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ASSESSMENT AND IMPROVEMENT OF THE CURRENT CARBON TRADING

Final Report

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This publication was produced for review by the United States Agency for International Development. It was prepared by Nicholas Dreves, JE Austin Associates Inc.

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Final Report

USAID JORDAN ECONOMIC DEVELOPMENT PROGRAM
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EXECUTIVE SUMMARY

In order to increase the competitiveness of Jordanian businesses in the international carbon credit market, it is necessary to fully understand the state of play of the Clean Development Mechanism in Jordan. It is also important to understand the key gaps and needs, so as to create the most conducive and enabling environment to seize this opportunity, bring maximum value to Jordanian business, and lead the carbon market regionally.

Although Jordan is relatively well set-up to facilitate the registration of CDM projects, especially compared to its neighbors, there is a very strong need for increased awareness of this opportunity for all potential participants, both public and private. There is also a strong need to increase the basic understanding of how to navigate the process once the decision has been made to participate, as the existing knowledge and data is not readily available to interested parties. Furthermore, existing domestic proponents are hamstrung by a lack of potential projects (an awareness and resource constraint issue), funding to expand (an awareness and capital problem), and transparent legal framework (a legal problem). Finally, the general trend of risk adversity demonstrated by these proponents inhibits the expansion of existing entities and dis-incentivizes the creation of new ones.

However, Jordan is well positioned to address these concerns. This report proposes the following recommendations:

- The creation of an electronic cataloguing system for the DNA, so as to facilitate the recording, documenting, and sharing of information;
- The creation of a DNA website, alongside e-copies of key processes, procedures, and background/support information;
- The creation of an advocacy entity, specifically for carbon/CDM, that is separate from the DNA – this avoids any potential conflict of interest, and a dedicated staff will be able to do much for awareness raising, capacity building, and advocacy, as well as serving as a clearing house for information and serving as a link for interested parties;
- The development and implementation of a strong awareness campaign (particularly for the financial sector), to be rolled out in phases;
- Lobbying for an enabling legal environment to incentivize service providers and provide a transparent and long-term platform/framework by which businesses can take decisions to develop renewable energy projects.

INTRODUCTION

This assessment has been drafted to provide Jordan, and more specifically the SABEQ program, with a clear picture of the state of the carbon market in Jordan. Although fairly narrow in breadth and depth (due to time and resource constraints), this paper provides a summary of key background information of the carbon credit markets (specifically touching upon the Clean Development Mechanism (CDM)), the existing state of play for the CDM in Jordan, key needs and/or gaps of the status quo, and finally offers three clear areas that should be addressed for improvement of the carbon marketplace in Jordan. It is the hope of the author that this paper, in combination with other work provided to SABEQ, will be used to leverage Jordan's existing resources to increase its participation in the international carbon credit markets, continue demonstrating responsible environmental stewardship, and lead the region in the CDM.

ESSENTIAL BACKGROUND

THE KYOTO PROTOCOL

The Kyoto Protocol (KP) is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC). The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions (called Annex I countries). These reductions amount to an average of five per cent against 1990 levels over the five-year period 2008-2012. The major distinction between the Protocol and the Convention is that while the Convention *encouraged* industrialized countries to stabilize GHG emissions, the Protocol *commits* them to do so.

Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere (as a result of more than 150 years of industrial activity), the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. A total of 184 Parties of the Convention have ratified its Protocol to date, with Australia being the most recent addition (the US is still not a ratified Party). The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the "Marrakesh Accords."

THE KYOTO MECHANISMS

The central feature of the Kyoto Protocol is its requirement that countries limit or reduce their greenhouse gas emissions. By setting such targets, emission reductions took on economic value. To help countries meet their emission targets, and to encourage the private sector and developing countries (called Non-Annex I countries) to contribute to emission reduction efforts, negotiators of the Protocol included three market-based mechanisms. The Kyoto mechanisms are:

- Emissions trading;
- Joint Implementation (JI);
- Clean Development Mechanism (CDM).

Together, these mechanisms help stimulate green investment and help parties meet their emission targets in a cost-effective way. They are discussed below, in ascending order of importance to Jordan.

JOINT IMPLEMENTATION

Joint Implementation (JI) provides for Annex I parties to implement projects that reduce emissions in other Annex I parties, in return for emission reduction units (ERUs). These ERUs in turn can be used by the Annex I party to meet its own emissions target under Kyoto. In practice, this means facilities being built in Eastern Europe and Russia, which are considered "economies in transition," primarily by industrialized Western European parties.

A fundamental idea behind JI is that of transfer: the sponsoring governments will receive credits that may be applied to their emissions targets, while the recipient nations will receive foreign direct investment and will "leapfrog" their technology to a higher level. Because of the entrenched infrastructure that often characterizes these industrialized parties, it is often cheaper to carry out energy-efficiency projects in these transitioning countries.

EMISSIONS TRADING

Emissions trading provides for Annex I Parties to acquire carbon credits from other Annex I and Non-Annex I Parties and use them towards meeting their respective emissions targets under the Protocol. This enables all parties involved to make use of lower-cost opportunities to reduce emissions, irrespective of where those opportunities exist.

In practice, the Protocol allows countries that have emissions units to spare (whether they be Assigned Amount Units (AAUs), ERUs, or Certified Emissions Reductions (CERs) from the Clean Development Mechanism) to sell this excess capacity to countries that are over their targets. This market has been informally dubbed the "carbon market" – as emissions of all gases are counted in terms of carbon dioxide – and is both flexible and realistic. Parties unable to meet their commitments will be able to purchase credits for compliance, but at

market prices. The higher the cost, the more pressure they will feel to use energy more efficiently domestically and to research and promote the development of alternative sources of energy.

Although a simple concept, a global market where emissions units are bought and sold has been complicated to set up. Details were not specified in the original Protocol, so additional negotiations were held in order to establish clear procedures as elucidated in the Marrakesh Accords. These details include: countries' actual emissions and precise records guaranteeing them, as well as trades carried out; the creation of registries, as well as accounting procedures dedicated solely to the carbon market commodities; international transaction logs, and review teams to ensure and police compliance among parties.

In addition to assigned amount units (AAUs), countries with credits created through JI projects and/or the Protocol's Clean Development Mechanism, which involves funding activities to reduce emissions by developing nations, are also fungible in the carbon market. All of these various units may be bought and sold in the emissions market or banked for future use according to their respective rules.

Emissions trading schemes may also be established as policy instruments at the national and regional level. Under such schemes, governments set emissions reduction targets to be met by their participants, and, depending on the rules of the scheme, their obligations may be fulfilled. These smaller carbon markets are now established in the European Union and other groups of countries and began operating in advance of the Protocol's entry into force in 2008. These emissions-trading systems are intended to start the process and to link up with the Protocol's global market once it becomes operational.

CLEAN DEVELOPMENT MECHANISM

The CDM allows emission-reduction (or emission removal) projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one ton of CO2.[1] These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol.

The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets.

[1] A 'Certified Emission Reduction' (CER) unit is equal to one metric ton of CO2 equivalent emissions reduced or sequestered arising from a CDM project

The projects must qualify through a rigorous public registration and issuance process designed to ensure real, measurable and verifiable emission reductions that are additional to what would have occurred in a "business-as-usual" scenario. In order to be considered for registration, the Designated National Authority (DNA) of the host country must first approve a project. The CDM Executive Board, answerable ultimately to the countries that have ratified the Kyoto Protocol, oversees the mechanism.

Operational since the beginning of 2006, the mechanism has already registered more than 1,000 projects (at the time of this writing) and is anticipated to produce CERs amounting to more than 2.7 billion tons of CO_2 equivalent in the first commitment period of the Kyoto Protocol (2008–2012). The mechanism is seen by many as a trailblazer: it is the first global, environmental investment and credit scheme of its kind, providing standardized emissions offset instrument, CERs.

Carrying out a CDM project and receiving final registration by the CDM Executive Board requires multiple steps. These steps are regarded as the CDM project cycle[2], and are put in place in order to safeguard the actual climate benefits of CDM project activities (see below for the key steps and participants involved in the development of a CDM project).

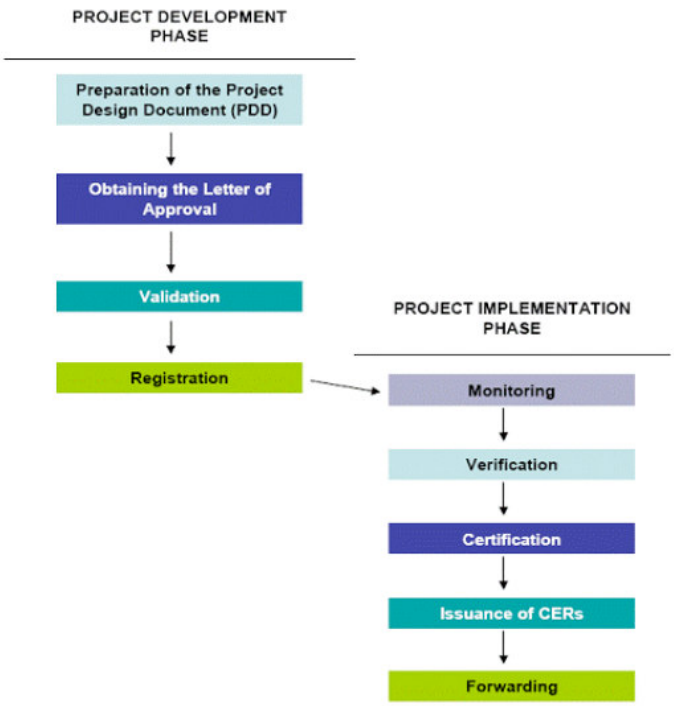

Figure 1 - CDM Project Development Process (source: http://cdmrulebook.org)

[2] This paper specifically refers to only CDM-related project needs, and does not address the needs of the basic project development cycle. It is assumed that the reader understands that these are two separate – although related and linked – processes.

CDM PARTICIPANTS

- Designated National Authority (DNA) – local regulatory authority
- Project Developer – project proponent
- Off taker – purchaser of CERs
- Carbon Advisor/consultant – can be the same as Off taker, but could also be independent consultant
- Designation Operational Entity (DOE) – third party auditor of project documentation for validation and verification
- Legal – In-house or specialist for contract drafting and document review
- Banks/financial institutions – financing of project, as/if required
- NGOs– advocacy and watchdogs for system and locals

PROJECT DESIGN DOCUMENT

This step involves developing a Project Design Document (PDD), which is a standard format document describing how the activity intends to fulfill the pre-requisites for registration as a CDM project. The PDD consists of a general description of the project, its proposed baseline methodology, a timeline and crediting period, a monitoring methodology, calculation of GHG emissions by source and stakeholder comments. The host country Designated National Authority (DNA) must issue a letter of approval for the project (based on the PDD) indicating that the government of the host country participates voluntarily in the proposed activity and that the project assists the host country in achieving sustainable development.

VALIDATION AND REGISTRATION

Validation is a process involving an independent evaluation of the project activity by an external auditor known as a Designated Operational Entity (DOE) – accredited by the CDM Executive Board – which is hired by the project participants (a list of DOEs can be downloaded from the UNFCCC website). The DOE reviews the PDD, conducts site visits and interview in order to determine whether the project meets CDM requirements.

Once a project activity has been validated by a DOE, a validation report is forwarded to the Executive Board (EB) requesting registration as a CDM project. The registration of a project will be final within eight weeks after the date of receipt by the EB, unless at least three members of the EB request a review of the project activity.

MONITORING

Once the project is operational, the emissions that occur from the activity must be monitored. This is done according to the monitoring plan submitted and approved in the PDD, which indicates the method used for measuring emissions from the project and how data relevant for these calculations will be collected and archived. The information on emission reductions must be included in a monitoring report estimating the amount of CERs generated and submitted to a DOE for verification**.**

VERIFICATION AND CERTIFICATION

Verification is the independent review of the monitoring report submitted by the project participants. A DOE different to that involved in the validation process carries out verification. The DOE must ensure that the CERs have been generated according to the guidelines and conditions agreed upon during the validation of the project. A verification report is then produced.

Certification is the written assurance from the DOE that the project achieved the stated level of emission reductions and that these reductions were real, measurable and additional. The certification report constitutes a formal request to the EB for issuance of CERs. Unless a project participant or at least three members of the EB request a review within fifteen days, the EB will instruct the CDM registry to issue the CERs.

ELIGIBLE CDM PROJECT TYPES

In order to comply with the overall framework for CDM project development, the project type applied must be eligible under the framework of the Kyoto Protocol. In general, all projects that reduce greenhouse gas emissions, while at the same time complying with the host country sustainable development criteria and the additional requirements as stated under the Kyoto Protocol, are eligible as CDM projects.

In order to safeguard the actual climate benefits of CDM projects, the crucial feature is to prove that CDM projects are additional. This implies that it should be possible to demonstrate that the proposed project activity is not the “business-as-usual” scenario and that the emission reductions are additional to any reductions that would have occurred in the absence of the project activity. This can be done by demonstrating that the CDM can help overcome some existing barriers for implementation of a given emission reduction activity.

In terms of energy-related CDM activities, some examples are listed below:

- End-use energy efficiency improvement
- Supply-side energy efficiency improvement
- Renewable energy
- Fuel switching
- Industrial processes
- Solvent and other product use
- Waste management

MODELS OF CDM PROJECTS

BILATERAL CDM

This model is characterized by a close relationship between an Annex I investor and host country project entity in the design, development, and/or financing of a CDM project. Such an approach envisions one or more Annex I investors as direct participants in the development, financing and possibly operation of a CDM project. In this decentralized model, the project selection, financing, and sharing of credits (and any pricing agreement) are worked out directly between parties on a project-by-project basis. This would be considered the 'typical' model for CDM project development.

MULTILATERAL CDM

This model is often referred to as "portfolio" or "fund" approach, and is very similar to a mutual fund. Financing flows from Annex I investors through a centralized investment fund (such as the ones managed by the World Bank) and is channeled towards project activities in host developing countries. There is typically a very clear separation between financing roles and project development roles in this model. Once emission reductions from project activities are issued, credits would be funneled to the Annex I investors, receiving CERs proportional to their capital contributions to the fund.

