INTERNATIONAL Clean Development Mechanism Dialogue

"Program of Activities" as CDM Projects: Implications of the Montreal Decision

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The Clean Development Mechanism (CDM) Dialogue Papers

The *CDM Dialogue Papers* are intended to help advance the design process for the Clean Development Mechanism. The concepts developed and opinions expressed in these papers are those of the Center for Clean Air Policy (CCAP) although these views have been informed by extensive interactions with participants in the "CDM Dialogue." Since May 2000, CCAP has facilitated several meetings of the CDM Dialogue, which brings together a group of high-level climate negotiators from developed and developing countries. The process gives participants a chance to informally discuss different approaches to the design of the CDM in a relaxed, off-the-record, non-negotiating setting. The CDM Dialogue is operated in conjunction with the *Dialogue on Future International Actions to Address Global Climate Change* (Future Actions Dialogue or FAD)—a forum for these high-level climate negotiators to discuss options for the post-2012 international response to climate change. More information on the FAD is available at: www.ccap.org/international/future.htm. Financial contributions for these efforts were provided by the Australian International Greenhouse Partnerships Office, Environment Canada, Foreign Affairs Canada, European Commission Directorate-General for Environment, Korean Ministry of Foreign Affairs and Trade, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Japanese Ministry of Economy, Trade and Industry, Netherlands Ministry of Housing, Spatial Planning and the Environment, New Zealand Climate Change Office, Norwegian Royal Ministry of Foreign Affairs, United Kingdom Department for International Development, United Kingdom Foreign and Commonwealth Office, the United States Environmental Protection Agency, Swedish Ministry of the Sustainable Development, Swedish Energy Agency, and Swedish Ministry of Industry, Employment, and Communications.

The *CDM Dialogue Papers* do not reflect consensus recommendations of the participants; rather, they are an attempt to harvest the thoughts and discussions that have been part of the process. More information on the Dialogue is available at: www.ccap.org/international/cdm.htm. The papers in this series include:

- *Alternative Tools for the Demonstration of Additionality: Assessment of Proposals*
- *"Program of Activities" as CDM Projects: Implications of the Montreal Decision*
- *Developing Terms of Reference for the CDM Executive Board and Operational Entities*
- *Implementing the Additionality Requirement & Ensuring the Stringency of Project Baselines under the CDM*
- *The Eligibility of Land Use, Land-Use Change and Forestry Projects under the CDM*
- *Sharing the Benefits: Mechanisms to Ensure the Capture of Clean Development Mechanism Project Surpluses*
- *Ensuring CDM Project Compatibility with Sustainable Development Goals*
- *Defining and Distributing the "Share of the Proceeds" under the CDM*

About the Center for Clean Air Policy

As a recognized world leader in air quality and climate policy since 1985, the Center for Clean Air Policy, an independent non-profit entity, seeks to promote and implement innovative solutions to major environmental and energy problems which balance both environmental and economic interests. The Center's work is guided by the belief that market-based approaches to environmental problems offer the greatest potential to reach common ground between these often conflicting interests. CCAP staff have participated in the Framework Convention on Climate Change negotiations, helping to shape the Joint Implementation provisions of the Rio Treaty and the Kyoto Protocol Mechanisms. For more information on CCAP, see: www.ccap.org

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EXECUTIVE SUMMARY

At the annual United Nations Climate Change (UNFCCC) conference held in December 2005 in Montreal, Canada, Parties adopted the Marrakech Accords (which set the framework for the implementation of the Kyoto Protocol) and negotiated a decision to improve the functioning, operation and reach of the CDM with the hope of further mobilizing the carbon market during the first commitment period. One of the more controversial elements of the CDM discussions in Montreal was centered on whether government policies and programs that could impact upon a wide number of project activities should be eligible as CDM activities? And if so, how would such projects need to be developed to meet the requirements of the CDM? After much debate, Parties decided:

> that a local/regional/national policy or standard cannot be considered as a clean development mechanism project activity, but that project activities under a programme of activities can be registered as a single clean development mechanism project activity provided that approved baseline and monitoring methodologies are used that, inter alia, define the appropriate boundary, avoid double counting and account for leakage, ensuring that the emission reductions are real, measurable and verifiable, and additional to any that would occur in the absence of the project activity.

As outlined in Article 12 of the Kyoto Protocol and elaborated in the Marrakech Accords, the CDM is defined as a *project*-based mechanism. Defining what actually constitutes a project has been the subject of considerable debate, with some defining it as narrowly as a single emission activity while others argue that a project could include policies, sectoral policies, or programs. The Montreal Decision should be considered different from "policy-CDM" and "sectoral CDM", as defined in this paper, since the Parties decided that policies can not be the project as is the case in "policy-CDM" and the entire sector or sub-sector does not necessarily have to be included as is the case in "sectoral CDM". While some have suggested that "programmatic CDM" is eligible under the Montreal Decision the specific implications of this decision are still in question since there are different perspectives on what it means for CDM projects. Therefore, we refer to the Montreal Decision as "program of activities" CDM to avoid confusing it with these other approaches.

A "one size fits all" approach to such factors as boundaries, baselines, and additionality is not likely under "program of activities" CDM since their implementation will likely vary between different project types. This implies that an EB decision on how "program of activities" CDM projects will have to address these factors will either not be extremely detailed since their application may vary across the range of projects or the EB will not issue guidance at all. The latter seems the most likely.

For project developers to move forward in "program of activities" CDM project types, there are several factors that the EB and project developers will need to grapple with.

Definitions. It might not be necessary to develop an agreed definition for the new terms created in the "program of activities" decision—policy, standard, and programme of activities—since an implicit working definition might be assumed. However, to provide greater clarity on the differences between these terms—since some are explicitly not allowed to count as CDM

projects—developing clear definitions could help add greater clarity and avoid more confusion as these types of projects are brought forward to the EB. In particular:

- If the government creates a goal to meet a certain amount of its electricity generation from renewables and creates an incentive program to help meet that goal, would the incentive program clearly be considered a "program of activities" and therefore be allowed or would it be considered the policy/standard and not be allowed?

Boundary. It seems possible to design a boundary for a single CDM project that incorporates a number of similar emissions reduction activities which have enough similarity that they could utilize the same approach for assessing baselines, monitoring and verification, and additionality. For example, various wind farms that are developed as a result of a program could be grouped into a single CDM project. However, a number of boundary questions could benefit from greater clarity, including the following.

- Can different types of projects (e.g., industrial energy efficiency in cement, iron and steel, and pulp and paper) be developed as a single CDM project and thus utilize a single PDD or could only projects in the same sets of activity (e.g., technology) use a single methodology and be considered in a single PDD?
- Can a program have a multi-national boundary or would such a program require CDM projects and the resulting methodologies to be developed for each country?

While the general project boundary (e.g., wind farms resulting from the CDM project) for "program of activities" CDM projects could be defined, the definition of the specific locations and facilities where the reductions will occur for specific CDM projects may be impossible or more difficult to define upfront since the number and location of the specific project activities (e.g., wind farms) that result from the "program of activities" is likely to be unknown with perfect certainty at program initiation. Some precedents in current approved CDM projects may make this a moot point since these projects used ex-post determination of the specific facilities in defining its boundary. However, confusion could be avoided by providing greater clarity on the following.

- Do the specific facilities/sites that will be generating CERs have to be defined upfront or can they be defined ex-post as they evolve over the life of the CDM project? For example, a project could either be required to define the boundary as 10 specific facilities or at all facilities intentionally impacted by the program.

Leakage. All CDM projects—whether they be at a single site or multiple sites—will need to account for leakage. It does not appear that there are any special requirements for "program of activities" CDM projects to address leakage, but certain types of projects proposed as a result of this decision (e.g., appliance efficiency programs) may have to address leakage in a more complex manner than at a single site since these types of projects may have a large number of replaced activities to track (e.g., old appliances). Leakage could arguably be minimized in some types of "program of activities" CDM projects since a larger number of facilities would be included in the boundary and thus directly accounted. However, leakage may be a bigger issue under relatively large "program of activities" CDM projects since a potentially large number of activities may be pushed outside the project boundary. Since leakage is a very case-by-case issue that is unique to each type of CDM project, "program of activities" CDM projects would

need to prove that leakage is addressed in a manner specific to the types of projects resulting from the program.

Baselines. Baseline determination for a "program of activities" CDM type project would likely be conducted using the same approaches as for current CDM projects. Would a single common baseline for the entire program be considered rigorous enough or would the baseline need to be developed and proven for each individual emissions reduction activity resulting from the program?

For a program that grouped different types of projects, such as energy efficiency in direct fuel combustion in cement, iron and steel, and pulp and paper, it would not be feasible to develop a single baseline methodology which accurately accounted for emissions and reductions in these diverse sectors. Therefore, such a project would likely require a different baseline methodology for each specific activity.

- While such an approach has been used in at least one approved CDM methodology, is this an acceptable approach or would project developers only be allowed to group projects which could use similar methodologies?

Monitoring: A top-down approach where monitoring is conducted at the program level, seems to be the most reasonable approach for "program of activities" CDM project types. While complex, setting a monitoring plan at the project activity level with many small sources of emissions may be even more arduous. For example, if a country institutes an appliance efficiency program, the tracking of the potentially thousands of older model appliances as they are replaced could be quite arduous.

- In cases such as this, it may make sense to use small-scale precedents, e.g., by allowing monitoring across the program through sampling methodologies instead of monitoring each individual project activity. Is this an acceptable approach for a "program of activities" CDM with many small sources of emissions? Or could default values be used for these small sources?

Additionality: Given the desire by Parties to streamline and improve the efficiency of the CDM process it seems reasonable that a "program of activities" CDM project might only need to demonstrate additionality once for the program—by showing that any emissions reductions that are likely to be generated by the project would not have happened without the CDM project—instead of for each individual project activity.

- Can additionality be proven only once—at the program level—or would it also need to be done for each individual project activity?
- How to address free riders? Can this be done by discounting?

Crediting Period: While a "program of activities" CDM project activity could easily fit within this existing crediting framework, the length of the crediting period could be an issue for projects which are implemented over different timeframes. Therefore, the key crediting period issues for determining how to implement the Montreal Decision are as follows.

- If the specific project activities (e.g., windfarms) resulting from the program are implemented during different timeframes, can these projects have different crediting periods?

- If so, does the project as a whole (e.g., all the implemented windfarms) have a maximum crediting period as spelled out in the Marrakesh Accords or do those limits only apply to the specific project activities (e.g., each individual windfarm)?

The "program of activities" CDM has the potential to provide positive incentives for developing countries to adopt government policies/standards/goals and develop specific programs to implement and achieve the objectives set forth in the policies/standards/goals. There are a diversity of views on the implications of this decision for such factors as boundary, leakage, baselines, monitoring and additionality. Whether the "program of activities" CDM decision will enable a broader set of emissions reduction activities to be considered as a single CDM project or only send a positive "clarifying" signal that they are eligible, greater clarity on several aspects could help avoid this issue being bounced back and forth between the Meth Panel, EB, and COP.

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I. Introduction

Interest in and project activity level of the Clean Development Mechanism (CDM) has been growing steadily for the past several years. The total volume exchanged through project-based transactions (mostly CDM, with some Joint Implementation [JI]) is estimated to have more than tripled between 2002 and 2004, leading to emissions reductions up to 107 $MtCO_2e$ in 2004 (Lecocq and Capoor, 2005). The total estimated value of transactions since 1998 are estimated at $1.38 billion. In addition, capitalization of carbon funds worldwide has increased 250 percent from approximately $275 million in January 2004 to $950 million in April 2005, indicating a rapidly growing demand for emissions reduction credits (Lecocq and Capoor, 2005).

