any time soon.

4.2.3 Lengthy Completeness Check

The EB introduced the enhanced completeness check in 2008 in an effort to reduce unnecessary requests for review. The Secretariat originally carried out the completeness check to ensure each request for registration contained the required payment and all the necessary documentation. With the introduction of an enhanced completeness check, the Secretariat was requested to assess every request for registration, particularly with regards to additionality, application of the methodology and quality of the documentation. The Secretariat's lack of staff resources resulted in the completeness check process taking up to 3–4 months,[65, 66] in addition to the 8-week request-for-review period. In a best-case scenario, it could take more than six months for a project to be registered after the request for registration was submitted by the DOE, and a total of 20 months from the start of validation to registration.

The EB attempted to address the inefficiencies created by the enhanced completeness check process by revising the procedures for requesting registration and issuance at EB 54 in May of 2010. However, unnecessary requests for review persist, particularly on requests for issuance.[67]

4.2.4 Frequent Changes in Policies, Inconsistent Decision-making and Lack of Transparency

Frequent changes in policies, inconsistency in EB decisions, and poor communication between the EB and project participants appear to be indicative of the system's inefficiencies. These problems have been exacerbated by the lack of transparency in the CDM decision-making process. In particular, decisions regarding registration and issuance, and in some cases, decisions on methodological matters, are made behind closed doors. The outcomes are only briefly summarized and communicated to the public in vaguely worded paragraphs contained within summaries of the EB meeting reports, and are not subject to any sort of formal administrative appeals process.

The ambiguous manner in which the EB communicates its decisions, combined with the fact that decisions often do not follow precedents, creates confusion amongst CDM market participants. It also inhibits action that could be taken to acknowledge and correct mistakes that have previously led to unnecessary calls for reviews and delays in the development of CDM projects. Moreover, the EB is slow to develop policies and guidance that can help address key problem areas that impact additionality determinations. Recently, efforts have been made to address these problems, but much remains to be done on the development of key policies and guidance, and the transparency of the decision-making process.

5 Key Differences Between the CDM and a U.S. Federal Offset Program

Building on the preceding discussion on the problems that arose in the CDM, the following discussion considers differences between the project approval and credit issuance process in the CDM and in a potential future U.S. mandatory cap-and-trade program based on provisions included in legislation debated in Congress in 2009 and 2010. We then consider in detail how other conditions in the U.S. policymaking and regulatory environments and relevant precedents may differ from those in the CDM, and how these differences may contribute to, or mitigate, backlogs and uncertainties in the project development and approval process, and impact offset market development.

5.1 Comparing the Offsets Project Cycle in the CDM and in Proposed U.S. Legislation

The proposed offset project development, approval and credit issuance process incorporated in legislation debated in the Congress differs from the CDM project cycle in a number of ways. These differences can be expected to have a major impact on future offset program performance. Principal similarities and differences are summarized below.[68]

- Positive list approach. The Waxman-Markey bill and the draft Kerry-Lieberman bill both included a "positive list" approach in which EPA and USDA would establish a list of approved project types before the start of the program and periodically update it. This approach, which has been adopted by U.S. voluntary offset programs, differs from the CDM's approach, in which there is no set of "pre-approved" project types that are per se eligible. A positive list approach may provide added certainty to project developers that can facilitate offset market development, particularly when the offset program administrator develops offset methodologies before the start of the program.

- Agency development and adoption of offset methodologies. The Waxman-Markey bill and the draft Kerry-Lieberman bill both included provisions calling for EPA and USDA to develop offset project methodologies before the start of the program, and to consider adopting additional methodologies or eliminating existing methodologies after the start of the program. This approach differs from the CDM's approach, and the approach used in some other offsets programs, in which methodologies are developed by project proponents and reviewed and approved on a case-by-case by the offsets program administrator. Developing project methodologies before the start of the program would provide developers with additional certainty that could stimulate investment decisions and project development, particularly in the critical early years of the program.
- Standardization to determine additionality versus a case-by-case approach. These bills called for the EPA to develop standardized methodologies for determining additionality and establishing activity baselines, similar to the approach used by CAR. This contrasts with the CDM's project-by-project approach to determining additionality using a multi-tiered additionality test that includes a financial additionality test. Data discussed in the prior section shows that the large majority of requests for reviews in the CDM were caused by its approach to making additionality determinations.
- Addressing the potential for impermanence and reversals in sequestration projects. The bills also adopted the approach incorporated in several other offset programs (for example, VCS, CAR, ACR, CCX and NSW GGRS), and included provisions to issue permanent offsets for sequestration. This approach contrasts with the approach developed by the CDM to issue temporary offsets for sequestration activities. In addition, the bills called for sequestration methodologies to establish mechanisms to address potential reversals, such as an offset reserves or insurance requirements. Market participants have expressed hope that this approach will be more successful than temporary crediting in the CDM for addressing permanence concerns unique to sequestration and stimulating investment in such projects.
- Reducing the potential for delays in the project cycle. Unlike the CDM, the bills also established time-frames within which EPA and USDA would be required to make project approval and verification determinations.
- Increasing transparency in program administration. In contrast to the CDM, the bills both required the establishment of an administrative process for appeal and review of determinations regarding project approval and verification. They also require EPA and USDA to explain decisions on project approvals, and to make publicly available any information relevant to that decision. This contrasts with the CDM EB's lack of transparency in its decision-making, and the inability of project proponents to appeal EB decisions.
- The role of third parties in the verification process. Similar to the CDM, the Waxman-Markey bill and the draft Kerry-Lieberman bill required an accredited third-party verifier to submit a verification report on behalf of the project developer. However, prior legislation was not very clear on the role of third-party validation. The Kerry-Lieberman draft bill would have permitted EPA and USDA to allow accredited (and randomly audited) third parties to make recommendations regarding project petitions (i.e. project registrations).

5.2 Different Policymaking Contexts

5.2.1 CDM Policymaking Context

The institutional entities originally included in the CDM, and the changes that have been made in their roles, are in many ways unique to the CDM. While the CDM provides an important example for policymakers and others considering how to design a U.S. offset program, it is important to recognize that the institutional entities and organizations in the CDM were developed in an entirely different context than that in which a U.S. program would be created.

The CDM was the first international offset program ever created, and represents the effort of more than 150 countries to develop a market-based mechanism to address climate change. There were no existing program models from which to draw upon in its design. As such, the CDM needed to learn by doing, and was bound to experience significant challenges in developing and implementing the program. The CDM's challenges may have been exacerbated by the decision to create a pilot phase for the EU ETS (that is, Phase 1, from 2005–2007), which was made after many of the rules governing the CDM were agreed to in 2002. The CDM initially was designed to be operational during the 2008–2012 commitment period established in the KP. The EU ETS pilot phase expedited the start-up of the CDM. If the EU ETS had begun in 2008, consistent with the start of the first KP commitment period, the CDM would

have had more time to develop the institutions and infrastructure required to implement the mechanism and the rules governing offset project development and creation. Fewer problems may have arisen if this had occurred.

Part of the CDM's learning by doing has involved creating new institutional entities and changing administrative structures and review processes over the course of the program's evolution. These changes were made in response to criticism regarding the program's ability to screen out non-additional projects, and to review and approve or reject projects in a timely fashion. A number of the problems that prompted such changes were specific to the CDM, and its original design and provenance. Although a large-scale U.S. offsets program likely would require changes over time to adapt to new learning, the key regulatory agencies have much more experience administering complicated programs, and consequently would be less likely to encounter problems as significant as those encountered in the CDM.

The CDM was developed through international negotiations leading to the KP, and so reflected a careful balance between the views and objectives of nearly all of the world's developed and developing countries. Similarly, its institutional design and implementation have been done in ways to guarantee representation of developed and developing country members on the EB. Because of this, and because members of the EB and its associated panels and working groups only work part time and are largely unpaid or underpaid, the EB often has not had the expertise needed to implement its mandate. Furthermore, due to its lack of resources and expertise, particularly at the beginning of the program, and possibly due to the bureaucratic nature of the UN which is responsible for implementing the CDM, the EB and other administrative bodies have changed their mandates and created additional administrative entities, such as the Registration and Issuance Team and the Accreditation Panel.