UNILATERAL CDM

Such a model places project development and financing, as well as its associated risks, entirely in the realm of the host country (there is no Annex I participation) and project developer. Non-Annex I parties would be free to develop and fund domestic activities that lead to additional emission reductions. Once certified, emission reductions from these activities would accrue directly to the host country. The host country could, in turn, sell CERs to interested Annex I corporations or governments on their own at a later date with no obligation to sell to any specific party.

VOLUNTARY MARKET

In voluntary carbon markets, activities that reduce GHGs produce Verified Emission Reductions (VERs) that can be sold to companies or individuals wishing to voluntarily reduce their carbon footprints. GHG emission reduction projects developed under the Kyoto Protocol's Clean Development Mechanism (CDM) have been highly successful in reducing emissions and generating Certified Emission Reductions (CERs), which are then purchased by governments and organizations in Europe and Japan to help meet their emission reduction targets. Although voluntary reductions are similar to regulated credits, they are different in some important ways.

VERs can be generated from projects which:

- Are either based in a country that has not ratified the Kyoto Protocol or does not have the infrastructure to support CDM project development;
- Have not yet been registered under the CDM;
- Fall outside of the scope of the CDM;
- Are too small to warrant the costs of CDM approval; and/or
- Are specifically developed for the voluntary market.

Several voluntary markets are in development around the world. However, there is no single regulating body currently enforcing quality standards in relation to the development and trading of VERs. For this reason it is important to partner with companies that have extensive experience developing high-quality emissions reduction projects that deliver real and measurable emission reductions.

CONTRACTUAL

In order for sellers and buyers of carbon credits to enter into a trade agreement, an Emission Reduction Purchase Agreement (ERPA or VERPA in the case of voluntary credits) is commonly used. The ERPA sets forth the terms and conditions of credit delivery, delegates responsibilities, and payment between the seller and the buyer.

This document takes various forms but the main objective of the agreement is to cover the legal aspects of credit ownership, the terms of payment and delivery as well as the management of risks inherent to the transaction.

In addition to this legal document, all other required documents must also be in place, such as those to ensure appropriate operation, maintenance, and basic running of the underlying project.

JORDAN'S STATE OF READINESS TO ENGAGE IN CDM – STATUS QUO

Jordan ratified the UNFCCC on 12 November 1993, and ratified the Kyoto Protocol on 17 January 2003.[3] As a Non-Annex I Party, Jordan does not have any commitments to reduce its emissions of GHGs. Jordan is, however, actively involved in the CDM, with one large-scale project registered (fuel switch at Aqaba Thermal Power Station, ATPS) with the Executive Board (EB) and several advanced projects in the CDM pipeline (the "Reduction of Methane Emissions from Ruseifeh Landfill," the "Samra 300 MW combined cycle project," and the "Amman Ghabawi Landfill Gas to Energy Project"). These projects are all available for review online at the UNFCC CDM website (http://cdm.unfccc.int/index.html). In addition to these four projects, there are a two other projects that have fully navigated Jordan's DNA procedure to obtain a Letter of Approval, as well as half dozen more in the pipeline.

[3] For more information related to climate change activities in Jordan – past and present – please see the this link, sponsored by the MoE, GEF, and the UNDP to assist in drafting Jordan's Second National Communication: http://www.snc.gov.jo/efforts

NATIONAL INSTITUTIONAL SETUP FOR CDM

National focal points for climate change related matters are housed primarily in the Ministry of Environment (MoE) of Jordan. The Climate Change Unit (CCU), housed in the MoE's Monitoring and Assessment Directorate and comprised of three individuals, supports all climate change activities (national communications, strategy formation, CDM, etc.) and serves as the clearing house for CDM specific information. The CCU is the reporter and organizer for the Designated National Authority (DNA) of Jordan, a required entity under the CDM. The DNA is charged with ensuring that all Jordanian CDM projects are voluntary and comply with all domestic rules and regulations, while also meeting the sustainable development needs of Jordan.[4,5] The DNA is comprised of a secretariat, charged with taking final decisions on CDM-related matters, and is assisted by a Technical Committee who reviews CDM project proposals according to their respective technical merits. In addition to the DNA, Jordan also has a group dedicated to the drafting of Jordan's Second National Communication (required under the UNFCCC), based and executed at the Ministry of Environment, funded by the Global Environment Facility (GEF) and managed by UNDP-Jordan.

By providing a Letter of Approval (LoA), the DNA signals to the validator and the CDM Executive Board that a particular project meets all domestic requirements for sustainable development. In order to obtain this LoA, the project developer of the prospective CDM project must submit documentation according to the following procedure.

PROJECT APPROVAL PROCESS

The Project approval process consists of the following:

1. The project developer (PD) sends the CCU a Project Idea Note or Project Document Form (PIN/PDF) of the proposed project.
2. The CCU reviews the project on a preliminary basis and provides any feedback as necessary, as well as adds the project to the national pipeline of CDM projects. (time – 2-3 days)
3. The PD proceeds with the development of the project, reviews and amends the PIN/PDF from feedback from CCU and sends updated copy to CCU. (time – as needed)
4. CCU forwards the PIN/PDF to both the Technical Committee (TC) of the DNA and the Secretariat of the DNA for review. (time – 2-3 days)
5. The TC reviews the PIN/PDF according only to the technical merits of the project and forwards its concerns or recommendations to the DNA, or alternatively responds back to the PD for more information or modification of project information. (time – 1-2 weeks)

[4] For a full list of DNA members, please see Appendix 3.

[5] For an indicative list of sustainable development criteria that can be used as a guideline, please see Appendix 2.

6. If the TC approves the project, their recommendations are forwarded to the DNA Secretariat. If concerns are highlighted, the PD will revert to step 3 with feedback from the TC.
7. With the recommendations for the project from the TC, the DNA Secretariat reviews the project according to its merits and by the rules developed by the CDM EB, primarily sustainable development, and either issues a preliminary approval for the project, or sends the project documentation back to the PD with its concerns for modification.
8. If the project receives preliminary approval, the DNA Secretariat informs the PD and awaits an official letter from the PD stating its affirmation and approval of the 15% surcharge on CER revenues to be directed to the Jordan Environment Fund.
9. Upon receipt of the 15% letter, the DNA Secretariat will issue a final and official Letter of Approval for the respective project.

As previously discussed, both project developers and project opportunities exist; however, there are very few domestic entities actively pursuing them within the CDM industry framework. At present, there are only three to four companies working within the CDM, and they are currently only serving as local partners/intermediaries. There are no locally-based Designated Operational Entity (DOEs). Though there are local branches of DOEs within Jordan (i.e. SGS and DNV), CDM-specific expertise is limited to Dubai and/or to locations entirely outside the region, and therefore DOEs and due diligence for CDM project development rely entirely on the import of talent and expertise. At present, there are no financial institutions, expert consultants, or CER off-takers located within Jordan that are directly and actively involved (though there are entities within the region, based regionally and internationally, that are actively involved in CDM project development). For example: ATPS is working with EcoSecurities (a private off-taker), Ruseifah Landfill with Finnder (Finnish Carbon Procurement Programme), Samra Power Plant with MGM International (also a private off taker), and Ghabawi Landfill with the World Bank (a multilateral institution working on behalf of numerous carbon funds).

PROBLEMS WITH CURRENT SITUATION – BARRIERS FACING PROJECT DEVELOPMENT

Despite being relatively advanced and a leader in the Middle East region, Jordan's CDM market is still in its infancy. The minimum national and institutional set-up for CDM project execution exists domestically (i.e. there is a DNA and there are several CDM projects lined up) but nevertheless there are numerous barriers impeding the pace and magnitude of CDM development, and domestic and foreign investment.

INSTITUTIONAL

The DNA, as described above, is charged with ensuring that all Jordanian CDM projects are voluntary and comply with all domestic rules and regulations, while also meeting the sustainable development needs of Jordan. To date, they have provided official Letters of Approval to several projects, which are now advanced through the pipeline and at stages close to registration (including one registered project, ATPS). Unfortunately, there is no documented material (soft or hard copy) available to the public highlighting these accomplishments, establishing what the DNA's role and responsibilities are (e.g. terms of reference), or elucidating the necessary steps to obtain an LoA for a prospective project (it should be noted that above steps were synthesized during the course of the author's assessment and interviews made with relevant officials in the CCU.[6]) In addition, there is no formal review process for the DNA and the CCU, nor for the procedures put in place by them. For example, the current procedure for obtaining a LoA should be reviewed, as the process neglects to take into consideration or review the final project documentation (the Project Design Document or PDD) needed to submit a project for registration to the CDM EB. Given that the PDD is a legal and published document, and as such is the only relevant document reviewed by all CDM participants, it would be prudent for the DNA to review the final draft. Furthermore, it should be the final document by which the DNA bases its decision for project approval.

Jordanian banks and financial institutions are another area where further research should be performed. Meetings with several aggressive Jordanian banks suggest that these entities are not currently active in the carbon markers and are completely unaware of their potential as a supply of new and innovative financial services. Such services could range from sophisticated debt-service arrangements for project developers (with carbon credit revenue taken into account) to attractive loan facilities for residents to invest in renewable and clean energy products (i.e. solar water heaters), to taking principal positions in carbon trading.

Private sector entities currently active in the CDM in Jordan (aside from project developers) are mostly limited to partners and intermediaries who serve as local contacts and liaisons for international carbon developers. This intermediary role is mainly relegated to streamlining local processes, though there is evidence that some of these partners are beginning to

[6] One could look at the websites of Egypt, the UAE, the Philippines, or China as examples.

expand their services beyond that of the intermediary relationship and will hopefully bring more of the carbon value chain in to Jordan.[7]

On the not-for-profit side, there are currently no NGOs or advocacy groups specifically organized to address climate change or the carbon credit industry in Jordan, although there are numerous groups that are engaged in the environmental field. By providing an enabling environment (including more recognition and acknowledgment by officials of the instrumental role NGOs can and should play to enhance environmental quality), strengthening of institutional capacity for NGOs, and providing sustainable sources of funding needed, NGOs will be able to carry out their environmental activities and projects on a sustainable basis, in addition to serving as watchdogs for the industry. Lastly, these non-profits can play an instrumental role in conducting awareness campaigns to promote CDM projects both in Jordan and abroad, and rallying and lobbying support among decision-makers and various segments of the public to amass more momentum for CDM projects in Jordan.

TECHNICAL KNOWLEDGE AND HUMAN RESOURCES

Both public and private project developers do exist, though most lack basic awareness and knowledge of the conditions, complexities, and risks of developing CDM projects. This is to be expected of new market players in any new industry, and will be mitigated with time and experience. Specific knowledge on the various aspects of CDM as related to its regulation, monitoring and enforcement is needed before, during, and after implementation of CDM projects in Jordan. Secondly, the level of technical skills in Jordan and the quality of trained personnel in many fields of expertise require enhancement and upgrading, despite Jordan's high ranking in terms of skilled labor in comparison to other countries within the region. Thirdly, there are few, if any, local firms that can provide advisory, consulting, and/or legal services to the industry; given this, project developers are almost entirely reliant on international carbon companies. This creates an environment in which project developers are not able to take full advantage of existing global market knowledge, weigh tradeoffs between risks and returns, assess counterparties, and capture the full value of carbon credits. The capacity building of local advisory firms is therefore of paramount importance.

There also appears to be a considerable lack of knowledge about CDM activities and climate change in general within most of the financial firms in Jordan. In fact, these firms rarely become involved in the undertaking of studies or any tasks in the field of the environment and, if there is a need to become involved in any environmental work, these firms, unable to stay in-house, tend to hire freelance experts in the field. There are several domestic firms that offer such services, however, for all practical purposes, their value is typically unappreciated and/or overlooked. Fortunately, some of these firms have foreign partners/associates that have already declared their willingness and commitment to participate in such projects, or they have signaled willingness themselves. This in turn has some important implications for local firms in terms of acquisition of international experience

[7] As a note, one intermediary that the author spoke with was unable to raise the necessary funds to expand the company's operation due to the lack of knowledge, and subsequently, confidence in the climate change industry.

and expertise in such a field via their foreign partners. Eventually, this will lead to institutional capacity building in the field of CDM project-related activities within Jordan.

The role of the financial, technical, and consulting firms in Jordan (and regionally) with regard to CDM project cycle activities may include, though is not limited to, the following:

- Provision of background information and updates on CDM developments.
- Carrying out GHG audits.
- Identification of the most cost-effective carbon emission reduction projects.
- Validation of baseline methodologies.
- Verification of actual emissions reduction.

INFORMATION AND AWARENESS

One of the most important conditions for the successful implementation of CDM projects is a high degree of awareness of the business opportunity and "how-tos" of CDM, as well as the availability of clear and unbiased information. In this context, Jordan – through various public and private institutions – needs to gather and disseminate information on various aspects related to CDM. Simultaneously, Jordan has to create, strengthen and/or enhance awareness of various stakeholders on CDM. This could be achieved through issuance of brochures, leaflets, information packages, websites etc. Additionally, specific industries should be targeted via presentations and discussions on CDM in their pre-existing industrial forums, conferences etc. It is absolutely clear that one of the reasons for the lack of momentum, as pertains to CDM implementation in Jordan, is due to the fact that information and awareness falls short of the optimal levels.

With specific regards to project developers, although the Ministry of Environment and the DNA have managed to wage a limited awareness raising campaign within government entities, it is clear that there exists a lack of awareness of the CDM for many large- and medium-sized businesses. In addition to reviewing the 2nd National Communication to the Kyoto Protocol, a review of existing methodologies has been done in order to link large emitters/energy consumers to approved methodologies. This will be provided to SABEQ and the MoE and should then be disseminated to the appropriate industries/companies by an advocacy group, and further shared with service providers (existing and potential). All of this would help to address the general risk-averseness of the population and institutions for new and innovative international carbon credit opportunities.

LEGISLATION, SUBSIDIES, TARIFF RATES

In general, the attraction of foreign investors relies heavily on the facilities and incentives provided to them in host countries. In the case of CDM implementation in Jordan, legislative amendments need to be introduced in order to include CDM project components within various investment incentives law. In addition, the lengthy and timely procedures for undertaking investments in Jordan need to be revised in order to facilitate the implementation of CDM projects in an efficient and effective manner.

