Study on

PROGRAMMATIC CDM PROJECT ACTIVITIES: ELIGIBILITY, METHODOLOGICAL REQUIREMENTS AND IMPLEMENTATION

Prepared for the
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Team Leader

Christiana Figueres
Tel. 202-294-4898
christiana@figueresonline.com

Team Members:

Econergy International Corp.
Margaree Consultants Inc.

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Abstract

A programmatic project activity is a CDM project activity where the emission reductions are achieved by multiple actions executed over time as a result of a government measure or a private sector initiative. This type of project activity should be eligible for the commitment period 2008-2012 under the current regulatory framework of the CDM, as long as the relevant methodological requirements are met. Programmatic project activities can use current approaches to boundary definition, leakage and double counting. Parameters that require an adjustment to current methodological practices include: baseline selection and additionality assessment. The Executive Board should provide appropriate methodological guidance for the submission of programmatic project activities as soon as possible.

1. Introduction

A few years after its modalities and procedures were defined in the Marrakech Accords, the Clean Development Mechanism (CDM) is now fully operational and has received support from countries worldwide. On the institutional side, all countries in Latin America and almost all in Asia have an established, or are in the process of establishing, a Designated National Authority (DNA), the national institutional framework necessary for participation in the CDM. Concrete efforts are underway to help establish DNAs in several African countries. In just a short time the CDM has raised global awareness of climate change issues, and has fostered the emergence of a rich body of learning in many developing countries.

From the perspective of the market, there is no doubt that the level of project-based emission reduction transactions is growing. In 2004, 107 million metric tons of CO_2 equivalent were purchased from CDM and JI projects, a 38% increase relative to 2003 (IETA and World Bank, 2005). Projections show that 2005 transactions will be an estimated 20% to 30% higher than in 2004. Recent increases in prices suggest that demand for CERs could be outpacing supply, and in response, national project portfolios are growing exponentially. In just the two weeks from October 18 to November 3, 2005, the CDM pipeline increased from 325 to 406 projects.[1] The market just recently passed a key milestone with the issuance of the first CDM Certified Emission Reductions – the trading 'currency' of the CDM.

And yet, despite the awareness, institutional preparedness and increased market activity, the CDM is far from delivering its full potential. Observers and analysts have pointed out that thus far, the CDM is having virtually no effect on the decarbonization of national economies, a key factor in the sustainability of growth in developing countries. While many factors are at play with respect to the impact of the CDM on GHG emissions in developing countries, the current single project approach is unlikely to catalyze the profound and lasting changes that are necessary in the overall GHG intensities of developing countries' economies. As policies and measures can have a significant impact on infrastructures and investments, this study proposes expanding the scope of the CDM to include "programmatic" CDM project activities during the first

[1] CD4CDM website updated November 3, 2005.

Kyoto commitment period 2008-2012 within the constraints of the existing CDM regulatory framework. This would strengthen the CDM in the short term without requiring re-negotiation of the basic architecture of the Protocol.

Programmatic project activities are the result of a government measure or private sector initiative. They are most promising in the areas of energy efficiency, fossil fuel switching and the use of renewable energies, particularly in private households, small enterprises and transportation, where technology improvements do not usually take place on their own but typically require the impetus of a deliberate program. In fact, the World Energy Outlook 2004 estimates that energy efficiency could account for 67% of the energy-related emission reductions attainable through policies and measures currently under consideration in developing countries (IEA 2004: 379). Yet this opportunity has not been captured by the CDM. Emission reduction activities in these areas are often dispersed, have high transaction costs and relatively low credit flows. Thus out of the 406 projects in the UNFCCC CDM pipeline, 14 fossil fuel switch and 40 energy efficiency projects (industry and household) represent only 0.8% and 1.6% respectively of the annual CERs on the market.[2] A CDM that allows a programmatic approach to these efforts could create the incentive for many countries to implement energy efficiency policies and measures sooner, with the corresponding positive impact on GHG emission trends.

This study first establishes the rationale for including programmatic project activities. The study then reviews the literature that has appeared over the past three years calling for a sectoral approach to mitigation, building on that literature to define what is meant by "programmatic project activities" and enumerate their main characteristics. The study assesses the eligibility and identifies the methodological issues involved in programmatic CDM by analyzing the existing regulatory framework and the current project pipeline, and concludes that programmatic project activities are eligible under the CDM and do not face any insurmountable methodological challenges for their immediate implementation.

2. The Need for Programmatic CDM

The Parties to the Kyoto Protocol created the CDM to help reduce the cost of meeting Annex I emission targets and to assist developing countries in achieving sustainable development and contributing to the stabilization of GHG concentrations in the atmosphere. If current trends persist, the CDM may only minimally meet this last goal.

The CDM is regrettably not having much of an effect on the quality of development in developing countries. From a climate perspective, achieving sustainable development in developing countries means decarbonizing their economies. In theory, the CDM could provide a much needed incentive and price signal to implement GHG-friendly actions. This incentive is particularly needed in the energy sector as energy-related emissions account for 66% of developing country emissions (CAIT 3.0, WRI).[3] Moreover, two thirds of the future increase (up to 2030) in global energy-related emissions is expected to come from developing countries (IEA, 2004). For developing countries reliant on imported fossil fuels, gradually decreasing the carbon intensity of

[2]Calculated based on CD4CDM website updated November 3, 2005.
[3] Excluding land use change and forestry emissions. CAIT 3.0, World Resources Institute

increased energy production through enhanced energy efficiency, deployment of cleaner energy technologies and development of renewable energy generation, is a critical step toward lower GHG emissions and sustainability.

Energy is a critical contributor to global warming, and hence energy also has to be part of the solution, including via the CDM. However, energy is underrepresented in the CDM. Only one tenth of current CDM reductions come from electricity generation based on renewables, and less than 2% can be attributed to energy efficiency measures.[4] The low global warming potential of CO_2, the long lead times of electricity projects, and above all the dispersed nature, small credit flows and high transaction costs of energy efficiency projects have made energy projects comparatively less attractive in the CDM market.

Not only are there few energy projects in the CDM, but most of these projects tend to be individual efforts at a "carbon upgrade" within the limited boundary of a single facility or enterprise, and thus have little to no transformational effect. While such a project may well improve the GHG intensity of the facility, it makes little contribution – if it is the only of its kind implemented - to decarbonizing production or consumption patterns. Unless the impact of the CDM can go beyond stand-alone project activities and be used to spur broad climate-friendly policies and measures, the CDM will not promote the much-needed transformation in the energy trends of developing countries (Figueres, 2005).

This paper offers a broader interpretation of a "CDM project activity", as one that embraces both single projects as well as government measures and private sector initiatives, the latter grouped here under the term "programs". The paper proposes a programmatic approach that would provide a real incentive for developing countries to enact policies and measures that make relevant sectors (energy, industry, transportation, etc.) less carbon intensive over time, thus successfully mainstreaming climate considerations into their economic growth.

The paper gives special attention to fossil fuel switching and energy efficiency, areas where clean technology deployment does not typically occur on an individual basis but rather as the result of an intentional program. Programmatic CDM project activities in these two areas can broaden the scope of the CDM to include households, small industry and transportation, sectors currently underrepresented in the CDM pipeline.

The current single-project approach will continue to be appropriate for some countries and sectors, and should therefore not be abandoned. Programmatic project activities complement the current single-project practice. The proposal is in line with a growing body of literature on the need for a sectoral approach to mitigation.

3. Review of the literature

There is growing consensus on the need for broad-based mitigation. The 2004 World Energy Outlook published by the International Energy Agency warns that "if governments stick with the policies in force as of mid-2004, the world's energy needs will be almost 60% higher in 2030 than they are now, with well over two thirds of the

[4] CD4CDM website updated November 3, 2005

projected increase in emissions coming from developing countries". However, under an Alternative Policy Scenario global energy trends could improve markedly "if countries around the world were to implement a *set of policies and measures* (emphasis added) that they are currently considering or might reasonably be expected to adopt." (IEA, 2004).

The need for broad, climate-friendly policies and measures has introduced the topic of sectoral approaches to mitigation. However, since the concept is still relatively new, the terms "sectoral" and "policy-based" have been used interchangeably and in several different contexts.

Starting with the broadest context, sectoral concepts are being considered for the general architecture of the international regime after 2012. Here the discussion is whether the sectoral approach should apply to the evolution of the entire regime or only to developing countries. Bosi and Ellis (2005) present the benefits of a possible sectoral focus to the entire future climate regime. They present three types of sectoral crediting mechanisms (policy-based crediting, fixed sectoral emission limits, and rate-based or indexed crediting), without ascribing any one of them to either Annex I or non-Annex I. In light of the findings of the World Energy Outlook, the sectoral approach appears to have the potential to encourage all countries to adopt climate-friendly policies, thereby reducing the GHG intensity of new investments. By contrast, Schmidt (2005) applies the sectoral lens specifically to the participation of developing countries in the future regime. Schmidt presents five options that range along a continuum of stringency with respect to possible future commitments for developing countries: fixed emission limits (absolute or growth-based), dynamic emission limits, benchmarks, sector policy-based credit generation and harmonized policies and measures.

A more specific context for the sectoral approach is the post-2012 structure of the CDM. Here the assumption is that a CDM-like mechanism for developing countries can play an important role in the future regime, if its scope can be expanded. The first call for a sectoral approach was Samaniego and Figueres (2002), focusing on government policies. "Under the Sectoral CDM, developing countries would be encouraged to develop regional, sectoral, sub-sectoral, or cross-sectoral projects, which would be the result of specific sustainable development policies, measuring the attained reductions, and selling those on the international emission reduction market." Bodansky et al (2004) expand the concept of the sectoral CDM to include both public and private sector measures. They introduce the term "programmatic crediting mechanism" as one that would certify reductions "resulting from a broad range of governmental or private efforts not linked to commitments. Qualifying efforts could be sectoral or territorial, and be undertaken by some combination of public and private actors."

Most recently, the discussion has shifted from the nature of the post-2012 CDM to the operation of the CDM during the 2008-2012 commitment period. Figueres (2005) analyzes how voluntary GHG-reducing public sector policies could be included in the current CDM, spurring decarbonization processes in developing countries and raising the volume of CERs on the market without renegotiating the basic architecture of the regime. Cosbey et al (2005) and Sterk and Wittneben (2005) support the position and include both government policies and private sector initiatives. While they both use

the term "policy-based" for government policies, Cosbey calls private sector initiatives "sectoral", and Sterk and Wittneben refer to them as "clustered".

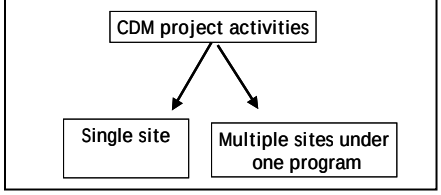
This paper builds on all previous efforts to construct an incentive for stronger participation of developing countries. Like the most recent literature, the authors see both the need for, and the possibility of, including programmatic CDM project activities in the 2008-2012 commitment period. The paper adopts the term "programmatic project activities" as inclusive of both public measures and private initiatives, and examines the viability of their short-term implementation within the existing regulatory framework.

4. Characterization of Programmatic CDM project activities

Article 12 of the Kyoto Protocol defines the CDM as a mechanism based on "project activities". A "project activity" can be an individual investment or action implemented in one clearly delineated geographical location, such as the construction of a wind farm or an efficiency retrofit in a specific industrial plant. Most current CDM project activities are of this nature.

However, CDM project activities can also be programmatic, where emission reductions are achieved not by one single investment, but rather by multiple actions executed over time as the result of a government measure or a voluntary program. Thus, a programmatic CDM project activity could involve energy efficiency standards for residential construction, an incentive or regulation for the conversion of LPG water heaters to solar heaters, or an electric utility enacting a demand side management (DSM) program.

Fig.1 Types of CDM project activities

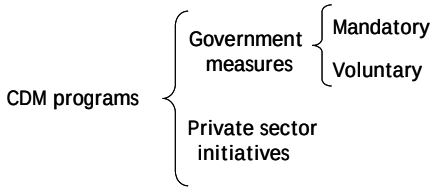


Characteristics

The core characteristics of programmatic CDM project activities are:

1- They occur as the result of a deliberate program. The program can be a public sector measure, either voluntary or mandatory. Examples could include a public soft loan program for energy efficiency, or mandatory performance standards for industrial motors. The program could also be a private sector initiative, such as the voluntary adoption or advocacy of technology standards, private promotion of improved wood stoves, or the sponsoring of a more efficient alternative to burnt clay bricks. The primary objective of the measure or program need not be the reduction of greenhouse gas emissions.

Fig. 2 Types of CDM programs



2- The program results in a multitude of dispersed actions. The program uses incentives or regulations to induce GHG reducing actions at multiple sites that would not occur but for the enactment of the program.

3- The GHG reducing actions do not necessarily occur at the same time. Although all actions respond to the same program, they can occur either simultaneously, or throughout the life of the program.

4- The type, the size and the timing of the emission reducing actions induced by the program may not be known at the time of project registration. However, the types and sizes of the expected actions have to be identifiable ex ante, attributable to the program, and verifiable by sources and activities ex post.
5- While GHG reducing actions can be implemented by one or more entities, the program has one enacting agent, responsible for providing the incentives or obligations to stimulate individual actions under the program, typically using (a part of) the CDM revenues to finance those incentive schemes or the implementation cost of mandatory measures. The enacting agent must be one of the "project participants" deciding on the distribution of CERs, and must be authorized by the Party to participate in the CDM. The nature of the enacting agent can be as varied as a public sector institution, a non-governmental organization, a private sector company, or a financial institution.
6- In programmatic CDM, the program is the project. The mitigation actions that are induced by the program do not constitute individual projects in and of themselves. However, it is the effect of these actions that must be measured, using approved baseline and monitoring methodologies, to ascertain the actual reduction achieved by the overall project.
7- The programmatic project activity is submitted to validation and registration through one single Project Design Document.

5. Analysis of eligibility and methodological requirements

The regulatory framework of the CDM is constituted in the first instance by the multilaterally agreed Kyoto Protocol and Marrakech Accords, and secondly by decisions of the Executive Board based on recommendations of the Meth Panel. Over the past two years, the Executive Board has received submissions of new baseline and monitoring methodologies that are programmatic in nature or that use considerations related to national policies. The EB has given attention to the emerging issues related to national policies in CDM baseline scenario development, as well as to other relevant issues that may have an impact on programmatic CDM project activities.

This section first assesses the eligibility of programmatic CDM, and then identifies the methodological challenges and potential requirements for CDM programmatic project activities. The analysis is performed on the basis of both the regulatory framework and the UNFCCC project pipeline.