As of March 20, 2006, there were about 670 CDM project activities in the pipeline, of which 145 are registered and 25 were requesting registration. These 145 registered CDM project activities are expected to deliver 330 million tons of CERs; and the 25 projects at requesting registration are expected to deliver 30 million tons of CERs before the end of 2012. The CDM Executive Board has so far issued 4.2 million certified emissions reductions (CERs) for 10 projects. When considering all project activities in the pipeline, expected emissions reductions are estimated at 836 million tonnes of CERs through the first commitment period.[1]

Estimates of demand from Annex 1 Kyoto countries however, far exceed this supply. Ratifying OECD countries alone may need 5 to 5.5 billion tonnes of CO_2e by 2012 to meet their Kyoto obligations (Newcombe, 2005). If half of these reductions were achieved domestically, the "compliance gap" still stands at approximately 2.5 billion tonnes or 1.7 billion tonnes short of the projected existing supply in the pipeline.

Concern has been raised that the current structure of the CDM will not deliver the amount of reductions needed by developed countries to meet their targets, deliver upon its goal of facilitating sustainable development, take advantage of key emissions reduction opportunities in developing countries, or lead to significant reductions in developing country emissions over time. The definition of a "project" under the Marrakech Accords has left several to suggest that "sectoral approaches", "policies", or "programs" are eligible to be developed as CDM projects and that these approaches would improve upon the operation of the CDM and in doing so address these concerns.

The decision at COP/MOP1 on strengthening the CDM is felt by many to have moved the CDM forward in this regard. Specifically, point 20 of the decision text reads (UNFCCC, 2005a):

> *Decides,* that a local/regional/national policy or standard cannot be considered as a clean development mechanism project activity, but that project activities under a programme of activities can be registered as a single clean development mechanism project activity provided that approved baseline and monitoring methodologies are used that, inter alia, define the appropriate boundary, avoid double counting and account for leakage, ensuring

[1] These estimates are based on the assumption that all activities presently at validation stage and/or requesting registration will eventually be registered. Furthermore, it is assumed that crediting periods will not be renewed (conservative approach).

that the emission reductions are real, measurable and verifiable, and additional to any that would occur in the absence of the project activity.

This paper will explore the implications of this decision—so-called "program of activities CDM"—including how it could be structured to fit within the current CDM framework and its potential to overcome some of the existing shortcomings of the CDM including extending its reach and scope. (For this paper, we use the term "program of activities" to refer to the above point 20 of the decision agreed to in Montreal in order to distinguish it from programmatic CDM which has been defined with certain characteristics (see section III.c) that may or may not be applicable to this Decision).

II. Background: Role of Policies, Standards, and Programs in the CDM

The role of policies and programs has been a contentious issue in the UNFCCC negotiations and within the Executive Board. Below we briefly discuss the main arguments proposed for why the CDM needs to be strengthened and what decisions have been taken by Parties and the EB regarding policies and programs.

II.A Why Strengthen the CDM?

Analysts and project developers point to a variety of reasons for the trickle of CERs on the global market including: difficulties in demonstrating additionality, methodological stringency; high transaction costs, governance issues, and market risk among others. Critics argue that these difficulties have led to shortcomings in the CDM such as minimal geographical distribution of project activities, negligible technology transfer to developing countries, and lack of significant contribution to the sustainable development objectives of the host countries (Cosbey et al., 2005).

The projects that have made it through the CDM project cycle have tended to be those that are the simplest to quantify and not necessarily those with the greatest benefit in terms of co-benefits or sustainable development. For instance, of the approximately 670 projects in the pipeline as of March 20, 2006, 9 HFCs and 2 NO_2 decomposition projects account for 47% of total CERs (UNEP RISOE, 2006). While this reflects the validity of the market (i.e., by finding the cheapest source of credits) many project types that could potentially have a significant impact on global emissions such as transportation, energy efficiency, and renewable energy projects are often over looked (see box 1).

Box 1. Transportation, Energy Efficiency, and Renewable Energy Projects in Developing Countries

The transportation sector accounts for approximately 22% of global CO_2 emissions and 16% of non-Annex I country emissions in 2000 (IEA, 2003). With many small sources of emissions (e.g., individual vehicles), the credit generation is often too low to justify CDM project and transaction costs even though, if scaled up, the impact on emissions could be enormous (Browne et al., 2005). With transportation sector emissions expected to double in developing countries by 2020 (IEA, 2004), efforts, such as through CDM, will need to play a critical role in the coming decades (Brown et al., 2005). As of April 1, there is currently only one transportation CDM project in the pipeline, which accounts for 7,000 CERs (UNEP Risoe Centre, 2005).

Energy production accounts for approximately 44% of non-Annex I CO_2 emissions in 2000 (IEA, 2003) and is projected to rise significantly—121%—between 2000 and 2020 (IEA, 2004). Therefore, energy efficiency and increasing renewable electricity generation will be important approaches for addressing global GHG emissions. However, energy efficiency and renewable energy projects account for a relatively small share of total emissions reductions currently in the CDM pipeline. As of April 1, there are 88 energy efficiency projects in the CDM pipeline (out of 693 total projects)—accounting for 5% of CERs—and 373 renewable energy projects—accounting for 16% of CERs (UNEP Risoe Centre, 2005).

Further, while emissions from the specific facilities/sites in a CDM project will be reduced, emissions within the entire sector or at other similar facilities/sites in the country may be increasing. This means that net emissions in the country or sector where the CDM project is occurring could be rising despite the CDM project. While CDM was not necessarily premised on reducing overall developing country emissions, the hope was that the technology spillover effects and market signals would help lead to greater reductions outside the specific project boundary.

Critics, therefore, suggest that if the CDM is to play a significant role in facilitating emission reduction opportunities in developing countries, this can only be achieved through a CDM that provides a strong incentive for the development and implementation of broad approaches (e.g., policies and programs) that can lead to large scale emissions reductions in the near- and long-term. Analysts argue that the ability of the market to have this impact and attract a larger pool of credits will only come with the inclusion of policies and standards (Garibaldi, 2003; Garibaldi, 2005; Winkelman, 2005).

II.B Decisions on Policies, Standards, and Programs

A past concern with the CDM was that developing countries would hold off on implementing climate-friendly policies due to the fear that their projects would be deemed as part of the baseline and thus not additional. Recent guidance by the EB at its 16th and again at its 22nd meetings has clarified this perceived shortcoming by stating that policies or standards that give comparative advantages to less emissions-intensive technologies need not be taken into account when developing the baseline scenario if the policy or regulation was introduced after 11

December 1997 for "E+" and 11 November 2001 for "E-" policies and regulations.[2] Specifically, the guidance reads:[3]

> As a general principle, national and/or sectoral policies and circumstances are to be taken into account on the establishment of a baseline scenario, without creating perverse incentives that may impact host Parties' contributions to the ultimate objective of the Convention.

Further clarification reads,

> National and/or sectoral policies or regulations under paragraph 6 (b) that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) need not be taken into account in developing a baseline scenario (i.e. the baseline scenario could refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place).

While these decisions clarified how to address the so-called perverse incentive, the Board and Meth Panel have been unable to decide on whether government policies, standards, and programs could be developed as CDM projects. The Meth Panel and the EB have been unable to draw conclusions on several policies and programs that were put forward as CDM projects—such as Ghana's proposed CDM project (NM 0072)[4]—that called for a national air conditioner standard—and Mexico's proposed CDM project (NM100)—that called for a national incentive program to replace existing industrial motors. As a result, the issue of how to deal with "local/national/regional policy, standards, and programmes as a CDM project activity" was forwarded to the Parties at COP/MOP (UNFCCC, 2005b).

II.C Outcomes of Montreal Decision on CDM

At the annual United Nations Climate Change (UNFCCC) conference held in December 2005 in Montreal, Canada, Parties adopted the Marrakech Accords (which set the framework for the implementation of the Kyoto Protocol) and negotiated a decision to improve the functioning, operation and reach of the CDM with the hope of further mobilizing the carbon market during the first commitment period (UNFCCC, 2005a). One of the more controversial elements of the CDM discussions in Montreal was centered on whether government policies and programs that could impact upon a wide number of project activities should be eligible as CDM activities? And if so, how would such projects need to be developed to meet the requirements of the CDM?

In Montreal after much discussion, Parties concluded that (UNFCCC, 2005):

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[2] E+ refers to "existing national and/or sectoral policies or regulations that give comparative advantages to more emissions-intensive technologies or fuels". E- refers to "national and/or sectoral policies or regulations that give positive comparative advantages to less emissions-intensive technologies (e.g., public subsidies to promote the diffusion of renewable energy or to finance energy efficiency programs)".

[3] http://cdm.unfccc.int/EB/Meetings/022/eb22_repan3.pdf

[4] http://cdm.unfccc.int/methodologies/PAmethodologies/publicview.html?OpenRound=8&OpenNM=NM0072&cases=W#NM0072

- "a local/regional/national policy or standard cannot be considered as a clean development mechanism project activity, but that project activities under a programme of activities can be registered as a single clean development mechanism project activity provided that approved baseline and monitoring methodologies are used that, inter alia, define the appropriate boundary, avoid double counting and account for leakage, ensuring that the emission reductions are real, measurable and verifiable, and additional to any that would occur in the absence of the project activity"; and
- "large-scale project activities under the clean development mechanism can be bundled if they are validated and registered as one clean development mechanism project activity".

What these conclusions mean and how they will be applied to specific projects has been left open for debate. The implication of this decision on "program of activities" CDM, including an attempt to define and differentiate the term from programmatic-CDM, sectoral CDM, and other policy CDM concepts, will be explored in the following sections.

III. Developing a Common Vernacular

The general idea behind sectoral, policy-based, and programmatic approaches to the CDM is to encourage developing country governments to adopt and implement GHG reducing policies and measures and to eliminate potential perverse incentives against policies. Because of their shared goals and the general concept, the terms "sectoral," "policy-based," and "programmatic" CDM have been used interchangeably in several contexts, creating confusion among policymakers, as alternatives to project-by-project approach to CDM. In some cases, addressing concerns raised with a particular approach (e.g., sectoral CDM) has been complicated by differing definitions and meanings implied by various policymakers and researchers.[5] This section will seek to define a common terminology for each approach based upon how it would address the key factors for a CDM project—boundary, baseline, monitoring, leakage, and additionality. The aim is to provide a solid basis for discussing the technical and political practicality of using such approaches; however, none of these approaches are currently in place so they should be considered more as concepts.

III.A Policy-based CDM

With a policy-based CDM (Policy-CDM), activities are implemented by the developing country government through "deliberate government policies" (Hargrave, 2000; Samaniego and Figueres, 2002, Cosbey et al., 2005; and Figueres, 2006).[6] The policy becomes the project; however, emissions reduction credits would only be generated for the impact of the policy ex-post. The CERs would flow directly to the hosting government, but the government could decide to allocate the CERs to private actors that were impacted by the policy. It would likely be done initially through a unilateral approach, but could be done with upfront support from Annex I

[5] It is important to note that our definitions for these approaches are in some cases different from those used by others since some authors mix together different elements of each approach which makes it difficult to distinguish them. Instead of creating new names for these approaches, we have instead used the same names but sought to clarify the distinctions between the approaches.

[6] A comparable approach is discussed by Bosi and Ellis (2005) who refers the Policy-based CDM as a "sectoral crediting mechanism with sectoral policy." In fact, this approach is essentially the same as the "Sectoral CDM" approach proposed by Samaniego and Figueres (2002) and Figueres (2006), where the CDM project activity is "policy-based and sectoral in scope."

countries – in latter case a purchasing agreement would need to be made in regards to ownership of the resulting CERs.

Since many types of government policies can affect greenhouse gas emissions—ranging from energy and manufacturing standards to tax credits or removal of energy subsidies, to infrastructure changes—a broad definition of Policy-CDM would allow a single policy that reduces emissions in a range of sectors and actors to be eligible as a CDM activity. For example, a government policy to adopt a fuel tax that impacts fuel consumption in transportation, electricity generation, and commercial and residential use would be considered a Policy-CDM project under this broad definition. Such an approach has also been termed a "cross-sectoral Sectoral CDM" approach (Samaniego and Figueres, 2002). For some policies—e.g., removal of energy subsidies—assessing baselines, additionality, etc. can prove difficult in practice since the policy would impact upon a range of actors that are likely to have varying responses to the policy. For example, assessing how consumers would respond to an increase in energy prices (e.g., through a removal of subsidies) could vary dramatically within a country since consumers are likely to respond differently (e.g., their price elasticity varies). Therefore, some have suggested that only policies that impact upon one sector would likely be able to meet the requirements of CDM and thus be eligible under a Policy-CDM approach. This more limited definition is similar to that used by Figueres (2006) for a "sectoral or sub-sectoral" Sectoral-CDM where "the policy is the project (activity) and the various emission reduction actions that are implemented to comply with the policy do not constitute individual project activities in and of themselves" and by Bosi and Ellis (2005) a "sectoral crediting mechanism with sectoral policies". Under this more narrowly defined Policy-CDM, the project boundary would be a particular sector and the eligible activity would be a government policy that directly was aimed at reducing emissions in that sector.