The government can also help to promote clean and renewable energy technologies by providing a long term, transparent, and consistent regulatory environment for importing, developing and operating clean and renewable energy technology and projects. It is unclear if the new proposal to develop a Jordan Environment Fund to support renewable energy projects will be positive or negative, as the majority of the funding is set to be sourced from a 15% surcharge on local CDM revenues. While a fund dedicated to clean and renewable projects is certainly positive, there may be deleterious affects from this surcharge in the additionality component of CDM projects, as well as the overall financial viability of such projects.[8] More research is needed in this area before a full capacity building and awareness raising program can be developed. Tendering processes and criteria also should reflect industry standards, as all too often the selection of counterparties is heavily weighted on price, instead of on the party's risk-mitigation skills or the specific CDM risks of the project.

Many CDM project types (e.g. in the area of renewable and energy efficiency) suffer knock-down effects from the high level of subsidies on fossil fuels in the region, because the effect of fuel saving only results in small savings in fuel costs. Thus fuel subsidies in a country can make many CDM projects financially unattractive and represent a major barrier for their implementation.

Though the Jordanian government seeks to reduce fuel subsidies, however, the general socio-economic situation of the population and the national economy in Jordan poses many challenges to this strategy and impedes progress.[9] The lack of a realistic or known natural gas price is also expected to cause significant distortions in the future of regional industries that rely on exported gas, though a switch to natural gas away from any 'dirtier' fossil fuel is positive.

Specifically for wind, a renewable energy source that is seeing increased interest in Jordan, gaps in the legal and regulatory framework that restrict or slow down wind power development should be identified and addressed. An inadequate electricity tariff, lack of institutional capacity and information on wind resources, as well as lack of knowledge (especially in the financial sector) about wind energy and how to evaluate the risks involved in lending for this type of activity is hindering progress and development.[10] There are

[8] Almost by definition, most carbon credit projects are financially risky. Any additional costs to such projects could serve to increase risk and dissuade investment.

[9] http://www.globalsubsidies.org/en/subsidy-watch/news/jordan-and-syria-rethink-fuel-subsidies-crude-prices-continue-soar

[10] http://go.worldbank.org/TG94CSJ1J0

several wind projects on the sideline that are awaiting legislative support and clarity before they can advance.

While at present no official assessment of the Jordanian voluntary market has been performed, anecdotal evidence suggests that there is currently little, if any, movement or awareness in this segment of the carbon market. A full study should be performed and a capacity building and awareness-raising program developed, this time aimed at the general public instead of industries. Fortunately, the voluntary market has been shown to grow with an increase in the awareness of climate change and the carbon markets in general, so capacity building and awareness raising efforts in the CDM will certainly have knock-on benefits to the voluntary market.

MOBILIZING JORDAN'S CDM POTENTIAL – WHAT CAN BE DONE?[11]

The conditions to mobilize the CDM potential in Jordan are quite good. Jordan provides a comparably favorable investment climate and overall stability, has a broad range of existing governmental and non-governmental institutions, and companies with relevant technical, financial and organizational skills necessary to transfer over for the successful implementation of CDM projects. Nevertheless, there are a number of areas where Jordan requires attention to prepare both public and private sectors and governmental institutions to be able to reach its domestic potential and to compete in the international emission reductions market.

Preparing Jordan for the CDM rests on three pillars:

- Institutional environment;
- Awareness raising and capacity building;
- Learning-by-doing.

In preparing Jordan for the CDM to be able to evaluate, approve, and register efficiently the projects comprising of Jordan's CDM potential an adequate institutional capacity has to be put into place and cemented by the government. The existing governmental climate change entities must be set in place with clear terms of reference (of powers and responsibilities), financial support, and the implementation of best business practices of organization and information management (i.e. up-to-date IT equipment, fast and consistent web access, and the construction of a web portal for public access to national CDM information). The next steps for the DNA include documenting and institutionalizing their knowledge and processes, creating e-copies of all material, and providing a forum for public access. In addition to the existing DNA set up, this strategy must include establishing an institutional environment that enables and promotes the CDM in the country. Constant monitoring of the Kyoto process

[11] Many, if not all, of these recommendations have already been provided to SABEQ and the EDAMA Association as an EDAMA Action Plan to begin reviewing and, hopefully, implementing. Please see SABEQ (http://www.sabeq-jordan.org/) or EDAMA (http://www.edama.jo/) for more information.

and of the international market of emission reductions allows for this pro-active approach to be flexible, enabling the government to detect changes in the market and to adapt its CDM strategy accordingly. This approach represents minimal costs to the Jordanian government whilst activating the country's CDM potential.

The domestic institutional capacity of Jordan to create and manage CDM projects, as well as maintain motivation, lacks sustainable momentum. This necessitates institutional capacity building of the relevant national agencies prior to or simultaneous with carrying out CDM projects. Although there are a variety of governmental institutions participating in climate change related work in Jordan, it is often the case that other employees within those institutions are unaware of existing programs and opportunities. A program of awareness raising and information sharing, implemented on a quarterly basis, would help to alleviate such gaps.

A database or a national clearinghouse for the international GHG offset market should be established and continuously updated. The objective of such a database or clearinghouse is to provide a systematic view with in-depth analysis and monitoring of the international carbon market. This is quite important for enabling Jordan to maximize its benefit from participation in the CDM activities on an international level. Along this line, the Climate Change Unit, in coordination with other government agencies and ministries should support the creation of an advocacy group.[12] While there exists a significant amount of expertise and experience in the DNA, an advocacy group should be created to raise awareness and lobby for a cleaner and more sustainable Jordan. This could be a quasi-governmental organization, but it should reside officially outside of the boundaries of the DNA in order to avoid any conflicts of interest between supporting project developers and the regulation of those projects.

[12] The CCU should also begin collating material and websites to provide to this advocacy group. For example, the website http://www.snc.gov.jo/profile could be included, as it is directly linked to climate change work in Jordan. As there is currently no clearinghouse for such information, the advocacy group would be a good start to gathering, holding, and disseminating such information.

The advocacy group's role could include (among many others):

- Undertaking activities for awareness raising and promotion of CDM in Jordan[13];
- Organizing training and workshops, seminars and exhibitions for capacity building on different aspects of CDM activities in co-operation with existing governmental or private institutions;
- Monitoring the international carbon market;
- Facilitating matchmaking between potential project hosts, investors, technology suppliers, etc.;
- Supporting the CCU for the CDM projects, as well as carrying out monitoring and follow-up activities for CDM projects initiated in Jordan;
- Assisting and/or acquiring various approvals and permits on behalf of CDM project developers without having them to go through a timely and tiresome process themselves;[14]
- Liaising and coordinating with ministries and governmental agencies to support the CCU in the preparation of position papers for Jordan on CDM;
- Keeping track of the CDM projects in Jordan in a national registry.

Given the preference of international investors for private company partners in CDM projects and vice versa, emphasis should be made to encourage the private sector of Jordan to build up the necessary engineering, consulting and verification due diligence skills to pursue such projects. This will enable Jordan to enhance its CDM capacity, increase the attractiveness of Jordan to international investors (especially those in Europe and Japan), and prepare Jordan to service both domestic and regional CDM needs. For example, there exists significant CDM potential in neighboring countries; here, Jordan could hold a competitive edge to meeting those projects' needs (i.e. Saudi Arabia, Iraq).

Finally, experience in other countries shows that learning by doing, i.e. the actual implementation of a CDM project is the most efficient way to prepare the relevant stakeholders and to pave the way for the CDM in a country. It is, therefore, suggested that parallel to all institutional and capacity building initiatives, the government and the newly formed advocacy group should promote the study and analysis of one or more CDM projects (e.g. ATPS). This could be used as the basis for the identification of a short-list of further CDM projects (in conjunction with the consolidated methodology review already prepared, as well as the list of all companies that contribute to GHG emissions in Jordan), for potential CDM implementation. Along with the lessons learned, the list of applicable and available methodologies, and the list if GHG-emitting companies in Jordan, a list of high potential CDM projects could be generated for further review by both domestic and international carbon market players.

[13] An Awareness Raising Campaign Roadmap is attached to this document as an Appendix (Appendix 5). Please use this Roadmap as a guideline when developing an awareness campaign.

[14] This will lower transaction costs considerably and thus, be instrumental in catalyzing CDM projects in Jordan.

CONCLUSION

At present, Jordan is the regional CDM leader: with the exception of its neighbors Egypt and Israel, there is only one other registered project within the Levant and Gulf regions, a gas flare avoidance project in Qatar. With one large scale registered project and several more advanced projects in the pipeline, Jordan has the potential to shift the momentum of CDM interest in the region. In addition to garnering the interest of large international carbon participants, Jordan can use this success to influence local and regional players to realize the existing potential of the CDM and demonstrate both the financial and environmental integrity of greenhouse gas reducing projects.

It is clear that Jordan faces several needs and that there are gaps in the current state of play: institutional gaps, awareness and capacity building needs, legislative and policy issues, among several others. However, these gaps are not insurmountable. With clear, consistent, and focused support and the leveraging of existing domestic resources, Jordan has the ability to successfully address all of the barriers that it currently faces in reaching full CDM potential.

APPENDICES

APPENDIX 1 – INSTITUTIONAL SETUP OF JORDAN DNA

1. DNA
    a. Secretary General of Ministry of Environment
    b. Secretary General of Ministry of Agriculture
    c. Secretary General of Ministry of Water and Irrigation
    d. Secretary General of Ministry of Planning and International Cooperation
    e. Secretary General of Ministry of Finance
    f. Secretary General of Ministry of Industry and Trade
    g. Secretary General of Ministry of Transport
    h. Secretary General of Ministry of Energy and Mineral Resources
    i. Secretary General of Ministry of Accounts and Payroll
    j. Secretary General of Ministry of Tourism
    k. Climate Change Unit (CCU) – reporter
2. Technical Committee – sub unit of DNA
    a. Ministry of Environment (permanent member)
    b. Ministry of Agriculture
    c. Ministry of Water and Irrigation
    d. Ministry of Planning and International Cooperation
    e. Ministry of Finance
    f. Ministry of Industry and Trade
    g. Ministry of Transport
    h. Ministry of Energy and Mineral Resources
    i. National Energy Resource Commission (permanent member)
    j. Royal Society of Scientists (permanent member)
    k. Aqaba Special Economic Zone Authority
    l. University of Jordan (permanent member)
    m. Project Developer for project being considered (permanent member as per each respective project)
    n. Reporter from the CCU
3. Climate Change Unit (CCU) – reporter and focal point for climate change matters
    a. 3 members from the Monitoring and Assessment Directorate of the Ministry of Environment

Project Approval Process

1. The project developer (PD) sends the CCU a PIN/PDF of the proposed project.
2. The CCU reviews the project on a preliminary basis and provides any feedback as necessary, as well as adds the project to the national pipeline of CDM projects. (time – 2-3 days)
3. The PD proceeds with the development of the project, reviews and amends the PIN/PDF from feedback from CCU and sends updated copy to CCU. (time – as needed)
4. CCU forwards the PIN/PDF to both the Technical Committee (TC) of the DNA and the Secretariat of the DNA for review. (time – 2-3 days)

5. The TC reviews the PIN/PDF according only to the technical merits of the project and forwards its concerns or recommendations to the DNA, or alternatively responds back to the PD for more information or modification of project. (time – 1-2 weeks)
6. If the TC approves the project, their recommendations are forwarded to the DNA Secretariat. If concerns are highlighted, the PD will revert to step 3 with feedback from the TC.
7. With the recommendations for the project from the TC, the DNA Secretariat reviews the project according to its merits and by the rules developed by the CDM EB, primarily sustainable development, and either issues a preliminary approval for the project, or send the project documentation back to the PD with its concerns for modification.
8. If the project receives preliminary approval, the DNA Secretariat informs the PD and awaits an official letter from the PD stating its affirmation and approval of the 15% surcharge on CER revenues to be directed to the Jordan Environment Fund.
9. Upon receipt of the 15% letter, the DNA Secretariat will issue a final and official Letter of Approval for the respective project.

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APPENDIX 2 – SUGGESTED SD CRITERIA FOR JORDAN CDM PROJECTS

Suggested Sustainability Criteria for CDM Project Approval Process of Jordan

Official Checklist (to be published online and provided to project developers):

Environmental Sustainability

* Project meets Jordan's environmental protection requirements, standards and regulations

* Project produces real and measurable reductions in greenhouse gas (GHG)

Economic Sustainability

* Project utilizes more efficient (energy efficient, resource efficient) technology than common industrial practice

* Project results in technology transfer and/or capacity building in GHG emission reduction technologies.

Social Sustainability

* Project helps to improve quality of life by creating opportunities for jobs, job enhancement, etc

Detailed Checklist (to be circulated internally to DNA members for guidance):

Environmental

- Environmental sustainability
    - In line with national SD policy
    - Complying with existing land use planning
- Respect of quality of resources
    - Not exceeding the threshold of existing national, local and environmental standards
    - Not causing air pollution
    - Not causing water pollution
    - Not causing soil pollution
- Respect of biodiversity
    - Maintain sustainability of local ecological functions

Economic

- Contribution to GDP growth and diversification
    - Improved GDP growth rate
    - Support government's economic diversification strategy
    - Enhancing the capacity and utilization of local human resources (education/training)

- Employment
    - Contribution to increased employment

Social

- Local community health & safety
    - Not imposing any health risk
    - Complying with occupational health & safety regulation
- Local culture
    - Respect of local culture and traditions

Technology transfer & know how

- Enhancing the capacity and utilization of local technology
- Enhancing the capacity and utilization of local resources
- Not using experimental or obsolete technologies
- Not causing dependencies on foreign parties in knowledge and appliance operation (know-how transfer)

APPENDIX 3 – DRAFT TERMS OF REFERENCE FOR DNA TECHNICAL COMMITTEE

Terms of Reference for the Technical Committee of Jordan's CDM DNA

Purpose: The role of the Technical Committee is to carry out the required technical evaluation of CDM project proposals using the guidelines provided by the Secretariat of the DNA in Jordan to analyze a project's eligibility for the CDM.