The consulting team analyzed the following material, related to the regulatory framework:

- Kyoto Protocol
- Marrakech Accords
- PDD format
- Relevant decisions of the CDM Executive Board at its meetings 16,17,19, 20 and 21 (recounted in Annex A of this study)
- Relevant reports of the Methodologies Panel from its meetings 15,16 and 18 (recounted in Annex B)
- Recommendations and decisions on relevant proposed new baseline and monitoring methodologies (summarized in Annex C)

The consulting team also reviewed the existing UNFCCC project pipeline, selecting 13 project activities that highlight the issues inherent in the programmatic approach as described in Section 4 of this paper. The 13 project activities reviewed are:

Small scale category:

- Kuyasa energy upgrade project activity - The program aims to improve the thermal performance, lighting and water heating efficiency of existing and future housing units in Kuyasa, South Africa. The City of Cape Town is the project participant, and will serve as the project's coordinating body. The installation of the technologies will be undertaken by a number of small contractors who will serve as the implementing parties. This project activity has been registered. The methodologies applied are AMS-I.C, AMS-II.C and AMS-II.E
- Photovoltaic kits in Morocco - The project activity will provide photovoltaic kits to a minimum of 101,500 rural households throughout Morocco. The primary project participant and coordinating body will be l'Office Nationale de L'Electricité (ONE), a public entity. Private companies will act as implementing bodies, and be responsible for ensuring that the installed systems are reliable. This project activity is under validation. The methodology applied is AMS-I.A.
- Biogas sector partnership in Nepal - The Biogas Sector Partnership (BSP) aims to sell and install 6,500 small biogas digesters to households located in 53 rural districts in Nepal. Nepal's Alternative Energy Promotion Center (AEPC), a government body, will be responsible for coordinating the program by designing and promoting the biogas policy. BSP-Nepal, a registered NGO, will play the intermediary role and implement the biogas plants in close cooperation with the AEPC. BSP will rely on around 40 companies to sell plants through their 200 branches located in various parts of the country. This project activity is a small component of the comprehensive Nepal Biogas project activity that includes a total of 200,000 biodigesters and will be submitted to the EB through more than 30 separate PDDs. This particular project activity is under validation. The methodology applied is AMS-I.C.
- Bagepalli CDM biogas program in India - The project activity will replace the commonly used and inefficient wood-fired mud stoves with 5,500 clean, sustainable and efficient biogas units in individual households. The project activity will be coordinated by Women for Sustainable Development (WSD), a registered NGO. This project activity is under validation. The methodology applied is AMS-I.C.
- CDM solar cooker project in Aceh, Indonesia - The project activity strives to transfer and disseminate the most technologically advanced solar cookers in households and small-scale fishery plants throughout two districts. The coordinating body is Klimaschutz e.V., of Germany. PT Petromat Agrotech, a private business specializing in solar home and agricultural systems and agricultural engineering, will be responsible for project administration and monitoring. This project activity is under validation. The methodology applied is AMS-I.C.
- Marketing of Low-Cost Irrigation Devices in Bihar and Uttar Pradesh, India – The project activity involves the facilitation of marketing 20,000 low-cost irrigation devices in rural areas, the primary target market including farm families currently employing rain-dependent farming techniques or diesel

pumpsets. The coordinating body will be International Development Enterprises India (IDE-I), and the project will be implemented by treadle pump manufacturers in the affected areas. The project activity is under validation. The methodology applied is AMS-I-B.

- Biomass Heating and Energy Conservation/GHG Emission Reduction in Moldova (3 projects) – The project aims to improve energy efficiency and implement fuel switching in the heating networks of a series of public buildings. Moldova's Carbon Finance Unit will be the coordinating body, and the installation of the technologies will be implemented by the Ministry of Education, the Ministry of Health, and local municipal authorities. The project is under validation. The methodologies applied are AMS-I.C-II.E-III.B.

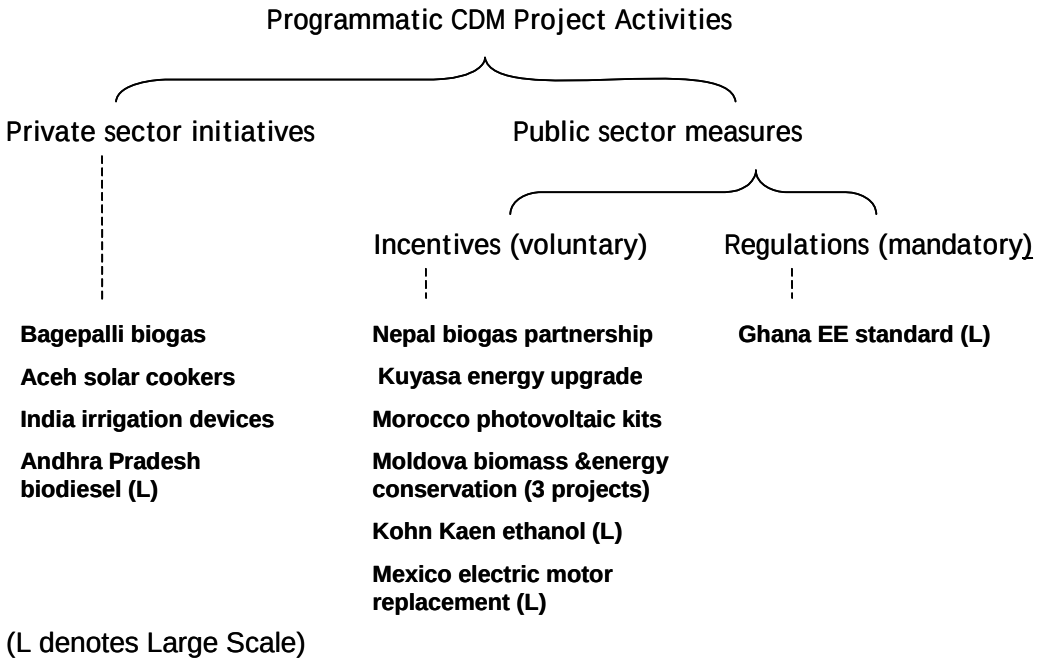
Large-scale category:

- Energy efficiency standard in Ghana - The project developers will work with the Government of Ghana to develop and implement a mandatory Energy Efficiency Standard for Room Air Conditioners throughout the entire country. By implementing the standard, the Government will force air conditioner suppliers to remove the most inefficient units from the market, and consumers will have no choice but to purchase more efficient models and thus lead directly to electricity savings. The Ghana Energy Foundation, Ghana Standards Board, and Ghana DNA have all been listed as project participants, and will be responsible for coordinating the program. The methodology that would be applied to this project activity is under consideration (NM0072).
- Electric motor replacement in Mexico - The project activity offers financial incentives to large energy users so that they replace inefficient motors with new, high-efficiency motors that meet the standards of the seal issued by the public-sector agency "Fideicomiso para el Ahorro de Energía Eléctrica" (FIDE). FIDE is the project sponsor and coordinating body. The methodology that would have been applied to this project activity was not approved for reasons not linked to its programmatic nature (NM0100).
- Fuel Ethanol Project in Khon Kaen, Thailand – The project activity involves the production of anhydrous ethanol from sugar cane molasses, which will be blended with gasoline and used in transportation. The coordinating body is the Government of Thailand, who will provide tax incentives to bio-ethanol producers. Ethanol production will take place at the Khon Kaen Alcohol Company and from there be distributed into the transportation sector. The proposed new methodology that would be applied to this project activity is to be reconsidered (NM082-rev).
- Fuel-switching from petrol-diesel to bio-diesel project in Andhra Pradesh, India - The project activity will manufacture bio-diesel from oils derived from various natural sources, and substitute this bio-diesel for, or blend with petro-diesel. Southern Online Bio Technologies, Ltd., a private-sector entity, is the project participant and coordinating entity. The proposed new methodology that would be applied to this project activity is to be reconsidered (NM0108).

The projects were selected to be representative of the possible types of programmatic project activities. Figure 3 classifies these programmatic project activities according to their type: public sector voluntary or mandatory, and private sector. Table A

summarizes the main characteristics of the selected project activities. A one-page description of each selected project is included in Annex D to this paper.

Fig. 3 Classification of reviewed project activities



(L denotes Large Scale)

Table A. Selected Project Activities.

Project activity	*Type of Activity*	*Enacting agent*	*tCO_2e (p.a. 2008-2012)**	*Methodology*	*Status*
Kuyasa Energy Upgrade Project (S.A.)	Renewable energy and energy efficiency	Public	7,000	AMS-I.C. AMS-II.C. AMS-II.E.	Project is registered
Photovoltaic Kits (Morocco)	Renewable energy	Public	39,500	AMS-I.A.	Validation public comments Sep./Oct. 2005
Biogas Sector Partnership (Nepal)	Renewable energy	Public	31,000	AMS-I.C.	Validation public comments Sep./Oct. 2005
Bagepalli CDM Biogas Program (India)	Renewable energy	Private	27,000	AMS-I.C.	Registration requested
CDM Solar cooker Project (Aceh, Indonesia)	Renewable energy	Private	3,500	AMS-I.C.	Validation public comments July/Aug. 2005
Marketing of Low-Cost Irrigation Devices (India)	Energy efficiency	Private	10,000	AMS-I.B.	Validation/public comments Oct./Nov. 2005
Biomass Heating and Energy Conservation: 3 Projects (Moldova)	Energy efficiency; Fossil fuel switch	Public	47,000	AMS-I.C.-II.E.-III.B.	Validation/public comments Sept./Oct. 2005
Energy-Efficiency Standard (Ghana)	Energy efficiency	Public	435,000	Proposed new methodology NM0072	Methodology on hold awaiting decision by EB on the eligibility of policies as CDM project activities
Electric Motor Replacement (Mexico)	Energy efficiency	Public	81,000	Proposed new methodology NM 100; incorporates ACM0002	Methodology not approved
Khon Kaen Fuel Ethanol Project (Thailand)	Renewable energy; Fuel switching	Public	46,000	Proposed new methodology NM82-rev.	Methodology re-submitted as per Meth Panel recommendation; current version under consideration
TPD Bio-diesel Project (Andhra Pradesh, India)	Renewable energy; Fuel switching	Private	26,000	Proposed new methodology NM108	Methodology to be reconsidered subject to changes reflecting comments by MP

* Figures for annual tCO_2e generated are drawn from the CD4CDM pipeline, as presented in the November 3, 2005 version.

As can be observed, most of the programmatic project activities currently in the pipeline involve the deployment of small-scale renewable energy and energy efficiency technologies in households, businesses and industrial facilities, and represent social and economic support to rural and poor populations. These actions would not be performed as single-site project activities, as they need a promoting program in order for the to occur. Frequently, the projects operate over relatively long project lifetimes, creating the potential for substantial and long-term emissions reductions.

5.1 Eligibility

The Kyoto Protocol and Marrakech Accords do not provide a list of eligible "project activities". Since the CDM has been implemented as a bottom-up mechanism and responds to submissions of proposed methodologies and proposed project activities, programmatic project activities should be presumed to be eligible if they meet all of the requirements for CDM project activities.

- Programmatic CDM project activities appear to be consistent with the purpose of the CDM. Article 12.2 of the Kyoto Protocol states that "*the purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3."*
- Programmatic CDM project activities implemented by governments and private entities appear to meet the requirements of Article 12.9 of the Kyoto Protocol: participation in CDM project activities "*may involve private and/or public entities.*" The EB has defined a project participant in the CDM glossary as *"(a) a Party involved, or (b) a private and/or public entity authorized by a Party involved to participate in a CDM project activity."*
- Programmatic CDM project activities appear to meet the definition of a "project activity" as defined by the EB in the CDM glossary: *"a measure* (emphasis added), *operation or an action that aims at reducing GHG emissions… A project activity could be a component/aspect of a project undertaken/planned."*
- Several decisions by the EB have approved CDM project activities that involve multiple emission reduction actions so this characteristic of programmatic CDM should not make them ineligible. The Board has agreed that small-scale CDM project activities may be bundled. The Board has registered project activities for methane capture from swine manure and for hydroelectric generation that involve multiple locations.

It thus appears that programmatic project activities meet all of the regulatory requirements for CDM project activities. In addition, the EB has considered proposed new methodologies that correspond to programmatic project activities:

- The Board has not emitted a final decision on NM108 (voluntary fuel switch in the transport sector), and it has considered, but has not yet been able to agree on, the eligibility of a project activity to implement mandatory appliance efficiency standards in Ghana (NM0072). The reasons why some Board

members are hesitant to rule on the eligibility of methodologies, such as NM0072 based on government policies, are not public.[5]

- Although the Meth Panel recommended that NM0100, replacement of industrial motors in Mexico - another voluntary public sector programmatic project activity - not be approved, the Panel identified as strengths of the proposed methodology that it *"builds on approved methodologies and is applicable to whole programmes of dispersed equipment rather than large stand alone projects, extending the scope of the CDM"* and that *"the program approach seems well thought out"* (emphases added).[6]

Eligibility is further confirmed by the EB's consideration of project activities that have been submitted with approved methodologies and have clear programmatic characteristics:

- The EB has approved and registered the Kuyasa energy upgrade project activity, a voluntary public sector small-scale programmatic project activity. Approved methodology AMS-II.C, demand-side energy efficiency programs for specific technologies, is deemed by the Board to be appropriate for "*programmes that encourage the adoption of energy-efficient equipment, lamps, ballasts, refrigerators, motors, fans, air conditioners, appliances, etc. at many sites."*
- One voluntary private sector programmatic project activity (Bagepalli biogas) has passed the validation stage and has requested registration.
- Three voluntary private sector programmatic project activities (Aceh solar cookers, Andhra Pradesh biodiesel and India irrigation devices project) are currently in validation.
- Six voluntary public sector programmatic project activities (Nepal biogas, Morocco photovoltaic kits, Khon Kaen ethanol, three Moldova projects) are currently in validation.

The consultant team concludes that programmatic project activities meet all of the requirements for CDM project activities. Having no impediments, they should be eligible as CDM project activities during the 2008-2012 commitment period. The consulting team further concludes that the EB has indicated a willingness to consider programmatic project activities based on voluntary programs, in both the private and the public sector. Only the eligibility of programmatic project activities based on mandatory government policies remains under consideration by the Executive Board. However, this study suggests that there is no regulatory impediment to the eligibility of programmatic project activities based on mandatory policies, as long as they fulfill the basic methodological requirements discussed below.

5.2 Methodological issues

Programmatic project activities are not substantially different from other CDM project activities, but they do encompass a greater number of variables that present

[5] The Board's lack of agreement on the "eligibility" of methodologies based on government policies may be related to its ongoing, but as yet unfinished, work on how to account for relevant national and/or sectoral policies and circumstances in the establishment of baselines. This issue is discussed further below.

[6] CDM: Proposed New Methodology Meth Panel recommendation to the Executive Board, F-CDM-NM0100: "Electric motor replacement program in Mexico", 14 - 17 June 2005, p. 10.

additional methodological challenges with respect to the usual single-site projects. Programmatic project activities operate on two levels (the program and the induced actions) introducing greater difficulty for baseline selection and additionality assessment. The fact that the induced actions may not be of the same type, size or even implemented at the same time, could offer complexity to boundary and baseline definition, to monitoring practices, and to the assessment of the appropriate crediting period for such GHG reducing actions. With many players involved in one program, the risk of double counting could be magnified. The analysis of the 13 selected project activities focuses on these key methodological and technical issues that must be addressed in the context of programmatic CDM project activities.