III.B Sectoral CDM

Sectoral CDM (S-CDM) is an approach where emissions reduction credits are generated from public and private actions in a single sector (e.g., electricity) or sub-sector (e.g., grid connected electricity) that reduce emissions below the level that would have occurred without the project (Samaniego and Figueres, 2002; Sussman et al., 2004; Cosbey et al., 2005; Bosi and Ellis, 2005). In S-CDM, all activities in a sector would be covered, not just the ones that are necessarily reducing emissions. Unlike the government-run, policy-based project activities suggested by Samaniego and Figueres (2002), this S-CDM approach does not involve a particular government policy as the driver for change but could be driven by both public and private actors.[7] This approach would require a baseline into the future—which could be a business as usual projection or an intensity level—that took account of the emissions for the entire sector without the project. Emissions reductions would be generated for all reductions below the baseline. In some sense, project boundaries could be defined at a national sector level (e.g., all passenger vehicles in a country) or sub-national level (e.g., all passenger vehicles in a specific metropolitan area). Such an approach requires a procedure—such as modeling—for calculating baselines of different operations in the selected sector, incorporating a large number of factors such as current and

[7] This mechanism could be identical to the "sectoral crediting mechanism with fixed sectoral emissions limits" or "sectoral crediting mechanism with rate-based or indexed crediting" approaches discussed by Bosi and Ellis (2005) to the extent that the fixed emissions or rate-based/indexed limits are based upon the "without project" baseline as used for current CDM projects.

projected use of energy sources, a natural rate of technological improvement over time, access to alternative input type, etc. [8] Given the potential error in estimating baselines, a discount factor could be used to ensure conservativeness. Demonstration of additionality and monitoring of emissions reductions under S-CDM could be more difficult and controversial than the bottom-up, project-based approach of the current CDM since the CDM project would need to show that the reductions in emissions from the sector are not the result of unrelated activities, but rather are a result of the public and private sector initiative. Further concerns are likely to rise under an S-CDM approach about "free riders". This could be handled in several ways under S-CDM, such as by calculating and monitoring the free riders ex-post and reducing the generated CERs by that amount, discounting the CERs ex-ante through an estimate of the free riders, or requiring stringent enough emissions crediting baselines that free rider concerns are minimized.

It is important to note that such an approach is potentially different than a Sector-based "no lose" intensity approach that has been proposed as a post-2012 climate change policy approach by the Center for Clean Air Policy (Schmidt et al., 2006). Under this approach developing countries pledge to meet voluntary "no lose" emissions intensity (e.g., CO_2/ton of steel) targets for electricity and major industrial sectors. Developed countries provide assistance through a "technology financing and assistance" package to help establish more aggressive "no lose" targets than the country would be likely or able to set on their own. The target is "no lose" in the sense that emissions reductions below the target are eligible for sale as emission reduction credits, but if the sector fails to meet the target they are not responsible to buy emissions reduction credits from other sectors/countries. One potential difference between this proposal and S-CDM is that emissions reductions below the baseline but above these "no-lose" targets would be retired permanently as the developing countries "contribution to the atmosphere", unlike in S-CDM where the all the emissions reductions below the baseline would be eligible for sale as CERs. However, S-CDM could be designed so that the baseline is below business-as-usual and then this distinction would not be relevant. The major difference is that the negotiation of the baseline/target would become more stringent as a result of the "technology financing and assistance package" included in the proposal and this package would provide explicit support for advanced technology.

III.C Programmatic CDM

Under "Programmatic CDM" project activities occur as the result of a "deliberate program," whether it is a public sector measure (voluntary or mandatory) or private sector initiative (Bodansky et al., 2004; Figueres et al., 2005). For example, the program could be a soft loan program for renewable energy (Figueres et al., 2006). The key characteristics of a "programmatic CDM" project are the following (Figueres et al., 2005):

- The program results in a multitude of dispersed actions. Response to the program occurs at multiple sites and amongst a variety of actors (e.g., an appliance efficiency program where an individual consumer receives a subsidy for upgrading one of their appliances)
- The activities and resulting emission reductions do not necessarily occur at the same time, but do respond to the same program. For example, some reductions may occur early in implementation of the program, while others may occur later.

[8] Modeling is a fairly resource intensive (time and money) endeavor; this may limit the number of developing countries who could undertake this type of CDM project

- The type, size, and timing of the actions induced by the program may not be known at the time of project registration; however, they are identified ex-post, attributable to the program, and verifiable.
- The program has one enacting agent, but can be implemented by one or more entities.
- The program is the project and the mitigation activities must be measured, using approved baseline and monitoring methodologies, to determine the actual reductions from the project.
- The project is submitted using one single Project Design Document.

Some have suggested that the definitions for programmatic CDM projects, as described above, could be the basis for the specific implementation of the "program of activities" CDM Decision (Figueres, 2006).

III.D Differentiating the Approaches

As can be seen from the above discussions, policy-based CDM, sectoral-CDM, programmatic-CDM, and sector-based "no lose" intensity targets have a number of similar features. This partly explains the often different ways in which the same approach is described by different researchers and policymakers. In Table 1, we outline the key differences and similarities between the approaches as discussed above.[9]

[9] It is important to note that the definitions we have used above do not necessarily reflect the terminology used by the proponents of the approach.

Table 1. Comparison of the Approaches				
	Project Boundary	**Baselines**	**Monitoring**	**Implementing Entity**
Project-based CDM	Facilities at a single site of emission reductions (or groups of single sites under a bundled approach).	Specific to project activity.	Specific to project activity	Private and Public
Policy-based CDM	Could be cross-sectoral under a broad P-CDM where the policy impacts multiple sectors but no necessarily all entities would participate. Could only be for facilities in a single sector under a narrower P-CDM.	Assessed based upon the impact with and without the gov't policy. Calculated as entity specific.	Top-down based upon all affected participants, but not necessarily sector-wide	Public and private depending on the decision in the policy.
Sectoral CDM	All facilities in an entire sector (or sub-sector).	Emissions without new public or private initiatives compared to emissions after the initiatives are undertaken. Calculated as sources either in aggregate or individually.	Top-down based upon sector-wide data and possibly at the level of individual facilities.	Private and Public
Programmatic CDM	Only sources in the program.	Developed for both the program and induced actions from the program. Calculated based upon specific methodologies for each.	Conducted for the induced actions resulting from the program.	Private and Public

IV. Implications of the Decision on a "Program of Activities" CDM

In theory, allowing a "program of activities" CDM has the potential to expand the scope of the CDM into new project areas and sectors, open up the market to projects that deliver more sustainable development benefits to developing countries, and streamline their development as CDM projects (Ellis, 2006; Figures et al., 2005). As stated in the decision text (UNFCCC, 2005), "a *local/regional/national policy or standard cannot be considered as a clean development mechanism project activity*, but that [sic] project activities under a *programme of activities* can be registered as a single clean development mechanism project activity *provided that* approved baseline and monitoring methodologies are used that, inter alia, define the appropriate boundary, avoid double counting and account for leakage, ensuring that the emission reductions are real, measurable and verifiable, and additional to any that would occur in the absence of the project activity [emphasis added]".

The Montreal Decision should be considered different from "policy-CDM" and "sectoral CDM", described above, since the Parties decided that policies can not be the project as is the case in "policy-CDM" and the entire sector or sub-sector does not necessarily have to be included as is the case in "sectoral CDM". While some have suggested that "programmatic CDM", as defined above, is eligible under the Montreal Decision (Figures, 2006), the specific implications of this decision are still in question since there are different perspectives on what it means for CDM projects (Figueres, 2006; Ellis, 2006). Therefore, we refer to the Montreal Decision as "program of activities" CDM to avoid confusing it with these other approaches.

Since the Montreal Decision does not spell out any steps for the EB to implement "program of activities", it could proceed along two fronts. The EB could issue explicit guidance spelling out how "program of activities" CDM would be defined and implemented (e.g., how boundaries, baselines, etc. would be developed) or the accumulation of EB decisions and "precedents" could shape its development without any explicit EB decisions on how "program of activities" CDM would be implemented. In the later case, project developers would have to utilize the precedents established in current CDM projects or establish new precedents by proposing approaches that the EB would have to approve. Which of these approaches will materialize will have significant bearing on the way that these types of projects will need to be structured to meet the requirements of the CDM.

What is clear is that a "program of activities" CDM must be developed so that it uses approved baseline and monitoring methodologies that properly account for such factors as boundary, double counting, leakage, and additionality. This could imply that such projects:[10]

(1) must be configured in a manner that allows them to meet the exact interpretation of the rules for baselines and monitoring methodologies that have been used by CDM projects to date which means that the precedents established in the approaches utilized by current projects must be used by "program of activities" CDM projects; or

(2) require the EB to provide additional interpretations of its rules for baselines and monitoring methodologies to account for the potential different approaches that such

[10] CCAP has held a series of informal consultations with leading climate change negotiators involved in the CDM Decision during the deliberations at Montreal, immediately following the Decision, and in the past couple of months. These characteristics are based upon our perception of the views of the different delegates.

projects could need to undertake—but not deviating from the rules and modalities for the CDM agreed to in the Marrakesh Accords. This implies that the precedents established to date do not necessarily apply to these types of projects and new "rules" would need to be developed.

For some areas, such as the option to develop a single Project Design Document (PDD) for the project, existing precedents probably will work for the "program of activities" CDM. While the Montreal Decision Text does not explicitly state that such projects can use only one PDD, current project activities are only required to submit one PDD so "program of activities" CDM projects should be required to follow a similar requirement since they can be registered as a single CDM project.

IV.A What is a "Program of Activities"?

While the terms "project" or "project activity" are evident throughout the Kyoto Protocol and the Marrakesh Accords, no definition for these terms is provided in either. As defined in the CDM Glossary contained in the project design document (PDD), "a project activity is a measure, operation or an action that aims at reducing GHG emissions." While this defines a project activity, it incorporates a number of additional terms—measure, operation, or action—which also have no definition. This has been partially responsible for creating the differences of viewpoints on what activities are eligible to be considered as a CDM ***project***. Some have argued that a "project" could be defined broadly to consider government policies—such as technology standards (Hargrave, 2000)—sectoral policies—such as modernization of the entire cement industry in a country (Figueres, 2006)—or "programmes"—such as energy efficiency standards for residential construction or an electric utility enacting a demand side management program (Figueres et al., 2006). Others have considered a "project" more narrowly as only related to a single activity at a clearly demarcated geographical location, such as fuel switching at a single facility or building a wind farm.

The Decision in Montreal adds more terms—policy, standard, and programme of activities—which have no concrete definition in the Kyoto Protocol or the Marrakesh Accords. Since there is no legislative history of the discussions to define these terms, we propose the following working definitions of these terms.

Policy or standard is a binding or non-binding requirement or objective set forth by a government authority that has the legal authority to establish such a requirement. For example, a government parliament requires or sets a goal that 10,000 MW of new renewables be built in the country.

Project activity is an emissions reduction activity that occurs at a single location within a narrowly defined boundary.

Programme of activities would be a program supported by a single entity that encourages or mandates a number of emissions reducing activities. For example, a government renewables program could be established to coordinate and implement a set of production tax credits to help meet the government's renewable production goal. Therefore, a program of activities would fall

somewhere between a policy or standard and a project activity as the following figure demonstrates (Figure 1).