Terms of reference for the Technical Committee:

1. To evaluate the technical components of proposed CDM projects based on the approved national CDM criteria;
2. To recommend and submit evaluated CDM project proposals to the DNA Secretariat for further consideration and Host Nation Approval;
3. To meet as needed to deliberate on proposed CDM projects;
4. To respond to any requests from the DNA Secretariat and provide guidance on specific technical issues in the CDM;
5. To assist the DNA in developing national policies, strategies, national CDM criteria and guidelines for implementation of CDM projects; and
6. For the Climate Change Unit reporter is to prepare minutes of Technical Committee meetings and distribute to all members.

Membership of the Technical Committee on CDM in Jordan consists of one representative from each of the below:

1. Ministry of Environment (Head of Committee)
2. Ministry of Agriculture
3. Ministry of Water and Irrigation
4. Ministry of Planning and International Cooperation
5. Ministry of Finance
6. Ministry of Industry and Trade
7. Ministry of Transport
8. Ministry of Energy and Mineral Resources
9. National Energy Resource Center
10. Royal Science Society
11. Aqaba Special Economic Zone Authority
12. University of Jordan
13. Project Developer for project being considered (member as per each respective project)

APPENDIX 4 – ROADMAP FOR ASSESSMENT OF CARBON TRADING IN JORDAN

Roadmap

Purpose: to serve as a guideline of next-steps in order to successfully complete the ToR for the "assessment and improvement of carbon trading" in Jordan as set out in the tasks and deliverables below.

Task	Deliverable
1- Conduct an assessment on Jordan's CDM activities including but not limited to the following and taking into consideration international best practices: ▪ National Institutional set up (status quo, improvement potential). ▪ Barriers facing projects owners. ▪ Role of the private sector including the role of banks. ▪ Opportunities that may or will exist after 2012.	- Documentation of the current process - List of recommendations on ways and mechanisms to improve the process. - Training needs assessment - Detailed list of carbon trading opportunities and possible beneficiaries/champions Clear recommendations on the role of the private sector (particularly financial institutions/banks). - Opportunities after 2012
2- Assist in developing an awareness campaign that will target possible beneficiaries through: ▪ Identifying high potential areas for CDM projects ▪ Providing appropriate content for CDM project awareness campaign	- Campaign objectives. - Detailed list of companies that need to be targeted through the awareness campaign - List of target entities and firms - 4 A4 pages of content to be used in the campaign - Benefits to champions/ implementers

As illuminated above, two main tasks have been highlighted as objectives of my time in Amman, Jordan. In my meetings with the Ministry of Environment (MoE), various SABEQ representatives, and a select group of third party stakeholders, my preliminary assessment is that the Designated National Authority (DNA) of Jordan has been designed and staffed with the necessary institutional and technical capacity to meet the current and near future needs of Jordan's Clean Development Mechanism (CDM) project pipeline. As it has been communicated to me by the MoE, there is a strong desire to bolster the current pipeline of

CDM projects with more high-potential projects and leads. Considering the capacity of the DNA, as well as the desires of its members to boost the CDM pipeline, I am suggesting the timeline below in order to successfully complete the deliverables listed above, as well as to reinforce the capacity of the DNA and provide an environment that is conducive to the development and advocacy of strong CDM/carbon projects in Jordan.

The four main areas of concentration are:

1. CDM DNA role and framework for duties (i.e. technical committees)
2. Sectoral review of methodologies (boost pipeline and local beneficiaries)
3. Awareness campaign and capacity building (i.e. website content, local knowledge)
4. Post-2012

25- 29 January 2009: completed

1-5 February 2009

- Identify more potential Jordanian champions/beneficiaries (in private and public sector), and arrange meetings
- Meet with DNA technical committee members to assess carbon knowledge, fluency
- Methodology review, in conjunction with DNA members, for relevant sectors and industries and distillation of appropriate methodologies for Jordanian market
- Meet with local and international banks and financial institutions

8-12 February 2009

- Meet with EDAMA task force
- Continue meetings with existing and potential champions/beneficiaries
- Discuss other areas of carbon market that may be of value to Jordan
    - VER projects
    - Carbon footprinting and carbon balancing/neutrality
- Determine strategy for awareness campaign based on above experience, and identify clear objectives and targets

15-19 February 2009

- Begin synthesis of assessment of state of carbon in Jordan (report writing)
- Work with DNA and identified Jordanian carbon champions/beneficiaries to determine clear recommendations for building and enhancing local capacity for CDM project development

22-25 February 2009

- Wrap up meetings
- Finalization of awareness campaign
- Strategy for medium- and long-term growth of CDM market in Jordan

APPENDIX 5 – ROADMAP FOR CDM INDUSTRY AWARENESS CAMPAIGN

Road map for CDM industry awareness campaign

- Difference between awareness vs. capacity building campaigns: raising awareness is about alerting the target group to an opportunity, and capacity building is about helping them to act on that opportunity.

  Awareness campaigns which target industry vs. public in general (i.e. this is not for the public in general, because that changes in terms of content, medium, etc)

- Potential for conflict of interest: recommend that regulatory body (DNA for CDM) be different from awareness/advocacy body (although both can be under auspice of MoE)

Role of awareness/advocacy group:

  - Unbiased 3rd party source of information related to climate change for industries
  - Enable and incentivize CDM projects (maybe some capacity building role here)
  - Facilitate networking related to CDM.

This awareness/advocacy body should incite bids from media/communications companies (who will elaborate on the suggested target audience, content, and media) and oversee the implementation of the awareness campaign(s).

1. Suggested target audience: divided into phases based on company size & industry

   Phase 1 (within 6 months): large industry – critical

   Phase 2 (within 12-18 months): SMEs – less critical

2. Suggested content (sector specific):

  - What is CDM?
  - How does it work?
  - Why am I interested?
  - How do I get involved? Directed to advocacy group and DNA website

3. Suggested media:

-Climate change awareness/advocacy website for static source of information (updated regularly)

- Phased information seminars, promoted via advertisement in industry magazines & e-campaign inviting potential stakeholders to attend, which:

  - Explain the basics & benefits of CDM
  - Introduce and establish relationships with climate change constituents
  - Develop and nurture synergies within industry

4. Suggested timing

Awareness Raising

- Phase 1 (at end of 6 months): announces creation of advocacy group, targets large industry
- Phase 2 (at end of 12 months): targets SMEs
- Phase 3 (at end of 18 months): general audience and content.

Capacity Building could also be implemented after the implementation of Phase 1

To consider:

1. Detailed list of companies (only large) that need to be targeted (see detailed list of companies that may have CDM project development potential attached to ZIP file)

2. Benefits to champions/implementers:

Benefits from the Clean Development Mechanism for Stakeholders in Jordan

The CDM gives a value to the reduction of GHG emissions in developing countries.
With this, additional hard currency investments are generated to promote clean technologies and sustainable development. This results in the following benefits for the stakeholders in Jordan:

- Increased project profitability from clean technology projects to the beneficiaries in the private and public sectors because the resulting certified emission reductions will generate additional revenues in foreign currency.
- Potential to increase foreign investment and sources of foreign currency for Jordan.
- Successful CDM projects may become a point-of-departure for other foreign investments, strengthening the Jordanian economy.
- Additional business opportunities for companies providing clean technologies in Jordan.
- Renewal of important infrastructures such as power stations, transport systems, sewage treatment plants etc., which improves the reliability and quality of public services and sectoral programs.
- Transfer of appropriate, environmentally clean, and reliable technology:
    - Reduces costs, and improves equipment, and thereby strengthens the competitiveness of the Jordanian industry.
    - Contributes to the improvement of local air quality by emissions reduction.
    - Contributes to capacity building.
- CDM activities for land use, land use change, and forestry (LULUCF) will support the current afforestation efforts to limit desertification in Jordan.
- An attractive mechanism to facilitate financing of clean technology projects from local banks because the regular (hard currency) payment for Certified Emission Reductions (CERs) may be used for the repayment of loans.
- CDM investments create employment opportunities for local labor and contribute to welfare.

In order to secure these CDM benefits for the country, Jordan must develop an efficient institutional setting for the marketing, approval, and overseeing of the CDM projects, which on the one hand, ensures the above mentioned benefits, and on the other hand, creates an attractive environment for international CDM investors.

APPENDIX 6 – TAKING ADVANTAGE OF POST-2012

Taking advantage of CDM pre-2012, considering existing options for post-2012

Briefing in response to common concerns

The re-emergence of the United States (with the election of Barack Obama) and Australia (who has now ratified the Kyoto Protocol) in the global climate negotiations has had the effect of increasing the pressure on certain developing countries to take on emissions commitments of their own. The initial focal points of this push for expanded participation are likely to be in two subsets – countries with high absolute (and growing) emissions (China, India, Mexico, Brazil, etc) and countries with relatively high per-capita (and growing) emissions (South Korea, Singapore, the Gulf countries). The parameters around bringing new countries into the system are still very formative and highly speculative, and may include a variety of policy options, including sectoral targets, growth caps, forest conservation and other innovative mechanisms. One thing that is relatively certain, however, is that the post-Kyoto iteration after 2012 will not simply place gross targets on newly participation developing countries, but will instead be the result of nuanced negotiations

Given these movements, several emerging-economy OECD members and advanced non-Annex I countries have expressed concerns that CDM participation could potentially place them at a disadvantage in the next regime, unknown as it may be. This briefing attempts to outline the opportunities and realities of CDM pre and post 2012.

China continues to dominate the market

The country whose uncapped emissions elicit the greatest concern from industrialized countries is undoubtedly China. Though a developing country, China's gross emissions are already rivaling the United States, despite having an economy that is still several times smaller, and is set to outpace the US as the world's largest emitter in the next few years. Given China's economic growth trajectory, it is clear to many that China's position as a completely uncapped country is unsustainable both environmentally and politically, given all of the other issues that surround China's growing prominence economically and diplomatically. It is therefore a reasonable assumption that China – or a significant subsection of its economy – will be subject to some form of emission mitigation requirement in the next iteration of negotiations. This rationale is extended to a lesser extent in regards to the clear emissions growth of the other BRIC (with the exception of Russia, as it is an Annex I nation).

Despite this growing consensus, China continues to be a clear leader within the CDM, in terms of projects, project types and particularly overall tonnage. Dominating the supply side market, this translates to a dollar volume representing a significant flow of capital to China's growing urge to be more sustainable. Most of the hundreds of projects already approved by the Chinese DNA will run up to 21 years (with recalculated baselines and additionality tests),

meaning that managing the transition from uncapped to capped positioning for different sectors and individual assets will be an increasingly important policy issue for many of these projects.

Transitioning to the post-2012 regime

The bottom line is that the potential transition to a different policy regime has not remotely slowed any major developing countries appetite for the capital and technology flow represented by CDM. It is extraordinarily unlikely that any political compromise that is reached to attract major developing countries to a capped position would not explicitly recognize the additional efforts that have already made through the encouragement of CDM. Indeed, it is virtually certain that the next regime will specifically include recognition of CDM activities, in setting up direct emissions targets or allocation.

It is highly unlikely that any developing country will be subject to the "reduction from prior year baseline" approach that characterized the Kyoto commitment for OECD nations. Rather, the aim of the next iteration is to impact the long-term emissions trajectory of key growth countries. The likely result will be that developing countries that choose to take on a commitment will be allocated "growth caps," set off against more significant reduction requirements in industrialized countries.

Looking at precedent, it is unlikely that there will be allowed significant carryover of unused CERs into forward periods. According to the Marrakech Accords, Annex I countries are permitted to carry over, or "bank," up to 2.5 percent of their assigned amount in CERs and ERUs as well as any remaining AAUs. "Each Party included in Annex I may carry over ERUs, CERs and/or AAUs held in its registry, that have not been cancelled or retired for a commitment period." Non-Annex I Parties, however, are not afforded the same conditions. The Marrakesh Accords explicitly state that "ERUs, CERs, AAUs and RMUs of a previous commitment period held in the registry of a Party which have not been carried over in this manner [a Party not included in Annex I] shall be cancelled."

The manner in which current CDM participation will likely be rewarded for newly capped countries will be in more generous allocations in their caps, explicitly recognizing the value of their early, voluntary participation the CDM.

Summary

Resource transfers between industrial and developing countries are fundamental to the CDM – without engaging in a transfer within a reasonable period of time, even a well constructed unilateral CDM project will come under scrutiny regarding its actual additionality, and therefore eligibility. Given that Annex I countries are only allowed to carry over a minute fraction of their AAUs, there is no evidence that developing countries would be allowed something substantially different from any pool of CERs that they may have held back for market timing purposes.

There is no link between carrying out CDM projects and being obliged to take on emissions reductions targets in subsequent commitment periods. Angela Merkel the German Chancellor and Yvo de Boer the head of the UNFCCC have both been quoted in the press as stating that in the long term any future targets should be based on per capita emissions, rather than any other considerations.

Not engaging in CDM will simply result in lost revenue, and higher emissions. Holding back CERs in anticipation of utilizing them to meet post-2012 emissions targets will simply result in their cancellation.

Regarding post-2012 negotiations of the EU commission

The EU institutions patched together a compromise on the 2020 climate policy program after tense negotiations. It is complex but beneficial for CDM demand. For a -20% target in the period 2013 - 2020 companies can import 150 million CER/ERUs in addition to the 1.4 billion that can be imported until 2012. Another 150 million of imports are likely to come from sectors newly covered by the ETS (air traffic, industrial gases in chemical, aluminum and fertilizer industry). All companies are entitled to cover at least 11% of the EU allowance allocation through CERs and ERUs. It is unclear whether forestry CERs can be used in the ETS after 2012. Quality criteria for CERs remain to be determined. The total EU allowance volume for the EU ETS remains unchanged compared to the Commission proposal. In case of a -30% target, the import threshold for the ETS would be increased by about 0.9 billion.

Some key proposals:

- A 30% reduction for all OECD members, Annex I countries and EU candidates;
- Unsold surpluses (e.g. from Russia and other countries in transition) should be deducted from the target an OECD-wide trading system by 2015, with some developing countries integrated by 2020;
- Developing countries to reduce emissions 15-30% from business-as-usual
- More than a third of the financing of emission reductions in developing countries beyond the domestic capabilities of the respective country should come through international carbon crediting mechanisms;'
- Implicitly excluding HFCs from the CDM to credit only those CDM projects that deliver real additional reductions and go beyond low-cost options;
- To replace the CDM through a sectoral carbon market crediting mechanism for advanced developing countries and highly competitive economic sectors;
- Over time, CDM should be super-ceded by cap and trade;
- Emission targets for international air and maritime transport below 2005 levels by 2020, and "significantly" below 1990 levels by 2050.