Two other design elements particular to the CDM also have been problematic for project developers. The EB continues to be reluctant to make its own and the other panels' deliberations and decisions fully transparent, and no appeals process exists. These procedural elements appear in part to reflect differences in opinion among Parties on the need for such elements, perhaps owing to the absence of similar administrative processes in some participating countries. In contrast, existing U.S. administrative law and provisions included in U.S. legislation would require transparency with respect to decisions made by program administrators, and participants would have the ability to appeal decisions.

Another fundamental program design element unique to the CDM is its pioneering project-by-project approach to establishing baselines, additionality and methodologies. This approach allowed for consideration of a multitude of particular emissions reduction options available in developing country economies, and may have been the only approach that would satisfy all parties. Given the various country- and technology-specific factors that need to be accounted for in project methodologies, the importance of avoiding the approval of non-additional projects, and the challenges of devising methodologies that can "fit" different projects while correctly determining emission reductions, the project-by-project approach was a reasonable starting point for the world's first large-scale offset program. However, the limitations of this approach—including its associated administrative and institutional burdens, and its inability to scale-up to stimulate large volumes of emission reductions necessary to address climate change—have become evident over the course of the CDM's evolution.

5.2.2 U.S. Policymaking Context

In contrast to the CDM, a U.S. offsets program would benefit from the comparatively limited range of concerns and perspectives in Congressional deliberations and more than 200 years of policymaking traditions. In addition, a U.S. offset program could draw upon prior legislative experience developing successful market-based environmental policies, such as the SO_2 trading program under Title IV of the Clean Air Act (CAA), and the deep experience of U.S. administrative agencies like EPA and USDA in developing and implementing regulations that govern complex, large-scale programs.

A U.S. program should benefit from learning derived from evaluating the experience of the CDM in the design and early stages of the operation of a large-scale offsets program, as well as that of other offset programs. The CDM's lack of a positive list, and the slow process by which the Meth Panel reviewed and approved new methodologies, caused bottlenecks relatively early on in the program. The U.S. likely would create and adopt methodologies differently by starting with a limited positive list of project types, and then allowing for the addition of other project types and methodologies over time.[69] The initial list could allow the program to approve several project types rapidly, in contrast to the long delays that resulted from the CDM requirement to have the Meth Panel review new proposed methodologies on a project-by-project basis.

A U.S. domestic offset program also can benefit from the greater homogeneity of emission reducing activities in the U.S., which may facilitate establishment of baselines and eligibility/additionality standards. It also can benefit from the accumulated experience and methodologies developed in the CDM, U.S. voluntary programs including the Climate Leaders program, and the offset program currently being implemented by California as an element of its cap and trade program. EPA gained important experience developing standardized methodologies through its Climate Leaders program, and in assessing how differences among offset protocols can impact the volume of offsets issued by projects.[70] This knowledge should help EPA to implement an offset program that provides greater certainty with regard to additionality determinations, and develop methodologies that are designed carefully and perhaps less likely to require subsequent revisions. In addition, as noted earlier, CAR already has developed offset project methodologies that have been adopted as part of the new compliance-based offset program in California.

EPA and USDA likely would receive more resources to implement an offset program than the CDM, which was significantly underfunded in the initial years of the program. In addition, EPA and USDA would implement the program using professional staff with significant subject matter expertise. This contrasts with the CDM EB, whose board members are volunteers who work only part time and in some cases do not have significant relevant expertise.

One anticipated policy design element of a U.S. offset program—addressing additionality "up front" rather than on a project-by-project basis as is done under the CDM—likely would impose some additional costs to operate the program. From a functional standpoint, the use of standardized methodologies, additionality tests and baselines likely would require more resources to be expended at the beginning of the program to collect data and undertake analysis necessary to establish baselines and determine eligibility/additionality requirements for different project types. In addition, a U.S. international offset program would need to devote resources prior to the beginning of the program to evaluate international project categories and their additionality. However, standardized methodologies, additionality tests and baselines likely will eliminate major sources of uncertainty for project developers, thereby reducing delays in the project cycle and promoting investment in offset projects. In this context, the additional resources devoted at the start of the program may be necessary to ensure the success of the program. In addition, a U.S.-developed international offset program has the advantage of being able to select a manageable number of eligible project types for which additionality determinations may be easier to make, rather than considering additionality for hundreds of different activity types, as the EB must do under the CDM's current approach.

While it is very clear that a U.S. federal offset program will not have the same institutional entities as the CDM, the development of a U.S. program would require the program administrator to consider and implement many of the same functions inherent to any offset program, as described in Section 3. These functions and responsibilities likely would be shared amongst executive branch agencies. Given that USDA has expertise and program experience unique to agriculture and forestry projects (for example, the Conservation Reserve Program (CRP) and the Environmental Quality Incentives Program (EQIP)), it is likely to be involved in developing and administering programmatic elements dealing with these offset categories. Similarly, EPA likely will need to collaborate with the State Department and the U.S. Agency for International Development (USAID) to develop and administer an international offsets program, and may need to consult with other federal agencies. Although coordination between executive agencies responsible for implementing a U.S. offset program would not be simple, it likely would present fewer challenges than implementing the CDM, in which institutions are comprised of representatives of developed and developing countries with very different interests, cultural backgrounds, objectives and levels of expertise. The executive agencies of the U.S. government cooperate frequently in program implementation.

A U.S. offset program also will be conditioned by a range of considerations affecting how Congress may choose to design such a program, such as the environmental community's concerns regarding additionality, baselines and permanence, and the business community's desires for the process to be efficient and able to create large supplies of offsets. These concerns could manifest themselves in administrative requirements such as mandated timeframes for decision-making at different steps in the project approval process, and requirements to conduct periodic review of the program for such elements as eligible project types and environmental effectiveness. As discussed above, the CDM's learning-by-doing process has resulted in decisions and administrative changes which have resulted in significant delays and uncertainties. Only recently have steps

been taken to streamline the process and improve the timeframe for reviewing and approving projects. In addition, unlike the CDM, a federal offset program likely would incorporate an administrative appeals process that would allow parties to challenge agency decisions relating to methodology approval, project approval, verification, and perhaps other elements of the program. Unless otherwise mandated by Congress, this process probably would be based on existing EPA agency administrative review processes, such as the Environmental Appeals Board (EAB).

5.2.3 Potential Impacts of Programmatic Differences and Conditions on Delays, Uncertainties, and Market Development

To a significant extent, differences between the CDM and U.S. policy-making contexts, and the institutions that would be responsible for developing and implementing a federal offset program, can be expected to mitigate delays and various uncertainties for project developers and buyers in a future U.S. offset program. Many of the factors contributing to delays and uncertainties in the CDM are unique to that program, and a U.S. program can be expected to benefit from lessons learned from the CDM and several U.S. voluntary offset programs. A U.S. program that includes such elements as standardized methodologies, additionality tests and baselines, more effective program administration, and an appeals process likely would cut down on delays. In contrast to the EB's lack of resources and relevant expertise, a U.S. offset program likely would have sufficient resources to administer the program, and probably would be developed by EPA and USDA, which have deep technical expertise, large staffs and demonstrated expertise in developing and implementing complex regulatory programs.

The CDM EB has tended to provide vague guidance to DOEs, perhaps so as to have more latitude to ensure environmental integrity when considering projects utilizing diverse and complex offset methodologies. In contrast, a U.S. offset program likely would start with a positive list of offset project methodologies which, collectively, would create fewer uncertainties regarding regulatory interpretation than CDM methodologies. In addition, standardized methodologies and additionality tests can be expected to mitigate a major cause of delays and uncertainties. As noted in Section 4, 67% of requests for review since 2004 cited issues related to the investment test as part of additionality determinations, and approximately 40% of the requests for review at registration that were due in part to the investment test have been rejected to date. Most if not all of these kinds of requests for review and associated delays or rejections could be avoided by using clear, standardized eligibility and additionality requirements, and standardized methodologies. The creation of an appeals process in a U.S. offset program also should reduce program uncertainty, and help to promote necessary clarifications of regulations, and consistency, transparency and the observance of precedence in decision-making.