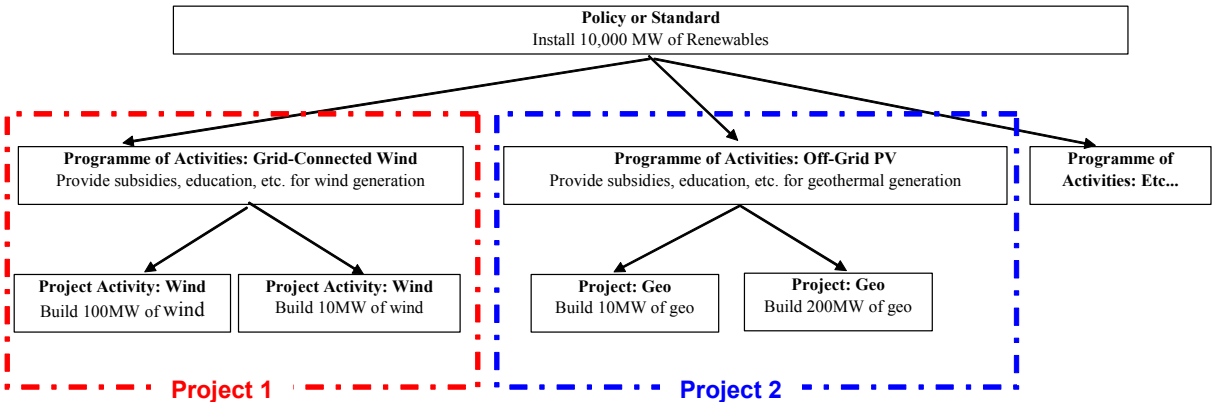

Figure 1. Illustration of the Differences between Policy/Standard, Program of Activities, and Projects

The key definitional question for "program of activities" CDM is:

- if the government creates a goal to meet a certain amount of its electricity generation from renewables, for example, and creates an incentive program to help meet that goal, would the incentive program clearly be considered a "program of activities" and therefore be allowed or would it be considered the policy/standard and not be allowed?

IV.B Boundary

The CDM project boundary is defined as one that encompasses all anthropogenic emissions by sources of greenhouse gases (GHG) under the control of the project participants that are significant and reasonably attributable to the CDM project activity (UNFCCC, 2004). For most CDM projects the boundary is easily defined around the specific technology or facility where the emission reduction occurs. For a "program of activities" CDM project however, this boundary is perhaps less certain.

That is, while the boundary for the program can be easily defined at a local, municipal, regional, or national scale depending on its mandate, the actual emission reduction activities under the program are perhaps only fully identifiable after the program gets underway or is completed. For example, in the case of a soft loan program designed to encourage the development of wind power, while the general targeted area of the program will be known ex-ante (e.g., wind generation in the country), the specific location of the new wind farms/turbines may not (e.g., wind generation at wind farm X and Y). One view of programmatic CDM raises the possibility that the location of the project activities resulting from the program do not have to be known at the outset (Figueres et al., 2005). This implies that the boundary for the project activities would be determined ex-post and held constant for the crediting period. This would be different from a "bundle" where the project activities in a bundle are known at registration and does not change over the lifetime of the project whereas in a program, the activities may not be known at

registration and may in fact change over time (Figueres and Haites, 2006).[11] While the vast majority of current CDM projects have a defined project boundary at the time the project is submitted since they are based upon a defined number of facilities (e.g., 50 wind turbines or one landfill), some approved projects have less defined boundaries at the time of project approval (Figueres et al., 2005; Ellis, 2006). For example, the Kuyasa small-scale CDM project defines the project boundary as the existing houses in a defined geographic location, where the number of houses that will undertake the emission reduction activity is defined only as that it will be less than 2,300.[12] Since such an approach to defining boundaries has been approved in at least one Meth Panel recommendation,[13] it has been argued that such an approach appears feasible for CDM projects (Figueres et al., 2005).

This idea of multiple sites under a "program of activities" CDM project presents potentially unique circumstances especially in situations where the program, for example, is implemented on a national scale involving hundreds of thousands of vehicles, homes, or air conditioners. The major difference between a single site and "program of activities" CDM would be that a "program of activities" CDM could have multiple project activities operating as a single project (see Figure 1). For example, a "program of activities" CDM could have multiple wind farms in different locations that result from the program included as a single CDM project.

Given the potential baseline and monitoring methodological requirements, the boundary for a "program of activities" CDM could potentially be developed so that only similar types of project activities (e.g., grid connected electricity) would be included as a single project. Therefore, these similar project activities are likely to be grouped together into a single project with a project boundary covering their activities. (This is discussed further in sections IV.D and IV.E).

The main questions in determining the boundary approach for "program of activities" CDM are:

- Can different types of projects (e.g., industrial energy efficiency in cement, iron and steel, and pulp and paper) be developed as a single CDM project and thus utilize a single PDD or could only projects in the same sets of activity (e.g., technology) use a single methodology and be considered in a single PDD?
- Can a program have a multi-national boundary or would such a program require CDM projects and the resulting methodologies to be developed for each country?
- Do the specific facilities/sites that will be generating CERs have to be defined upfront or can they be defined ex-post as they evolve over the life of the CDM project? For example, a project could be either required to define the boundary as 10 specific facilities or at all facilities intentionally impacted by the program.

IV.C Leakage

Leakage is defined as the net change of anthropogenic emissions by sources of greenhouse gases (GHG) which occurs outside the project boundary, and which is measurable and attributable to

[11] Given that guidance on the "large-scale bundling" Decision has yet been specified by the EB, further clarification and deliberations by policymakers of the distinction between large-scale bundling and on the definition of program of activities is needed.

[12] Similarly the Moldova rural biomass project indicates that it is relatively difficult to determine all the project activities with exact location.

[13] Meth Panel's recommendation on NM0100.

the CDM project activity (UNFCCC, 2005). Assessing and defining leakage is a very case specific issue. In principle, no different issues arise when assessing leakage for a project at a single site and one that involves multiple sites as is the case of "program of activities" CDM

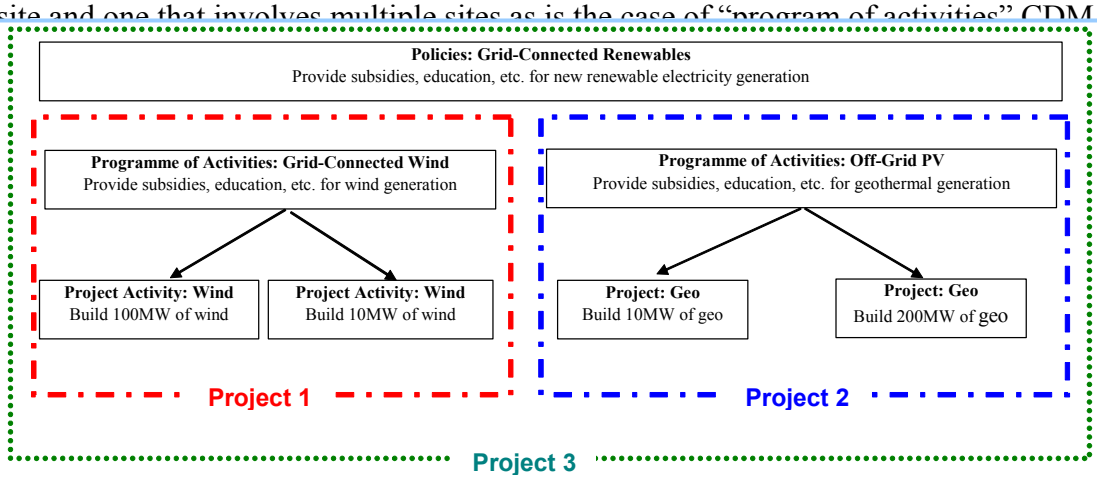

Figure 2. Different Boundaries and Methodological Requirements for a "Program of Activities" Project

The baseline for a CDM project activity is the scenario that reasonably represents the anthropogenic emissions by sources of GHG that would occur in the absence of the proposed project activity. Under paragraph 48 of the CDM modalities and procedures three approaches to baseline development are identified, they include (UNFCCC, 2004):

- Existing actual or historical emissions, as applicable; or
- Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment; or
- The average emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.

While baseline determination for a "program of activities" CDM project would be consistent with a single site CDM project, one area where it may differ is in the composition of the program. If, for example, the program includes various emission reduction activities under its scope then multiple baselines may be required in one PDD. Where there is a large variation in the emission reduction activities, only through the use of multiple baseline methodologies can the project be accurately assessed.[14] As shown in Figure 2, this would imply that "project 3" would be developed to have a single PDD, but would have separate methodologies for "project 1" and "project 2" since the emissions reduction activities under each would need different methodologies. Such an approach could run the risk of needing multiple decisions from the meth panel before the project can be approved if, for example, the baseline methodology of "project 1" was approved but was rejected or sent back for review for "project 2".

[14] Efforts by the EB to develop methodologies that are more broadly applicable, as requested in UNFCCC (2005), could make such an approach more feasible.

The multiple baseline approach used in the Kuyasa energy upgrade project provides a good example (Figueres et al., 2005). This project involves several different emission reduction activities including installation of solar water heaters, energy efficient lighting and insulated ceilings. As a result, the project involves the use of three baseline methodologies for each aspect of the emission reduction activity. For example, a baseline methodology for a grid and non-grid connected electricity project are likely to be extremely different. Presumably, the precedent established by the Kuyasa project would imply that such an approach could be used for other projects assuming that they meet the other requirements of the CDM (e.g., additionality). As one of the rationales for developing "program of activities" CDM is to reduce transaction costs, it is unclear that the use of multiple methodologies under a single PDD would reduce transaction costs to a large extent since methodology development is typically a time and resource consuming process.[15]

An alternative means to address such an issue would be to group only similar program of activities into a single project and therefore enable the use of a single baseline methodology for the entire project. In Figure 2, this would imply that "project 1" would have a single PDD and methodology and "project 2" would have a separate PDD and methodology. But again, this might only have a minimal impact, if any, on the reduction of transaction costs.

The key baseline question for "program of activities" CDM project is:

- Would a single common baseline for the entire program be considered rigorous enough or would the baseline need to be developed and proven for each individual emissions reduction activity resulting from the program?

IV.E Monitoring & Verification

As with typical CDM projects each project activity would need to be accompanied by a monitoring methodology, which in theory would be no different for a "program of activities" CDM project in that the methodology would need to collect data related to the emissions within the project boundary. In practice however, the monitoring and verification issues arising from a program of activities could be different than a project implemented at a single site.

Since a "program of activities" CDM may lead to emissions reductions at a variety of locations, diversity of sizes, and over a range of different actors, monitoring and verifying emissions reductions at each and every site may be cumbersome. One approach for addressing such an issue could be to use a statistical sampling methodology with an acceptable margin of error (Figueres and Haites, 2006). Recent precedent for this approach can be found in the modalities and procedures for small-scale projects. The EB-22 meeting report (annex 33, 11E) contains additional guidelines for monitoring small-scale CDM project activities and states, "Where ever a statistical sample is proposed for monitoring, the sample should be representative of the population and should have a minimum level of confidence of one times the standard deviation

[15] Some streamlining will likely occur when using an approved methodology as the Kuyasa project did since it is a small-scale project and was able to use the approved small-scale methodologies.

(one sigma), unless detailed specifications are provided as part of the indicated methodology".[16] The U.S. program in the Acid Rain law which set aside a defined quantity of SO_2 allowances for energy efficiency used default factors for different project types to minimize the transaction costs associated with monitoring emissions reductions from a large number of small activities. Such an approach could be an alternative means for monitoring, but could raise concerns about standardized baselines that have been a contentious issue in the past.