It should be noted that although these project activities have evident programmatic characteristics, the absence of methodological guidance for the deliberate submission of programmatic project activities has forced project proponents to try to fit these broader scope mitigation efforts into single-site methodological provisions. Some unfortunate distortions occur and are discussed below.

a. Project boundary. For a programmatic project activity the program boundary is the geographic region and/or set of entities where the energy efficiency, fuel switching, or other emission reducing actions are expected to be implemented. Even though the location of the induced actions may not be known at the outset, the boundary of a programmatic project activity can be delineated ex ante and considered fixed for the duration of the crediting period. The exact locations where actual emission reductions occur over time can be determined ex post and constitute the project boundary, as in other CDM project activities. If the programmatic project activity uses an approved methodology that does not include appropriate boundary definitions for multi-site project activities, section B4 of the PDD should introduce the necessary boundary definitions.

Both NM0072, the room air conditioner standard for Ghana, and NM0100, the industrial motor replacement program for Mexico, define the program boundary ex ante. In each instance, the exact number of participants or their precise location (plant name and location, household address) cannot be determined in advance. The specific locations of the room air conditioners and motors is not important, only that they be supplied by the national electricity grid. The Meth Panel deemed this approach appropriate in its recommendations for NM0100. The Meth Panel has not yet prepared a recommendation on NM0072. The project boundary for NM0108, production of biodiesel in India, is defined in a manner similar to that for a single-site CDM project activity.[7] In this project, the plant location is specified, though by definition the vehicles that use the fuel are not fixed, nor is their exact number known. The definition of the project boundary does not seem to be a methodological challenge for programmatic project activities.

b. Leakage. Leakage is the net change of GHG emissions outside the project boundary that is measurable and attributable to the CDM project activity. A CDM project

[7] The project boundary was defined as including the oil seed plantation, the biodiesel production facility, the biodiesel users, and the vehicles transporting the feedstock and biodiesel. The Meth Panel recommendation indicated that the proposed coverage of GHG emissions within the project boundary was incomplete.

activity must estimate the associated leakage and deduct the net increase from the emission reductions achieved within the project boundary.

The sources of leakage depend upon the nature of the project activity. This is the case for programmatic project activities as well. Programmatic project activities covering an entire country could induce emission increases (or reductions) outside that country. It is generally assumed that reducing the sales of less efficient equipment leads to an equivalent reduction in the production of inefficient models.[8] However, it is possible for manufacturers to reduce the prices of inefficient models and sell more in other countries, or that the market for more efficient models expands beyond the country's borders. The occurrence of such scenarios would be very difficult to determine. If they were in fact to occur, it would not be feasible to measure and attribute the higher emissions in one country due to a programmatic CDM project activity in another country, so the higher emissions would not be considered leakage.

NM0072 states that there would be no leakage for the mandatory efficiency standard for room air conditioners. NM0100 would disable the inefficient motors replaced to eliminate this source of potential leakage. It identifies free riders as a potential source of leakage but argues that the magnitude is negligible because the program addresses older, inefficient motors still in use a decade after the existence of minimum efficiency standards. The Meth Panel considers this treatment inadequate. NM0108 proposes that leakage due to the production of biodiesel includes methane emissions from upstream methanol production and CO_2 emissions from harvesting of oil-bearing seeds. The Meth Panel considers this treatment inadequate and offers suggestions to address the problems identified.[9]

Among the projects submitted with approved methodologies, leakage does not appear to be much of an issue. The only two cases where leakage appears to receive detailed consideration are that of the Andhra Pradesh biodiesel project and the Bagepalli biogas program. In the case of the Bagepalli project, the validation report states that since CH_4 and N_2O emissions in the baseline are not counted for reasons of conservativeness; they are likely to be larger than any potential unintended CH_4 emissions from the project. The adopted approach is deemed conservative and appropriate.

c. Baseline. The baseline methodology for a CDM project activity must include a stepwise approach justifying the selection of the most plausible baseline scenario from the possible alternatives. The project participants must identify plausible and credible alternatives to the proposed project activity and then select the most plausible alternative as the baseline scenario.

[8] Participants in some energy efficiency programs use some of the money saved for a higher level of service; for example, customers that purchase more efficient air conditioners may choose a lower temperature or may operate the air conditioner more. This is called the "rebound", "take back" or "feedback" effect. If the project boundary is defined as the energy using equipment, the rebound effect for that equipment occurs within the project boundary and so would not be leakage.

[9] The Meth Panel recommendation notes that the methane emissions associated with methanol production are negligible and could be ignored and consideration of CO_2 emissions from harvesting of oil-bearing seeds does not make sense, as the plants are only grown due to the project activity.

Programmatic project activities operate at two levels: the level of the program, and the level of the induced actions. In selecting a baseline scenario, a two-level approach must be used, establishing the baseline for both the program and the induced actions according to approved baseline methodologies. The plausible and credible alternatives to a proposed voluntary initiative or mandatory measure will depend upon the specific circumstances, but as discussed below, the conceptual approaches to defining the alternatives are similar to those for a single-site CDM project activity.

(i) Voluntary programs: For a voluntary program offered by a private entity, a baseline scenario without the program would be credible as one of the baseline alternatives unless the entity was subject to a requirement to offer such a program. The requirement could be a law or regulation or an obligation imposed by a regulatory body, such as a requirement that a utility offer energy efficiency or fuel switching programs. As discussed below, a law or regulation could be a programmatic project activity for the relevant government agency even if one or more private entities are to implement the actions specified.

Treatment of National and/or Sectoral Policies in a Baseline Scenario

Stakeholders have observed that the CDM can act as an unintended and perverse incentive for countries to delay climate friendly policies in order to not jeopardize the additionality of potential CDM projects. Recognizing this issue, the Executive Board agreed to "Clarifications on the treatment of national and/or sectoral policies and regulations in determining a baseline scenario" at its 16th meeting (EB 16, Annex 3). It agreed that the following four types of national and/or sectoral policies will be treated differently in determining a baseline scenario:

(a) **Type E+**: Existing national and/or sectoral policies or regulations that give comparative advantages to more emissions-intensive technologies or fuels.
(b) **Type E-**: 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).
(c) **Type L-**: Sectoral mandatory regulations adopted by a local or national public authority motivated by the reduction of negative local environmental externalities and/or energy conservation which would incidentally reduce GHG emissions.
(d) **Type L+**: Sectoral mandatory regulations adopted by a local or national public authority motivated by the reduction of negative local environmental externalities which incidentally prevent the adoption/diffusion of less GHG emitting technology.

The Board agreed that Type E+ policies implemented since 11 December 1997 and Type E- policies adopted since 11 November 2001 may not be taken into account in developing a baseline scenario. In other words, the baseline scenario should refer to a hypothetical situation without those policies or regulations. This decision solves the perverse incentive problem and reassures developing countries that CDM project activities will not be penalized due to the adoption of climate-friendly policies and regulations (and cannot benefit from counteracting the impacts of policies that increase emissions).

The Board has yet to agree on how to consider mandatory sectoral policies or regulations of types L+ and L- when developing a baseline scenario.

As indicated in the text box, the Board has begun to consider how to treat national and/or sectoral policies in baseline scenarios for project activities. It has decided that voluntary policies that promote less emissions-intensive technologies implemented since 11 November 2001 need not be part of the baseline scenario for a CDM project

activity. Consistent with this decision, one possible baseline for a programmatic project activity involving a voluntary program implemented after 11 November 2001 could be defined as the policies in effect prior to that date.[10]

In the voluntary projects reviewed, baselines were prepared at the program level only, since there is no methodological guidance requesting anything different. The project activities use models and survey data to measure the impact of the program as a whole in terms of generating emissions reductions. The Kuyasa energy upgrade and Nepal biogas partnership are both public sector voluntary programs. In neither case is the government's program is part of the baseline. The Bagepalli biogas, Aceh solar cookers and India biodiesel represent private sector voluntary programs. In all three cases the program is not included in the baseline. This approach to the treatment of voluntary programs in the baseline is consistent with the EB's decision on the matter, and reinforces the notion that the program is the project.

NM0132 is not programmatic in nature, but it is instrumental in highlighting the case of an incentive as a measure. The methodology proposes a way to calculate the emission reductions due to switching from heavy fuel oil to natural gas at a cement plant in Egypt. The cement plant receives a financial contribution toward the cost of switching to natural gas from the local gas distribution company under a program offered by the Egyptian Natural Gas Holding Company. The Meth Panel, at its 18th meeting, recommended that NM0132 be consolidated in approved methodology AM0008, "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility". Thus at its next meeting the Board will decide on the principle of a CDM project activity based on an incentive. If it accepts this possibility, a proposed baseline methodology will be recommended by the Meth Panel. Those decisions would provide valuable guidance for the development of a baseline methodology for a financial incentive offered by a private entity, and by extension, for a voluntary programmatic project activity based on a financial incentive.

(ii) Mandatory policies. As discussed in the text box, the Executive Board has not yet agreed on how to treat mandatory sectoral policies when developing a baseline scenario for a regular CDM project activity. This leaves a methodological vacuum for both single-site and programmatic project activities that are based on mandatory policies or measures (e.g., NM0072, mandatory energy efficiency standards for room air conditioners in Ghana), and that need guidance on the consideration of these policies in the baseline.

The apparent inconsistency between a mandatory policy and the voluntary nature of the CDM may be a concern. It is important to understand that participation in a CDM project activity is voluntary for each Party involved (Article 12.5(a) of the Kyoto Protocol). There is no requirement in the Protocol or the Marrakech Accords for participation by legal entities to be voluntary. A programmatic project activity, therefore, could involve a policy or measure voluntarily adopted by a national government that imposes mandatory regulations on legal entities. Only the national

[10] The Board's current decision does not specify the period for which the baseline scenario would reflect the pre-11 November 2001 policies. At some point a different baseline scenario is likely to be considered more realistic. This is an issue for regular CDM project activities as well as programmatic activities.

government would be the project participant for such a programmatic project activity. The legal entities implementing the mandatory regulations could not register these as CDM project activities, since that would invite double counting.

In the case of the Mexico industrial motors project, a mandatory efficiency standard has been in effect for ten years, but it only covers new motors at the time of sale, and thus does not apply to motors already in operation at the time the standard was implemented. The proposed programmatic CDM project would create a distinct, voluntary incentive program to accelerate equipment turnover and expand the number of efficient motors in operation. Therefore, the project baseline includes the ten-year-old mandatory standard that under business-as-usual conditions would result in emissions reductions through turnover at a slower rate than that delineated under the proposed project, which provides a financial incentive for large energy users to replace inefficient motors at a faster pace. The voluntary incentive program is not part of the baseline in this case.

Similarly, in the case of the Morocco solar PV project, a voluntary program targeting remote rural communities is distinct from the existing national electrification program (arguably a mandatory measure), and is therefore not included in the baseline, because it is evident that the electrification program cannot reasonably include these communities. In the absence of electrification, these communities would use diesel generators in mini-grids.

In the Ghana project, the mandatory energy efficiency standard for air conditioners would be a new initiative, the implementation of which would be entirely dependent on the creation of a national testing laboratory funded by CERs. Therefore, project proponents argue against including the standard in the baseline, which is based on the operation of air conditioners at typical efficiency levels and reflects the gradual improvement in average efficiency over time through the natural diffusion of more efficient equipment in the marketplace due to changes in the specifications of the equipment offered on the market. Accordingly, the mandatory efficiency standard is not considered part of the baseline in this instance.

As noted in several instances, in the case of programmatic CDM "the program is the project". The project activities reviewed illustrate this feature. In the Mexico project, the voluntary incentive program is excluded from the baseline because it is distinct from the mandatory policy, and addresses a lacuna in it.[11] The mandatory policy is included in the baseline as a result. In contrast, in the Ghana project the mandatory policy is excluded from the baseline because the relevant baseline is the business-as-usual scenario without the policy.

The project documents reviewed illustrate how the baseline analysis often addresses the interplay between the program, once implemented, and the end-user behavior by taking into account suppressed demand and rebound effects, for example. Some complexity is added to the analysis, to be sure, but this does not render the exercise impossible. Indeed, the Kuyasa project employs modeling to develop the baseline assuming no suppressed demand for energy services. Other proposed projects, such as

[11] Indeed, it would be impractical for FIDE to make the efficiency standard retroactively binding on all owners of industrial motors.

the Morocco solar-PV project and the Ghana efficiency standard, include similar analyses.

Since project implementation produces a material shift in the supply-demand balance, leading to a change in end-user behavior, the business-as-usual dimension of the baseline must be adjusted from a simple projection of emissions based on current trends to one that reflects emissions arising from use of the business-as-usual technology at levels of demand observed during project implementation. To make ex ante judgments as to what that demand would be requires modeling based on empirical data. For example, in the Ghana energy-efficiency standard project, the project proponents argue that project implementation will not lead to higher air conditioner prices that would in turn depress sales, thereby complicating the determination of emission reductions. Data are available to demonstrate that higher-efficiency units do not cost more than the lower efficiency units already on the market.

However, similar programs presented for other sectors may well face the possibility that the data do suggest an impact on demand. This highlights the need for project proponents to assess all the emissions impacts from some programmatic activities, and the possibility that programmatic CDM will tend to require more substantial documentation to justify a given project's additionality argument and baseline calculations.

(iii) Baselines for the emission reduction actions. The emission reductions stem from the actions induced and implemented as a result of the program. To calculate the emission reductions achieved by a programmatic activity it is often necessary to have a baseline for the actions implemented. If the actions induced by one program are of different type, each type must use an appropriate approved baseline and monitoring methodology. The baseline(s) for the actions would reflect the baseline for the program. For example, if the baseline for the program is business as usual, the baseline(s) for the emission reduction(s) is business as usual.

Since virtually all of the programmatic projects and methodologies to date adopt business as usual as the baseline for the program, this is also the baseline for the emission reduction actions. The Mexico methodology assumes that the existing motors would be used for the remainder of their operating lives. The Ghana air conditioner standard assumes that average performance would improve gradually reflecting the change in the mix of models available on the market. In Morocco the alternative to solar PV panels is assumed to be power supplied by diesel generators. The baseline for the India biodiesel project is continued use of petro diesel, while the baselines for the Nepal and Indian biogas programs and the Aceh solar cooker project is typical current practice within their respective project boundaries.

(iv) Determination of plausible alternatives. In the case of a proposed voluntary program, not offering a program is usually a plausible alternative, but it is not automatically the baseline scenario. A no program scenario would correspond to maintaining the existing policies and measures and corresponds to paragraph 48(a) of the Annex to Decision 17/CP.7 "existing actual or historical emissions." It is also consistent with the Board's decision relating to the treatment of voluntary policies in the development of a baseline scenario. It may be economically attractive for a legal

entity to offer a voluntary measure: an energy efficiency program may be less costly for an electric utility than adding new generation capacity, for example. Then a plausible alternative would be a program that represents an economically attractive course of action for the entity, which is equivalent to paragraph 48(b) of the Annex to Decision 17/CP.7.[12]

In the case of the plausible alternative scenarios for a mandatory policy adopted by a national government, one can again refer to the concepts reflected in paragraph 48 of decision 17/CP.7. Selecting a specified date, such as 11 November 2001, as the basis for deciding would be one option, and it would be consistent with the Board's decision relating to the treatment of voluntary policies. Other plausible scenarios include specification of a policy or measure that represents an economically attractive course of action taking into account implementation barriers and the policies of other countries in similar social, economic, environmental and technological circumstances.