Regarding post-2012 negotiations

Frankly speaking, there is not much public material available on the current status of UN-sponsored international negotiations on climate change commitments for post-2012. The following updates are mainly relegated to various nations announcing targets and/or policies independent of the Kyoto Protocol. These include: Australia has announced a -5% target from 2000 to 2020 that could be strengthened to -15% if an ambitious Copenhagen agreement is reached; Switzerland has announced a -20 to -30% target, aligning itself with the EU (it could take a -50% target but this could then be entirely reached by CER/ERU imports); Mexico has announced a -50% target by 2050; Chile published a climate policy plan, but did not set any target; and finally Malta has applied to become Annex I member.

To discuss future commitments for industrialized countries under the Kyoto Protocol, the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP) established a working group in December 2005 called the Ad Hoc Working Group on Further Commitments for Annex 1Parties under the Kyoto Protocol (AWG-KP). The AWG-KP is set to complete its work by the end of 2009. The Seventh session of the AWG-KP and fifth session of the AWG-LCA will take place from Sunday 29 March to Wednesday 8 April 2009 in Maritim, Bonn. This is the first of three planned negotiating sessions before COP 15 in Copenhagen in December.

While there is now a lot more certainty in European climate legislation, there is still considerable uncertainty regarding the future of a global agreement. There are high expectations surrounding the UN COP/MOP summit in Copenhagen this December to make visible steps to extend or replace the Kyoto Protocol. A global approach to tackling emissions may focus minds more on the long-term. Unfortunately though for many, the year 2012 is still a real 'cliff' beyond which very little is known, nor can be predicted.

Suggested further reading includes:

- Climate Action Network Australia:http://www.cana.net.au/kyoto/template.php?id=5
- The UNFCCC Ad Hoc Working Group: http://unfccc.int/kyoto_protocol/items/4577.php
- Wikipedia: http://en.wikipedia.org/wiki/Vienna_Climate_Change_Talks_2007

APPENDIX 7 – LIST OF LARGE EMITTERS IN JORDAN

Iron & Steel Industry (Ferrous Metals)

No.	Company
1	General Steel Manufacturing Co.
2	National Steel Co.
3	Iron and Steel Manufacturing Co.
4	Petra Steel Industrial Co.
5	Jordan Steel Co.
	Total fuel consumption

Chemicals Industry

No.	Company
1	Jordan Agricultural Co.
2	Yeast Manufacturing Co.
3	Rum Agricultural Co.
4	The Arab Potash Co. Ltd
5	Jordan Phosphate Mines Co.
6	National Company for Chlorine Industry
7	Japanese Fertilizers Co.
8	Al-Itihad Co. for Chemical Fertilizers
9	Petrochemicals
10	National Petroleum Refinery Co.
11	Jordanian Indian Co.
12	Petro-Chemical Industries Co
13	Al-Hassa Phosphate Co.
14	White Phosphate Co.
15	Al-Rusaifeh Phosphate Co.
16	Al-Shedieh Phosphate Co.
	Total Fuel Consumption

Pulp, Paper and Print Industry

No.	Company
1	Paper Industry Co.
	Total Fuel Consumption

Food Processing, Beverages and Tobacco Industry

No.	Company
1	Modern Mills Co.
2	Zarqa Mills Co.
3	National Co.
4	Coca Cola
5	Jordan Dairy Co.
6	Oil Factories Co.
7	Al-Asrieh for Dairy Products
8	Al-Intaj Co.
9	Hijazi & Ghousheh Co.
10	Al-Intajieh for Grain Co.
11	Dairy Products Co.
12	Al-Arabieh for Oil Industry Co.
13	Nuqul for Nutrition food
	Total Fuel Consumption

Construction & Other Industries

No.	Company
1	Middle East Automobile Co.
2	International Investments Co.
3	Jordan Cement Factories Co.
4	Petra for Construction
5	Huge Constructions Co.
6	Al-Tanqeeb for Industries Co.
7	Kondata and Lafouri Co.
8	Middle East for Industries Co.

9	Al-Mafraq Industrials Co.
10	Amin Kawar Co.
11	Al-Khalijan for Agencies
12	Al-Romania Co.
13	Al-Niser Factories Co.
14	Al-Arabia For Leathern Industries Co.
15	Jordan Plastic Co.
16	Jordan Pottery Co.
17	Jordan Tanning Co.
18	Al-Arabia Company
19	Pipes industries Co.
20	Jordan Development Co.
21	Middle East for Industry Co.
22	Al-Watanya for Industry Co.
23	Al-Arabia for industry Co.
24	Jordanian Factory for Industrial Materials
25	Textiles Co.
26	White Cement Co.
27	Al-Watanya for Medicine
28	Halawani Co.
29	Al-Sharq for Crushers
30	Al-Mutahida for Textiles
31	Middle East for Industries Co.
32	Al-Heet for Contracting
33	Al-Riyad Co.
34	Al-Dawlia for Industries
35	Jordanian Group Co.
36	Modern Factories Co.
37	Household Appliances Co.
38	Al-Kawader Industrial Company
39	Al-Tawfiq Co.
40	Al-Keena Co.
41	Precast Cement Company
42	Al-Nahda for Construction
43	Rasheed Abdullah Co.

44	M. Al-Jabali Co.
45	Haimour Co.
46	Industrial Machines Supplies Co.
47	Al-Arabia Al-Dawlia Co.
48	Mohammad Al-Saad Factory
49	Al-Lou'lou' Textiles
50	Al-Arabia Industrial Co.
51	Al-Balqa Factories Co.
52	Al-Alamieh Al-Haditha Co.
53	Jordan Cement Factories
	Total Fuel Consumption

APPENDIX 8 – METHODOLOGIES APPROPRIATE FOR JORDAN

1.1.1.1 AM0009: "Recovery and utilization of gas from oil wells that would otherwise be flared" (v. 3.1)

Project activity: "The project activity encompasses the recovery of gas at oil fields, the transportation of the recovered gas to a gas processing plant and the production of the products dry gas, LPG and condensate in a gas processing plant. These products are distributed to end-users, substituting fossil fuels at end-users and thereby reducing GHG emissions."

Applicability: This methodology is applicable to projects recovering gas at oil wells under the following conditions:

- Associated gas at oil wells is recovered and transported to:
- A processing plant where dry gas, liquefied petroleum gas (LPG), and condensate are produced; and/or,
- An existing natural gas pipeline without processing.
- Energy required for transport and processing of the recovered gas is generated by using the recovered gas;
- The products (dry gas, LPG and condensate) are likely to substitute in the market only the same type of fuels or fuels with a higher carbon content per unit of energy;
- The substitution of fuels due to the project activity is unlikely to lead to an increase of fuel consumption in the respective market;
- In the absence of the project activity, the gas is mainly flared;
- Data (quantity and fraction of carbon) is accessible on the products of the gas processing plant and on the gas recovered from other oil exploration facilities in cases where these facilities supply recovered gas to the same gas processing plant.

Baseline: The baseline assumes that the recovered gas would be flared in the absence of the project. For sake of conservatism, 100% flare efficiency is assumed. That is, it is assumed that all carbon in the flared gas is converted to carbon dioxide.

Additionality: Additionality is addressed through an analysis of the economic attractiveness and legal aspects of all likely uses for the gas, including: venting, flaring, on-site consumption, injection, and the project activity (recovery, transport, processing, and distribution to end-users.) The option that is economically most attractive should be considered the baseline. To apply this methodology, participants should demonstrate that flaring is the baseline scenario. The project can be considered additional if the IRR of the project activity is lower than the hurdle rate of the project participants.

Leakage: There are three potential sources of leakage:

• CO_2 emissions due to fuel combustion for transport and processing of the gas

• CH_4 and CO_2 emissions from leaks, venting and flaring during transport and processing of recovered gas

• Changes in CO2 emissions due to the substitution of fuels or additional fuel consumption at end-users, where these effects occur.

1.1.1.2 AM0014: "Natural gas-based package cogeneration" (v. 4)

Project Activity: This methodology encompasses the installation of a package cogeneration system whose input is natural gas from the gas pipeline and whose outputs are electricity and heat.

Applicability: This methodology is applicable to natural gas-based cogeneration projects under the following conditions:

• The cogeneration system is a third party cogeneration systems, i.e. not own or operated by the consuming facility that receives the project heat and electricity or the cogeneration system is owned by the industrial user (henceforth referred to as self-owned) that consumes the project heat and electricity;

• The cogeneration system provides all or a part of the electricity and or heat demand of the consuming facility;

• No excess electricity is supplied to the power grid and no excess heat from the cogeneration system is provided to another user.

Leakage: The principal sources of leakage are associated with the gas consumption of the cogeneration system:

1. The emission of methane from natural gas production, and
2. Pipeline leakage.

Baseline: Baseline emissions are those emissions that are offset by the installation of system. These emissions have five components:

a) **CO2 from combustion:** CO2 emissions corresponding to the combustion of natural gas that would have been used if the cogeneration system did not provide heat to the factory.

b) **CH4 from combustion:** CH4 emissions corresponding to the combustion of natural gas that would have been used if the cogeneration system did not provide heat to the factory.

c) **N2O from combustion:** N2O emissions corresponding to the combustion of natural gas that would have been used if the cogeneration system did not provide heat to the factory.

d) **CH4 leaks:** CH4 emissions from natural gas production and leaks in the transport and distribution pipeline supplying the factory and leaks in the gas distribution piping within the factory, associated with the natural gas consumption identified in item (a) above.

e) **CO2 from electricity generation:** CO2 emissions associated with the electricity that would have to be purchased from the power grid if the cogeneration system did not provide electricity to the factory.

Additionality: Additionality is demonstrated using four provided additionality tests. Not all four are relevant to every project. The project is additional if all applicable tests are passed. These tests aim to answer two questions for a potential project:

1. Are there technological barriers to cogeneration in the country?
2. Are there institutional barriers to cogeneration?

1.1.1.3 AM0017: "Steam system efficiency improvements by replacing steam traps and returning condensate" (v. 2)

Project Activity: The project activity addresses energy efficiency improvements by reducing losses in steam traps and by increasing the return of condensate. Efficiency improvements are achieved through the installation of additional equipment, the repair and/or replacement of steam traps and the application of O&M practices.

Emission reductions occur as a result of steam savings by improving the functioning of steam traps and collection and reutilization of condensate. The steam savings decrease the combustion of fossil fuels in the boiler, thereby reducing GHG emissions. To a smaller extent, GHG emissions are also reduced as a result of energy saved for pumping makeup water to the boiler.

Applicability: This methodology is applicable to steam efficiency improvement project activities with the following conditions:

• Steam efficiency is improved by replacement and/or repair of steam traps and the return (collection and reutilization) of condensate;

• Steam is generated in a boiler fired with fossil fuels;

• The regular maintenance of steam traps or the return of condensate is not common practice or required under regulations in the respective country;

• Data on the condition of steam traps and the return of condensate is accessible in at least five similar other plants.

Additionality: The additionality of the project activity is addressed in four steps, which are (i) demonstrating that it is not common industry practice; (ii) there are no legal or regulatory requirements; (iii) there exist barriers to the implementation of the project activities; and (iv) the registration of the project as CDM allow it to overcome barriers.

Baseline: There's no defined baseline protocol, because it's unnecessary. If the project is additional, then the baseline is the amount of emissions that would have taken place absent the use of steam traps and the collection of condensate.

Leakage: Potential sources of leakage are taken into account in the calculation of baseline emissions.

1.1.1.4 AM0018: "Baseline methodology for steam optimization systems" (v. 2.1)

Project Activity: The methodology addresses the improvement of energy efficiency by reducing steam consumption in industrial processes, in the case where the most likely baseline scenario is the continuation of production using current processes and efficiencies

Applicability: This methodology is applicable to steam optimization projects in production processes with homogeneous and relatively constant outputs with continuous monitoring of steam output.

Also, "If the most likely baseline scenario is not the continuation of production using current processes and efficiencies, then this methodology does not apply."

Additionality: Demonstrated using the latest version of the "Tool for the demonstration and assessment of additionality"

Baseline and Emissions Reductions: The baseline energy efficiency is the "Specific Steam Consumption Ratio," or SSCR. The SSCR is a ratio of two representative benchmarks, Steam / Output for an appropriate time period (per day, or per batch of output), prior to project implementation. In other words, the SSCR is the steam-intensity of output prior to the project, and is determined by looking at total output and steam use during a representative sample of the facility's prior operations.

Emission reductions are determined ex-post by multiplying the improvement of the baseline benchmark SSCR with the actual, monitored output of the project after implementation.

Leakage: No leakage is envisaged. Additional electrical load that may result from the project activity is accounted for in the determination of emission reductions.

1.1.1.5 AM0019: "Renewable energy projects replacing part of the electricity production of one single fossil fuel fired power plant that stands alone or supplies to a grid, excluding biomass projects" (v. 2)

Project Activity: The project activity involves the construction of a renewable energy power plant, excluding biomass.

Applicability: This methodology is applicable to:

• Proposed project activities where electricity production from the zero-emission renewable energy sources: wind, geothermal, solar, run-of-river hydro, wave and/or tidal projects that displaces electricity production from an identified, individual, plant;[15]

• New hydro electric power projects with reservoirs having power densities (installed power generation capacity divided by the surface area at full reservoir level) greater than 4 W/(m^2);

• Where the identified baseline plant has sufficient capacity to meet the increase of demand expected during the crediting period.

Baseline, Additionality, and Emissions Reductions: When applicable, the methodology can be applied through the following five steps:

• Step 1 - Demonstrate that the proposed project activity only displaces the electricity of one identified, individual power plant,

• Step 2 – Demonstrate that the proposed project activity is not the BAU scenario,[16]

• Step 3 – Determine the Carbon Emission Factor of the existing power plant,[17]

• Step 4 - Calculate project emissions,

• Step 5 – Calculate baseline emissions and emission reductions of the proposed project activity.

Leakage: No significant sources of leakage are to be expected for renewable energy projects.

Crediting Period: The crediting period of the project activity shall not exceed the remaining technical and economic lifetime of the existing plant (that is being displaced.)