Since a "program of activities" CDM project could potentially use multiple baseline methodologies to reflect the different activities under the program, as discussed above, it might be necessary to utilize multiple monitoring and verification methodologies. For example, the Kuyusa program used three different random sampling monitoring methodologies which were applicable for use in the three baseline methodologies used for the project. Further guidance related to this in regards to small-scale projects, was given at the COP/MOP1. Annex II, point 31, reads, "If project activities are bundled, a separate monitoring plan shall apply for each of the constituent project activities (…) or an overall monitoring plan shall apply for the bundled projects…"

Another issue distinct to a "program of activities" CDM project is the fact that the exact quantity of emission reductions may not be known at the time of registration. In a program where the participation level is unknown at the onset, e.g., a voluntary energy efficiency upgrade program, an exact estimation of emission reductions is not possible. While a general ex-ante estimate should still be required, the exact quantity of CERs may not be known until the time of verification. This is not an issue at the international level since some current CDM projects have had wide variation between expected and actual CERs (Ellis, 2006). The uncertainty would then be more of an issue for CER buyers, but this could be addressed in how the buyer values the expected CERs and the contract provisions. The key here is that the number of CERs is immaterial once you have determined an accurate baseline and assessed additionality.

For "program of activities" CDM projects with many small sources of emissions:

- Is it an acceptable approach to use sampling methodologies instead of monitoring each individual project activity? Or could default values be used for these small sources?

IV.F Additionality

As written in the Marrakech Accords (UNFCCC, 2000a): "a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity."

For a "program of activities" CDM stating that without the program the emission reduction activities would not exist may not be enough to satisfy the additionality requirement. In "program of activities" CDM projects where a single baseline methodology is used, it is possible that additionality would only need to be proven once for the "program of activities" as a whole.

[16] The Ghana Air Conditioning Standard CDM project for example (although still not approved), proposed sampling to a margin of error of less than 5% and then to be conservative, proposed discounting CERs by the margin of error (Ofosu-Ahenkorah, 2005).

For example, a project with multiple wind farms could prove additionality by showing that the wind generation in all the project activities would be additional.

Alternatively, "program of activities" CDM projects could be required to prove additionality for each of the project activities under the program, as well as, for the program as a whole (Figueres et al., 2005). In this case, additionality would need to be proven for each and every wind farm under the "program of activities" to demonstrate that the specific wind farm would not have materialized without the CDM project. This alternative however, would not mitigate the cumbersome nature of demonstrating additionality. Few examples of current approved or reviewed projects provide any sense of how this issue would be handled by the EB and the Meth Panel. Some of the small-scale projects with different activities operating within a single project are small-scale projects and have used the streamlined additionality approach for such projects (Ellis, 2006).

Some have also suggested that further guidance may be needed on how to interpret the EB decisions on government policies and standards—the E+ and E- Decisions—in sectors where "program of activities" CDM could occur (Ellis, 2006). The concern appears to be that "program of activities" CDM projects could have significant risk of free riders since all activities implemented under a mandatory standard/regulation would be rendered eligible to generate CERs. For example, some individuals would have purchased more efficient appliances without the program could be eligible for generating credits. The solution could be to discount the amount of CERs generated from the program based on the year to year energy efficiency improvement before the program.

The key additionality issues for determining how to implement the Montreal Decision are:

- Can additionality be proven only once—at the program level—or would it also need to be done for each individual project activity?
- Do special requirements need to be established for free riders?

IV.G Crediting Period

The crediting period for a CDM project activity is the period for which reductions from the baseline are verified and certified by a designated operational entity for the purpose of issuance of CERs (UNFCCC, 2004). The starting date of a crediting period occurs after the first emission reductions are generated by the CDM project activity. The project participants may choose between two options for the length of a crediting period:

(i) fixed crediting period (a maximum of ten years)
(ii) renewable crediting period (a single crediting period for a maximum of seven years or renewed at most two times up to a maximum of 21 years)

The starting date and length of the first crediting period has to be determined before registration.

While a "program of activities" CDM project activity could easily fit within this existing crediting framework one foreseeable issue with the length of crediting period is the potential for loss of credits with those project activities with long timeframes or implemented over differing timeframes. Figueres et al. (2005) suggest that this can be addressed by registering a series of

separate projects during a specified period. Klaus Opperman (2005) suggests that "program of activities" CDM projects should be allowed distinct crediting periods for different vintages of actions.

The key crediting period issues for determining how to implement the Montreal Decision are:

- If the specific projects activities (e.g., windfarms) resulting from the program are implemented during different timeframes, can these projects have different crediting periods?
- If so, does the project as a whole (e.g., all the implemented windfarms) have a maximum crediting periods as spelled out in the Marrakesh Accords or do those limits only apply to the specific project activities (e.g., each individual windfarm)?

V. Case Studies of Potential Programs of Activity

The Montreal decision has the potential to expand the range and scale of the CDM within the existing framework. Programs that reduce GHG emissions include everything from technology or performance standards, tax credits, loan programs, etc. and can be implemented at the local, regional, or national scale. The following case studies explore the potential of three programs to be considered as a single CDM project under the decision reached at Montreal. Given the lack of transportation projects in the CDM and the growing emissions from this sector in developing countries, the first two studies consider policies and programs in this sector; they include a regional BRT network development program under India's National Urban Transportation Policy and a Chinese Vehicle Efficiency Program. The third case study explores the potential of a program under a renewable energy law in Mexico.

V.A A Regional BRT Network Development Program under India's National Urban Transportation Policy

In 2005, the Government of India (2005a) drafted its first National Urban Transport Policy with the aim of "providing a transport system that would "save lives, time and money." The Policy calls for (Government of India, 2005b):

- Integrated land use and transport planning
- Equitable allocation of road space
- Improved use of public transport
- Greater use of non-motorized transportation (NMT)
- Discouraging the use of personal motor vehicles
- Management of parking spaces
- Management of freight traffic
- Coordinated planning and management of city transport
- Capacity building
- Promotion of cleaner technologies

For the "improved use of public transport" objective, the Indian Government established *a goal that would* see *each city with a population over 4 million to start planning for mass transit with the aim of adopting a technology that would best suit the city requirements in the next 30 years* (Government of India, 2005b). The Central Government encourages all proven technologies including metro, BRT, electric trolleys, etc.

According to the draft Policy released in May 2005, the Central Government would create a mass transit fund to help finance mass transit systems throughout the country. This capital support would take the form of equity participation and/or viability gap funding for the infrastructure while the users would pay for the operating costs and the rolling stock (Government of India, 2005b). Participation in the fund will come after an evaluation of how the project incorporates the above policy objectives and assessment of a handful of parameters including among others (Government of India, 2005c):

- Extent of resources from private participation

- Institutional capacity of the state government to ensure a well-coordinated public transit system
- Willingness to divert funds from road capacity projects towards public transit
- Initiatives that promote NMT and safety

As of March 2006, the Policy is awaiting approval by the Union Cabinet and the full scheme behind the mass transit fund is still to be formulated.

V.A.1 *Program Description*

Under the auspices of this national policy, and India's goal for each city with a population over 4 million to start planning for mass transit with the aim of adopting a technology that would best suit the city requirements in the next 30 years, this case study will explore the viability of the development of a regional BRT network as a single CDM project activity under a "program of activities CDM". The program of activities will include a comprehensive BRT network with complimentary land use and non-motorized transport (NMT) policies (e.g., bike and pedestrian facilities) and would be supported by the Indian government out of its mass transit fund to support its National Urban Transport Policy.[17]

As outlined in the Central Government's evaluation process, participation in the fund would be dependent upon the applicant meeting the above parameters and fulfilling the policy objectives as set out under the National Urban Transportation Policy. As a CDM program, the Central Government could expand this evaluation process to ensure that the applicant would meet the necessary requirements of the CDM. In this case, not only would the successful applicant meet the main CDM criteria they would also fulfill the additional sustainable development policy objectives of the Indian Government.

Using the definitions of policies, "program of activities", and project activities described earlier in the paper, we consider this CDM project as follows (see Figure 3 below).

[17] It is not envisioned that this fund would include funding from Official Development Assistance or that the CDM project would exclude such funding to meet the requirements of the CDM.

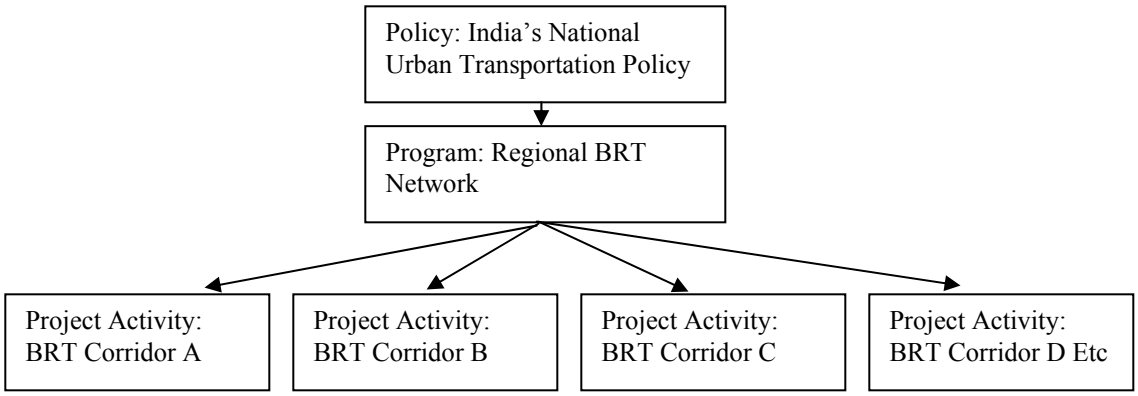

Figure 3: Framework for a Regional BRT Network Development Program under India's National Urban Transportation Policy

India's National Transportation Policy would not be eligible as a CDM project since it would be considered the policy. The "program of activities would be a regional BRT network and the project activities would be the multiple individual BRT corridors that include:

- Attractive, easily accessible and well integrated bus stations
- High capacity, low emission vehicles
- High frequency, synchronized, all day service
- Intelligent transportation systems (ITS)
- Pre-boarding fare collection machines, smart cards and multiple door boarding to reduce station times, and simple and easy to follow route layouts[18]
- Scrappage programs for older vehicles
- Pedestrian and bicycle infrastructure/facilities at stations and along the corridors
- Complementary land use policies (e.g., mixed use, high density, parking management, etc.)

While each BRT corridor is considered an individual project activity, these corridors could also be grouped together so that one baseline and one monitoring methodology would be developed for the full network of BRT corridors in a particular city or metropolitan area instead of one for each separate corridor. The methodological issues with both approaches are described below.

V.A.2 *Methodological Requirement*

Transportation sector projects account for a small portion of the CDM pipeline. Given the methodological difficulties in capturing trip movements—e.g., bus, train, bike or pedestrian—most have involved technology fixes such as fuel switching. Only the two BRT CDM projects Bogotá's Transmilienio[19] and Mexico City's Insurgentes[20] BRT Corridor—have attempted to capture the behavioral side of the transportation sector.[21]

[18] Center for Transportation Excellence: http://www.cfte.org/trends/brt.asp#1
[19] http://cdm.unfccc.int/methodologies/PAmethodologies/publicview.html?OpenRound=13&OpenNM=NM0105-rev&cases=B#NM0105-rev

This section explores what impact, if any, the program of activities decision may have on improving the viability of this type of transportation CDM project using India's new transportation policy as a backdrop.

V.A.2.i Boundary

The boundary for this program could be delineated around the region of a major Indian metropolitan area. Casting a net this wide would capture all movements within the region (or attempt to) and would reduce some potential issues related to leakage and induced demand. Alternatively, and as with the Insurgentes methodology, the boundary could be drawn around the individual BRT corridor which may prove more difficult since determining the exact zone of influence of the corridor is quite complex (see Box 2 below).

Box 2. Induced Demand

Access to a convenient and effective transit system will initially take some people who currently drive and pull them into the BRT system. Depending on the scale of this mode shift, this can effectively increase available road capacity. The laws of supply and demand and empirical evidence indicate that increased road capacity leads to an increase in driving, which could offset some portion of the project GHG savings. Various studies show that each ten percent increase in metropolitan-area lane-kilometres leads to a four to nine percent increase in travel demand over the long-term. [22] Capturing this phenomenon around individual BRT corridor boundaries may prove difficult and adds technical complexity to the baseline and monitoring methodologies. On the other hand, setting a broader/regional boundary that captures all fluctuations in travel behavior would address this issue. (It is important that travel models used to forecast baseline travel levels account for induced demand).