If a CDM project activity displaces electricity in one location with suppressed demand or supply constraints, total electricity use may change in comparison to the without project case. The Executive Board has agreed that such conditions affect the method of calculating the emission reductions due to the electricity displaced. Specifically, the Board has agreed that the "build margin" is the appropriate method to determine the emissions coefficient for a grid with suppressed demand or supply constraints. These considerations would apply to programmatic project activities as well.

In summary, credible and plausible alternatives can be identified for a proposed programmatic project activity whether the project activity is a voluntary program implemented by a legal entity or government, or a mandatory policy implemented by a government. The alternatives would, like those for current CDM project activities, reflect the conceptual approaches specified in paragraph 48 of the Annex to Decision 17/CP.7. The baseline for the emission reduction actions implemented would reflect the baseline defined for the program.

As can be expected, in many of the project activities reviewed, especially those involving rural renewable energy programs, the alternatives identified are quite straightforward and based on an assessment of the limited options facing inhabitants in those countries. In the case of Ghana, Aceh, and Kuyasa, for instance, the only alternative is the business-as-usual case. In the case of the Mexico efficient motor program, the plausible alternative presented is likewise business-as-usual. Given the existence of a mandatory efficiency standard, however, this suggestion was viewed by the Meth Panel as being inadequate.

d. Additionality. For a project to be "additional", the project participants must demonstrate that the proposed CDM project activity is not the baseline. The Executive Board has developed an optional additionality tool that allows project participants to demonstrate additionality by showing that:

- The proposed project activity is economically or financially less attractive than other alternatives without the revenue from the sale of certified emission reductions (CERs); and/or

[12] There could also be situations where paragraph 48(c) is used to define one or more plausible alternatives.

- The proposed project activity faces barriers that prevent its implementation but do not prevent the implementation of at least one of the alternatives.

Satisfactory demonstration of additionality is one of the most difficult challenges for proposed CDM project activities.

In the case of programmatic project activities, additionality must be determined for the program and for the induced actions using the addionality tool or other approved means. The current approach to determining additionality in single-site project activities is applicable to programmatic project activities at the program level. A voluntary program or mandatory policy might be financially or economically less attractive than other alternatives or face barriers that prevent its implementation. NM0072, the room air conditioner standard for Ghana, for example, argues that a mandatory standard requires a local testing facility, which currently does not exist, and could only be established with the revenue from the sale of the CERs. NM0100, the industrial motor replacement program for Mexico, argues that the incentive offered by the proposed program is needed to induce industrial participants to replace existing inefficient motors before the end of their operational lives. NM0108, production of biodiesel in India, argues it would be additional because it would be the first facility to produce biodiesel in India.

However, the additionality of a voluntary initiative or mandatory regulation may not be sufficient to guarantee that all emission reduction actions implemented are additional. Three situations are possible:

- The emission reduction actions implemented are by their nature additional. For example, if there is only one biodiesel production facility, as in NM0108, and it is demonstrated to be additional, then it should not be necessary to demonstrate that all biodiesel use is additional. Similarly, if the mandatory room air conditioner efficiency standard is additional, the additionality is reflected in the difference between the average efficiency before and after the standard is implemented.
- The individual emission reduction actions are large and some may not be additional. Then the additionality of each action implemented under the program could be assessed. A voluntary program to encourage fuel switching at industrial facilities is a possible example.
- The individual emission reduction actions are small and some may not be additional. In this case, participation needs to be restricted so that the actions are likely to be additional and the monitoring methodology must estimate the emission reductions due to "free riders". For example, the Mexico motor replacement program, NM0100, proposes to exclude very old motors because they would likely be replaced soon in any event.

In summary, a programmatic project activity would need to demonstrate the additionality of the program in a manner similar to that for current CDM project activities. In addition, a programmatic project activity would need to indicate how it would address the additionality of the actions under the program. The additionality of the induced actions could be assessed individually if the actions are large in size and small in number, or through a combination of eligibility conditions and estimation of free riders if the actions are small in size and many in number.

The projects evaluated include several project activities that involve many end users. As can be reasonably expected in the absence of methodological guidance, in some cases additionality was assessed at both levels, such as for the Bagepalli biogas program. Others cases, such as the Ghana and Mexico project activities, determined additionality only at the program level, while yet another set of cases (such as Aceh) assessed the issue only at the end user level. It would appear that programs with high social benefits would likely incorporate reference to additionality at the end-user level in a generic way based on survey data and information about standard practices. Those project activities involving a handful of large industrial and commercial end-users, on the other hand, tend to seek programmatic design features to determine additionality at the program level only.

In both the Ghana and Mexico energy efficiency programs, the promoter argues that without the CDM they would not implement the project. However, concerns about free-ridership are cited as justification for additional project features intended to demonstrate additionality more clearly. The design features to eliminate free-riding include specific requirements for equipment age in the case of the Mexico electric motor program, for example. In its objections to NM100, the Meth Panel noted that the assumptions regarding motor efficiency, remaining motor life and operating hours necessary for demonstrating additionality and calculating the baseline were not documented, and indicated that a classification of the motors into different subgroups with relevant assumptions for each parameter would be needed. Such information would have to be based on survey data used to generate economy-wide estimates.[13]

e. Free riders. For certain voluntary initives or mandatory measures, it is possible that some of the individual actions implemented might not be additional even if the programmatic project activity is demonstrated to be additional. For such measures, participation requirements can be designed to increase the probability of these actions being deemed additional. Nevertheless, some of the energy efficiency or fuel switching actions implemented under the programmatic project activity might have been implemented in the absence of the program. The entities implementing those actions are called "free riders". Free riding emission reductions do not represent an emission reduction by the program since those actions would have been implemented in any case.

The emission reductions by free riders can be estimated using a control group, econometric methods, participant surveys, review of documents in business decision processes, payback comparisons, and engineering modeling.[14] Not all of the approaches are suitable for a given program, and the approaches differ with respect to their cost and the accuracy of their estimates. The fact that participants are not known in advance also complicates the choice of methods.[15] A programmatic project activity would need to specify the proposed approach used to estimate the emission reductions created by free riders as part of the proposed baseline and monitoring

[13] See F-CDM-NMmp ver04-NM100 (4 February 2005).
[14] TecMarket Works Framework team, 2004, pp. 133-146.
[15] A control group appears to be the most accurate way to estimate free riders. However, establishing a control group ex ante and excluding them from the benefits of participating in the program raises philosophical issues. As well, the ex ante control group may not be representative of the actual participants. A control group selected ex post from non-participants may be unrepresentative due to adverse selection bias; the behavior of non-participants may not be representative of that of participants.

methodology. One of the criticisms of proposed methodology NM0100, the industrial motor replacement program for Mexico, was that it did not address free riders.

Free riders are not a concern for all programmatic project activities. By comparing the average efficiency of room air conditioners before and after implementation of the mandatory standard, NM0072 would capture the impact of free riders.[16] Since the biodiesel plant using methodology NM0108 would be the first in India, there would be no free riders. A program to install a costly technology, such as solar power panels, could safely assume that the number installed in the absence of the program would be negligible.

In the projects reviewed, free riding does not receive much consideration. In the case of the smaller projects, where the project sponsors assert that additionality is clear because of the poverty and limited access of poor communities to sustainable energy technologies, free-riding is by definition a non-issue, since no one in the community would have the resources or access to undertake an activity of the sort being promoted without the support of the program. In effect, free-ridership is impossible given the characteristics of the project.

In the Ghana energy efficiency standard case, free-ridership is conceivably an issue, in the sense that a Ghanaian household may decide to purchase a more efficient air conditioner outside of the normal channels provided by distributors. However, it seems hard to imagine how this might happen except in an isolated instance. The project proponents argue that without the standard, no one would buy more efficient equipment. It would appear that this assertion could be tested through a random sampling of distributors, a survey instrument, or through government data (which may be of uncertain reliability, however). This type of information could be requested in the project documentation.

Similarly, the Mexico efficient motor project attempts to address the free-ridership issue by limiting certain industries' access to the program based on motor manufacture dates. The Meth Panel objected, among other things, to the reliability of the information available on equipment age and capacity. However, it seems that this limitation, complemented by presentation of data from an inventory of such motors (which was not presented in the project documentation), could well be sufficient to address these concerns.

A programmatic project activity would need to demonstrate that free riders are not an issue or include appropriate provisions in the monitoring methodology to estimate free ridership.

f. Double counting. In the case of many projects involving a technology that reduces GHG emissions, the producers, intermediaries (wholesalers, retailers, utilities, etc.) and consumers alike could all claim it is their particular action that reduces the emissions. Thus, there is a risk of double or triple counting emission reductions. Project types where this risk exists include:

[16] Assuming that the proportion of customers that buy air conditioners that are more efficient than the minimum standard does not change as a result of the standard, the impact of their purchases is reflected in the average efficiency prior to implementation of the standard.

- Production/supply/sale/consumption of blended cement;
- Production/supply/sale/consumption of biofuels for transport;
- Production/supply/sale/use of energy-efficient equipment.

It is clear from the Kyoto Protocol and the Marrakech Accords that CERs should be issued only for emission reductions that are additional to any that would occur in the absence of the project activity. But neither the Kyoto Protocol nor the Marrakech Accords indicate how to prevent double counting. The Meth Panel, in the report of its 18th meeting, has requested guidance from the Executive Board on how to address double counting in the methodologies for such project types.[17]

The Meth Panel report notes that the Executive Board has approved baseline/monitoring methodologies for the production of blended cement and for the use of energy-efficient equipment that do not address the issue of potential double counting. The issue is raised in two methodologies involving the production and sale of biofuels for use in the transport sector currently under assessment by the Meth Panel. These methodologies suggest different means to avoid potential double counting.

NM0082-rev, the Khon Kaen fuel ethanol project in Thailand, proposes that project proponents must obtain written confirmation from the host country's Designated National Authority (DNA) stating that it is willing and able to ensure that no fuel switch projects are approved that use the bio-ethanol produced by the project activity. NM0129, which involves production of sunflower methyl-ester biodiesel in Thailand,[18] proposes that in a particular host country only biofuel production projects or biofuel consumption projects would be eligible to generate CERs. This would be determined by the type of project registered first.

NM0108, which was not approved, proposes to prevent double counting and ownership disputes relating to emission reductions from the biodiesel produced by entering into agreements with the biodiesel purchasers. The fuel dealers, trucking companies, railways and other biodiesel purchasers would agree not to claim CERs for the emission reductions, and the project proponent would use the "additional revenue" from the sale of CERs to subsidize the sale price of the biodiesel fuel. The Meth Panel sees this to be potentially problematic if more CDM project activities that produce the same type of bio-fuel are developed in India. The proposed strategy is also considered problematic as no methodology for monitoring compliance with the agreements is offered. If specific monitoring procedures were implemented to verify compliance within the agreements, however, the arrangement would appear to be a sound way of avoiding double counting of CER credits. The Meth Panel's concern over future biofuel projects seems to address non-programmatic, single-site projects. For example, a plant switching from fossil fuel consumption to biofuel consumption in its day-to-day operations would be the de facto owner of CER credits generated by the project, and would thus receive any revenues generated by these credits.

[17] See Annex 6 to the report of the 18th meeting of the Meth Panel: http://cdm.unfccc.int/Panels/meth/Meth18_repan6_Double_counting_final.pdf

[18] The consultant team determined that this project did not meet with all the criteria for a programmatic project activity. Should the project proponents choose to develop certain aspects of the project more fully, it is possible that it might be considered a programmatic CDM project.

The above proposals suggest three basic approaches to reducing the risk of double counting:

- Developing agreements between the project participants and all other potential claimants of the emission reductions resolving ownership of CERs, and undertaking not to claim the reductions. There is still a risk that some of the other claimants may request CERs for some of the emission reductions. This possibility would need to be checked by the DOE or by some other means.
- Requiring the DNA (national government) to ensure that the project activities it approves do not create a risk of double counting. Written confirmation of this undertaking could be an explicit requirement for registration of relevant project activities. There would still be a risk of a DNA not identifying and excluding all of the potential instances of double counting. In the case of project activities where a public agency is a project participant, potential double counting must be checked by the DOE.
- Specifying the project activities to which an approved methodology would apply so as to prevent double counting. For example, the approved biofuel production methodology could state that it could be used only if there is no biofuel distribution or consumption project activity in the country with complementary provisions in the approved methodologies for biofuel distribution and consumption. Then approval of a proposed project activity by the DNA would indicate the host government's preferred project type.

In programmatic project activities, emission reductions achieved at the action level must contribute to the emission reduction level of the overall program. Certified emission reductions can only be claimed by the project participants at the program level. In the case of several implementing entities potentially interested in ownership of the CERs, the project participants may have agreements with other potential claimants indicating that they cede their claims to the project participants in exchange for a share of the CERs issued or the value equivalent. That agreement could be either a separate agreement or it could be reflected in the agreement regarding the distribution of CERs, which must be submitted at the time of registration. The CERs are issued to the project participants and one of the participants then transfers the agreed CERs or funds to the potential claimant.

The Meth Panel and Executive Board are currently considering ways to reduce the risk of double counting in all CDM project activities. Baseline methodologies for programmatic project activities will need to be consistent with the Board's approach to reducing the risk of double counting, when that is known. In the meantime, project participants using approved methodologies must indicate in sections B3 (additionality) and D2 (choice of the monitoring methodology) of the PDD, as well as in the Monitoring Plan, appropriate measures to prevent double counting. Project participants proposing new methodologies must include tools to prevent double counting.

g. Crediting period. The crediting period for a CDM project activity is the period during which emission reductions from the baseline can earn certified emission reductions (CERs). The project participants may choose between: (a) a fixed crediting period of ten years or (b) a crediting period of seven years which may be renewed at most two times, provided that, for each renewal, a DOE determines that the original

baseline is still valid or has been updated where appropriate.[19] The crediting period may only start after the date of registration of a CDM project activity and may not extend beyond the operational lifetime of the project activity.[20]

The crediting period of a programmatic project activity can be determined at the time of submission for registration. The provisions relating to the crediting period are adequate except if the emission reduction actions have a relatively long life and are implemented over a long time, for example, if the actions had a life of 15 years and were implemented over 10 years.[21] The potential loss of CERs can be addressed by registering a series of separate projects each covering the actions implemented during a specified period, such as 1 or 2 years.[22] The baseline and monitoring methodology would be the same for each of the projects, so the administrative costs would be relatively low.[23]

The potential loss of CERs for emission reductions achieved when long-lived actions are implemented over a long period of time also could be addressed by establishing crediting periods for specific vintages of actions. For example, all actions implemented during a given period, such as 1, 2, or 5 years, would constitute a vintage with the same crediting period. The COP/MOP or the Executive Board could agree to allow a programmatic project activity to cover multiple vintages, identifying vintages for emission reduction actions that start during the program lifetime but not after termination of the (renewed) crediting period of the first vintage.[24]

NM0072, the room air conditioner standard for Ghana, NM0100, the industrial motor replacement program for Mexico, and NM0108, biodiesel fuel production in India, have all elected a seven-year renewable crediting period.

Seven of the 13 projects reviewed chose a seven-year crediting period. The choice of a seven-year renewable crediting period appears to reflect the argument that projects will have relatively long lifetimes in the communities where the smaller-scale projects are being implemented. It may also reflect the recognition that conditions in those

[19] For afforestation and reforestation project activities the length of the fixed period is 30 years and the length of the renewable period is 20 years to a maximum of 60 years.