[15] Emphasis added for clarity—this is a central condition of this methodology.

[16] This is where additionality is demonstrated, using the latest approved version of the additionality tool.

[17] Methodology requires three years of records to ensure reliable and accurate data.

1.1.1.6 AM0020: "Baseline methodology for water pumping efficiency improvements" (v. 2)

Project Activity: This methodology reduces emissions by improving the efficiency of a municipal water system, by decreasing the amount of energy needed to move water through the system.

Applicability:

This methodology is applicable to project activities that:

• Seek to reduce GHG emissions by explicitly reducing the amount of energy required to deliver a unit of water to end-users in municipal water utilities;

• Improve energy efficiency in the overall water pumping, including reducing technical losses and leaks as well as the energy efficiency of the pumping scheme, which consume electricity from the electricity grid, where:

• The efficiency (water and energy) of existing schemes1 is being improved; or

• A new scheme is being developed to completely replace the old scheme which will no longer be used. This methodology will apply to the new scheme only up to the measured delivery capacity (annual amount of delivered water) of the old scheme;

This methodology is NOT applicable to project activities cases where entirely new schemes are built to augment existing capacity. This will ensure that only emissions reductions up to the existing capacity of the system will be considered.

Baseline and Additionality: Additionality is demonstrated using the latest version of the additionality tool. Once additionality has been established using the "Tool for the demonstration and assessment of additionality", a typical carbon emissions baseline is established by multiplying the pre-project efficiency ratio (PPER) with the total post-project[18] water volume (M3) delivered in year y and the carbon emission factor (EF):

Baseline emissions(y) = PPER * M3(y)* EF(y),

Where EF(y) is the emission factor for an electricity system

Emissions reductions: ER = Baseline Emissions – Project Emissions, where:

Project emissions(y) = kWh(y) * EF(y),

Where kWh = Total post-project amount of electricity required to move water (kWh) to its destination in year y, and EF(y) is the same as above.

OR: Emissions Reductions = (PPER * M3(y)* EF(y)) – (kWh(y) * EF(y))

Leakage: There are no potential sources of leakages from this project activity.

[18] Note that the efficiency ratio in the baseline calculation comes from before the project, but that the water volume comes from after the project. This ensures that emissions reductions are due to changes in the efficiency ratio rather than changes in volume.

1.1.1.7 AM0021: "Baseline Methodology for decomposition of N2O from existing adipic acid production plants" (v. 2.2)

Project Activity: Production of adipic acid generates N2O as a by-product. Nitrous oxide (N2O) is typically released into the atmosphere as it does not have any economic value. This baseline methodology is for a project that consists of the installation of a dedicated decomposition facility to convert the nitrous oxide into nitrogen, and thereby prevent its release to the atmosphere.

Applicability:

This methodology is applicable to projects which decomposes N2O from adipic acid production plants under the following conditions:

• Either catalytic or thermal decomposition of the N2O by-product of adipic acid production at existing production plants.

• The methodology is spatially generic, being applicable across regions where the data (both related to baseline and project activity as well) exist to undertake the assessments.

• The methodology is applicable only for installed capacity (measured in tons of adipic acid per year) that exists by the end of the year 2004.

Additionality: The additionality test consists in confirming and providing evidence to support each of the following three conditions:

> ***Condition 1:*** There is currently no existing regulation that will require, as of the beginning of the crediting period, that facilities must undertake N2O abatement.
>
> ***Condition 2:*** The project activity is not common practice in relevant sector and region.
>
> ***Condition 3:*** The project activity would not be commercially viable even taking into account the market value of any by-products of the decomposition plant.

Baseline: The baseline scenario is defined as the continuation of N2O emissions to the atmosphere at the rate currently observed, absent regulations to restrict N2O. The baseline emissions are calculated on an *ex-post* basis from the amount of adipic acid produced.

Leakage: Potential leakage is associated with the energy sources used to generate any steam and electricity used by the decomposition plant.

Emission Reductions: Since the project activity seeks to convert all the N2O being produced in the BAU scenario, the reductions achieved are equal to the baseline emissions, after downwardly correcting for project emissions (PEy) and leakage (Ly):

> ERy = BEy – (PEy + Ly)
>
> *Where ERy, BEy, PEy and Ly are measured in ton of CO2 equivalent.*

1.1.1.8 AM0023: "Leak reduction from natural gas pipeline compressor or gate stations" (v. 2)

Project Activity: Reduce emissions by fixing leaks in natural gas distribution systems, where there is no or insufficient financial incentive to do so.

This methodology is applicable to project activities that reduce leaks in natural gas pipeline compressor stations and gate stations in natural gas long-distance transmission systems, as well as to other surface facilities in gas distribution systems including pressure regulation stations by establishing advanced leak detection and repair practices:

- Where natural gas pipeline operators have no current systems in place to systematically identify and repair leaks;
- Where leaks can be identified and accurately measured;
- Where a monitoring system can be put in place to ensure leaks repaired remain repaired.

Also: This methodology is applicable only if the most likely baseline scenario is the continuation of current leak detection methods and practices.

Baseline and Additionality: Additionality is demonstrated using the latest version of the additionality tool. This methodology provides clarifications and relevant details for steps 2, 3, and 4 of the additionality/baseline process. In summary:

Project participants shall identify the most plausible baseline scenario among all realistic and credible alternatives(s). Steps 2 and/or 3 of the latest approved version of the "tool to determine and assess additionality" should be used to assess which of these alternatives should be excluded from further consideration (e.g. alternatives where barriers are prohibitive or which are clearly economically unattractive). Where more than one credible and plausible alternative remains, project participants shall, as a conservative assumption, use the alternative baseline scenario that results in the lowest baseline emissions as the most likely baseline scenario.

Emissions Reductions: The level of emission reductions is determined *ex-post* as part of the project implementation and monitoring. However, project participants shall provide an *ex-ante* estimation of the level of emission reductions.

Leakage: Humor notwithstanding, no leakage is expected as a result of this project.

1.1.1.9 AM0024: "Baseline methodology for greenhouse gas reductions through waste heat recovery and utilization for power generation at cement plants" (v.2)

Project Activity: The project activity reduces CO2 emissions by using waste heat to produce electricity, reducing the electricity use of a cement plant.

Applicability: This methodology is applicable to project activities that use waste heat gas generated in clinker making process (i.e. in the cement kilns) to produce electricity,

The methodology is applicable under the following conditions:

1) The electricity produced is used within the cement works where the proposed project activity is located and excess electricity is supplied to the grid; it is assumed that there is no electricity export to the grid in the baseline scenario (in case of existing captive power plant);

2) Electricity generated under the project activity displaces either grid electricity or from an identified specific generation source. Identified specific generation source could be either an existing captive power generation source or new generation source;

3) The grid or identified specific generation source option is clearly identifiable;

4) Waste heat is only to be used in the project activity;

5) In the baseline scenario, the recycling of waste heat is possible only within the boundary of the clinker-making process[19]

This methodology is NOT applicable to project activities,

1) Where the current use of waste heat or the identified alternative business as usual use of waste heat is located outside of the clinker making process

2) That affect process emissions from cement plants.

Baseline: The baseline scenario for the project will be identified through the following steps:

- Step 1: Determination of technically feasible alternatives to the project activity
- Step 2: Compliance with regulatory requirements:
- Step 3: Undertake economic analysis of all options that meet the regulatory requirements.

Additionality: Demonstrated using the latest version of the additionality tool.

Leakage: Expected to be negligible.

[19] This is the most important applicability condition. It means that this methodology can still be applicable if waste heat is already being used in the BAU scenario, but *only* if that waste heat's use is confined to the clinker-making process.

1.1.1.10 AM0025: "Avoided emissions from organic waste through alternative waste treatment processes" (v. 10.1)

Project Activity: This methodology addresses project activities where fresh waste originally intended for landfilling is treated either through composting, gasification, anaerobic digestion, or RDF processing. The project activity avoids methane emissions by diverting organic waste from disposal at a landfill, where methane emissions are caused by anaerobic processes.

The methodology is applicable under the following conditions:

The project activity involves one or a combination of the following waste treatment options for the fresh waste that in a given year would have otherwise been disposed of in a landfill:

- a composting process in aerobic conditions;
- gasification to produce syngas and its use;
- anaerobic digestion with biogas collection and flaring and/or its use;
- mechanical/thermal treatment process to produce refuse-derived fuel (RDF)/stabilized biomass (SB) and its use. The thermal treatment process (dehydration) occurs under controlled conditions (≤ 300°). In case of thermal treatment process, the process shall generate a stabilized biomass that would be used as fuel or raw material in other industrial process. The physical and chemical properties of the produced RDF/SB shall be homogenous and constant over time;
- incineration of fresh waste for energy generation, electricity and/or heat. The thermal energy generated is either consumed on-site and/or exported to a nearby facility. Electricity generated is either consumed on-site, exported to the grid or exported to a nearby facility. The incinerator is rotating fluidized bed or hearth or grate type.

Also: Only applicable if the makeup of organic waste that is processed in the project activity can be determined, in order to estimate the emissions that would have occurred. And, emissions reductions due to RDF use can only be claimed if RDF use can be monitored. This methodology is **not applicable** to project activities that involve capture and flaring of methane from existing waste in the landfill[20]. This should be treated as a separate project.

Baseline and Additionality: Demonstrated using the tool. The methodology is only applicable if the most plausible baseline scenario involves at least partial escape of landfill methane into the atmosphere.

Leakage: Potential sources of leakage include CO2 emissions from the transportation of waste materials and the CH4 and N2O emissions from residual waste.

[20] In other words, this methodology prevents waste from being disposed of in a landfill in the first place. Waste that is already there is outside the scope of this methodology.

1.1.1.11 AM0027: "Substitution of CO2 from fossil or mineral origin by CO2 from renewable sources in the production of inorganic compounds" (v. 2.1)

Project Activity: The project activity reduces net CO2 emissions by substituting CO2 from fossil or mineral origin by CO2 that originates from the processing of biomass as input for the production process of inorganic compounds. This methodology is applicable generally to industrial production/manufacturing processes of inorganic compounds where fossil or mineral sources of CO2 are presently used as an input and where renewable sources of CO2 are available as a substitute input in the project activity case, but switching to such sources is not attractive without the CDM.

Applicability:

- The methodology is applicable under the following conditions:
- The residual CO2 from the processing of biomass was already produced but was not used before the project activity, so that no diversion of CO2 from other applications is due to the project activity.
- The processing of biomass undergoes no substantial changes in the process with the project activity;
- CO2, from fossil or mineral sources, used for the production of inorganic compounds in the baseline is from a production process whose only useful output is CO2. The CO2 production process from fossil source does produce any energy by-product;
- CO2 from fossil or mineral sources that is used for the production of inorganic compounds prior to the project activity will not be emitted to the atmosphere in the project activity;
- There are no substantial changes (e.g. product change) in the production process of inorganic compounds as a result of the project activity;
- Production levels of the plant (tons of inorganic compound produced per year) may in general not increase with the project activity over historic maxima;
- No additional significant energy quantities are required to prepare the renewable CO2 from biomass processing for use in the production of inorganic compounds[21]
- All Carbon in the produced inorganic compounds stems from the CO2 supplied during the production process.

Baseline: Demonstrated in 3 steps: Identify alternatives to project activity; assess additionally of project activity; and, determine the most likely baseline scenario from the alternatives identified. These steps are discussed in detail in the methodology.

Additionality: Demonstrated using latest version of the tool.

Leakage: Applicability conditions are set to eliminate all leakage sources. Thus, if the conditions under which the methodology is applicable are satisfied, there is no leakage concern.

[21] • Related CO2 emissions are <1% of total emission reduction

1.1.1.12 AM0028: "Catalytic N2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants" (v. 4.2)

Project Activity: This methodology reduces emissions through the destruction of some or all of the N2O found in the tail gas of nitric acid or caprolactam plants. This is called "tertiary destruction" due to its location in the production cycle. This methodology establishes two approaches to the destruction of N2O: catalytic decomposition, and catalytic reduction. These methods may require the use of ammonia and hydrocarbon input streams as part of the destruction process.

Applicability: This methodology is applicable when the following conditions apply:

• The applicability is limited to the existing production capacity measured in tons of nitric acid or caprolactam, where commercial production began before January 1, 2006.[22]

• Existing caprolactam plants are limited to those employing the Raschig process not using any external sources of nitrogen compounds other than feed ammonia.

• The project activity will not result in shut down of an existing N2O destruction or abatement facility at the nitric acid or caprolactam production plant;

• The project activity shall not affect the nitric acid or caprolactam production level;

• The project activity will not cause an increase in NOX emissions;

• In case a DeNOx unit is already installed prior to the start of the project activity, the installed DeNOx is a Selective Catalytic Reduction (SCR) DeNOX unit;

• The N2O concentration in the flow at the inlet and the outlet of the catalytic N2O destruction facility is measurable.

Baseline: Demonstrated with a 5-step process, summarized below. Methodology describes these steps in detail (4-5 pages) to aid in the baseline establishment process.

Step 1: Identify technically feasible baseline scenario alternatives to the project activity:

Step 2: Eliminate scenarios that do not comply with legal/regulatory requirements

Step 3: Eliminate scenarios that face prohibitive barriers:

Step 4: Identify the most economically attractive baseline scenario alternative

Step 5: Re-assess the baseline scenario during project activity lifetime.

Additionality: Established using the additionality tool. Project is additional if it's not the baseline. There doesn't seem to be any economic incentive to destroy N2O, so additionality shouldn't be hard to demonstrate. It is notable, however, that there can exist potential uses for tail gas N2O that compete with its destruction for emissions reduction purposes, such as using it for feedstock for the plant or for other external purposes.

Leakage: If a tail gas turbine is installed to re-capture energy used in the N2O destruction process, no leakage is expected. Otherwise, leakage can result from these energy inputs and must be accounted for.

[22] Pertinent definitions found in methodology, excluded here for brevity

1.1.1.13 AM0029: "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas"[23] (v. 3)

Project Activity: This methodology seeks to reduce emissions by increasing the amount of Natural Gas-fired electricity generation over that which would occur otherwise. Since Natural Gas is less GHG intensive and can be more expensive than competing fossil sources, this methodology creates the opportunity for income streams from CDM activity to increase the role of NG in the electricity-generation mix, displacing GHG emissions.