V.A.2.ii Leakage

For a "program of activities" BRT project such as this, the leakage issues will be similar to the other BRT transportation CDM projects and can be incorporated into the project design. For example, a vehicle scrappage program could be included as part of the project activities to ensure that as the older buses are replaced they do not end up in another country or region in India.

V.A.2.iii Baseline Methodology

The baseline is intended to reflect GHG emissions associated with travel conditions in absence of the project. While it is impossible to know this counter-factual situation with 100 percent certainty, there are more and less compelling approaches. Least compelling is a linear projection of past trends to determine a future mode split (x% bus, y% private car, etc.). Most compelling is a robust regional travel model, supported by high quality data, which uses state-of-the art

[20] http://cdm.unfccc.int/methodologies/PAmethodologies/publicview.html?OpenRound=14&OpenNM=NM0158&cases=B#NM0158

[21] Bogotá's TransMilenio (Phase II to IV) CDM project, has been in the pipeline since early 2005 and has been redrafted several times. The current draft, Version III NM105-rev, was resubmitted on February 25, 2006. The slow progress this project has had is a testament to the difficulties of transportation sector CDM projects. Mexico's Insurgentes Avenue BRT corridor project, NM158, was submitted in early 2006 and will be considered at the Meth Panel's 21st meeting.

[22] *Working Together to Address Induced Demand*. Eno Transportation Foundation, Washington, D.C., 2002 p. 16.

techniques to incorporate regional and micro-level land-use effects and capture induced demand. The regional travel model could be re-run without the CDM project at the time of program measurement to capture the effects of exogenous factors such as population levels and economic growth. (See below, for more discussion on a dynamic baseline). In reality, although most developing countries lack high quality data and models they can still develop more credible forecasts than the typical straight-line approach (e.g., by accounting for income levels and system capacity).

For this "program of activities" CDM, a single baseline could be developed to capture the entire program i.e., the entire BRT network in a particular city/region; or conversely, multiple baseline methodologies could be developed for each individual BRT corridor. Developing a baseline for the latter would likely follow the same general steps as that developed for the Insurgentes Avenue BRT corridor. And, without passing judgment on the quality of the Insurgentes BRT Corridor methodology titled "GHG emissions reductions in urban transportation projects that affect specific routes or bus corridors or fleets of buses including where fuel usage is changed," if it is approved by the meth panel and the EB, other project developers might attempt to ascertain its use for their regions. An important limitation with this methodology, as indicated in the PDD, is that it is not applicable to projects that are city-wide and it "cannot easily manage projects that cause extensive changes in land use and degree of motorization over an entire metropolitan area".[23]

If the corridor carries only a very small portion of regional travel, then travel patterns in other similar corridors may provide a sufficient basis for baseline determination. Accurately forecasting the travel impacts of a corridor-level project requires consideration of off-corridor impacts.[24] For a small-scale project, this may be difficult to do credibly; corridor-level models and approximation techniques may be appropriate. For comprehensive and multi-corridor programs that impact travel on a larger scale, regional travel modeling would be a preferred approach to calculate the counter-factual case. It is not obvious what the threshold is for when a set of projects or program of activities becomes large enough to warrant regional modeling; this will depend to some extent on the resolution and sophistication of the available data and travel models in the country. Given the policy and planning value of improved regional modeling, and the growing recognition that comprehensive policy packages are necessary to slow growth in travel demand, a country may find more lasting value in regional assessments than in more limited corridor-level analyses.

Whether at the corridor or regional level, to provide the most accurate account of the baseline a static baseline may not be sufficient. A dynamic baseline that accounts for important changes in key parameters is needed as the baseline should be able to capture any major fluctuations in travel patterns resulting from such things as gas prices, significant changes in urban growth, and variation in fleet technology and fuel efficiency. The Insurgentes methodology for instance, uses "direct source management over the project timeframe to create a dynamic baseline that automatically accounts for changes in the natural growth of passenger-trips per year on

[23] Insurgentes PDD, page 10.

[24] These can include direct impacts, e.g., when BRT passenger used to ride the bus on a different, now slower parallel corridor, or a former bus passenger who now finds it attractive to drive because the BRT has lowered congestion levels.

Insurgentes due to an expanding urban population; and the renovation, growth and change in technology and fuel efficiency of the active vehicle fleet over the project timeframe".[25] While this may be sufficient for this scale of project developing a dynamic baseline for a region would require more detailed modeling. Once this model is developed however it could be updated with key parameters over the lifetime of the program to determine the net impact of the program on travel behavior in the region.

V.A.2.iv Monitoring & Verification

There are a variety of monitoring techniques that could be used for this type of CDM project including: modeling, regional origin-destination (O-D) surveys, on-site sampling or surveys. If one monitoring methodology was developed for the entire program, then regional O-D surveys (with results plugged into a regional model) would be necessary to ascertain the full picture of travel movement across all modes within the region. This could prove difficult however as only a handful of developing country cities, such as Santiago de Chile, attempt this level of travel data measurement and modeling. Given the cost and resources needed to carry out this type of assessment, a trade off between what is realistic and what is most accurate may be necessary. That is, while a frequency of once every two years might be ideal to assess the impact of the program on the region, once out of every 3-5 years may be sufficient.

Developing a monitoring methodology for each individual corridor may be slightly less intensive in that modeling might not be necessary. That is, for a single BRT corridor it may be sufficient to use surveys or on-site sampling to assess the impacts of the BRT as compared to another non-BRT corridor. A complication in this instance however, may occur when a BRT corridor takes rather than adds a lane. In this case, the capacity reduction should also be taken into account and leakage onto other corridors should be assessed, if possible, to determine net capacity impacts. At the network level, this would not be as significant of an issue as you would be gathering enough travel data to capture this in the measurement. Finally, depending on the number of individual corridors in the program, efficiencies in data collection may be gained by developing a single monitoring plan for the program rather than individual plans for each corridor.

V.A.2.v Additionality

For a "program of activities" CDM demonstrating the additionality of the program may not be enough to satisfy this requirement—i.e., stating that without the program the emission reduction activities would not exist. As with the other CDM methodological requirements, additionality may have to be proven for each of the project activities under the program. Again, this level of analysis will involve more time and resources for project developers.

V.A.2.vi Crediting period

Developing this scale of infrastructure project is a long term undertaking. It is likely that the individual project activities undertaken within the program will be implemented at different times, i.e., corridor A may be developed before corridor B. To be clear, the crediting period would be linked to the project activities and not to the program. Further to this, within the

[25] http://cdm.unfccc.int/methodologies/PAmethodologies/publicview.html?OpenRound=14&OpenNM=NM0158&cases=B#NM0158

development of each corridor, certain pieces of the corridor may be built quicker than others -- e.g., bike lanes along the route may be finished before the segregated bus lane and conversely, changes in land use such as increased housing density, may occur long after the segregated bus lane is completed. While the project activities could fit within the existing crediting structure it may prove necessary to allow for different vintages of crediting over the lifetime of the program given the difficulties associated with planning, developing, and running a large infrastructure project such as this.

V.A.2.vii Double counting

To ensure that double counting is minimized, the program coordinator, or this case, India's Central Government would be the sole credit owner and would garner all CERs generated from the program. The Central Government and the DNA would need to ensure that double counting is minimized by ensuring that the project activities implemented under the program were not submitted by other project developers.

V.A.3 *Other Issues*

Developing the technical capacity to gather, and analyze travel data is a key necessity for any city, region, state or country. By developing this understanding of gathering and assessing travel data, development countries will be better able to understand and carryout effective transportation planning.

While some developing countries, like Chile, already have some capacity for developing regional Origin-Destination surveys, most countries lack the experience and the resources for conducting them. As we move into the post-2012 climate era, having the capacity for gathering/analyzing travel data and modeling will be an instrumental tool for developing countries. How this capacity is developed however is an important question and one that could be perhaps addressed through the UNFCCC or in partnerships with Annex 1 entities.

V.A.4 *Conclusions*

BRT corridors, when developed as a component of a larger urban mobility strategy that includes consideration of more efficient land use patterns, pedestrian and bicycle infrastructure, and other site design measures, can accomplish the two goals of the CDM delivering both sustainable development objectives to the developing country and emission reductions for the carbon market. They also have the potential to provide significant benefits in terms of a reduction in local air pollutants along with many other co-benefits.

Given the positive aspects of transportation projects (e.g., co-benefits and addressing a fast growing source of emissions in developing countries) and the small number of transportation projects in the CDM pipeline, some had hoped that the decision on "program of activities" CDM would help create more transportation CDM projects. In this case study, it appears that a "program of activities" CDM developed at the regional level with one baseline and one monitoring methodology for the group of project activities seems to have the potential to reduce some of the transaction costs and barriers associated with existing transportation CDM projects. The "program of activities" CDM decision, however, does not alleviate or even lessen the methodology complexities that are currently acting as significant barriers to transportation sector

projects. While this may have been too much to hope for from this decision, other methodological factors will likely need to be addressed before transportation CDM projects, such as regional mass transit systems and land use and non-motorized transport improvements, can play a larger role.

V.B Chinese Vehicle Efficiency Program

China has instituted a two-stage system of fuel economy standards for its passenger vehicles. The first phase took effect on July 1, 2005 for new models of vehicles and goes into effect on July 1, 2006 for continuing models. Phase II takes effect on Jan. 1, 2008 for new models and on Jan. 1, 2009 for continuing models. The standards are broken up into 16 weight classes and set maximum limits for fuel consumption expressed in litres per 100 km. In 2008, these range from 6.2 l/100 km for passenger cars weighing less than 750 kg up to 13.9 l/100 km for cars greater than 2,500 kg. On a fleet-averaged basis, the standards are equivalent to 6.2 l/100 km in 2008, using the US CAFE drive cycle. These are equivalent to 180 g CO_2/km in 2005 and 170 g/km in 2008 using a European drive cycle (An, 2005).

China is in the process of setting fuel economy standards for light commercial trucks and is beginning to plan for Phase III of the passenger vehicle standards. China is also considering other policies related to GHG emissions from transportation, including a differential consumption tax based on vehicle size and/or performance, fuel taxes, and vehicle labeling of fuel consumption.

V.B.1 *Program Description*

China's efficiency standards for cars and planned standards for light trucks present a potential opportunity for "program of activities" CDM projects. Per EB16 and EB22, the first and second phases of the car standards would not be included in the baseline as the efforts were implemented after 2001. The program we consider here is the implementation of Phases I, II and III of the passenger vehicle standards, but the approach could apply equally to the light commercial truck standards which are currently under development. As the implementation of the policy can not *per se* be considered a CDM project, we consider the specific programs implemented as the CDM project. The policy would be implemented through a range of measures that could include:[26]

- Promulgation of the standard
- Development and calibration of test procedures to measure fuel economy. This should include empirical measurement of real-world (on-road) driving conditions and corresponding adjustments to test cycle data.
- Measurement of a statistically valid sample of new vehicles
- An enforcement scheme (e.g., penalties, offsets) for failure to comply with the fuel consumption limits[27]

[26] These are illustrative measures and not based on actual implementation of Phases I and II, which would require further research beyond the scope of this paper.

[27] While a robust enforcement mechanism is preferred, as long as there is a strong measurement mechanism, then weak enforcement will just lead to fewer CERs – it will not result in inflated savings calculations.

V.B.2 *Methodological Requirement*

This section discusses whether the Chinese vehicle efficiency program could be considered a CDM project under the "program of activities" decision and how it would likely need to be developed as a CDM project.

V.B.2.i Boundary

The "program of activities" CDM project would include project activities grouped under the programs developed by the law's policies, namely implementation of the efficiency standards. In this case the project activity is the manufacturer producing X number of new cars meeting the standard. The boundary would encompass the classes of passenger vehicles that would be impacted by the implementation of the programs in support of the policy.

V.B.2.ii Leakage

There are a few areas in which project impacts could be diminished both within and beyond the project boundary. First, the "rebound effect" manifests because increased fuel economy reduces the cost of driving and leads to increased driving. A 10% elasticity is typical in the US, but a local value should be used to account for these impacts. Second, to the extent that the fuel consumption limits make new vehicles more expensive, some lower income consumers may purchase older, less efficient vehicles. Or, conversely they may be dissuaded from purchasing a vehicle at all, thereby slowing motorization rates. Alternatively, if CERs help make cars more affordable, that might accelerate motorization rates. It remains to be determined if sufficient elasticity data exist to credibly quantify these effects.