[20] Provided that they are submitted for registration by December 31 2005, project activities started between 1 January 2000 and 18 November 2004 can have a crediting period that begins before the project activity is registered.

[21] If the start date chosen for the crediting period is the date at which the first activities reduce emissions, the reductions that are not counted are those for subsequent activties that will still yield emissions 21 years later. The discounted present value of those emission reductions is likely to be relatively small.

[22] Assuming that each project covers the actions implemented during a two year period, the program would consist of five projects each with its own crediting period. Assuming that each of the projects selected a 7 year renewable crediting period, the participants could renew the crediting period once to get CERs for 13 to 14 years of reductions from each vintage. The project participants could also decide to renew the crediting period a second time to get CERs for the remaining 1 to 2 years of reductions from each vintage.

[23] The project participants could choose between registering all of the actions implemented as a single project activity and renewing the crediting period twice to capture emission reductions for 21 years or registering multiple (5 to 10) projects each with its own crediting period that is renewed once and hence capturing the emission reductions for 13 or 14 years of the 15 year life of each action.

[24] The provisions relating to the crediting period are specified in the Marrakech Accords, so the use of separate crediting periods for "vintages" of actions as part of a single programmatic project activity might require a COP/MOP decision rather than an Executive Board decision.

communities are changing rapidly, thereby necessitating the baseline review that would be required to renew the project after the conclusion of the first seven-year crediting period. Furthermore, these project activities employ technology with a shorter lifespan, so the equipment can fail prior to the end of the credit period(s). It thus may make sense for a project to employ the shorter 7-year, renewable crediting period to match it more closely to the equipment lifetime. For some project types, the 7-year period is presumably closer in length to the equipment lifetime than a 10-year period, which would pose a greater possibility of a larger gap between the equipment lifetime and the crediting period.

Three of the projects, the Bagepalli Biogas program in India, the Solar Cooker project in Indonesia, and the BSP project in Nepal, account for all equipment deployment to occur during the first year of the project. These projects have opted for a 7-year crediting period, and do not differ greatly from single-site project activities in the sense that everything starts at the same point in time (project start date and crediting period). The lifetimes for the projects are either equal to the length of the crediting period (BSP Nepal), or surpass their crediting periods.

The remaining projects, however, have implementation schedules that range from 5 to 7 years. This is not unusual for programmatic project activities that are typically implemented on a phased basis, so full implementation does not occur in the first year of the crediting period. The Mexico motor efficiency program, for example, states that the incentive program is to last 7 years. In this case, the crediting period must be renewed to earn CERs for the actions implemented late in the initial crediting period.

Projects opting for a fixed 10-year crediting period include the Morocco PV Kit project, the Khon Kaen ethanol project, the low-cost irrigation project in India, and the three Moldova projects. The Morocco project, for example, is set to start in 2004, while the crediting period has a later start date of 2007. This serves to account for a 5-year implementation plan, lasting from 2004 to 2008, inclusive.

None of the projects present the option of vintaging credits, since that is currently not an accepted practice. However, programmatic CDM project activities can be structured so that they are not materially disadvantaged by the existing provisions relating to crediting periods. An interpretation that allows groups of actions implemented during a specified period under the programmatic project activity to have separate vintages or crediting periods, without having to submit additional PPDs, would provide additional flexibility.

h. Monitoring. Each CDM project activity must use an approved monitoring methodology. A monitoring methodology specifies in detail what data need to be collected to calculate the baseline emissions, the actual emissions and leakage. It specifies how each data item is to be collected and stored and discusses the uncertainty and the quality assurance/quality control procedures for each data item. Each type of CDM project activity, such as landfill gas recovery, has at least one approved monitoring methodology.

Each programmatic project activity would need an approved monitoring methodology that covers the same topics. Programmatic project activities may qualify as small-scale, for which monitoring typically is simpler. In some cases, the only monitoring

required covers collection of the number of small systems (PV, biogas) in operation. Where the programmatic project activity involves implementing a few large actions, such as industrial fuel switching, the monitoring methodology could be the same as that for a similar single plant CDM project activity. Where the programmatic project activity involves implementing many small actions, such as motor replacement, an appropriate monitoring methodology would need to be proposed in section D2 of the PDD and approved.

Monitoring generally is not implemented at every site if a program involves many participants. Rather, a sampling plan is used to select participants to be monitored and to extrapolate the monitored results to the full program with a quantifiable level of statistical precision. Sampling is already part of the approved methodologies for some small-scale and regular CDM project activities. Depending upon the measures implemented, the energy savings, and hence emission reductions, may be monitored by combinations of metering and calculations, billing analysis, and/or use of models.[25] Each approach would have a different cost and level of accuracy. The project participants and DOE would propose a monitoring methodology they considered appropriate for approval by the Executive Board.

Based on the project PDDs reviewed, it would appear that the provisions for project monitoring in the case of programmatic CDM activities would involve collection of data from national energy sectors and from industrial entities to a greater extent than is normally the case with single-site project activities. Among other considerations that will arise as a result, there may be issues related to data availability to facilitate annual verification in a timely manner, as well as data quality concerns. In addition, the large number of points of implementation will make physical inspection impractical; random checks, remote data collection systems from data loggers and other types of equipment routinely used in the energy efficiency sector, and statistical methods may offer tools to enhance the credibility of the monitoring process.

The experience with energy efficiency and demand-side management programs in the United States over the past fifteen years has produced a series of widely accepted documents that address the issues involved in monitoring the impacts of such programs.[26] They do not specify the "best" monitoring methodology for a given program, but they identify the monitoring issues, methods to address the issues, the strengths and weaknesses of monitoring options, sample design issues, metering options, and they provide guidance in the preparation of a monitoring plan. This extensive body of material should facilitate the development of sound monitoring methodologies for programmatic project activities.

Implications

The foregoing discussion shows that the current provisions relating to single-site CDM project activities for the project boundary, leakage and double counting are equally

[25] Here metering means meters installed to measure the performance of the measure installed, such as run time or energy use. Billing analysis means analysis of the gas or electric bill for the facility. Metering is more costly to implement, but yields estimates specific to the measures installed. Billing data is already available, but reflects changes in addition to the measures implemented, such as changes in the level of production as well as changes in the efficiency of the motors.

[26] See Hirst and Reed, 1991; Vine and Sathaye, 1999; FEMP, 2000; IPMVP, 1996-2004; ASHRAE, 2002; and TecMarket Works Framework Team, 2004.

suitable for programmatic project activities. Some adjustments need to be made in the current approaches to baseline selection and additionality assessment due to the fact that programmatic project activities operate on two levels: the level of the program and the level of the individual actions. By the same token, the provision for the crediting period must be adjusted to the fact that not all actions under one program start at the same time. Finally, given the fact that some programmatic project activities involve many small actions over time, appropriate monitoring methodologies would need to be proposed.

Section 6 presents concrete proposals on how to deal with each of these provisions.

6. Proposal for the implementation of Programmatic CDM

Inclusion of programmatic project activities in the CDM is a two-way street. The Executive Board needs to give a clear signal that it is willing to consider such an approach under the CDM, especially for project activities that involve mandatory policies or measures, and project participants need to submit project activities with methodologies appropriate to the programmatic approach and congruent with the regulatory framework.

6.1 Regulatory

For the Executive Board the issue is clear. There are no provisions in the Kyoto Protocol or the Marrakech Accords that make programmatic project activities ineligible under the CDM. The Executive Board has already ruled on the treatment of voluntary policies in the baseline, has registered one programmatic project activity based on a public sector voluntary program, and has indicated a willingness to consider programmatic project activities implemented by private entities. Only the eligibility of programmatic activities based on a mandatory government policy remains to be confirmed. However, there is no impediment to the inclusion of these programmatic project activities either, and they too should be eligible as CDM project activities for the first Kyoto commitment period 2008-2012, if they meet all relevant methodological requirements.

6.2 Methodological

Project participants that submit a proposed new methodology for a programmatic project activity can be guided *mutatis mutandis* by the existing modalities and procedures for CDM project activities. The following provisions can be applied in an identical manner to current CDM practice:

- **Boundary.** Even though the location of induced actions may not be known at the outset, the boundary of a programmatic project activity can be delineated ex ante and considered fixed for the duration of the crediting period. The exact locations where actual emission reductions occur over time can be determined ex post, and constitute the project boundary, as in other CDM project activities. If the programmatic project activity uses an approved methodology that does not include appropriate boundary definitions for the project boundary for multi-site project activities, section B4 of the PDD should introduce the necessary boundary definitions.

- **Leakage.** Any CDM project activity could have leakage if there is net change of GHG emissions outside the project boundary that is measurable and attributable to the CDM project activity. As in other CDM project activities, a programmatic project activity can be designed to minimize leakage and identify any remaining sources of leakage.
- **Double counting.** In programmatic project activities, emission reductions achieved at the action level must contribute to the emission reduction level of the overall program. Certified emission reductions can only be claimed at the program level. Even so, as is the case with other CDM project activities, some programmatic project activities may involve the risk of double counting. The Meth Panel and Executive Board are currently considering ways to reduce the risk of double counting, and programmatic project activities will need to be consistent with that guidance when it is emitted. Project participants using approved methodologies should indicate in sections B3 (additionality) and D2 (choice of the monitoring methodology) of the PDD, as well as in the Monitoring Plan, which appropriate measures will prevent double counting. Project participants proposing new methodologies should include tools to prevent double counting.

Some adjustments would have to be made in the following provisions:

- **Baseline.** Programmatic project activities operate at both the program level and the induced action level. In selecting a baseline scenario a two-level approach must be used, establishing the baseline for the program and for the induced actions according to approved baseline methodologies. Consistent with the EB's decision on the treatment of national policies in the baseline, policies or programs that have been implemented since 11 November 2001 may not be taken into account in developing a baseline scenario at the program level. The EB still needs to decide on the consideration of mandatory policies in the baseline, which would apply to single-site as well as to programmatic project activities. The baseline for the induced actions should reflect the baseline selected for the program. For both voluntary and mandatory policies, plausible alternatives to the baseline can apply the modalities specified in paragraph 48 of the Annex to Decision 17/CP.7.
- **Additionality.** In determining additionality, a two-level approach must be used, establishing the additionality of the program and of the induced actions using the addionality tool or other approved means. The current approach to determining additionality in single-site project activities is applicable to programmatic project activities at the program level. The additionality of the induced actions could be assessed individually if the actions are large in size and few in number, or through a combination of eligibility conditions and estimation of free riders if the actions are small in size and many in number.
- **Crediting period.** In a programmatic project activity induced actions may start at different times. The project participants could register actions implemented during specified periods as separate projects to ensure that they earn CERs for all of the emission reductions achieved by the program. Alternatively, the COP/MOP or the Executive Board could agree to allow a programmatic project activity to cover multiple vintages of actions each with its own crediting period.
- **Monitoring.** Under a programmatic project activity, induced actions occur at multiple sites. The current approved methodologies for monitoring apply to

programmatic project activities in the case where the programmatic project activity involves implementing a few large actions, such as industrial fuel switching. Where the programmatic project activity involves implementing many small actions, such as motor replacement, section D2 of the PDD should introduce the necessary sampling procedures.

An additionality option

Some programmatic project activities lend themselves to an alternative approach to addressing additionality if approved by the Executive Board. Assume the program established a minimum performance level that is more stringent than the baseline scenario, a requirement that would need to be validated by a Designated Operational Entity. The current requirement is to demonstrate the additionality of the program and, where relevant, the activities implemented under the program and to claim CERs for the emission reductions from the baseline scenario. An alternative could be to not demonstrate additionality but claim CERs only for emission reductions from the minimum performance level established by the program. Then the CERs equal to the difference between the baseline scenario and the minimum performance level of the program are foregone in return for not having to demonstrate additionality.

An example that is easy to describe, although not the most likely programmatic project activity, is a mandatory emissions trading program for electricity generators and industrial sources in a developing country. The program establishes an emissions cap for the participants (this could depend on output and so might rise over time) that is lower than their emissions in the baseline scenario. Assume the actual emissions are lower than the cap, allowances prices are positive and that the surplus allowances are banked. As long as the emission reductions are clearly identifiable, attributable to the trading program and verifiable ex post, a CDM project activity would claim CERs for the difference between the actual emissions and the baseline scenario that consists of the difference between the baseline scenario and the emissions cap plus the banked allowances. The alternative approach would earn CERs only for the banked allowances but not be required to demonstrate additionality.

6.3 Adequacy of the PDD

The projects reviewed contained inconsistent discussion of some of the key issues that arise when considering projects from the perspective of programmatic CDM. For purposes of the implementation of programmatic project activities, some improvements could be made to the PDD document in the form of more precise instructions and more detailed requirements. Some examples of how this might be done are noted here.

Boundary definition. The supplementary instructions for developers should note that a project boundary may encompass a geographically defined region or political subdivision, or a specific industrial sector within that region. Clarity on this point will facilitate understanding of the treatment of any leakage considerations.

Baseline development. The document should instruct developers that they have to demonstrate the rationale for excluding a national policy or private initiative from the baseline, and that the baseline must also be determined at the level of the induced actions.

Additionality. In the additionality section, the proponent must address the existence of two levels at which additionality may be addressed. No change to the current additionality tool per se seems necessary, rather the analysis must take the end-user level additionality into account. The presentation should not evolve into a separate presentation of additionality at each level, rather it should show how the integration of additionality at both levels is ensured by the project design. The additionality tool should also allow for a social/economic cost benefit analysis of public policies as an alternative to the current financial analysis.

Free riding. It could be advisable to direct project participants to explicitly address the issue of free-riding, if relevant, most appropriately in the context of the additionality section.

Double counting and ownership of CERs. As this is an important issue in all CDM project activities, the document format should invite project participants to address both issues specifically. Once the Board has decided how to address the risk of double counting, more detailed guidance should be provided to developers.

Crediting period. Project participants should provide a justification of the choice of crediting period. If the Board agrees to allow a programmatic activity to have vintages of emission reduction actions with staggered crediting periods, justification for the period covered by each vintage should be provided.

6.4 Implications for small scale projects

A programmatic CDM project activity can be a large-scale or a small-scale CDM project activity (SSC). Indeed, as discussed later, one already registered small-scale project activity has the characteristics of a programmatic project activity. In the case of small-scale project activities, a programmatic approach can be used if the implementing actions under the program respect the relevant limits for small-scale CDM project activities for each type of small-scale project activity. In such a case the programmatic project activity can use an approved small-scale baseline and monitoring methodology.

It is important to note that small scale programmatic CDM is not the same as "bundling". Bundling brings together "several small-scale CDM project activities, to form a single CDM project activity or portfolio without the loss of distinctive characteristics of each project activity". (CDM EB 21, Annex 21). The project activities included in a bundle must be indicated at the time of registration and cannot change over time. The bundled projects do not occur as the result of a program; rather the purpose of bundling is merely the reduction of transaction costs for independent small project activities. In a small-scale programmatic CDM project activity, the program itself is registered as the project. The composition of the SSC programmatic project activity may not be known at the time of submission, since individual emission reduction actions implemented as the result of the program may not be known at the outset, and in any case, they are not registered as separate project activities.