Applicability: The methodology is applicable under the following conditions:

• The project activity is the construction and operation of a new natural gas fired grid-connected electricity generation plant, where <1% of the fuel is of any other type[24].

• The geographical/ physical boundaries of the baseline grid can be clearly identified and information pertaining to the grid and estimating baseline emissions is publicly available.

• Natural gas is sufficiently available in the region or country, e.g. future natural gas based power capacity additions, comparable in size to the project activity, are not constrained by the use of natural gas in the project activity.

• Where the use of natural gas for this project will not displace natural gas use elsewhere.

Baseline: The baseline is established in a two step process: identify plausible alternative scenarios, and select the most attractive one as the baseline. The methodology describes pertinent issues and questions for this arena. If the emissions rate of the most plausible baseline scenario is lower than that of the project activity (i.e., if it is hydro, nuclear, or biomass,) then the methodology does not apply.

Additionality: Articulated in a three step process. Proponents must demonstrate:

1) the proposed CDM projected activity is unlikely to be financially attractive;
2) the project activity is not common practice to the relevant country/sector;
3) the likely impact of the registration of the project activity.

When these three steps are satisfied, the project is considered additional.

Leakage: Leakage concerns are fugitive CH4 emissions and CO2 emissions from associated fuel combustion and flaring.

[23] This methodology is, compared to many others, very simple, logical, and well written.

[24] Makes a small allowance for startup and auxiliary fuels, but the point is that this is a NG-only plant.

1.1.1.14 AM0034: "Catalytic reduction of N2O inside the ammonia burner of nitric acid plants" (v. 3.1)

Project Activity: This methodology involves the installation of a dedicated N20 abatement catalyst inside the ammonia burner of a nitric acid plant. It catalytically reduces N2O emissions, after N2O has been formed in the Ammonia Oxidation Reactor.[25]

Applicability: This methodology is applicable under the following conditions apply:

• The applicability is limited to the existing production capacity of nitric acid plants who began operations before 2006.

• The project activity will not result in the shut down of any existing N2O destruction or abatement facility or equipment in the plant;

• The project activity shall not affect the level of nitric acid production

• There are currently no regulatory requirements or incentives to reduce levels of N2O emissions from nitric acid plants in the host country.

• No N2O abatement technology is currently installed in the plant.

• The project activity will not increase NOX emissions.

• NOX abatement catalyst installed, if any, prior to the start of the project activity is not a Non-Selective Catalytic Reduction (NSCR) DeNOX unit.

• Operation of the secondary N2O abatement catalyst installed under the project activity does not lead to any process emissions of greenhouse gases, directly or indirectly.

• Continuous real-time measurements of N2O concentration and total gas volume flow can be carried out in the stack:

  o Prior to the installation of the secondary catalyst for one campaign, *and*

  o After the installation of the secondary catalyst throughout the chosen crediting period of the project activity

Also: This methodology cannot be used if there are less than five complete, and indicative, campaigns of production upon which to base estimates of baseline emissions.

Baseline: Stipulated that the baseline must be identified using the same procedure as is used in AM0028. Summary of AM0028 quoted here for convenience:

"Baseline: Demonstrated with a 5-step process, summarized below. Methodology[26] describes these steps in detail (4-5 pages) to aid in the baseline establishment process.

Step 1: Identify technically feasible baseline scenario alternatives to the project activity:

Step 2: Eliminate scenarios that do not comply with legal/regulatory requirements

Step 3: Eliminate scenarios that face prohibitive barriers:

Step 4: Identify the most economically attractive baseline scenario alternative

Step 5: Re-assess the baseline scenario during project activity lifetime."

Additionality: Demonstrated using the latest version of the tool. Leakage: None expected.

[25] This methodology provides an excellent overall summary of itself on the first 2 pages.

[26] That is, AM0028

1.1.1.15 AM0035: "SF6 Emission Reductions in Electrical Grids" (v. 1)

Project Activity: This methodology reduces emissions of sulfur hexafluoride from electrical grids through recycling and reuse efforts, as well as leak reductions.

Applicability: The methodology is applicable to project activities:

• To recycle SF6 and/or reduce SF6 leaks implemented at an electric utility;

• Implemented either in the entire electrical grid or a verifiable distinct geographic portion of an electrical grid of the electric utility;

• Where documented proof is available to confirm that reduction in emissions of SF6 from replaced or repaired equipment is not claimed by any other CDM project. The DOE shall verify the documentation at validation as well as at verification.

• Where the baseline scenario is the continuation of current practices.

• Where data is available for at least three years prior to the start of the project, for baseline establishment purposes.

Baseline: This methodology establishes the baseline and additionality of the project activity by comparing two alternatives:

1) The implementation of the project activity without CDM, and
2) Continuation of current practice.

If both alternatives are plausible, whichever alternative is more profitable is considered the baseline alternative. If current practice is financially preferable, then the project is additional. Methodology requires an assessment of:

National policy/regulations on SF6
Current level of implementation by utilities in the region.[27]

Additionality: Demonstrated using the latest version of the additionality tool. In addition, it must be shown that no binding policies exist that require the recycling or leak management of SF6 in electrical infrastructure. As guidance for the application of the tool, the methodology lists several specific barriers that should be evaluated on p. 3.

Baseline emissions: If current practice is the BAU scenario, then baseline emissions are the total SF6 emissions from both leaks and non-recycling during repair and maintenance. Baseline emissions will be based on data from at least three years of operations prior to the project activity.

Emissions reductions: The difference between emissions of SF6 before and after the project activity.

Leakage: None expected.

[27] If any utilities in the region (subject to the same regulations) undertake SF6 recycling, then the project proponents must demonstrated that there are barriers that prevent the implementation of the same activity within the project boundary of the project activity. Otherwise, the project will not be considered additional.

1.1.1.16 AM0037: "Flare (or vent) reduction and utilization of gas from oil wells as a feedstock" (v. 2.1)

Project Activity: This methodology is applicable to project activities that recover associated gas from oil wells, which was previously flared, and utilize this associated gas in an existing or a new end-use facility, to produce a useful chemical product.

The following conditions apply to the methodology:

- The associated gas from the oil well, which is used by the project activity, was flared or vented for the last 3 years prior to the start of the project activity;
- Under the project activity, the previously flared associated gas is used as feedstock and, where applicable, partly as energy source in a chemical process to produce a useful product (e.g. methanol, ethylene, or ammonia).

Baseline: Established using normal procedure. The methodology provides a list of plausible alternative baseline scenarios: flaring at the processing site; on-site use of tail gas for energy; injection of tail gas into reservoirs; recovery, transportation, processing or distribution of tail gas to end-users; the use of tail gas as a fuel and/or feedstock at offsite facility; and the use of another source of feedstock, other than tail gas, at the end use facility. These, *inter alia*, should be subjected to barrier and investment analysis.

Additionality: Demonstrated using the latest version of the additionality tool. Guidance is provided in the methodology for specific application.

Leakage: Expected to be negligible, unless fugitive methane presents a problem.

1.1.1.17 AM0039: "Methane emissions reduction from organic waste water and bioorganic solid waste using co-composting" (v. 2)

Project Activity: The methodology avoids methane emissions from both wastewater and solid waste by implementing a co-composting process. This avoids the methane emissions that would result from anaerobic degradation of the organic wastewater in open lagoons or storage tanks and from natural decay of bioorganic solid waste in landfills, which would have happened absent the project activity.

Applicability: The methodology is applicable under the following conditions:

• Organic wastewater and bioorganic solid waste can be generated at separate locations;

• The bioorganic solid waste can be of a single type or multiple types mixed in different proportions. The proportions and characteristics of different types of bioorganic waste processed in the project activity can be determined;

• Project activities shall employ co-composting process for treatment of the organic wastewater and the bioorganic waste;

• The anaerobic lagoons or storage tanks utilized for wastewater treatment in the BAU scenario meet the following conditions:

- The monthly average ambient temperatures are greater than 10 ºC[28]
- Depth of the wastewater anaerobic lagoon or storage tank is greater than 1 m;
- Residence time of the organic matter should be at least 30 days.

NOTE: The methodology is not applicable to waste streams from manure management.

Also: This methodology is only applicable if the baseline is landfilling of the bio-organic solid waste; and anaerobic lagoons or open tanks for the treatment of organic wastewater.

Baseline: Determined with normal procedure, including barrier and investment analysis. The proponents must determine the most plausible baseline for waste water and solid waste separately, and the methodology provides a list of alternatives that should be considered.

Additionality: Demonstrated using the latest version of the additionality tool. If the baseline is landfilling and open lagoons/storage tanks, then the project is additional.

Leakage: No leakage is expected.

[28] Any months with average temperature of less than 10*C are assumed to have 0 methane emissions. The methodology is still applicable in areas where the temperature is below 10*C part of the year.

1.1.1.18 AM0044: "Energy efficiency improvement projects: boiler rehabilitation or replacement in industrial and district heating sectors" (v. 1)

Project Activity: This methodology reduces emissions by improving the efficiency of boilers in thermal energy generation, either through the replacement or rehabilitation of inefficient boiler equipment that would otherwise be left in place.

Applicability: The following conditions apply to the methodology:

• The methodology is applicable to project activities that results in thermal energy efficiency improvement of boilers, at multiple locations, through rehabilitation or replacement of the boilers implemented by the project participant;

• The boilers being replaced/rehabilitated must have some remaining lifetime;

• The geographical extent of the project boundary can be clearly established;

• The project activity involves efficiency gains, **not** fuel switching

• There are no enforced minimum efficiency standards applicable to the boiler(s) within the project area;

• Only one type of fuel is used by each boiler in the project area;

Baseline: Project participants must establish a baseline using a basic 2-step process of identifying potential alternatives and then selecting the most plausible one. The methodology provides specific alternative scenarios that must be considered. **This methodology is only applicable if the most plausible baseline scenario is "continued use of existing boilers."** Participants may use barrier or common practice analysis to rule out alternatives to the current system. Specific rules for using these analyses are provided on p. 4 of the methodology.

Additionality: Demonstrated using the latest version of the tool, with specific additional instructions. The investment analysis is mandatory **only** if the project is going to be implemented by a third party. In the case that participants embark on an investment analysis, there is guidance in the methodology for how to conduct an IRR analysis in this field. Additionally, the analysis of barriers is optional in demonstrating additionality, but if it is invoked there are a few important exceptions. Participants can only cite a technology barrier if all boilers in the project activity use the same technology. Additionally, prevailing practice arguments are only valid if this is a first-of-kind project and this is the first implementation of the new boiler technology in the host country. The demonstration of additionality requires a comparison of the project activity to common practices in a control group in the host region. **If >33% of the control group uses improved boilers that are similar to the project activity, it is not additional.**

Leakage: Negligible if project applicability conditions are met.

1.1.1.19 AM0045: "Grid connection of isolated electricity systems"[29] (v. 2)

Project Activity: This methodology reduces emissions by replacing isolated electricity systems with grid-connected ones. Roughly, this can occur in two ways: the expansion of an interconnected electricity grid to isolated systems, and the displacement of isolated systems by more efficient power generation from the interconnected grid.

Applicability: The methodology is applicable under the following conditions:

• Emission factors estimated take into account the increase of demand of the isolated systems and the remaining lifetime of the equipments;

• Renewable energy based electricity generation in the isolated systems is not displaced and its operation is not significantly affected.;

• All fossil fuel fired power plants in the isolated system are 100% displaced.

Baseline: Project The baseline scenario is determined through the following steps:

1. Identification of realistic and credible alternative scenarios that are consistent with applicable mandatory laws and regulations. The methodology provides a list of specific alternatives that should be considered.

2. Identification of barriers and assessment of alternative scenarios that are not prevented by these barriers, using the additionality tool. If there is only one alternative scenario that is not prevented by any of the identified barrier, then this alternative scenario is identified as the baseline scenario.

Where more than one alternative remains, project participants shall use the lowest-emissions baseline scenario or conduct an investment analysis

3. Investment analysis, using the additionality tool.

Additionality: Demonstrated using the latest version of the tool:

Step 1 - As per the latest version of the Additionality Tool

Step 2 - Investment Analysis, as per the Additionality Tool

Step 3 – Barrier Analysis (The authors of the methodology provide an imaginative list of potential barriers that could prevent the project activity)

Step 4: Common Practice Analysis, as per the Additionality tool

The methodology includes the following additionality instructions: In step 2, describe any specific financing and/or subsidizing mechanisms to which such projects are eligible in the host country as introductory background information. In step 4, describe the latest similar activities undertaken in the sector (including disclosing nonconfidential information about the PP's latest similar activities, if any, such as, when they were undertaken, what has changed since then, etc.

Leakage: Possible emissions potentially giving rise to leakage in the context of electrification projects are emissions arising due to transmission lines construction.

[29] This is a very clear and well –written methodology. If considering a project like this, reading the methodology itself is recommended.

1.1.1.20 AM0046: "Distribution of efficient light bulbs to households" (v. 2)

Project Activity: This methodology reduces emissions through the enhancement of energy-efficient lighting in households. The project coordinator sells, at a reduced price, or donates compact fluorescent lamps (CFLs) to households within a distinct geographical area, thereby replacing less energy efficient light bulbs. The individual households that use the CFLs are not the project participants. The households return the previously used light bulbs to the project coordinator. To measure emissions reductions, participants must survey energy use in many households in the region, establishing experimental and control groups. A big part of this methodology is experimental design.

Applicability: This methodology is applicable under the following conditions:

- The light bulbs distributed are ≤ 100 W, and ≤ 4 light bulbs are distributed per house.
- The households are connected to a national or regional electricity grid.
- The power rating of each type of light bulb that is distributed or sold by the project coordinator is known before the start of the project activity and the P-U characteristic curves of these light bulb types have been determined by laboratory measurements.
- No other CDM project that may affect the energy efficiency of lighting in households located within the total project area has been registered.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and the necessary information to calculate the grid emission factor.
- Metering equipment recording the utilisation hours or the electricity consumption of each light appliance is attached to every lamp socket or the cable leading to the lighting appliance.
- The project coordinator implements a social lottery system among all households included in the sample groups that provides a strong incentive to participate while not impacting lighting behavior. (This is for the purpose of measuring efficiency gains achieved through replacement of light bulbs).