As noted above, additionality issues were a principal reason for the EB delaying two-thirds of CDM projects and rejecting a significant portion of them. Addressing additionality through the use of standardized additionality tests and baselines in a U.S. offset program has the potential to significantly increase the volume of offsets that could be issued from the start of the program. This would be critical to reducing the program's costs and achieving other key benefits. In addition, the use of a positive list and the development of approved methodologies prior to the start of the program also could encourage submission of a larger number of projects than likely would be the case under a project-specific approach like the CDM's.

In short, the combination of standardized methodologies with the comparatively greater homogeneity of U.S. offset project types should streamline the review process and reduce the number of projects requiring additional review. Nevertheless, the site-specific nature and complexities of such key U.S. domestic offset project types as forest management and afforestation—such as the need for project-specific baselines, the frequency of monitoring, and the large number of measurement sites—may create the potential for frequent reviews.

Other changes in a U.S. offset program relative to the CDM are associated with the potentially greater receptiveness of U.S. policymakers to the concerns of the business community than has been the case with the CDM EB. A U.S. offsets program can be expected to avoid the CDM's retroactive application of decisions, its frequent changes in institutional roles, and the ambiguity of its rules and guidance. These differences can be expected to promote market development and avoid the disincentives created by CDM regulatory risk.

Nevertheless, some elements of U.S. administrative procedures could make a U.S. program more transparent, but also somewhat more cumbersome than the CDM system. For example, while the CDM Meth Panel has had relatively broad discretion to develop and approve methodologies, a U.S. program implemented by the EPA might have to identify new eligible project types and project methodologies (that is, after the initial positive list is approved in

regulations) through the formal notice-and-comment rulemaking process. This approach already has been adopted in California where all new methodologies and revisions must be approved through a formal agency rulemaking process. In addition, certain EPA actions under an offsets program certainly would be subject to legal challenge in the courts.

EPA may be required to perform and make public an analysis of how each methodology meets the requirements of the statute that created the offsets program if the program is established by legislation. This requirement, and others like it, could lengthen the amount of time it would take to create a U.S. offsets program. In addition, coordination and shared authority between EPA, USDA, the State Department and other federal agencies has the potential to contribute to delay and project-related backlogs if the program requires duplicative effort and approvals and if there are major differences in the views of implementing agencies.

More generally, despite the many advantages a U.S. offset program may have vis-à-vis the CDM, the potential for delay is likely to remain for several reasons. First and foremost, the creation of offsets is based on developing a counterfactual argument about whether emissions reductions would have happened in the absence of a program. Proving such additionality always will be difficult and controversial. In addition, as with the implementation of any complicated statute, EPA rulemakings and program implementation often are subject to delays for a variety of reasons. Therefore, a range of other factors in the U.S. may contribute to delays in the development of an offset program, the approval of projects and the issuance of offset credits.

6 U.S. Policy Choices and Potential Impacts on Offset Market Development

As discussed in Section 4, by the end of 2010, registered projects in the CDM accounted for less than 50% of all the projects in the pipeline, and only 30% of registered projects, or 15% of all projects in the pipeline, had been issued CERs. If a U.S. offset program experienced these kinds of delays, offset supplies would be limited, and compliance costs under a U.S. cap-and-trade program likely would be higher than assumed in EPA's economic analyses of proposed federal cap-and-trade programs.

Based on provisions incorporated in proposed cap-and-trade legislation debated in 2009 and 2010, it appears that a U.S. federal offset program would adopt different approaches that could significantly reduce the delays and uncertainties experienced in the CDM's project review and approval and credit issuance process. Many of these approaches were discussed in Section 5. Nevertheless, it is possible that choices confronting U.S. policymakers will change by the time a federal offsets program is once again considered by policymakers. The policy choices made at that time can have a significant impact on the length of the project approval and credit issuance process, risks that project developers and buyers will face, and other factors that will affect market development and determine if an offset system can achieve its objectives. To highlight these potential impacts, the following discussion considers several policy choices and their possible program impacts.

6.1 Allowing Retroactive Decisions Versus Providing More Certainty

As discussed in Section 4, the CDM EB changed its role in project reviews from supervisory to a day-to-day operational role, and changed the Secretariat's role from supporting the EB's initial mandate to performing enhanced completeness checks. These changes led to increased requests for project review, a lengthier approval process, inconsistent decisions, delays and uncertainties. In addition, by 2008, one of the leading reasons for requests for review at registration was the retroactive application of decisions not available at the time an offset projects was validated.

Based on its decisions, it appears the EB considered the environmental benefits of its changes in administrative mandates, and its retroactive application of decisions to projects, to outweigh any concerns about potential negative impacts on CDM market development. This perspective also may have some proponents in the context of a U.S. offset program. However, changes in the project review process and the retroactive application of rule changes had the effect of delaying the issuance of CERs, significantly reducing the size of the CDM market, and potentially stifling development of new projects. Investors who deploy capital, particularly in new markets, typically desire risks to be knowable and quantifiable. The CDM's changing administrative process, and retroactive application of rules, rendered assessments of regulatory risk highly uncertain and so discouraged investment. In addition, these practices significantly raised compliance costs for European firms under the EU ETS, and led to the foundering of a number of project development firms that had assumed that regulatory actions would be more predictable. In contrast, an approach that provides greater regulatory predictability and reduces uncertainty can be expected to facilitate development of a more robust offset market, and to reduce the number of potential appeals.

Although a U.S. federal offset program would be developed in a very different context from that in which the CDM evolved—and would have the benefit of existing experience to date in the development and operation of offset programs—there is the potential EPA may be encouraged to institute programmatic and regulatory changes in the early years of a program. This could occur because the need to adapt to new information and unanticipated events can arise in any large-scale program. In addition, there will be tensions associated with balancing environmental integrity with administrative feasibility and the desire to reduce investors' risks. In addressing such concerns, policymakers will need to consider potential impacts on offset market development. Approaches that reduce investor uncertainty while addressing environmental concerns will avoid sending a negative signal to project developers and the investment community, and increase the potential of creating a robust market capable of creating economic and environmental benefits.

6.2 Using Standardized Approaches to Establish Baselines and Additionality

Project-specific additionality tests and baselines can be used to try to ensure that no non-additional project is approved, and no non-additional offset credit is issued. This goal is important, as any non-additional offset credit issued and used for compliance represents a one-tonne increase in the cap-and-trade program's "true" emissions cap. However, the CDM's project-specific additionality tests have been the primary reasons for requests for review and associated delays. The use of standardized methodologies can avoid the subjectivity, complexities and uncertainties associated with these tests. As noted earlier, two-thirds of requests for review in the CDM since 2004 related to the investment (i.e. financial additionality) test, and 40% of those projects that were reviewed were rejected. Additionality is one of the principal uncertainties facing CDM project developers, and the EB's unpredictable decisions regarding the additionality of different project types have limited the CDM's effectiveness.[71]

California soon will provide important experience regarding the use of standardized methodologies within the context of a mandatory GHG cap-and-trade program. Based on the California example, and trends in U.S. voluntary offset programs, it appears there is a growing consensus that a project-specific approach to additionality based on subjective tests, such as the financial additionality test, is inefficient, and that a standardized approach can be used for many project types in the U.S.