In some programmatic project activities, but not all, the expected volume of emission reductions or size of induced actions can be fairly accurately estimated ex ante. This is not an issue for the issuance of CERs since that does not occur until the emission reductions have been verified and certified ex post. However, the ex ante uncertainty means that the actual induced actions may not stay within the relevant limit for the type of small-scale project activity. Thus the decision lies with the project proponent. If the ex ante estimation indicates that the actions will remain with the relevant limit, the project could be submitted as small scale and benefit from the simplified procedures. Actual reductions would be verified ex post and the project activity would receive CERs up to the established limit, foregoing those achieved reductions that exceed the limit. Alternatively, the project proponent could have the option of re-submitting the entire project activity as a regular size programmatic project activity, complying with all the corresponding requirements, to benefit from the additional CERs. If the ex ante estimation indicates that the relevant limit for each type of activity may be exceeded, it would be advisable to submit the project as a full-scale project activity from the start in order to avoid double submission.

Some programmatic project activities have already been submitted as SSC projects, although they are part of a much larger program whose total emission reduction level is known to be above the SSC thresholds. These project activities comply with the principles for de-bundling established by the Executive Board. Project participants divide the larger program into separate PDDs (sometimes as many as 30 PDDs) in order to use an approved SSC methodology. This has caused the unwelcome situation that project participants are submitting multiple identical PPDs and causing an approval bottleneck. Two options could be considered as possible solutions:

1- Project proponents could submit to the Meth Panel a new proposed methodology that is in fact an approved SSC methodology but follows all other methodological and procedural requirements for large scale project activities, such as demonstration of additionality and separate DOEs for validation and verification/certification;
2- The EB could consider allowing large-scale projects to use an approved SSC methodology if the project activity involves a multitude of small emission reduction actions and the total level of reductions achieved is above the SSC threshold. The project activity would have to comply with all other methodological and procedural requirements of large-scale project activities.

6.5 Technical and institutional capacities needed

Successful implementation of programmatic CDM will most likely require a strengthening of technical and institutional capacity on various levels, beginning with developing countries where these project activities take place. A programmatic approach increases the role of governments particularly in public sector project activities in which a public entity is the enacting agent responsible for implementation of the program. In such projects the relevant government agency bears the responsibility of defining and documenting the baseline, and of implementing the monitoring methodology for the program. Even in the case of programmatic project activities enacted by a private sector entity, the government of the host country will have oversight responsibility for greater emission reductions within its borders. The

investment in this added capacity at the country level may well be counterbalanced by possibilities of greater economies of scale and lower transaction costs per ton of CO_2 equivalent.

At the international level, DOEs would have to develop the capacity to deal with project activities that have a broader scope than the current single-site emission reduction projects. Validation would require the capacity to assess a sectoral or geographical baseline, confirm the rigor of the additionality tests, and evaluate the suitability of the monitoring methodology, possibly including the use of stratified samples, metering, control groups, and regression analysis. Verification would involve ensuring actual implementation of the program and assessment of the impact of the program on the respective sector's or region's emission levels, including estimation of free riders where appropriate. DOEs interested in validating and verifying programmatic project activities might have to propose guidelines on how this is to be done.

The Meth Panel and the EB might have to undergo similar increase in capacity. They would have to entertain submissions of methodologies that are adapted to meet the broader scope of programmatic project activities, as has been discussed above. They may also be faced with an exponential increase in methodology submissions, but the increased demand on the Meth Panel and the EB will come not only from programmatic project activities, but from the maturation of the market as whole. For this reason the Executive Board is already examining concrete ways to become more effective.

7. Conclusions

Programmatic CDM project activities, including those based on mandatory policies, face no impediments under the current regulatory framework. One *de facto* programmatic project activity has already been registered, and others are in validation. Programmatic project activities that meet all relevant methodological requirements should be eligible as CDM project activities for the first Kyoto commitment period 2008-2012.

While the regulations allow for the inclusion of such projects in the CDM, there is an obvious vacuum in the provision of appropriate methodological guidance for the submission of programmatic project activities. The vacuum has led to the unfortunate situation of project proponents submitting what are in fact programmatic project activities "as if" they were single-site project activities, trying to fit these broader abatement efforts into the methodological provisions for individual project activities.

The Board should provide relevant methodological guidance for the submission of programmatic project activities as soon as possible. Programmatic project activities are not substantially different from other CDM project activities. The parameters that are key to other CDM project activities (boundary, leakage, baseline, additionality, crediting period, double counting, monitoring) are likewise central to programmatic project activities, and the basic methodological approaches that have been developed for single-site project activities are in principle applicable to programmatic project activities. The clear difference with single-site project activities is that programmatic project activities encompass a greater number of variables (two levels, multi-site, different times, exact type, size and location not known ex ante). This multi-

dimensional nature of programmatic project activities demands a more intricate application of existing methodologies, but it does not require new conceptual approaches.

Prompt methodological guidance for programmatic project activities would constitute a minor step with a major impact. The lessons learned from the programmatic CDM project activities in the current UNFCCC CDM pipeline support the intuitive understanding that this type of CDM activity can broaden the scope of the CDM for energy efficiency and for fuel switching measures, as well as for the use of renewable energies in the household sector, in transportation and in small enterprises, areas with significant social and economic benefits that are currently under-represented in the CDM. Through the deliberate inclusion of programmatic project activities in the CDM, the Board can do much to improve the development impact of the CDM in the short term within the constraints of the current regulatory framework.

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Annex A: EB decisions relevant to Programmatic CDM

EB meeting	Relevant Decisions/Considerations
EB 21	• Deliberation on the issue of National Policies. The EB took note of the oral report from the chair of the Meth Panel on the deliberation of the Meth Panel on national policies. It agreed to consider this issue with a view to agreeing on guidance to the Meth Panel at its 22nd meeting. The Meth Panel should only consider the issue on national policies once the Board has provided further guidance. • The Board took note of the ongoing work by the Meth Panel in preparation of an optional tool to assist in selecting a baseline scenario. • The Board agreed on principles of bundling as contained in Annex 21 of EB 21 report, and requested the SSC-WG to continue its work on technical aspects of bundling.
EB 20	• On consideration of methodologies for baselines and monitoring plans, the Board took note that the Meth panel will only reconsider the proposed new methodology for case NM0072 (mandatory energy efficiency standard for room air conditioners in Ghana) once guidance by the Board is provided with regard to the eligibility of project activities covered under this methodology.
EB 19	• The Board had an initial consideration on the request of the Meth Panel to obtain guidance on whether local/national/regional policy development and/or implementation can be eligible as a CDM project activity. The panel had received a baseline and monitoring methodology proposing a policy measure as a project activity (NM0072). The Board was unable to agree on a course of action.
EB17	• The Board agreed to amend the "Tool to assess and determine additionality", by incorporating the following text: "the use of this tool to assess and determine additionality does not replace the need for the baseline methodology to provide for a stepwise approach justifying the selection and determination of the most plausible baseline scenario alternatives. Project participants proposing new baseline methodologies shall ensure consistency between the determination of additionality of a project activity and the determination of a baseline scenario.
EB 16	• The Board agreed to provide "Clarification on treatment of national and/or sectoral policies and regulations (referred to paragraph 45 (e) of the CDM Modalities and Procedures) in determining a baseline scenario" contained in Annex 3 of the EB16 report

Annex B: Meth Panel considerations relevant to Programmatic CDM

MP Meeting	Relevant Recommendations/Considerations
MP 18	The Meth Panel recommended that proposed new methodologies: • *NM 0131*: Baseline methodology for project activities involving fuel switch measures at an industrial facility, and • *NM0132*: Industrial fuel switching from petroleum fuels to natural gas without extension of capacity and lifetime of the facility where barriers to switching exist. Be consolidated in approved methodology AM0008 "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility". These methodologies are potentially linked to the programmatic CDM discussion since the eligibility criteria consider whether or not local regulations/programs constrain the facility from using certain types of fossil fuels. The Meth Panel requested guidance from the Executive Board on methods to prevent double counting. If both the producer and user of a GHG-friendly system are eligible claim credits there is a risk of double counting of emission reductions. This could occur if the producers, intermediaries (retailers, suppliers, utilities etc.) and consumers of the system/product claim that it is their action that reduces GHG emissions. This is a potential issue for several different project types, e.g.: (a) Production/ supply/sale/consumption of blended cement; (b) Production/ supply/sale/consumption of biofuels for transport; and (c) Production/supply/sale/use of energy-efficient equipment. Two biofuel methodologies under assessment (NM0082-rev and NM0129) suggest different means to avoid potential double counting of emissions credits. The Meth Panel has asked the Executive Board to address: (a) If a host country DNA is willing to provide written assurance that it will not approve another project that conflicts with already-approved projects, is this an acceptable means of ensuring that no double counting will occur? (b) If not, could this checking be done by a DOE? (c) Is a rule that limits all projects in a given country to biofuel producers or consumers, whichever is submitted first, an acceptable means of reducing potential double counting? (d) Is the possibility that one CDM project, by being first, would be able to disqualify other potential CDM projects a concern?
MP16	Meth Panel considered two methodologies clearly linked to the programmatic CDM discussion detailed as: *NM0072*: Energy Efficiency through mandatory national level appliance standards. *NM0100*: Activities for the promotion of electricity efficiency, through the replacement of unitary equipment, by parties that are not the energy

MP Meeting	Relevant Recommendations/Considerations
	consumers. With respect to NM0072, the Meth Panel requests guidance from the EB on eligibility of such types of national programs as CDM project activities, highlighting a discussion already taken place at MP15 when initial consideration was given to NM0072. The panel receives a set of clarifications from project participants as they relate to the initial recommendation of the panel on the methodology. With respect to NM0100, the panel decides to recommend the EB not to approve the proposed methodology, as it is described on the relevant form submitted to the consideration of the EB.
MP15	Meth Panel considers NM0072 for the first time, discusses the issue related to eligibility of such types of national/sectoral programs as CDM project activities, reaches an initial recommendation and forwards a request to the project participant for clarifications under the existing feedback loop established for consideration of new methodologies.

Annex C: Overview of new baseline and monitoring methodologies relevant to Programmatic CDM

New Baseline/ Monitoring Methodology	Methodological Issues
NM0072 (the Meth Panel requested guidance from the Executive Board on the eligibility of local/national/regional policy development and/or implementation as a CDM project activity. The Executive Board considered this matter at its 19th and subsequent meetings and has not yet been able to agree on a course of action.)	*Eligibility*: countries/regions where: 1) no mandatory energy efficiency standard for the proposed appliance exists, 2) where there is an existing standard for specific appliances but technology improvements allows for an increase in the standard, 3) it can be demonstrated by the project developer that the standard is put in place as a result of the CDM credits. *Baseline approach and determination*: a) existing actual or historical emissions as applicable. Energy consumption of the population of the given appliance before the standard will be compared to the total energy consumption of the population of the given appliance after the mandatory standard is put in place. For baseline determination suggests the use of international standard practices in the field of appliance standards based on surveys and data samples, although it does not describe the procedure for determination. There is no discussion on how national/regional policies (Annex 3 of EB 16) affect the selection of a baseline scenario. *Additionality determination*: suggests the use of the additionality tool but does not describe the implementation of the tool. The PDD describes in more detail from the perspective of the project activity *Project activity boundaries*: definition of the appliance or the subset of a particular appliance that is covered by the standard, and the geographic area covered by the law. *Leakage*: no leakage considered. *Accounting of emissions reductions*: based on vintage and estimated lifetime, with readjustment of baseline every year to account for actual new population of appliance and mean operating hours. *Monitoring*: Number of new units sold. Issues may arise on some of the monitoring parameters
NM0100 (based on available information from the Meth Panel recommendation to the EB. The Meth Panel recommended the proposed methodology not be approved and the Executive Board decided not to approve	*Eligibility:* programs that encourage adoption of energy efficient equipment at many sites and disable the inefficient equipment removed implemented by organizations that are not the end users of energy with emissions reductions achieved at power plants supplying the grid. *Baseline approach and determination*: a) existing actual or historical emissions as applicable. The Meth Panel review considers the baseline approach as appropriate but stipulates that for generalized use paragraphs 48 b) and c) need to be discussed by the project participant from the perspective of program development. The Meth Panel concluded that the basis for determining the baseline scenario and additionality are appropriate and adequate with the exception that analyses are not provided indicating that the early replacement of motors is not cost-effective for the owners of the motors or the servicing electric utility, and that all motors (equipment) are operational. However, legal requirements,

New Baseline/ Monitoring Methodology	Methodological Issues
the proposed methodology at its 20th meeting.)	economic/financial considerations and barriers could affect the baseline scenario in other applications of the proposed baseline methodology. Neither national/regional energy efficiency policies nor government/utility programs are addressed in the baseline. The methodology proposes that there is a contradiction between the texts of the Marrakech Accords/the Consolidated tool for demonstration of additionality and the Annex 3 of EB 16, although it does not go into detail in explaining the apparent contradiction. *Additionality determination*: the methodology recommends use of the tool for additionality. , mentioning that analysis has to be conducted on: legal requirements and obligations, national incentive to promote similar activities and sectoral policies to promote similar activities; although it does not establish the criteria suggested for incorporation in the tool analysis. *Project activity boundaries*: the methodology specifies the boundary as the electricity using equipment replaced and the electricity grid that supplies the new equipment. The review noted that if the new equipment is served by different local grids the appropriate carbon emission factors would need to be applied. *Leakage*: the methodology claims there would be no leakage because all equipment installed is new and the inefficient equipment removed is disabled. *Accounting of emissions reductions*: the methodology was proposed for application to both fixed and variable load equipment. It was considered basically suitable for fixed load equipment (motors) but not for variable load equipment. Revisions to address several specific issues such as motor efficiency, remaining motor life and motor operating hours would be required before the proposed methodology could be approved for fixed load equipment. *Monitoring*: several issues were raised on the monitoring methodology related to clarification of definitions of "similar" equipment, sampling, frequency of measurements and surveys proposed. *Ownership*: the Meth Panel recommendation notes that ownership of the emission reductions is not resolved.
NM 0108 (based on available information from the Meth Panel recommendation to the EB. The Meth Panel recommended the Executive Board decided at its 21st meeting that the	*Eligibility*: the methodology would apply to the manufacture of biodiesel from edible/non-edible oils derived from tree borne oil bearing seeds, fatty acids, animal fats, etc. to blend with or substitute for petro-diesel used in transportation vehicles. *Baseline approach and determination*: a) existing actual or historical emissions as applicable. Continued use of petro-diesel is proposed as the baseline. The Meth Panel concluded this is appropriate if the methodology is limited to biodiesel blends that do not require vehicle modifications, otherwise the baseline could include a mix of petro-diesel and other fuels (CNG, LNG, LPG). The Meth Panel notes that how national and/or sectoral policies are taken into account in the selection of the baseline scenario should be explained in more detail. *Additionality determination*: use of the additionality tool is appropriate, but the methodology could benefit from further

New Baseline/ Monitoring Methodology	Methodological Issues
proposed methodology could be reconsidered after revision to address issues raised by the Board, recommendations made by the Meth Panel.)	guidance e.g. as to relevant barriers. *Project activity boundaries*: the project includes the biodiesel plant site, transportation of the feedstock and the biodiesel, the vehicles use biodiesel rather than petro-diesel with bio diesel, and the preparation of new plantations and harvesting of the oil bearing seeds. The Meth Panel identified several revisions that are needed, mainly to address non-CO_2 emissions, and proposed that several minor emission sources be excluded to reduce transaction costs. *Leakage*: the methodology proposed to estimate methane emissions from upstream methanol production and CO_2 emissions from harvesting of oil-bearing seeds (devegetation). The Meth Panel concluded that the leakage estimates from both of these sources should be changed and potential leakage due to deforestation to clear land for oil seed plantations be addressed. *Accounting of emissions reductions*: emission reductions are those associated with the amount of petro-diesel displaced with a potential adjustment for changes in the efficiency of fuel use. The procedure for determining the efficiency adjustment in practice is not clear. It implicitly assumes all biodiesel replaces petro-diesel and so ignores theft, wastage, sales to Annex I Parties etc. which could be monitored. *Monitoring*: electricity consumption, petro-diesel and other fossil fuel use for biodiesel production and CO_2 emissions from land clearance for news plantations are monitored. Emission factors are used to estimate baseline emissions due to use of petro-diesel. *Ownership*: the Meth Panel recommendation notes that the possibility that the emission reductions will be claimed by the users of the biodiesel needs to be addressed.