Another interesting wrinkle is that if government policies make vehicle ownership and driving more affordable and convenient (e.g., through road capacity expansion), then annual driving per vehicle may increase. In this case, calculated annual GHG savings would increase as annual VKT increased, even though total GHG emissions are higher. This may require baseline adjustments, as discussed below.

V.B.2.iii Baseline

Baseline emissions would be calculated from records of new car purchases, measurements of new car efficiency (l/100 km) and measurement of annual distance traveled for all 16 weight classes of new cars. Baseline calculations would have to updated annually.

For Phase I of the standards (July 2005 to December 2007 for new models, and July 2006 to December 2008 for continuing models) new car efficiency would be measured for the period up until the standards went into effect, e.g., 2001 to July 2005. The annual change in fuel economy over that time period would be used to forecast baseline fuel economy during the Phase I time frame. Alternatively, if technical and economic data were available to forecast technology penetration rates, then that could provide a more robust baseline than simple extrapolation of historic trends.

For Phase II of the standards (starting in January 2008 for new models, and January 2009 for continuing models), measurement of the fuel economy of cars manufactured under Phase I of the standards and measurements of annual distance traveled would define the project baseline. If

Phase I standards achieve 100% compliance, then this approach would be the same as using the standards as the baseline efficiency level, but this dynamic approach will ensure that the baseline reflects real-world performance.

When Phase III of the standards are promulgated, measurement of the passenger vehicles manufactured under Phase II of the standards plus measurements of annual driving would define the baseline for that time period.

It will be important to consider how other government policies, such as fuel taxes or vehicle labeling, affect baseline emissions levels. If locally credible data on how changes in fuel prices affect consumer vehicle purchase behavior, then such elasticities could be used to adjust the baseline accordingly. Alternatively, and more simply, a fuel tax increase could be included as one of the program elements and its independent impacts would not need to be accounted for. In conjunction with fuel economy standards a fuel tax increase could reduce annual distance traveled and could encourage consumers to purchase smaller, more efficient vehicles.

If government policies make vehicle ownership and driving more affordable and convenient (e.g., through road capacity expansion), then annual driving per vehicle may increase. In this case, calculated annual GHG savings would increase as annual VKT increased, even though total GHG emissions are higher. To control for this potential leakage, annual VKT used in calculating GHG reductions could be capped at pre-project levels. For example if average annual driving for passenger cars was 12,000 km in 2005, but increased to 14,000 km in 2008, then the savings calculation would be based on only the first 12,000 km. This idea clearly needs further exploration.

V.B.2.iv Monitoring & Verification

Annual emissions would be calculated from data on new car purchases, measurements of new car efficiency (l/100 km) and measurement of annual distance traveled for all 16 weight classes of new cars.

Efficiency. The efficiency of new vehicles would be measured using well defined test procedures. The China Automotive Technology and Research Centre (CATARC) currently handles vehicle testing for China. It will be important to assess that the test methodology and drive cycles accurately reflect real world driving conditions, or are adjusted to reflect any discrepancies. A statistically valid sample of new vehicles in each of the 16 weight classes would need to be measured to determine compliance with the standard, and to calculate actual new car efficiency by class. Assuming a 10 year crediting period, periodic measurement of on-road fuel economy would be necessary to assess whether there is any degradation in fuel economy over time; GHG calculations would need to be adjusted accordingly. While degradation has been a concern for air pollutant control equipment, fuel economy degradation has not been a significant concern. But with new technologies coming into play and the uncertainty of driver behavior it is an appropriate issue to assess.

Annual Driving. A survey instrument would need to be developed to accurately sample the annual VKT for new vehicles and to assess how annual VKT decreases over time. There may be data collection instruments that collect odometer data for other purposes (taxes, insurance) that

could be used in this context. It will be important to assess whether these annual VKT measurements need to occur separately for all 16 weight classes of passenger vehicles. It is likely that annual VKT could be tracked by two or three clusters of weight classes and reduce monitoring costs without sacrificing accuracy. Certainly taxis would require there own category as they have much higher annual VKT levels.

V.B.2.v Additionality

Phases I and II of the standards were promulgated after 2001 (and Phase III is under development) and are therefore excluded from the baseline forecast. China seems to have pursued these strategies primarily for energy security reasons, but that does not change the fact that they will have a major impact on GHG emissions. The implementation of these standards will result in additional GHG reductions beyond BAU market trends.

V.B.2.vi Crediting period

The crediting period should reflect vehicle lifetime, typically 10-15 years. This would need to be assessed for China. A 10-year crediting period is probably appropriate.

V.B.2.vii Double counting

Perhaps some consumers would have purchased more efficient vehicles even if the standards were not promulgated, but this would be difficult to assess. Moreover, it is unclear if the market would actually provide sufficient high efficiency vehicles to meet such demand. A high quality baseline can partially address this issue: including business-as-usual efficiency improvements into the baseline (x% annual improvement) would capture expected consumer uptake of more efficient vehicles.

V.B.3 *Conclusions*

If China were to put forward this approach as a CDM project under the "program of activities" CDM a key issue would be to distinguish what is the policy and what are the "program of activities" which implement the program. The Montreal decision is clear that the policy per se can not be considered a CDM project, so presumably some program to implement the Chinese vehicle efficiency standard would need to be spelled out. If high quality measurement of on-road efficiency and annual VKT is not feasible, then perhaps conservative estimation techniques and/or default values could be used, and the final savings discounted. It appears that Chinese fuel economy standards will result in significant GHG reductions and represent a major effort on the part of the country.

V.C Mexican Renewable Energy Program

Total power capacity in Mexico in December 2003 was almost 50,000 MWs, which generated 203,555 GWh in 2003. The vast majority—44,554 MWs—is state owned employed in providing public service electricity. The power sector is based predominantly on fossil fuels. Of the electricity produced for public service, primary energy sources (hydro, geothermal, wind, and nuclear) accounted for 11,935 MW of generation in 2003, while 32,620 MW were based on fossil fuels (gas, fuel oil and coal).

Article 27 of the Mexican Constitution states that it is the nation's obligation to supply electric energy as a public service. As a result, the state currently predominates in the power sector. In 2003, the National Electricity Commission (CFE) generated 74 percent of all electricity, while Luz y Fuerza del Centro (LFC)—both state owned—accounted for an additional 2 percent. Independent producers (13.6 percent), self-supply producers (6.3 percent), co-generation (2.9) and other uses explained the rest of total capacity. Furthermore, legal requirements force the predominant utility to buy electricity at the lowest cost, which is interpreted as the short run marginal cost of the last dispatched unit, usually a combined cycle gas turbine.

The Mexican congress is currently considering a Law Initiative for the Use of Renewable Sources of Energy (LAFRE), with a suite of incentives for renewable energy. It calls for the creation of a Program for the Use of Renewable Energy Sources of Energy with a suite of incentives for renewable energy, and establishes a goal to have 8% of total energy generation in 2012 from renewable energy (not including large hydroelectric plants). The Secretaria de Energia (SENER) will develop and coordinate the program implementation. The initiative would combine a suite of incentives and federal taxes to produce the desired level of renewable energy generation. It would seek to accumulate around 600 million pesos per year (aprox. 55 million USD; at 2005 value) to achieve the goal. Incentives would include a set of Policies and Measures (P&M) to promote renewable Energies (RE):

- Providing a new federal tax regime for fossils fuels, to feed the carbon fund.[28]
- Accepting electricity from renewable energy sources provided to the National Energy System, at any time it is produced.
- Providing capacity credits and interconnection incentives[29]
- Reflecting operation costs avoided by the suppliers through the operation of the generation projects.
- Other activities, including policy support, technology standards, and Multilateral contributions can be included or operate in tandem with the fund.

Resources will be channeled into a trust fund to support both different categories of projects, i.e. mature, rural, and emergent technologies (both electrical and others), as well as research.[30]

[28]This tax intends that fossil fuels pay a right based on the Carbon Dioxide (CO_2) emitted during their combustion, penalizing their consumption under "the polluter pays principle". For liquid fuels, it proposes rights of 0.52¢ to 0.97¢ peso per liter and a greater tax for solid fuels. For natural gas, it proposes rights of 19.7¢ of weight per thousand cubic feet. Income generated will be destined to the promotion of RE. Additional contributions form other domestic and international sources can also feed the fund.

[29] In the past, Mexican RE regulation did not recognize electric peak hour generation capacity provided to the National Electric System. However, as of January 2005, the Energy Regulatory Commission (CRE) approved modifications to the Interconnection contract model to determine self-supplied capacity calculations. This is the average of the mean capacities in the Interconnection Point presented in the 12 measurement intervals included within the hour of maximum demand for all the working days of the considered month. The resulting self-supplied capacity can be credited to reduce charges for billable demand within the consumption centers of those requesting the permits. Additionally, electricity exchanges currently done through short term total cost will be done through variable electricity tariffs, increasing transparency when determining the amount of energy that the holder of a permit exchanges with his partners.

[30] These would include a "Green Fund", to foster the use of mature RE (55%), (electrical applications), a rural electrification fund (10%), a biofuels fund (7%) an emergent technologies fund for electrical applications (6%) • an

Projects to be considered include those within the Comisión Federal de Electricidad's (CFE) expansion plans, a part from which shall be small scale projects (< 30 MW), other small scale renewables not included in the CFE's expansion plans, self supply renewable projects, and projects in isolated rural communities.

V.C.1 *Program Description*

Project activities under programs advanced by this law could be considered to fall within the Montreal rules. However, it is important at this stage to note that the Law Initiative has not been approved by the Senate, tax credits have not been passed by the Finance Ministry and the Congress, and Energy Policy has not been changed. Therefore, the analysis is based upon the assumption that the Law passes as it is currently structured and other factors such as the tax incentives are provided as envisioned.

It is clear from decisions of the EB (EB16 and EB22) and Montreal (UNFCCC, 2005a), that the renewable law cannot be considered a CDM project. The same would apply to any SENER led program establishing a number of policies or measures that reduce emissions. We consider the project as a group of activities under the programs developed by the law's policies. The root of this distinction lies in the environmental integrity principle of the convention, and in the interest of the delegates in insuring its observance through effective, rather than announced, CDM project activity. Thus, what would be credited are specific project activities executed with the support of the set of policies and measures included in the law. Projects would include for instance those supported by the fund within CFE's expansion as well as by private project developers, and projects in isolated rural communities.

V.C.2 *Methodological Requirement*

For the project activities included within the different programs adopted as a part of the Mexican Renewable Law to be considered within a single CDM project, it would have to be designed to meet the methodological requirements of the CDM. The following section discusses how each methodological requirement of the CDM could be addressed for such a project.

V.C.2.i **Boundary**

In theory, the boundary for the renewable generation resulting from the law initiative could be considered using a single boundary that covered all the renewable generation made possible by the program of activities resulting from the law initiative. Activities resulting from the law initiative could be grouped within program categories (i.e., large scale renewables, rural electrification, off grid and non electric, etc.) and registered as project activities within any of the programs under the law, so that a single baseline and monitoring methodology could be used for the specific project under each program. More specifically, projects could be grouped to use baseline and methodologies developed individually for sets of activities created within each of the components of the fund itself (i.e. a sub-program or line of activities in large scale, small scale or Rural renewable energy, for instance). Each of these would follow a common set of

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emergent and general Technologies Fund (for electrical 6% and non electrical 7% applications) and 15% for a Research and Technological Development Fund.

baseline determination and methodology application. For example, projects within the Ventosa area in the Tehuantepec isthmus could be grouped as a single program and urban landfill projects in major urban areas (e.g., Monterey, Acapulco, Guadalajara) another program.

V.C.2.ii Leakage

Leakage issues related to this "program of activities" project are not likely to be different from those in other renewable generation CDM projects. As such, this project is likely to address leakage through a similar approach as in approved methodologies for renewable projects. The approved methodologies for renewable projects stipulate that project participants do not need to consider emissions from power plant construction, fuel handling, and land inundation in their methodology (UNFCCC, 2005c; UNFCCC, 2006).