However, although it appears standardization can provide important benefits, use of standardized approaches likely will impose more work on regulators and require more resources early in the program. In addition, not all project types lend themselves equally to standardization. For example, U.S. domestic forestry projects may vary significantly by region and within regions. Because of this, policymakers expressing a preference for standardized additionality tests, baselines and methodologies still will face choices regarding how to address such project types. These choices are particularly important because EPA analysis has concluded that afforestation, reforestation and forest management are likely to account for a significant majority of domestic offsets in the United States. Following the example of CAR and other programs, EPA and USDA may develop very carefully constructed eligibility requirements as one way to screen out non-additional projects. In addition, it may be necessary to provide specific guidance and requirements on estimating baselines because BAU practices and legal requirements differ throughout the U.S.

In developing methodologies for forestry and agricultural offset projects, policymakers are likely to face tradeoffs. For example, ARB's requirements for establishing project eligibility and baselines in reforestation and improved forest management programs are complex. Furthermore, reforestation projects must meet a financial additionality test.[72] This could lead to the types of delays and uncertainties that have occurred in the CDM as a result of its project-by-project approach to additionality. In this context, federal policymakers will benefit from California's experience, and will need to consider how to achieve the right balance between ensuring additionality and facilitating market development.

6.3 EPA Develops its Own Methodologies and Adopts a Positive List

A U.S. federal offsets program administered by EPA, or jointly administered by EPA and USDA, could adopt several different approaches to develop offset methodologies. For example, it could develop new protocols, following the approach of most programs to date. Alternatively, it could follow California's lead and review and modify existing third-party protocols and adopt them as U.S. EPA/USDA protocols. Similar to the CDM and ACR, it could allow project proponents to bring new and modified methodologies to EPA/USDA for review, modification and approval. Alternatively, it could adopt all or a combination of these approaches. Interestingly, ACR also allows project proponents to use (without modification) existing approved CDM methodologies. This approach potentially could be used in the context of the development of an international offset program developed by EPA. Finally, if the mechanism related to developing and using methodologies is not statutorily defined, EPA could adopt a "hybrid approach" that begins with a finite list of project types identified on a "positive list," and allows for additional project types to be added over time, as proposed in federal cap-and-trade legislation in 2009 and 2010. One precedent for EPA to develop its own methodologies to measure and reduce GHGs is the Climate Leaders program, although it was a voluntary program.

Using a positive list approach and issuing several EPA/USDA-approved methodologies at the start of the program could help to increase certainty for project developers and project financiers and help promote development of early offset supplies. In addition, allowing other methodologies to be added to the list over time—as permitted under a hybrid approach and consistent with adapting to new information and learning—could avoid the unnecessary exclusion of potentially valid offset types that could help to reduce GHG emissions and control the economic costs of the larger cap-and-trade program.

If EPA decides to use existing methodologies, or to develop its own methodologies, prior to the start of the program, this would benefit offset market development—assuming that the methodologies it approves are clear and avoid requirements that impose cost burdens disproportionate to their potential benefits.[73] In addition, EPA and USDA may have resource constraints that restrict their ability to develop several offset methodologies before the start of a program. In this scenario, California's approach to modifying and adopting existing methodologies could be used to avoid delays in market development. Similarly, leaving the task of developing acceptable methodologies to project proponents or third parties may delay the final issuance of methodologies, and therefore the development of the offset market. In addition, this may result in development of narrowly defined methodologies that are not widely applicable.

6.4 Determining Leakage on a Regional Basis Rather than on a Project-by-Project Basis.

One of the most challenging technical issues to be addressed in an offset program is the approach to be used to estimate project-related emissions leakage. From an accounting perspective, all emission leakage must be accounted for to maintain an offset project's environmental integrity. Leakage has been accounted for on a project-by-project basis in most offset protocols to date, so this may be the most acceptable approach going forward. However, estimates of leakage can range from 10% to 43% of total creditable carbon, depending upon the offset protocol.[74] Based on "road testing" of different offset protocols, leakage can be one of the largest contributors to the break-even carbon price of a forest management project. This large, and perhaps disproportionate, role of leakage estimates in determining the economic viability of otherwise attractive forest management projects may be due to the incorporation of "conservative" (that is, high) estimates of leakage to account for uncertainties. However, a project-specific approach may not be the only way to estimate leakage, and it may not be the most accurate method.

Rather than requiring leakage to be assessed on a project-by-project basis as is done in the CDM and other offset programs, it may be possible for EPA and USDA to design an approach whereby leakage can be assessed on a broader scale, either at the regional or national level, at regularly scheduled times. Offset credits would be added to, or deducted from, offset projects accordingly based on this assessment. This approach has the potential to be equally or more accurate; it would reduce documentation preparation requirements for project developers, thereby reducing transaction costs; and, it may result in more valid projects coming to market.

6.5 Creating Confidence in a System of Third-Party Verification

The EB attempted to address its concerns regarding the ability of DOEs to correctly follow guidance in validating projects and verifying emission reductions by making significant changes in administrative roles of various entities and developing new ones, and significantly increasing requests for review during the course of the program. The EB's apparent lack of trust in DOEs, and its actions in attempting to address this issue, may have reduced the issuance of non-additional CERs, but it also led to very significant delays in the approval of valid projects (due to additional time spent by the CDM EB and the Secretariat, and additional time spent by DOEs), and a less robust offsets market.

It takes an average of fourteen months for a new offset project to be validated, and up to three years for a project to move through the entire CDM review and approval process, from the submission of the PDD to issuance of CERs. If it takes offset projects in a U.S. federal offset program the same amount of time to receive necessary approvals, the program likely would create only a fraction of the offset volumes needed to achieve significant cost savings and other benefits. Another report developed by EPRI estimates timelines required for review and approval of projects based on provisions

included in the Waxman-Markey bill and the Kerry-Lieberman draft bill.[75] Based on this work, and the assumption that verification will take less than six months, our expectation is that a U.S. offsets program's approval process would take less than one year from submission of project documents to issuance of offset credits. A U.S. program that took one year to approve projects and issue offset credits would have offsets available for compliance at the end of the program's first year. However, if this process takes three years, as has been the case for some CDM projects, offsets will not be available until the end of the third year of the program. This would result in significantly higher costs for entities required to limit their emissions. It also could discourage investment in projects, thereby reducing the project pipeline and potential cumulative offset supply.

In the U.S., there appear to be a number of ways to build a system of trust and confidence in third-party verification while avoiding the problems that plagued the CDM. EPA has used external verification in a number of its voluntary and regulatory programs. Among these is the voluntary Climate Leaders program, in which EPA created a GHG Inventory Protocol that provided guidance for third-party verification of the GHG inventories of its partners, which were offered as an alternative to EPA review.[76] A U.S. offset program also would be able to build upon experience in California and voluntary offset programs in working with project verifiers. Some offset program requirements for third-party verifiers hold promise as potential ways to build trust and enforce good practice in verifiers. For example, CAR now requires verifiers to become accredited by ANSI under ISO 14065[77] (or another accreditation body as approved by CAR). It also requires verifiers to meet CAR's additional sector-specific requirements, to complete training on CAR sector-specific protocols, and to demonstrate a thorough understanding of the CAR project and verification protocols.[78] The EPA may opt to undertake a similar process in which it could partner with an independent body to assist in verifier accreditation under an ISO standard, with additional training required on the particular protocols and methodologies under which the verifier would be licensed.

Another issue central to creating confidence in third-party verifiers is conflict of interest. In the CDM and most other offset programs, the project developer is responsible for hiring an accredited, independent third-party auditor for validation and/or verification. Some observers have noted the CDM provides an incentive for project developers to overstate the amount of emission reductions to be generated by a CDM project, and creates the potential for auditors, who are paid by project developers for their auditing services, and in some cases for other services, to have conflicts of interest with projects they audit. EPA may seek to address conflict of interest risks in various ways, such as assigning third-party verifiers to projects, compensating verifiers from fees collected from all projects, and/or requiring verifiers to have a duty of care to EPA rather than project proponents, as required under the NSW GGRS program. Auditing requirements also could help to ensure the quality of verifications. Finally, EPA could help verifiers make accurate assessments and decisions by ensuring that program guidance is clear and unambiguous.