Annex D: Overview of Selected Projects

Low-Cost Urban Housing Energy Service Upgrades (Kuyasa, Khayelitsha, S.A.)

Classification of the program. Public; Voluntary.

CDM methodology: AMS.I.C, AMS.II.C, AMS.II.E

Description of the project activity and project boundaries. The program aims to improve the thermal performance, lighting and water heating efficiency of existing and future housing units. The project will consist of three activities in each household unit: installation of insulated ceilings; installation of solar water heaters; and installation of energy efficient lighting. The project size will be limited by the small-scale threshold of 15GWh/year for two of the three types of interventions, and to 15MW for the Solar Water Heaters component. The project boundary for the three project activities is the area of the houses in the specified area of Cape Town, South Africa.

Program design, CDM Participants and funding. The City of Cape Town is listed as the project participant, and will serve as the project's coordinating body. The installation of the technologies will be undertaken by a number of small contractors who will serve as the implementing parties. These contractors will be selected through a tendering process facilitated by the existing Ward Development Forum (WDF) in Khayelitsha. The program is voluntary, and any uptake of the new technologies will be based on individual household choice. There is support from the Dutch Government through the South*South*North organization to facilitate the development of the project activity by covering costs associated with the design and transaction of the project activity. Dutch government resources have also been set aside for the validation of the project. These funds are a loan to a public sector project that will be repaid, and are included as such in the project's cash flow analysis. South African public money has been made available to cover the shortfall in costs of the technologies, their installation and their maintenance. The retrofit activities of the project activity may require national public sector funding (in the form of loans or debt financing from development banks) to finance some parts of the project implementation.

Baseline and Additionality. Baseline is established on the level of the individual household, no baseline selection on the program level itself. Additionality is demonstrated from the perspective of the end user by analyzing prevailing practice barriers, investment barriers to implementing the technologies, and information barriers. The project does not address additionality from the perspective of the implementing agency.

Monitoring. The number of households choosing to implement the upgrades is uncertain and will be monitored. A random sample of households will be selected for quarterly monitoring. Water heater monitoring will be based on calibrated models as opposed to direct measurements. Wattage of replaced lamps will be monitored upon replacement. Sampling will be used to determine operating hours and ensure compact fluorescent lamps (CFLs) are still in use. Space heating monitoring is a combination of measurements and calibrated modeling.

Crediting period and emission reductions. The total crediting period and expected project lifetime is 21 years (three seven-year crediting periods). Both the project and the crediting period are set to start in 2005. The life of the CFLs will tend to be shorter than one crediting period. The project will generate 7,000 tCO_2e annually and a total of 48 tCO_2e until 2012.

Mandatory energy-efficiency standard for room air conditioning (Ghana)

Classification of the program. Public; mandatory.

CDM Methodology. NM072: "Energy Efficiency Through Mandatory Appliance Standards."

Description of the project activity and project boundaries. The project developers involved in this activity will work with the Government of Ghana to develop and implement a mandatory Energy Efficiency Standard for Room Air Conditioners throughout the entire country. By implementing the standard, the Government will force air conditioner suppliers to remove the most inefficient units from the market, and consumers will be made to purchase more efficient models and thus lead directly to electricity savings. Since the project is intended to cover all room air conditioners used in the country, the boundary for the project will be all consumers connected to the Ghanaian grid (which covers a majority of the territory). The boundary also includes all of Ghana's thermal generating plants, which will be used to determine the combined margin and thus the carbon intensity of the electricity saved.

Program Design, CDM Participants, and Funding. The Ghana Energy Foundation, Ghana Standards Board, and the Government of Ghana (represented by its DNA) have all been listed as project participants, and will be responsible for coordinating the program. The Ghana Standards Board, which will be involved in the CER transactions, is a government agency but will require and receive authorization from the DNA of Ghana once it is established. The government currently lacks the funds necessary to implement this project, and is counting on CDM revenue to directly overcome this barrier. CDM revenues will be used to pay for a testing lab which will help track the key data required to accurately calculate emissions reductions. These revenues will also go towards setting up an outreach and education system that will help ensure the standard's success.

Baseline and Additionality. The baseline is air conditioners at typical efficiency levels, and reflects the gradual improvement in average efficiency over time. The PDD assumes that the policy would not cause a significant increase in prices, and therefore would not reduce sales. Additionality is addressed from the perspective of the implementing agency, which would not proceed with the policy without CDM funding. The PDD does not address additionality from the suppliers' perspective, in other words why manufacturers would not supply higher-efficiency air conditioners in the absence of the policy. Furthermore, the methodology addresses the issue of free-riding by comparing the average efficiency of air conditions prior to and following the implementation of the mandatory standard. Any impact of free riders would be captured through this analysis.

Monitoring. The key monitoring parameter is the number of new units sold each year.

Crediting Period and Emissions Reductions. The lifetime of the project is 21 years and the total crediting period is 21 years (3 renewable 7 year periods). The starting date for both the project activity and for the crediting period is set for 2005. The PDD states that the baseline efficiency will not reach the proposed efficiency standard until after the end of the crediting period(s). Calculation of CERs accounts for air conditioner vintage and estimated lifetime to accurately quantify year-to-year reductions. The project activity will generate 435,000 tCO_2e annually and a total of 3,000,000 tCO_2e until 2012.

Photovoltaic Kits in Rural Households (Morocco)

Classification of the Program. Public; Voluntary.

CDM Methodology. AMS.I.A

Description of the Project Activity and Project Boundaries. The project provides rural households throughout Morocco with photovoltaic kits in order to enable them to meet their basic energy needs. The project mandates that a minimum of 101,500 households be equipped with such kits, along with the basic installation for domestic electricity use (bulbs, plugs) from 2004 to 2008. 2008 has been set as the closing date for this project, when 30 to 50% of all rural households in Morocco will have been electrified. The project will be implemented in all regions of Morocco, including rural areas where households are either scattered or grouped in small hamlets. In such rural areas, the activity will be carried out only in these douars. The project will use 86,705 kits of 75Wp each. The project boundary includes all rural areas within the national territory.

Program Design, CDM Participants and Funding. The primary project participant and coordinating body will be l'Office Nationale de L'Electricité (ONE), a public entity. Private contractors will be in charge of implementing the program, to ensure that the installed systems are reliable. These private companies will guarantee the quality of the service delivered, and are responsible, under a 10-year contract, for managing the technical and financial aspects of the program. The ONE will provide 39% of the equity for the project. Public funding in this project will also include a donation of €5 million from Germany (2.4% of total project cost). A long term loan from the "Agence Française de Développement" will cover an additional €5 million in project costs. Intermediary organizations will provide an addition 3.9% in financing, and the users of the PV kits will fund the remaining 52.2% of project costs, including running costs over a 10 year time period. Households paying for the kits will make an initial down payment, and then pay monthly contributions representing running costs for 10 years. CDM revenue will enable ONE to resume the project activity after the closing date of 2008, until the final goal of complete rural electrification is achieved.

Baseline and Additionality. The baseline reflects energy consumption equal to the output of the PV systems, and assumes that the energy would be provided by a diesel-fired generator via a mini-grid. Additionality is addressed from the perspective of the implementing agency, which would not proceed with the project without CDM. Additionality from the end user's perspective is demonstrated by analyzing investment, technological, and other barriers.

Monitoring. The number of PV systems initially installed and the number still operating will be monitored. Electricity generation of the PV systems will not be monitored.

Crediting Period and Emissions Reductions. The operational lifetime of the project is 15 years, and the crediting period is a fixed 10-year period. The project activity's start date is set for January 1, 2004 and the crediting period has a starting date of January 1, 2007. The PDD states that the implementation of the program actually began in 2003, and has set a closing date as the year 2008. Accounting of CERs includes the effect of phased implementation of the project. The project activity will generate 39,500 tCO_2e annually and a total of 236,000 tons until 2012.

Biogas Sector Partnership (Nepal)

Classification of the Program. Public; Voluntary.

CDM Methodology. AMS.I.C.

Description of the Project Activity and Project Boundaries. Under the proposed project activity, the Biogas Sector Partnership (BSP) aims to sell biogas digesters to households located in 53 of 75 rural districts in Nepal. The activity is a sub-project of the BSP-Nepal umbrella biogas program that aims to install a total of 200,000 small biogas digesters throughout the country. The program is divided into Activities 1 and 2. The umbrella biogas program is the fourth phase of the Nepal government's biogas program at the national level. Under the first three phases, a total of 111,395 biogas plants have been disseminated all over Nepal. The proposed activity in the PDD will install a total of 6,500 small biogas digesters. All biogas households agree by contract to transfer the CO_2 credit and all other rights associated with the transaction and administration of these ERs to the Alternative Energy Promotion Center (AEPC). The key objective of the umbrella program is to develop the donor-support biogas program as a commercial activity. At the unit level, the project boundary is defined by the individual sites and refers to the operation of the biogas digester at the household level. Emission sources are under the control of the project participants (i.e. the households), significant and attributable to biogas digesters.

Program Design, CDM Participants and Funding. Nepal's Alternative Energy Promotion Center (AEPC), a government body located under the Ministry of Science and Technology, will be responsible for coordinating the program by designing and promoting the biogas policy. BSP-Nepal, a registered NGO, will play the intermediary role and implement the biogas plants in close cooperation with the AEPC. BSP will rely on around 40 companies to sell plants through their 200 branches located in various parts of the country. Each biogas household will also be a key participant who will decide whether or not to invest in a biogas plant and thus own any emissions reductions generated thereafter *(see "crediting period" below)*. As part of the BSP umbrella program, the project received public funding from various parties, namely the German Development Bank KfW (US $9.15 million) and the Directorate General for International Cooperation of the Government of the Netherlands DGIS (US $4.92 million). Funding was also received from the Government of Nepal (US $5.61 million) through the AEPC. Nepal's biogas sector will become a commercially sustainable sector through the integration of CDM revenues benefiting a large portion of the rural population. CER revenues will additionally serve to support quality control and assure the function of BSP-Nepal necessary to maintain the construction standard and, subsequently, the performance of the actual technology.

Baseline and Additionality. The baseline is based on typical current practice, as determined through a sampling of households. Additionality is addressed from the perspective of both the implementing agency and the individual households.

Monitoring. Monitoring consists of a count of operating systems, which is multiplied by a calculated value of emission reductions per system.

Crediting Period and Emissions Reductions. Project lifetime and crediting period is 21 years (3 renewable 7 year crediting periods). The project start date is January 2004, and the first 7-year crediting period will begin during the installation year, from January 2004 to March 2004. Calculation accounts for system vintage and estimated lifetime to accurately quantify year-to-year reductions. The Nepal project includes a mechanism to transfer CER ownership from the households purchasing the biogas systems to the government. This mechanism would serve to avoid the possibility of double counting, though the specific term is not explicitly referred to in the PDD. Activities 1 and 2 of the BSP program will each generate 31,000 tCO_2e annually, and a total each of 233,000 tons until 2012.

Bagepalli CDM Biogas Program (Kolar District, India)

Classification of the Program. Private; Voluntary.

CDM Methodology. AMS.I.C

Description of the Project Activity and Project Boundaries. The project activity involves setting up 5,500 biogas digesters of $2m^3$ capacity each in individual households. The aim of the project is to replace the commonly used and inefficient wood-fired mud stoves with clean, sustainable and efficient biogas units. Each participating family will additionally displace 46 liters of kerosene annually, used primarily as supplementary cooking fuel. The submitted PDD describes the project as "a bundle of small biogas plants of a total of less than 15MW total generating capacity, supplying thermal energy directly to users." The size of the actual biogas digester will depend on family (household) size, as well as on the number of cows per household. The physical, geographical site of the renewable energy technologies generating the thermal energy and the equipment that uses the thermal energy produced is considered as the project boundary. The project encompasses the physical site of all biogas plants (digester system, pipe leading to the stove and the stove proper).

Program Design, CDM Participants and Funding. The project owner and developer, who will assume the role of coordinating body, is an NGO, Women for Sustainable Development (WSD). A list of suitable and interested households (voluntary participation) has already been identified to participate in the project. The successful implementation of this project hinges on its validation and registration as a CDM project, as it is to be financed to a high extent from generated carbon revenues. No public funding is as of yet involved in the project. Any specification with respect to public funding will be made once the official Annex I country buyer has been identified.

Baseline and Additionality. The baseline is based on typical current practice, as determined through a sampling of households. Additionality is addressed from the perspective of the implementing agency, who would not implement the project without revenue from CERs, and from the perspective of the individual households, who would continue using inefficient wood-fired mud stoves in the absence of the proposed project activity.

Monitoring. As allowed by the methodology due to the small size of each system, monitoring consists only of a count of operating systems, which is multiplied by a calculated value of emission reductions per system.

Crediting Period and Emissions Reductions. The operational lifetime of the project is 20 years, and the crediting period will be seven-year renewable. The project and first crediting period start dates are set for January 2005. The project activity will generate 27,000 tCO_2e annually and a total of 199,000 tons until 2012.

CDM Solar Cooker Project (Sabang Islands and Aceh Tengarra, Indonesia)

Classification of the Program. Private; Voluntary.

CDM Methodology. AMS.I.C

Description of the Project Activity and Project Boundaries. The project strives to transfer and disseminate the most technologically advanced solar cookers and heat retaining containers throughout the two named districts. The new technologies use renewable resources for cooking, heating and sterilizing water, and preserving food, and will be distributed partially prefabricated. The project is designed for households and the small-scale fishing industry, and comprises up to 1000 solar cookers (1000 households). The installed power adds up to a total of less than the 15MW threshold for small-scale CDM projects. The project boundaries are the Sabang Islands of Aceh and the city of Badar in Aceh Tenggara. Firewood is logged locally in both sites, and not imported from other locations.

Program Design, Project Participants and Funding. The coordinating body for this project is Klimaschutz e.V., of Germany. Klimaschutz will be responsible for project supervision, and will also take on the role of investor. The company receives 100% of the CERs generated by the project activity, and this CDM revenue will be used to cover the cost of equipment, project implementation and maintenance procedures. PT Petromat Agrotech, a private business specializing in solar drying, solar home systems and agricultural engineering, will be responsible for project administration and monitoring, as well as for equipment assembly, distribution and maintenance. The company will also perform annual project reviews. There is no public development funding available to the project. Total project investment costs amount to Euros 164,800, and an additional Euros 77,700 is counted for monitoring and supervision costs. As described above, the project is to be funded through CER revenues.