V.C.2.iii Baseline

The baselines would employ as an ultimate basis the past historical performance (i.e., emissions and efficiency) of the national power system and consider the displaced emissions according to specific methodologies to assess emission reduction for each category, thus reducing project transaction costs within each. The baselines would not discount the impact of the policies and measures (as these do not move the baseline) per EB22 decision. Rather, reductions from the baseline would account for those policies and measures that were effectively implemented through the renewables program of activities.

The baseline for categories of project activities supported by the program which are grid connected could be easily assessed. Mexico has an interconnected electric system which has employed a central national planning scheme, based on 10 year prospective studies (i.e., "prospectivas") that provide a basis for an examination of the potential evolution of the system and an official baseline. Furthermore, dispatch is centrally coordinated and the mix of fossil fuel plants that are displaced—at different regions and time schedules—can be clearly examined using an analysis of the technologies being dispatched within the system on a daily and seasonal basis. While regional and temporal differences can be taken into account, a standard national methodology can be developed as a basis for each category to make a clear case of the technologies being displaced.

However, it should be noted that the prospectivas themselves could not be considered the baselines for two reasons:

(i) They are a declaration of purpose, rather than the actual implementation of policy. In fact, to deliver the result suggested in the prospectivas, it requires not only the decision of the Ministry of Energy in Mexico—which generates the baseline—but also the decision of several other ministries—which in turn can foster or hinder the achievement of the goals included within the prospectivas.

(ii) They seldom, therefore, provide an exact or in several occasions approximate prediction of the future. Rather, they are typically an indication of policy intent. For this same reason, supporting the baseline within the prospectiva is likely not to be useful for developing a baseline for the projects since it could result in either a lower or over calculation of CERs generated from the project depending on whether the prospectiva

over or under estimates the amount of fossil generation in the future. Further, using the prospective as the basis could provide an incentive for gaming as the regulators could hypothetically adjust the prospective to meet their CDM purposes.

V.C.2.iv Monitoring & Verification

Project activities would be monitored by considering the effective reductions in the sites that are ultimately included in the project boundary for each of the categories of activities included in the program. Thus, monitoring would be closely linked to the ex-ante project activities within each of the categories of the program and be based upon the types of project activities resulting from the program. Different monitoring methodologies could be used to address the various types of activities (e.g., large grid connected renewables and rural electrification) induced by the program of activities. A number of monitoring methodologies for the various categories of renewables that would be induced by the law initiative have been approved by the EB, so the project could potentially use one of the methodologies or draw largely from these approaches.

V.C.2.v Additionality

The projects would be additional to what would have happened considering the past historical performance of the National Interconnected system as a whole. Thus, the impact of the policies and measures of the project (i.e, those described under the program description above) would be considered an additional effort.

V.C.2.vi Crediting period

The crediting period would be linked to the actual activities implemented, rather than to the program itself. Therefore, appropriate crediting periods would be chosen for each project activity instead of a single crediting period for the entire program. The Executive Board or COP/MOP could consider crediting periods for different vintages of project activities during the duration of the program, and in all cases during the agreed terms of the specific project activities approved under the program.

V.C.2.vii Double counting

Ownership of the CERs could be vested either within the program (at the Fund itself) or with the project developers. However, they could not be considered by both for obvious double counting reasons. Including the CERs within the Fund would allow for redistribution/recycling of CER revenues to either provide extra incentive or to address sustainable development issues) and extend its live in the same percentage in which they are developed.

If project activities in areas similar to those under the program scope (Large scale RE, Rural electrification, or others) are actually implemented but do not receive program support, I believe they could nevertheless account for the reduction. However, this development is unlikely, as a) the system is interconnected, b) transmission is unavoidable for most projects. However, off grid projects and/or other non electric projects could still use the program baseline as a proxy for baseline, and cash in the resulting CERs. It could be argued that these would be produced as an indirect impact of the Program's P&Ms.

V.C.3 *Conclusions*

These approaches would continue to operate within standard CDM rules with project activities effectively implemented at the corer of the proposal. However, the differences lie in the facilitation of the proposal. By employing a common baseline and methodology and account for the impacts of P&M within the reductions, rather than the baseline, they would diminishing transaction costs, avoid perverse incentives, and provide incentives for government action.

VI. Conclusions

As outlined in Article 12 of the Kyoto Protocol and elaborated in the Marrakech Accords, the CDM is defined as a *project*-based mechanism. Defining what actually constitutes a project has been the subject of considerable debate, with some defining it as narrowly as a single emission activity while others argue that a project could include policies, sectoral policies, or programs. The recent decision at COP/MOP1 to allow a "program of activities" as a CDM project activity has opened up the debate on latter definition of a project by allowing government or private sector programs to be considered as a single CDM project.

The literal interpretation of a "program of activities" CDM, however, is still an open question as the EB has yet to offer any further guidance and several definitions in the Decision have no definitive definition. That said, what we do know is that project activities under a program of activities can be registered as a single CDM project activity provided that they meet the methodological and other requirements of project-based CDM projects. Depending on the diversity of the project activities under the program — e.g., in regards to its temporal, spatial, and sectoral composition — structuring a "program of activities" CDM that fits within the current CDM framework could be quite complex or it could be rather straightforward.

This paper explored the methodological implications of a "program of activities CDM" project through three case studies in two important sectors in the CDM market—renewable energy and transportation—which some have hoped would gain a stronger foothold in the CDM through the "program of activities" CDM decision. These case studies explored the potential of the "program of activity" CDM to enable broader transportation and renewable energy projects to be considered CDM projects. These case studies highlight that a "one size fits all" approach to such factors as boundaries, baselines, and additionality is not likely since their implementation will likely vary between different projects. This implies that an EB decision on how "program of activities" CDM projects will have to address these factors will either not be extremely detailed since their application may vary across the range of projects or the EB will not issue guidance at all. The latter seems the most likely.

For project developers to move forward in implementing these types of projects or others under the "program of activities" decision, there are several factors that the EB and project developers will need to grapple with.

Definitions. It might not be necessary to develop an agreed definition for the new terms created in the "program of activities" decision—policy, standard, and programme of activities—since an implicit working definition might be assumed. However, to provide greater clarity on the differences between these terms—since some are explicitly not allowed to count as CDM

projects—developing clear definitions could help add greater clarity and avoid more confusion as these types of projects are brought forward to the EB. In particular:

- If the government creates a goal to meet a certain amount of its electricity generation from renewables and creates an incentive program to help meet that goal, would the incentive program clearly be considered a "program of activities" and therefore be allowed or would it be considered the policy/standard and not be allowed? This is a threshold question since if the answer is "not allowed" the Montreal Decision is fundamentally meaningless. For our purposes in this paper, we assume that the Montreal Decision was meant to be a change so such activities would be allowed.

Boundary. It seems possible to design a boundary for a single CDM project that incorporates a number of similar emissions reduction activities which have enough similarity that they could utilize the same approach for assessing baselines, monitoring and verification, and additionality. For example, various wind farms that are developed as a result of a program could be grouped into a single CDM project. However, a number of boundary questions could benefit from greater clarity, including the following.

- Can different types of projects (e.g., industrial energy efficiency in cement, iron and steel, and pulp and paper) be developed as a single CDM project and thus utilize a single PDD or could only projects in the same sets of activity (e.g., technology) use a single methodology and be considered in a single PDD?
- Can a program have a multi-national boundary or would such a program require CDM projects and the resulting methodologies to be developed for each country?

While the general project boundary (e.g., wind farms resulting from the CDM project) for "program of activities" CDM projects could be defined, the definition of the specific locations and facilities where the reductions will occur for specific CDM projects may be impossible or more difficult to define upfront since the number and location of the specific project activities (e.g., wind farms) that result from the "program of activities" is likely to be unknown with perfect certainty at program is initiation. Some precedents in current approved CDM projects may make this a moot point since these projects used ex-post determination of the specific facilities in defining its boundary. However, confusion could be avoided by providing greater clarity on the following.

- Do the specific facilities/sites that will be generating CERs have to be defined upfront or can they be defined ex-post as they evolve over the life of the CDM project? For example, a project could be either required to define the boundary as 10 specific facilities or at all facilities intentionally impacted by the program.

Leakage. All CDM projects—whether they be at a single site or multiple sites—will need to account for leakage. It does not appear that there are any special requirements for "program of activities" CDM projects to address leakage, but certain types of projects proposed as a result of this decision (e.g., appliance efficiency programs) may have to address leakage in a more complex manner than at a single site since these types of projects may have a large number of replaced activities to track (e.g., old appliances). Leakage could arguably be minimized in some types of "program of activities" CDM projects since a larger number of facilities would be included in the boundary and thus directly accounted. However, leakage may be a bigger issue under relatively large "program of activities" CDM projects since a potentially large number of

activities may be pushed outside the project boundary. Since leakage is a very case-by-case issue that is unique to each type of CDM project, "program of activities" CDM projects would need to prove that leakage is addressed in a manner specific to the types of projects resulting from the program.

- Are there any special leakage requirements for a "program of activities" CDM project or will leakage need to be addressed in the same manner as for single site projects?

Baselines. Baseline determination for a "program of activities" CDM type project would likely be conducted using the same approaches as for current CDM projects. For example, the Mexican Renewable Law considered in the case study would likely follow a similar approach as used in approved methodologies for renewable projects at single sites and use a single methodology for each project activity.

- Would a single common baseline for the entire program be considered rigorous enough or would the baseline need to be developed and proven for each individual emissions reduction activity resulting from the program?

For a program that group different types of projects, such as energy efficiency in direct fuel combustion in cement, iron and steel, and pulp and paper, it would not be feasible to develop a single baseline methodology which accurately accounted for emissions and reductions in these diverse sectors. Therefore, such a project would likely require a different baseline methodology for each specific activity.

- While such an approach has been used in at least one approved CDM methodology, is this an acceptable approach or would project developers only be allowed to group projects which could use similar methodologies?

Monitoring: A top-down approach where monitoring is conducted at the program level, seems to be the most reasonable approach for "program of activities" CDM project types. While complex, setting a monitoring plan at the project activity level with many small sources of emissions may be even more arduous. For example, if a country institutes an appliance efficiency program, the tracking of the potentially thousands of older model appliances as they are replaced could be quite arduous.

- In cases such as this, it may make sense to use small-scale precedents, e.g., by allowing monitoring across the program through sampling methodologies instead of monitoring each individual project activity. Is this an acceptable approach for a "program of activities" CDM with many small sources of emissions? Or could default values be used for these small sources?

Additionality: Given the desire by Parties to streamline and improve the efficiency of the CDM process it seems reasonable that a "program of activities" CDM project might only need to demonstrate additionality once for the program—by showing that any emissions reductions that are likely to be generated by the project would not have happened without the CDM project—instead of for each individual project activity.

- Can additionality be proven only once—at the program level—or would it also need to be done for each individual project activity?
- How to address free riders? Can this be done by discounting?

The "program of activities" CDM has the potential to provide positive incentives for developing countries to adopt government policies/standards/goals and develop specific programs to implement and achieve the objectives set forth in the policies/standards/goals. There are a diversity of views on the implications of this decision for such factors as boundary, leakage, baselines, monitoring and additionality. Whether the "program of activities" CDM decision will enable a broader set of emissions reduction activities to be considered CDM projects or only sent a positive "clarifying" signal that they are eligible, greater clarity on several aspects could help avoid this issue being bounced back and forth between the Meth Panel, EB, and COP.

Crediting Period: While a "program of activities" CDM project activity could easily fit within this existing crediting framework, the length of the crediting period could be an issue for projects which are implemented over different timeframes. Therefore, the key crediting period issues for determining how to implement the Montreal Decision are as follows.

- If the specific projects activities (e.g., windfarms) resulting from the program are implemented during different timeframes, can these projects have different crediting periods?
- If so, does the project as a whole (e.g., all the implemented windfarms) have a maximum crediting period as spelled out in the Marrakesh Accords or do those limits only apply to the specific project activities (e.g., each individual windfarm)?

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