6.6 Opting for "Listing" in Lieu of Project Validation

The "listing" approach adopted by CAR and the California offset program, in which initial project approval is simplified and elements of validation are considered during project verification, may provide a useful model for streamlining the project approval and credit issuance processes. This approach could be facilitated by the clarity provided by standardized methodologies, additionality tests and baselines. Based on the Kerry-Lieberman bill's endorsement of standardized additionality tests and baselines, it can be envisioned that a U.S. federal offset program could incorporate an approach similar to CAR's listing approach—that is, EPA and USDA could assess additionality as part of the approval process, but would leave more extensive review to the verification stage, when projects would receive more scrutiny. This notion is further supported by language in the bill that would have made it optional, but not mandatory for a third-party auditor to become involved in the validation process.

Given this legislative history, it appears that Congress could adopt a listing approach in lieu of formal project validation. This could reduce the amount of time required for review and approval of projects overall, thereby helping to increase offset supply in the early years of a program. In practice, however, it is possible project types such as reforestation and improved forest management, which involve project-specific baseline calculations and more complex eligibility requirements, may require a more thorough and time-intensive project approval process.

6.7 Adopting a Seller Rather than a User Liability Approach

As noted in Section 3, the CDM to date has adopted a "DOE liability" approach that currently is being clarified, and which has not been tested because no CERs have yet been invalidated. California has proposed a "buyer liability" approach for its offset program because ARB appears to believe:

1. It will be easier to enforce the offset program if offset liability rests with parties that the agency typically works with already as part of its enforcement programs (for example, electric companies, industrial emitters, etc…), rather than a new set of offset developers and related entities the agency has not regulated previously.
2. Some offset developers and related parties may be "fly by night" organizations and/or small out-of-state or international entities that will be difficult to prosecute in the event of offset invalidation.
3. A buyer liability approach will encourage buyers to undertake enhanced due diligence when considering contracting for offset credits, thereby raising the performance of sellers and screening out questionable projects from the system.
4. Buyers in primary offset markets will be able to address the risk of offset invalidation through contractual arrangements and possibly insurance coverage.

ARB also may have been concerned about the resource costs associated with enforcement efforts under a seller liability approach, particularly because many sellers could be located outside of California.

However, as discussed in Section 3, a user liability approach increases the risk of higher transaction costs and potentially reduced interest in the use of offsets for compliance. If this occurred, the size and benefits of the offset market would be reduced. A buyer liability approach also could increase the risks associated with buying offsets in the secondary market, potentially eliminating a cost-effective compliance option and reducing market liquidity.

Based on its existing enforcement authority under the Clean Air Act (CAA), it appears that EPA (and/or the U.S. Department of Justice (DOJ)) would have sufficient authority to sanction the failure to deliver offsets credits as promised, fraudulent reporting of credits, and/or reversals. At the federal level, it will be more challenging, however, to address liability in the international context. Without the domestic legal structure, EPA may not be able to enforce penalties on foreign entities that may make false filings. To address this concern, the Kerry-Lieberman bill required international project developers to make at least one individual subject to U.S. jurisdiction. The broader issue of buyer, seller or verifier liability does not appear to have been directly addressed in either the Kerry-Lieberman or the Waxman-Markey bill.

In light of EPA's ability to take enforcement action against offset sellers, and the negative impacts of a user liability approach on transaction costs, secondary offset markets, and offset markets more generally, many market participants may advocate for EPA to adopt a seller liability approach.

6.8 Using a Simplified Approach to Validate and Credit Certain Types of Agricultural Offsets Projects

Some types of agriculture and forestry-based offsets projects, such as afforestation of marginal cropland, nitrous oxide (N_2O) emissions reductions associated with reduced nitrogen fertilizer use and others, require complex, project-specific baseline and emission reduction or sequestration estimates. These complexities are an integral part of trying to accurately estimate emission reductions from such projects under a traditional approach to project validation, but they raise costs for project developers and can make projects uneconomical.

One approach that could make these projects more economical, and thereby achieve larger-scale and more cost-effective emission reductions, would be to allow these projects to be validated by USDA staff through a simple field validation as is done today as part of the CRP and EQIP programs. In addition, offsets credits could be issued for these types of projects based on regional averages that take into account the emissions reductions or sequestration expected to occur over established time blocks, such as five year periods, and related regional variability. Such an approach would reduce project costs and could facilitate much higher participation in these activities. This approach was used by CCX for soil carbon sequestration projects, and led to rapid implementation of projects on large swaths of cropland in the Midwest and the creation of large-scale offset project aggregations.

7 Conclusion

By the time a U.S. federal offsets program may once again be debated in Congress, a lot of experience likely will have been accumulated related to offset policy design, including experience in the U.S. context. Initial signals related to the performance of California's and the WCI's offset programs may be evident, and voluntary programs such as CAR, ACR and VCS likely will have issued tens, if not hundreds, of millions of tonnes of offsets across a variety of project types.

On the other hand, it likely will be too early to have a clear picture of the longer-term performance of these programs, and the implications of the myriad policy choices these programs have made. In this context, lessons learned from the CDM can fill a critical gap. While the policy contexts for the CDM and a U.S. offset program differ significantly as has been discussed, many of the policy and technical issues to be addressed and the policy choices that policymakers will face in designing a U.S. offset programs will be similar. In particular, all offset programs need to incorporate specific requirements and processes to ensure the environmental integrity of issued offset credits. At the same time, policymakers need to be cognizant of the impact different design approaches may have on the development of offset markets if a new offsets program is to achieve its economic objectives and other benefits. As highlighted by the results of many economic models of proposed cap-and-trade programs, a program that tightly constrains offset supplies is likely to have far higher compliance costs than one in which compliance parties can secure large quantities of comparatively low-cost offsets.

Incorporating lessons learned from experience with the CDM can help U.S. policymakers avoid some of the most important sources of uncertainty and delays that have plagued the CDM.

Improvements in the efficiency and clarity of a U.S. offset program relative to the CDM will be important to achieve because other challenges also are likely to arise. For example, these include ensuring the project approval process for afforestation and forest management projects is not so onerous as to discourage investment in these projects, as these project types are expected to be the largest sources of domestic offsets.

8 Glossary of Terms

ACR	The American Carbon Registry (ACR) is a voluntary offsets program and registry operated by Winrock International.
Additionality	The degree to which GHG benefits achieved by an emission mitigation project would not have occurred in the absence of the added incentive of creating GHG emission mitigation.
Afforestation	An activity included under Article 3.3 of the Kyoto Protocol; more generally, establishing new forests on land that has not ever, or in recent times, been forested.
A/R	Afforestation and reforestation.
ANSI	American National Standards Institute.
AP	Accreditation panel. The AP was established by the CDM Executive Board to assist in accrediting DOEs.
ARB	The California Air Resources Board. ARB is the regulatory agency in charge of developing and implementing a CO_2 cap-and-trade program and an associated offsets program in California pursuant to the law known as "AB-32."
Baseline	The schedule of GHG emissions related to a project that would be expected to occur in the absence of a project.
BAU	Business As Usual.
CAR	The Climate Action Reserve. Previously known as the California Climate Action Registry. An offsets program and registry created originally by the State of California.
CDM Executive Board (EB)	The executive body that is charged by the UNFCCC COP to oversee the operation of the CDM.
Certified Emission Reduction (CER)	An emissions unit under the Kyoto Protocol that is issued under the procedures of the CDM.
CCX	Chicago Climate Exchange.
CRP	The Conservation Reserve Program operated by the U.S. Department of Agriculture.