Baseline and Additionality. The baseline is based on typical current practice, as determined through a sampling of households. The project considers only the household perspective in determining additionality.

Monitoring. Monitoring consists only of a count of operating systems, which is multiplied by a calculated value of emission reductions per system.

Crediting Period and Emissions Reductions. The expected operational lifetime of the project is 15 years and the crediting period will be seven-year renewable. The start date for the project and for the first crediting period is October 2005. The project will generate 3,500 tCO_2e annually and a total of 25,000 tons until 2012.

Electric Motors in Industry Replaced with Tighter Voluntary Standards (Mexico)

Classification of the Program. Public; Voluntary.

CDM Methodology. NM 100

Description of the Project Activity and Project Boundaries. The purpose of the project is to offer financial incentives to large energy users so that they replace inefficient motors with new, high-efficiency motors that meet the standards of the public-sector agency "Fideicomiso para el Ahorro de Energía Eléctrica" (FIDE) in its Sello FIDE program. Under the proposed financial incentive, some users of inefficient electric motors would turn in their existing motors and replace them with energy-efficient models. While Mexico has minimum efficiency standards already in place that cover electric motors, these standards determine motor efficiency at the time of purchase only, without addressing existing motors. The proposed program is intended for three-phase induction motors common among industrial users and agricultural and municipal services (large users of electricity). Motors in the residential sector are low power units not covered by the FIDE seal. The project boundary is the physical, geographical location of each piece of equipment installed, and power plants throughout Mexico.

Program Design, CDM Participants and Funding. FIDE will be the project sponsor and coordinating body. The program is designed to function nationally: FIDE will provide a "bounty" to electricity end users who turn in their inefficient electric motors and purchase high-efficiency motors. This bounty will appear as a discount on the purchase price of the new motor. Program eligibility will be determined based on motor vintage, power and whether or it is in operating condition. Although FIDE has utilized external funding (such as the Energy Efficiency loan of the IDB, which is now being considered for continuation in a new loan program), this program would not benefit from ODA. Japan's Electric Power Development Company will be the Annex I participant in the project. The project activity would not be undertaken without the CDM, as the incentives to be provided to industrial electric motor users do not provide any economic benefit to FIDE itself. The distribution of financial incentives can only be justified through potential CDM revenues.

Baseline and Additionality. The baseline calculation is based on accepted procedures, but must include a determination of the useful life of existing motors. This poses a methodological challenge, as most users are still employing inefficient electric motors despite the fact that mandatory standards have been in place for a decade, and regardless of the existence of voluntary standards. Additionality is addressed from the perspective of the implementing agency (FIDE), who would not proceed with the policy without CDM revenues. The PDD notes that the continued use of inefficient (by FIDE standards) electric motors does not violate any laws in place in Mexico, thus manufacturers would not necessarily supply higher-efficiency motors in absence of the FIDE program. The potential for a rebound in emissions after the end of the useful life of the motor is controlled by the fact that the efficiency standards will apply to new motors purchased. The program focuses on inefficient motors still in service despite implementation of the standards.

Monitoring. The project operator, FIDE, will monitor electricity savings from motor replacements. FIDE will collect "Certificates of Deposits" (issued upon purchase of new efficient motor) as well as "Certificates of Destruction" (of old motors), in order to monitor a one-to-one correspondence between the two types of certificates. On-site inspections of all authorized participants will be performed to ensure compliance with FIDE procedures.

Crediting Period and Emissions Reductions. The project lifetime depends on the remaining life of the motors at time of replacement. The incentive program itself is expected to last 7 years. Regardless of when the incentive is applied and the motor replacement carried out, the

remaining life can be expressed in terms of the date of original manufacture of each motor (a useful life of 40 years is assumed). The crediting period starts later than the project activity since motors replaced in a given year are assumed to accrue energy savings from the following year. The length of the first renewable crediting period is 7 years. The project will generate 81,000 tCO_2e annually and a total of 568,774 tons until 2012.

TPD Bio-Diesel Project (Andhra Pradesh, India)

Classification of the Program. Private; Voluntary.

CDM Methodology. NM108

Description of the Project Activity and Project Boundaries. The project activity involves the manufacture of bio-diesel from oils derived from various natural sources, and to substitute this bio-diesel for petro-diesel, or to use a blend mixture of the two types. The project activity involves the manufacture of bio-diesel (methyl esters of fatty acids) from Pongamia and Jatropha seeds in 100% grade of methyl esters, called B100 bio-diesel. This bio-diesel will be delivered to filling stations where B100 diesel will be blended with petro-diesel to make B5 or B20-grade biodiesel. To date, there are no official regulations or guidelines in India mandating the use of bio-diesel or the setting up of bio-diesel plants. The project's boundary is defined as the physical project within which the biodiesel plant is constructed, and the fleet of vehicles using biodiesel. Transportation of biodiesel from the project to filling stations, as well as transportation of feedstocks, chemicals and other process inputs, are included within the project boundary. The spatial extent of the project includes: the biodiesel production plant site; transportation of biodiesel; combustion sources or vehicles that substitute petro-diesel with bio-diesel; and preparation of oil bearing seeds from new plantations.

Program Design, CDM Participants and Funding. As of yet, the project has only one participating party, which will act as the coordinating body. Southern Online Bio Technologies, Ltd., a private-sector entity, will bring in the required capital for setting up the project. The company will also be charged with taking decisions with regard to the transaction of emissions credits. No public funding from parties included in Annex I is involved in the project activity. The required capital to implement the project will be provided by Southern Online Bio Technologies, Ltd. High risk is associated with investment in new technologies such as bio-diesel technology, and no support from funding agencies within India has yet been identified.

Baseline and Additionality. The baseline scenario in the absence of the project activity is the continuation of the existing practice of using petro-diesel. Additionality is addressed from the perspective of the implementing party as well as that of consumers. The CER sales will enable the producer to pass along the revenue it receives in the form of a discount to the end user. Increases in emissions outside the project boundary due to the consumption of methanol are considered as leakage emissions. It is also not clear whether fuel that is displaced will not go to new, unforeseen uses.

Monitoring. The PDD states that monitoring will consist of determining the level of electricity consumed by the project and oil extraction activities. Petro-diesel consumption consumed from off-site transport will also be monitored, as will the quantity of fossil fuels used on-site.

Crediting Period and Emissions Reductions. The operational lifetime of the project is 25 years and the crediting period is renewable (7 year periods). Both the project and the first crediting period are set to start on September 1 2005. Emissions reductions will be proportional to the quantity of petro-diesel substituted by the bio-diesel consumed by transport vehicles. Duplication of CER credit ownership and double counting issues specifically accounted for in the PDD. The two issues are to be avoided through an arrangement whereby bio-diesel consumers do not claim CERs for consumed bio-diesel, and additional revenues from the sales of CERs will be passed on to bio-diesel consumers as subsidy on the sale price of the fuel. The project will generate 26,000 tCO_2e annually and a total of 169,000 until 2012.

Khon Kaen Fuel Ethanol Project (Khon Kaen, Thailand)

Classification of the Program. Public; Voluntary.

CDM Methodology. NM82-rev. "Baseline methodology for production of sugar cane based anhydrous bio-ethanol for transportation using LCA."

Description of the Project Activity and Project Boundaries. The project involves the production of anhydrous ethanol (bio-ethanol), which will then be blended with gasoline and used in transportation. The project has a capacity of 85,000 liters of anhydrous ethanol per day. Reduction of anthropogenic emissions of GHGs will occur through the substitution of gasoline and MTBE with bio-ethanol, a renewable fuel. There has been a drive in Thailand to employ more domestic natural resources so as to reduce dependence on imported oil, and demand for the gasohol is estimated to reach over 2 million liters/day. To satisfy national demand for this fuel, the Thai government introduced a round of bids for licenses in 2002, and again in 2004. Although seven licenses for the manufacture and production of anhydrous ethanol were issued in 2002, only two license holders currently have commissioned plants. Commissioning of investments in bio-ethanol has been extremely slow due to barriers facing investment in ethanol production facilities. The volume of alcohol currently produced thus does not satisfy government goals, and consumer demand levels for the product are not being met. To this end, the Thai government has embarked on a program to foster the development of an anhydrous ethanol sector, and has provided tax incentives for the blending of bio-ethanol, though no mandate on its use exists in Thailand. The project boundary encapsulates all emissions related to the production and combustion of both bio-ethanol and gasoline, and extends to include and cover the final use of the anhydrous bio-ethanol in transportation.

Program Design, CDM Participants and Funding. The coordinating body will be the Ministry of Natural Resources and Environment of Thailand, who will provide the tax incentives that will drive investment in bio-ethanol producing facilities. The Khon Kaen Alcohol Company, a private entity, will undertake ethanol production at its plant. The Royal Danish Ministry of Foreign Affairs is listed as a "project participant," and Agrinergy, Ltd. of the U.K., will be the monitoring agency. No public funding is included for this project. CDM registration and resulting CER revenues help the project overcome investment barriers, and improve the project IRR by 5 percentage points.

Baseline and Additionality. Baseline determination for the project activity consists of two elements. The first is the baseline at the site (i.e. at the Khon Kaen facility) that will produce the bio-ethanol. The second element is the baseline fuel that will be displaced by the anhydrous ethanol produced by the project activity. The methodology uses the additionality tool to evaluate whether investment in anhydrous bio-ethanol production capacity at the project site is a plausible baseline scenario. The baseline accounts for the DNA being made aware of the fact that the project boundary will cover the final use of anhydrous bio-ethanol in transportation, and will therefore not approve project activities that conflict with this boundary and could result in "double counting" of emissions reductions.

Monitoring. As part of the monitoring process, all CDM project activities registered in the host country are to be recorded to ensure that none conflict with the boundary for this project activity. This will ensurethat no "double counting" of emissions reductions occurs. The project's integrity will be monitored through the verification of production of bio-fuel, and assuring that only the production that ends up in transportation fuel qualifies for CERs.

Crediting Period and Emission Reductions. The starting date of the project activity is September 2005, and the operational lifetime is 20 years. The crediting period is fixed and lasts 10 years (beginning in September 2005). The project will generate 46,000 tCO_2e annually and a total of 322,000 tons until 2012.

Marketing of low-cost Irrigation Devices in Rural Areas of Bihar and Uttar Pradesh, India

Classification of the program. Private, Voluntary.

CDM methodology: AMS-I.B.

Description of the project activity and project boundaries. The International Development Enterprises India (IDE-I) will facilitate the marketing of 20,000 low cost irrigation devices (treadle pumps) in rural areas of states of Eastern Uttar Pradesh and Bihar. The primary target market includes small and marginal farm families whose only alternative is to either continue depending on highly risky, rain-dependant farming, or use diesel pumpsets. The change in technology from diesel pumps to mechanically driven pumps will reduce GHG emissions. The sale of treadle pumps will be over a two-year period, and the IDE-I will market the pumps by educating and training farmers, as well as providing working capital, quality assurance, market development and general handholding support.

Program design, CDM Participants and funding. In the PDD, the following stakeholders are mentioned: The International Development Enterprises India (IDE-I) as the enacting agent; treadle pump manufacturers in the two states (M/S Purvanchal Engineering Complex and M/S S R Industries); the distributor network; and the buyer of CERs (the Japanese Ricoh Company). Funding from Swiss agency for Development Co-operation and other bi-lateral development funding organizations is currently being utilized to support the market development and promotional costs of the activity. CDM revenue will reduce the dependency on Donor Funds and make the project more sustainable.

Baseline and Additionality. The proposed baseline for this project is the diesel fueled pumps, and the emissions factor for diesel is used for the calculations. The existing treadle pump market is fraught with several barriers (including poor infrastructure, poor knowledge regarding the benefits of treadle pumps and the small and marginal farmers' limited purchasing power), all of which the proposed project will remove by making investments possible in promotion and market development aimed at educating the farmers about the technology and the manufacturers to develop the market till a sufficient network develops. The additionality of the project is assessed at the beneficiaries' side.

Monitoring. The annual emissions reductions used to generate CERs may be determined by an annual check of a sample of treadle pumps to ensure that they are operating. The IDE-I has a sophisticated internal tracking system for the pumps, so they can track and monitor the performance of the pumps and fed the data into a computerized database.

Crediting Period and emission reductions. The project started January 1, 2001 and the crediting period is set to 10 years. The project will generate 10,000 tCO_2e annually and a total of 96,000 tons until 2012.

Moldova Biomass Heating in Rural Communities 1
Moldova Biomass Heating in Rural Communities 2
Moldova Energy Conservation and GHG Emission Reduction

Classification of the program. Public; Voluntary

CDM methodology: AMS-I.C., AMS-II.E., AMS-III.B.

Description of the project activity and project boundaries. This project is in fact one programmatic project, though three PDDs were submitted to the Executive Board in order to comply with current CDM rules. This procedure will also avoid any loss of emission reductions due to the use of one single crediting period that does not include the vintage approach. The two PDDs concerning biomass heating in Moldova are identical except for the crediting period. The programmatic project aims at reducing GHG emissions by improving the efficiency and switching fuel in the heating of a series of public buildings (kindergartens, schools, hospitals, etc.). The energy conservation measures will take place in three phases. The Ministry of Finance of Moldova will provide loans to the municipalities for them to finance the improvements of public buildings. The boundary of the rehabilitated local heating systems in Moldova includes the end user heating system, the pipelines and the possible new local heating source (GHG emission source). The specific buildings are specified in the PDD. Centralized boilers or local power plants are not included within the boundary.

Program design, CDM Participants and funding. Carbon Finance Unit Moldova (CFU) is listed as the project participant, and will serve as the project's coordinating body. The installation of the technologies will be undertaken by Ministry of Education (in the case of schools and orphanages), the Ministry of Health (in case of hospitals) and the municipality/local authorities (in case of public buildings). The Project will be financed by IDA credit, internal cash generation and municipal contributions and the Swedish International Development Agency (SIDA) and by carbon revenues. The Ministry of Finance of Moldova will set up a lending scheme for the municipalities.

Baseline and Additionality. Baseline is established from the known fuel consumption for all of the considered public buildings. The baseline evaluation in the PDD does not include the program level itself. Additionality is demonstrated from the perspective of the municipalities and ministries responsible for the public buildings by analyzing prevailing practice barriers, investment barriers to implementing the technologies, and information barriers. The project does not address additionality from the perspective of the implementing agency.

Monitoring. All the project beneficiaries are very similar and consequently a common monitoring plan can be applied to them. The key parameter in the monitoring plan is the monthly metered fuel consumption. In cases where fuel meter readings are not available estimated values will be applied. An annual project emissions report will document the final ERs.

Crediting Period and emission reductions. The Energy Conservation project started July 1, 2004, the first biomass heating project started September 1, 2005 and the second will start September 1, 2007. The expected operational lifetime of the project activities including boilers and local network is 15 years. The crediting period is set to 10 years. Together, the projects will generate 47,000 tCO_2e annually and a total of 248,000 tons until 2012.