CRTs	Climate Reserve Tonnes. Carbon offset credits issued by the Climate Action Reserve for qualifying greenhouse gas emissions reductions. Equal to 1 metric tonne of CO_2e.
Deforestation	An activity included under Article 3.3 of the Kyoto Protocol; more generally, the conversion of forested land to some other land use following forest clearance (for example, by harvesting or forest fire).
DOE	Designated Operational Entity. A DOE is an independent, third-party auditing, accounting, engineering or similar organization accredited by the CDM Executive Board to validate projects and verify GHG emissions reductions associated with offsets projects.
EQIP	The Environmental Quality Incentives Program operated by the U.S. Department of Agriculture.
EU ETS	The European Union Emissions Trading Scheme. A CO_2 cap-and-trade program that covers 27 EU nations which has been in effect since 2005.
GHG	Greenhouse gas. This term usually is used to refer to the collection of all six types of GHGs regulated by the Kyoto Protocol (CO_2, CH_4, N_2O, SF_6, PFCs and HFCs)
ISO	International Standards Organization.
Joint Implementation (JI)	A provision described in Article 6 of the Kyoto Protocol that allows tradable credits called ERUs to be generated through projects in “Annex B” (industrialized) countries that can be used by Annex B countries for compliance with their Kyoto commitments.
Kyoto Protocol (KP)	A protocol under the UNFCCC where, inter-alia, industrialized countries took on binding commitments to reduce their greenhouse gas emissions in a first commitment period (cp1), 2008-2012.
Leakage	A GHG effect occurring outside the boundary of what is being reported or accounted for a project or activity that, however, is caused by the project or activity and reduces its environmental benefit.
lCER	Long-term CER; a particular form of CER issued under the CDM for LULUCF A&R projects.
Methodologies Panel (aka Meth Panel)	An independent panel of experts established by the CDM Executive Board to evaluate proposed CDM offset methodologies and to make recommendations to the EB regarding approval or disapproval of proposed methodologies.
NSW GGAS	New South Wales Greenhouse Gas Reduction Scheme. Originally the GHG Abatement Scheme.
PDD	Project Design Document.
Reforestation	An activity included under Article 3.3 of the Kyoto Protocol; more generally, establishing forests on land that has in recent past times been forested but in more recent times has been under some other land use.
RGGI	Regional Greenhouse Gas Initiative.
tCERs	Temporary CER; a particular form of CER issued under the CDM for LULUCF A&R projects.
UNFCCC	United Nations Framework Convention on Climate Change, the multilateral environmental agreement to address the risk of global climate change.
USDA	The United States Department of Agriculture.
US EPA or EPA	The United States Environmental Protection Agency.
VCS	Verified Carbon Standard (VCS). Previously known as the Voluntary Carbon Standard. An international voluntary offsets standard that operates an offsets program and registry.

9 Endnotes

1. The lead author and co-author of this paper, Robert Youngman and Richard Rosenzweig, respectively, were Director of Economic Analysis and Chief Operating Officer of Natsource, LLC from 2000 to 2011. During this period, Natsource provided advisory, research and asset management services in emissions and renewable energy markets. Adam Diamant, Senior Project Manager, Electric Power Research Institute (EPRI) also contributed to development of this paper.

2. China has indicated it will attempt to develop pilot trading programs among provinces as an element of its 12th five year plan, with energy consumption caps potentially to be put in place by 2015. See Reuters, "China set to cap energy use in national low-carbon plan," August 4, 2011, http://unfccc.int/press/news_room/items/2768.php?topic=all (scroll down to "China set to cap energy use in national low-carbon plan" for link).

3. This paper is based on information presented in a comprehensive recent EPRI report titled *Key Institutional Design Considerations and Resources Required to Develop a Federal Greenhouse Gas Offsets Program in the United States*. EPRI, Palo Alto, CA: 2011. 1023122.

4. The term "industrialized countries" specifically refers to Parties included in Annex I of the UNFCCC, which generally matches the list of Parties that took on binding GHG emissions limitations in Annex B of the KP.

5. The European Union Emissions Trading Scheme (EU ETS) is a mandatory CO_2 cap-and-trade system that has been implemented in the 27-nation EU. It has been operating since 2005.

6. In many cases, project developers require financial assistance relating to CDM project cycle costs. The CDM cycle cost varies depending on the size of the project, the assigned Designated Operating Entity (DOE,) and the level of project complexity. Costs are incurred at different stages of the CDM cycle, including project design document (PDD) development, validation, registration, and verification. These costs include:
   - PDD development costs usually are addressed in agreements with a CDM consultant. Depending on the size of the project and the agreements between the buyer, consultant and project developer, consultant fees can exceed $20,000. There also may be a per CER payment (that is, payment for each CER delivered), which can vary from €0.10 to €1.50.
   - Project validation costs can range between €22,000 and €50,000, and vary depending on the complexity of the project and the DOE.
   - Project proponents must pay a CDM registration calculated based on the expected annual quantity of CERs up to a maximum of $350,000.
   - Project verification costs also vary depending on the complexity of the project. Initial verification costs range between €18,000 and €30,000, and subsequent verification costs can range between €14,000 and €24,000. These costs also may vary depending on the DOE.

7. Excerpted from *A Comprehensive Overview of Project-Based Mechanisms to Offset Greenhouse Gas Emissions.* EPRI, Palo Alto, CA: 2007 1014085.

8. Details on various elements of the CDM's methodology development, offset project approval and credit issuance process are available at the CDM official website (http://cdm.unfccc.int/Projects/pac/index.html), and from "CDM in Charts," November 2009, Japan Ministry of the Environment and the Institute for Global Environmental Strategies, http://enviroscope.iges.or.jp/modules/envirolib/view.php?docid=835 .

9. Provided it is forwarded two weeks before the next EB meeting; otherwise it will be added to the subsequent meeting agenda.

10. *Identification and Analysis of Institutional Barriers to Developing a Large-Scale Federal Greenhouse Gas Emissions Offsets Program in the United States*. EPRI, Palo Alto, CA: 2011, 1023122.

11. The Verified Carbon Standard (VCS) Program was known as the Voluntary Carbon Standard prior to March 1, 2011. The program aims to establish a rigorous, global standard for voluntary GHG emission reductions. The VCS 2007 (VCS' initial standard) was launched in November 2007 by the VCS Association (VCSA), a non-profit organization responsible for developing and maintaining the VCS Program. Three non-profit organizations created the VCSA—The Climate Group, the World Business Council for Sustainable Development (WBCSC), and the International Emissions Trading Association (IETA).

12. In 2003, the Australian state of New South Wales (NSW) established the Greenhouse Gas Reduction Scheme, originally called the Greenhouse Gas Abatement Scheme. GGRS is a mandatory emission reduction program that covers 21 NSW electricity retailers, one large direct electricity user, and (through their voluntary participation) nine large consumers of electricity. It differs from the other offset programs considered here because it is a mandatory government program. Its administrative, procedural and institutional design reflects the program's mandatory nature and the constraints and preferences of a particular government regulator.

13. The Climate Action Reserve (CAR) is an offset program that establishes protocols for GHG offset projects in North America. It provides oversight to independent third-party verification bodies, issues carbon offset credits known as Climate Reserve Tonnes (CRTs), and tracks issuances and transactions of credits in a publicly accessible offsets registry. In December, 2010, the California Air Resources Board (ARB) adopted four offset protocols originally developed by CAR to be used for compliance purposes by entities covered by the new California GHG cap-and-trade system implemented under AB-32 (the California Global Warming Solutions Act). These four compliance protocols include Forestry, Urban Forestry, Livestock Waste Digester, and Ozone Depleting Substances (ODS).

14. The American Carbon Registry (ACR) is a non-profit voluntary registry founded in 1997 as the "GHG Registry" by two non-profit environmental organizations, the Environmental Resources Trust (ERT) and the Environmental Defense Fund (EDF). It was the first private voluntary GHG registry in the U.S. In 2007, ERT became part of Winrock International, another non-profit organization, and its registry was renamed the American Carbon Registry (ACR) in 2008. In that year, ACR was the most widely used voluntary carbon market registry in the world.

15. The Chicago Climate Exchange (CCX) was a voluntary GHG cap-and-trade program and associated registry launched in 2003. Participants committed to legally binding GHG emission reduction targets, and could use offsets to meet up to 50% of their compliance requirements. Only CCX members were permitted to buy CCX offsets. In October 2010, the CCX announced that its emission reduction program would cease operations at the end of that year, and that a new offsets program, called the CCX Offsets Registry Program, would be initiated for 2011 and 2012. While this development eliminated the role of CCX in the U.S. offsets market, it remains an important example of an offset program.

16. For more information about each of these offset programs, please refer to A Comparison of Greenhouse Gas Emissions Offsets Project Development and Approval Processes, Background Paper for the EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #8, June 2010. Online at: http://globalclimate.epri.com/annual_events__ghg_offset_policy_dialogue__archive.html#d20100624 .

17. Section 735(a) of the draft Kerry-Lieberman bill (the "American Power Act," draft bill released on May 13, 2010, http://kerry.senate.gov/imo/media/doc/APAbill3.pdf); and Section 734(a) of the Waxman-Markey bill (H.R. 2454, the "American and Clean Energy Security Act of 2009," 111th Congress, passed in the House of Representatives on June 26, 2009, http://www.gpo.gov/fdsys/pkg/BILLS-111hr2454eh/pdf/BILLS-111hr2454eh.pdf).

18. For a more in-depth discussion of additionality, see Overview of Different Approaches for Demonstrating Additionality of Greenhouse Gas Emissions Offset Projects, Background Paper for the EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop 2," September 2008, available online at: http://mydocs.epri.com/docs/PublicMeetingMaterials/0809/6CNS9RLUQLS/404416__E230717_Additionality_EPRI%20Workshop2_090208_Final.pdf. A more detailed summary of the CDM's additionality tests is provided in the Appendix to this EPRI background paper.

19. See Table 1 in Trexler, Broekhoff and Kosloff, "A Statistically-Driven Approach to Offset-Based GHG Additionality Determinations: What Can We Learn?" in Sustainable Development Law & Policy, Winter 2006.

20. The Offset Quality Initiative is an initiative of The Climate Trust, Pew Center on Global Climate Change, California Climate Action Registry, Environmental Resources Trust, Greenhouse Gas Management Institute and The Climate Group.

21. Offset Quality Initiative, "Ensuring Offset Quality: Integrating High Quality Greenhouse Gas Offsets into North American Cap-and-Trade Policy," July 2008, http://www.pewclimate.org/docUploads/OQI-Ensuring-Offset-Quality-white-paper.pdf.

22. RGGI is a CO_2 cap-and-trade program for the electric power sector in ten Northeastern and Mid-Atlantic states.

23. Section 734(a)(1) and (2) of the Waxman-Markey bill.

24. Section 735(a) of the draft Kerry-Lieberman bill.

25. Impermanence refers to the fact that removal of carbon from the atmosphere by biological processes, such as growing forests or grasslands, is not permanent because the stored carbon can be re-emitted as a consequence of fire, disease, die-off, timber harvesting, and other activities.

26. Information in this paragraph derived from "CDM Rulebook" entries for tCERs and lCERs, Baker & McKenzie, http://cdm-rulebook.org/PageId/332.

27. For more information about the issues of permanence and leakage, please see the background paper and speaker presentations from EPRI's GHG Emissions Offsets Workshop #4 available online here: http://globalclimate.epri.com/annual_events__ghg_offset_policy_dialogue__archive.html#d20081120.

28. An Assigned Amount Unit (AAU) is an emissions unit under the KP. Countries that took on binding emissions targets under the KP ("Annex B countries") are allotted an amount of AAUs equal to their "assigned amount." For the first KP compliance period of 2008–12, this amount is equal to the country's annual emissions target times five.

29. "Kyoto units" include CERs issued under the CDM program, Emission Reduction Units (ERUs) issued under the Joint Implementation (JI) program, and Assigned Amount Units (AAUs) issued directly to Annex B nations under the KP.

30. UNEP Risoe CDM/JI Pipeline Analysis and Database, January 1, 2011, http://cdmpipeline.org/publications/CDMpipeline.xlsx .

31. Section 753(a) of the draft Kerry-Lieberman bill, Section 732(b) and 502(b)(2) of the Waxman-Markey bill.

32. International Organization for Standardization (ISO).

33. Section 735(a) of the Waxman-Markey bill. Section 736(c) of the draft Kerry-Lieberman bill.

34. Section 736(d) of the draft Kerry-Lieberman bill.

35. Section 736(a) of the Waxman-Markey bill, Section 737(b) of the draft Kerry-Lieberman bill.

36. Although the Kyoto Protocol was adopted in December 1997, detailed rules for the CDM—or "modalities and procedures"—were not established until 2001, when Parties to the KP agreed to the Marrakech Accords.

37. http://unfccc.int/cop7/documents/accords_draft.pdf

38. "Deficiency" is defined as: "(a) Conducting validation or verification activities in a manner that does not comply with the requirements of the accreditation standards applicable at the time of the validation or verification activity;

(b) Insufficiently validating or verifying a fact or set of facts; (c) Incorrectly applying a CDM rule or requirement in effect at the time of the submission of the request for registration or issuance of CERs; (d) Validating or verifying facts based on information that is incomplete, inconsistent with or contrary to the validated or verified facts; (e) Providing incorrect factual information to the Board." http://cdm.unfccc.int/UserManagement/FileStorage/5U1SYL8OB796QXCKWNGF4HA32RTIVM

39. http://cdm.unfccc.int/UserManagement/FileStorage/5U1SYL8OB796QXCKWNGF4HA32RTIVM

40. Decision -/ CMP.6, "Further guidance relating to the clean development mechanism," http://unfccc.int/files/meetings/cop_16/conference_documents/application/pdf/20101204_cop16_cmp_guidance_cdm.pdf.

41. In a separate decision, the EB also recently addressed some uncertainties relating to liability in the context of Programmatic CDM, which allows for aggregation of many component project activities (CPAs) in one Program of Activity (PoA). This decision clarified the conditions under which DOEs will be held liable if they erroneously include a non-eligible CPA in a PoA. See http://cdm.unfccc.int/filestorage/N/I/H/NIH7CEJP0S1A9QOWYT8V2KLMGZ34D6/eb61_report%20v01.1?t=S3N8MTMwODg1NTcyMy40Mw==|KY3JuLNdbtJEAf_k6b7Gusz_maw= .

42. California Environmental Protection Agency, Air Resources Board, "Proposed Regulation to Implement the California Cap-and-Trade Program, Part I, Volume 1, Staff Report: Initial Statement of Reasons," Release Date: October 28, 2010, http://www.arb.ca.gov/regact/2010/capandtrade10/capisor.pdf.

43. ARB modified its proposed rules in its first 15-day amendments (on July 15, 2011) and second 15-day amendments (on September 12, 2011). ARB's second 15-day amendments can be found at http://www.arb.ca.gov/regact/2010/capandtrade10/2ndmodreg.pdf.

44. Ibid, p. A-279.

45. Ibid. p. A-282.

46. Ibid.

47. Ibid, pp. A-283–291

48. See for example the International Emissions Trading Association's (IETA) comments on ARB's cap-and-trade program rules, http://www.ieta.org/assets/PositionPapers/ieta%20comments%20on%20carb%20cap-and-trade%20program%20rules%206%20december%202010.pdf .

49. California Air Resources Board, "Notice of Availability of Modified Text and Availability of Additional Documents," July 25, 2011, http://www.arb.ca.gov/regact/2010/capandtrade10/candt15daynot2.pdf, p. 32.

50. VCS Association, "VCS Standard, Version 3.0," March 8, 2011, p. 27, http://www.v-c-s.org/sites/v-c-s.org/files/VCS%20Standard%2C%20v3.0.pdf.

51. Climate Action Reserve, "Verification Program Manual," December 20, 2010, p. 18, http://www.climateactionreserve.org/wp-content/uploads/2010/12/2010-Verification-Program-Manual-12-201.pdf

52. http://cdmpipeline.org/.

53. http://cdmpipeline.org/publications/CDMpipeline.xlsx, "Analysis" worksheet, cell BI3.

54. The validation process takes about 14 months to complete due to a combination of limited resources at DOEs and the amount of information to be assessed by the DOE to ensure the project meets CDM requirements set by the EB.

55. Annex "Modalities and procedures for a clean development mechanism" of Decision 3/CMP.1, paragraph 5 states: "The Executive Board shall supervise the CDM, under the authority and guidance of the COP/MOP, and be fully accountable to the COP/MOP." Paragraph 18 states: "The Executive Board may establish committees, panels or working groups to assist it in the performance of its functions." The functions referred to relate to the responsibilities listed in the Annex. The EB's responsibilities are limited to: making recommendations on the CDM modalities and procedures; reporting to the COP/MOP; approving new methodologies; reviewing the provisions for small-scale project activities; making information public; and accreditation of DOE's and its relevant procedures.

56. http://cdmpipeline.org/publications/CDMpipeline.xlsx, August 1, 2011 version, "Time" worksheet, Table 1.

57. The estimate of 1,000–2,000 projects reflects an assumption that the average project could yield between 50,000 and 100,000 tCO_2 per year. (1,000 projects, each with reductions of 100,000 tCO_2 per year, would yield an offset supply of 1 billion tonnes; similarly, if each project generated 50,000 tCO_2 per year, 2,000 projects would be required to obtain a total of 1 billion tonnes.) This estimate is based on consultations with individuals engaged in the development of offsets projects today. The average CDM project yields 135,000 tCO_2/year; however, this yield is likely to be larger than would be likely under a U.S. domestic offsets program where eligible offsets are likely to be based in the agricultural and forestry sectors of the economy, rather than industrial gas and other kinds of industrial projects more common in the CDM program.

58. UNEP Risoe CDM/JI Pipeline Analysis and Database, January 1st, 2011.

59. International Emissions Trading Association, "State of the CDM 2007."

60. International Emissions Trading Association, "State of the CDM 2008."

61. For example, CDM Project with UNFCCC Reference No. 1859, China Fujian Putian Landfill Gas Generation Project, was called for review by the EB on October 2008. One of the reasons the EB requested review was the project documentation did not include a timeline showing continuous CDM consideration as per the guidance provided at EB's 41st meeting held from 30 July–02 August 2008. However, this guidance was issued after the request for registration was submitted in June 2008. Nonetheless, the guidance was applied retroactively because the request for registration only was forwarded to the EB by the Secretariat after having been delayed in the completeness check process for approximately 90 days.

62. IGES CDM Review and Rejected Project Database, 06 January 2011

63. Guidelines for Assessment of the Investment Analysis. http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf.

64. For example, in 2010 the EB suspended TÜV SÜD (see http://cdm.unfccc.int/EB/053/eb53_repan02.pdf), and in 2009 the EB suspended SGS (see http://cdm.unfccc.int/CDMNews/issues/issues/I_8E6B4XT8XB76MXB300JIHUI94163BX/viewnewsitem.html).

65. The completeness check process initially took less than one month between 2004 and 2005, and less than one-and-a-half months between 2006 and 2007. After the introduction of the enhanced completeness check in 2008, the duration of the process doubled to 3–4 months between 2008 and the third quarter of 2010.

66. UNEP Risoe CDM/JI Pipeline Analysis and Database, January 1st 2011.

67. The procedures for review of requests for issuance require the review to be completed within 34 days (http://cdm.unfccc.int/UserManagement/FileStorage/P7IFZTCJ5EU8BSN2XY-60LOVRA14KG3). However, there is no timeline for the start of the review after the response for the request for review has been submitted by the project developer and the DOE. The average wait time is approximately 48 days.

68. These differences are discussed in more detail in *Key Institutional Design Considerations and Resources Required to Develop a Federal Greenhouse Gas Offsets Program in the United States*. EPRI, Palo Alto, CA: 2011. 1023122.

69. If the mechanism related to development and utilization of methodologies is not statutorily defined, it seems likely EPA would adopt a "hybrid approach" that begins with a finite list of project types and allows for additional project types to be added over time. One precedent for EPA to develop its own methodologies for measuring and reducing GHGs is EPA's Climate Leaders program, although that program was voluntary and not mandatory.

70. More information on EPA's "road testing" of different offset protocols is provided in a background paper for one of EPRI's workshops for the GHG Offset Policy Dialogue—see http://mydocs.epri.com/docs/PublicMeetingMaterials/0907/42NL25NHW5H/E232297_Background_paper.pdf.

71. For more information about the application of the financial additionality tests to different types of offset projects in the CDM, please see the case studies contained in Key Institutional Design Considerations and Resources Required to Develop a Federal Greenhouse Gas Offsets Program in the United States. EPRI, Palo Alto, CA: 2011. 1023122.

72. See California Environmental Protection Agency, Air Resources Board, "Proposed Regulation to Implement the California Cap-and-Trade Program, Part V, Staff Report and Compliance Offset Protocol: U.S. Forest Projects," http://www.arb.ca.gov/regact/2010/capandtrade10/cappt5.pdf, pp. 6–7. "Projects must satisfy both a Legal Requirement Test and a Performance Test for additionality, and the protocol contains specific guidance on setting a baseline to ensure only additional reductions are credited. For example, all modeled project baselines must incorporate all legal constraints. Reforestation Projects must demonstrate that the land has been out of forest cover for 10 years, or where a recent significant disturbance has occurred, demonstrate that reforestation would not be expected to be financially viable without the project or occurs in an area not historically subject to tree harvesting. Improved Forest Management Projects must take various factors into consideration when setting the project baseline, such as carbon stocking levels relative to comparable lands (common practice), historic management practices (high stocking reference), management of other entity forest lands within a logical management unit, financial feasibility of the baseline model, as well as the current stocking levels and legal constraints on the management of project lands."

73. For example, one offset "road testing" study noted that uncertainty provisions in certain afforestation/reforestation (A/R) protocols may create high transaction costs and significantly reduce the volume of offsets from A/R projects. For example, the Regional Greenhouse Gas Initiative's (RGGI) A/R protocol requires that each carbon pool (even small pools) be measured separately and with no more than 10% uncertainty with 95% statistical confidence. In the study authors' view, this makes sampling more expensive than necessary to achieve accurate estimates. In addition, CAR requires that all verification personnel be individually certified by the American National Standards Institute (ANSI). The authors state that this requirement increases costs for verifiers, leading many to drop out and the rest to charge higher verification fees. See "Road-Testing

of Selected Offset Protocols and Standards—A Comparison of Offset Protocols: Landfills, Manure, and Afforestation/Reforestation," June 2009, Michael Lazarus, Gordon Smith (Stockholm Environment Institute (SEI)), and Kimberly Todd, Melissa Weitz (U.S. EPA Work Assignment Managers), Working Paper WP-U.S.0904, http://www.sei-us.org/WorkingPapers/WorkingPaperUS09-04.pdf.

74. See background paper for an EPRI workshop on the "road testing" of GHG offset protocols, entitled "Insights from "Road Testing" Analyses of Proposed and Existing Greenhouse Gas Offsets Methodologies and Protocols," July 2009, http://mydocs.epri.com/docs/PublicMeetingMaterials/0907/42NL25NHW5H/E232297_Background_paper.pdf, p. 12.

75. *Identification and Analysis of Institutional Barriers to Developing a Large-Scale Federal Greenhouse Gas Emissions Offsets Program in the United States*, EPRI, Palo Alto, CA: 2011, 1023122. See discussion in Section 5.1.2 on the project review and approval process.

76. EPA Climate Leaders GHG Inventory Protocol, Chapter 9 Design Principles, and "Reporting GHG Emissions" available at: http://www.epa.gov/climateleaders/documents/resources/design-principles.pdf, p. 52.

77. ISO 14065 is a standard established by the International Organization for Standardization (ISO) setting requirements for greenhouse gas validation and verification bodies for use in accreditation.

78. Climate Action Registry, "Verification Accreditation," available at: http://www.climateregistry.org/tools/verification/verification-accreditation.html.

EPRI Resources

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