Baseline: The baseline scenario is that lighting in the households in the total project area would (in the absence of the project activity) have occurred (a) By utilization of the currently used light bulbs); and (b) By utilization of new light bulbs with the same or greater efficiency (autonomous replacement).

The use of light bulbs in the absence of the project activity is determined by monitoring a control group of households – the baseline sample group (BSG) – over the whole crediting period. Since the baseline scenario for utilization of lightening appliances is determined by monitoring a control group, any policies and measures affecting the use of light appliances are reflected in the baseline scenario.

Additionality: Demonstrated using the latest version of the additionality tool.

Leakage: The scrapping of lighting appliances handed in by households is a potential source of leakage, and it must be monitored, documented, and independently verified.

1.1.1.21 AM0047: "Production of biodiesel based on waste oils and/or waste fats from biogenic origin for use as fuel" (v. 2)

Project Activity: This methodology reduces emissions through the production, sale and consumption of blends of petrodiesel with biodiesel to be used as fuel, where the biodiesel is based on waste cooking oil. Emissions reductions are achieved through the displacement of petrodiesel with biodiesel. The project activity includes the construction and operation of a biodiesel plant.

Applicability: The following conditions apply to the methodology:

• This methodology only applies to waste cooking-oil biofuels, insofar as this is the only kind of biodiesel that can generate CERs using this methodology;

• Glycerol produces in the process must be used or incinerated, not discarded;

• The consumer (end-user) of blended biodiesel in the transport sector is a captive fleet.

• The CERs generated are claimed only by the producer, not the user, of biofuels;

• Use of blended biofuels does not require major modifications on the consumer side;[30]

• Project participants claim CERs **only** for the CO2 emissions from petrodiesel displaced by the biodiesel, and not for any other indirect potential reductions[31]

Baseline: The baseline scenario should be separately determined for the following elements: **1) Production of fuels (P)**: What would have happened at the production level in the absence of the CDM project activity? **2) Consumption (C):** Which fuel would have been consumed in the absence of the CDM project activity? The methodology gives guidance for how to answer these questions. **The methodology is applicable only if the production baseline is "continuation of current practices with no investment in biodiesel production capacity" and the consumption baseline is "continuation of petroleum diesel consumption."**

Additionality: The additionality of the project activity shall be demonstrated and assessed using the latest version of the Additionality Tool. Additionality is assessed only for the project activity (i.e. the construction and operation of the biodiesel plant). Additionality is established ex-ante for the duration of the crediting period, i.e. the relevant parameters are not subject to monitoring, and only need to be revalidated at the renewal of the crediting period. For the Investment Analysis, participants must include a sensitivity analysis of the biodiesel sales price, the feedstock costs and fuel costs.

Leakage: The main concern with regards to leakage is the displacement of the existing uses of cooking oil. The methodology provides a process by which this leakage can be identified and measured on page 10.

[30] If the fuel is to be used by vehicles, any blend with ≥20% biodiesel must be justified in the PDD to ensure that engine modifications are not required.

[31] List of other emissions reductions that will **not** generate CERs under this methodology is given on p. 2

1.1.1.22 AM0048: "New cogeneration facilities supplying electricity and/or steam to multiple customers and displacing grid/off-grid steam and electricity generation with more carbon-intensive fuels" (v. 2)

Project Activity: This methodology achieves emissions reductions by displacing carbon-intensive electricity and steam generation with more efficient cogeneration facilities in both on-grid and off-grid applications. This methodology is unique in that it addresses both producers and consumers of the project electricity and steam.

Applicability: The following conditions apply to the methodology:

• Customers of project-generated electricity or steam do not currently cogenerate, nor will do so in the baseline scenario;

• The project can provide electricity and/or steam to the existing capacity available to the consumer.[32]

• Customers of project-generated electricity or steam can ensure that the equipment displaced by the project activity will not be sold or used for other purposes.

Baseline: The baseline scenario is established using a two-step method:

Step One: Identification of alternative scenarios (plausible scenarios are provided on pp. 3-4 of the methodology)

Step Two: Barrier analysis

Additionality: The additionality of the project activity shall be demonstrated and assessed using the latest version of the Additionality Tool. The methodology provides supplementary details on pp. 5-6. There is considerable guidance for the analysis of potential barriers.

Investment Analysis: If the IRR of the implementing project activity without CDM is less than the other alternatives and less than accepted benchmark for rate of return within the country, then the implementation of project facility is additional. For the customer, if the cost of power delivered by the project facility is the highest among all alternatives, then the use of project facility supplied power to the project customer is additional.

Leakage: This methodology considers two potential sources of leakage:

1) Fugitive CH4 emissions associated with the extraction, processing, liquefaction, transportation, degasification and distribution of fossil fuels used in the project plant and fossil fuels used in the grid in the absence of the project activity.
2) In the case liquefied natural gas (LNG) is used in the project plant: CO2 emissions from fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.

The methodology contains procedures to help quantify these leakages.

[32] This applicability condition is unclear, and there is no clarification to be found in the methodology itself.

1.1.1.23 AM0049: "Methodology for gas based energy generation in an industrial facility" (v. 2)

Project Activity: This methodology achieves emissions reductions through the installation of a gas based energy generation (electricity and/or steam/heat) system at an existing industrial facility to meets its own energy demand. The methodology is applicable to project activities that (1) generate on-site electricity and/or steam, either in separate generation systems on-site or co-generate3 electricity and steam on-site; (2) that generate non-steam thermal energy in one or several element processes (3) switch from use of coal or oil to gaseous fuel for generating energy, and (4) use any of the following four technologies available for cogeneration of electrical energy and thermal energy: Topping cycle, Topping cycle with steam turbine, or Topping cycle with gas turbine/engine applications[33]

Applicability: The methodology is applicable under following conditions:

- The fuel used in the project activity (known as 'project fuel') may include natural gas or synthetic gas produced by a coal or natural gas-to-liquid-products plant;
- Prior to the project activity, the existing industrial facility meets its own thermal energy demand but does **not** produce sufficient electricity to meet its demand;
- No natural gas is used in steam generation facilities or element processes prior to the project activity;
- 'Project fuel' is abundant enough that the project does not constrain other projects;
- Regulations do not require the use of **any** specific fuel including the 'project fuel;'
- There is no increase in the output capacity or lifetime of the steam or element processes, nor in total energy generation capacity, during the crediting period;
- The project activity does not lead to change in the quality of steam/heat required on-site
- The geographical/physical boundaries of the baseline grid can be clearly identified and information pertaining to the grid and estimating baseline emissions is publicly available;
- In the case where the project uses synthetic gas produced by a coal and natural gas-to-liquid-fuels plant: (a) there is no capacity expansion of the synthetic fuel production plant based on fuels other than natural gas, and (b) Data on fuel inputs and product outputs from the synthetic fuel plant are available to calculate energy and/or carbon balance for the synthetic fuel production plant.

Baseline: For the purpose of determining **baseline emissions** for heat, project participants shall include carbon dioxide emissions from the combustion of the quantity of coal or oil that would have been used in the absence of the project activity to generate steam and/or non-steam thermal energy. For determining electricity **baseline emissions**, project participants shall include carbon dioxide emissions from the generation of electricity from sources in the absence of the project activity as per the tool to calculate the emissions factor for electricity systems.

Leakage: The methodology considers two major sources of leakage:

- Leakage due to fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of project fuel. This includes mainly fugitive CH4 emissions and CO2 emissions from

[33] These technologies are described in more detail in the full text of the methodology.

associated fuel combustion and flaring, Leakage from upstream emissions related to the production of project fuel, if the project fuel is synthetic gas produced in a coal to liquid fuels plant.

1.1.1.24 AM0050: "Feed switch in integrated Ammonia-urea manufacturing industry" (v. 2.1)

Project Activity: This methodology achieves emission reductions by reducing the amount of excess carbon involved in the production of ammonia and urea. It is applicable to existing ammonia-urea production facilities that use **only** naptha to make ammonia currently. In this methodology, natural gas is used either to wholly replace or to supplement naptha in ammonia and urea production. Since natural gas has a lower carbon/hydrogen ratio than naptha, less CO2 is emitted per unit of output and emissions are reduced.

Applicability: This methodology is applicable under the following conditions:

• There are no regulations on the use of naptha nor obligations to use natural gas as feed;

• Project activities do not result in the increase of the production capacity;

• The project does not create a natural gas shortage nor constrain other NG projects;

• Integrated ammonia-urea manufacturing plants in which excess carbon is currently produced in the urea production process, which is emitted as CO2 to the atmosphere;

• The integrated ammonia-urea manufacturing plant is an existing plant with a historical operation of at least three years prior to the implementation of the project activity;

• Project does not result in changes in the production process other than the feed switch;

• If the use of natural gas in project activity results in a situation of insufficient carbon for urea production, then the balance CO2 required is recovered with the use of a Carbon Dioxide Recovery Plant (CDR) from CO2 in flue gases emitted from an existing source of fossil fuel combustion for energy purposes within the project boundary;

• Fossil fuels provide the thermal energy necessary for feed processing, before **and** after the project.

• The quantity of steam/electricity required for ammonia production is not affected by the project

Baseline/Additionality: The most plausible baseline scenario and the additionality are identified and determined according to the latest version of the "Combined tool to identify the baseline scenario and demonstrate additionality". The methodology provides some alternative baseline scenarios that should be considered.

Leakage: The leakage (LEy) in the project activity would be due to feed extraction, processing, liquefaction, transportation, re-gasification and distribution of feed outside of the project boundary. This includes mainly fugitive CH4 emissions and CO2 emissions from associated fuel combustion and flaring. In this methodology, the following leakage emission sources shall be considered: (1) Fugitive CH4 emissions associated with feed extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas used in the project plant and fossil fuels used in the grid in the absence of the project activity. (2) In the case LNG is used in the project plant: CO2 emissions from fuel combustion / electricity

consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.

1.1.1.25 AM0051: "Secondary catalytic N_2O destruction in nitric acid plants" (v. 2)

Project Activity: This methodology results in the destruction of N_2O emissions by either catalytic decomposition or catalytic reduction of N_2O within the reactor chamber of nitric acid plants. This process is known as secondary destruction. It applies to plants that have been in operation since before 2006. Note further that emission reductions can only be claimed for the existing production capacity measured in tons of nitric acid.

Applicability: The following conditions apply to this methodology:

• The project activity shall not affect the level of nitric acid production;

• At the start of the project activity, there are no regulatory requirements or incentives to reduce levels of N_2O emissions from nitric acid plants in the host country;

• No N_2O abatement technology is or has been installed in the plant, ever;

• The project activity will not cause an increase in NO_X emissions;

• If any NO_X abatement catalyst is installed prior to the start of the project activity, it is not a Non-Selective Catalytic Reduction (NSCR) $DeNO_X$ unit;

• Operation of the secondary N_2O abatement catalyst, installed under the project activity, does not lead to any process emissions of greenhouse gases, directly or indirectly;

• The N_2O concentration in the flow before and after the secondary catalyst is measurable in real time.

• This methodology is only applicable if the most plausible baseline scenario is that no N_2O abatement technology would be installed in the absence of the project and the N_2O would continue to be emitted to the atmosphere.

Baseline: The baseline scenario shall be identified using the procedure for identification of the baseline scenario described in the latest approved version of methodology AM0028 "Catalytic N_2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants"

Additionality: The additionality of the project must be demonstrated and assessed using the latest version of the Additionality Tool taking into account similarity of approaches used to determine baseline scenario and additionality. Consistency must be ensured between the baseline scenario and additionality demonstration. The baseline scenario alternative selected must be used when applying the tool for demonstration and assessment of additionality. In case of a re-assessment of the baseline scenario as a consequence of new NO_X regulations, the baseline scenario must be reassessed as well. In such a case, the additionality of the project must also be re-demonstrated.

Leakage: There will not be any significant leakage of nitrous oxide or other green house gases outside the project boundaries. The secondary catalyst installed in the reactor underneath the precious metal gauzes will result in no measurable increase in resource use in the nitric acid plant.

1.1.1.26 AM0052: "Increased electricity generation from existing hydropower stations through Decision Support System optimization" (v. 2)

Project Activity: This methodology achieves emissions reductions by increasing the annual electricity generation of an existing hydropower station through the introduction of a Decision Support System (DSS) that optimizes the operation of the existing hydropower facility. It is applicable to existing grid-connected hydropower systems that may include multiple hydro generation units linked in a cascade, including both run of the river and reservoir-based units.

Applicability: The methodology is applicable under the following conditions:

• The operation of hydropower systems is not currently optimized using a DSS, with optimization controls or modeling;

• At a minimum, three complete year of recorded data is available to establish the baseline relationship between water flow and power generation;

• Power generation units, covered under the CDM project activity, have not undergone and will not undergo significant upgrades beyond basic maintenance (e.g., replacement of runners) that affect the generation capacity and/or expected operational efficiency levels during the crediting period;

• No major changes to reservoir size (e.g. increase of dam height) or to other key physical system elements (e.g. canals, spillways) that would affect water flows within the project boundary, have been implemented during the baseline data period or will be implemented during the crediting period;

• The project activity only includes the optimization of generation units that generated and supplied power to the electricity system during the year(s) for which historical data for the baseline was collected;

• Either no additional hydro power units are located downstream of the last hydropower unit within the project boundary or the first hydropower unit downstream the project boundary has the capacity to regulate at least 24 hours of maximum flow from upstream.

• This methodology is only applicable if the continuation of current water management practices is the most likely baseline scenario.

Baseline: The methodology determines the baseline scenario through the following steps: Step I: Identify all alternatives to the proposed CDM project activity that deliver a similar level of additional generation to the grid; Step II: Identify the most likely scenario from the alternatives identified in Step I using the investment and barriers analysis steps as defined in the most recent version of the Additionality Tool.

Additionality: The project should be demonstrated as additional using the most recent version of the "Tool for the demonstration and assessment of additionality", together with additional guidance provided on p. 4 for barrier and common practice analysis.

Leakage: There is no leakage expected from the installation of a Decision Management System. The installation of software and meters will not lead to additional emissions.

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1.1.1.27 AM0053: "Biogenic methane injection to a natural gas distribution grid" (v. 1.1)

Project Activity: This methodology reduces emissions by displacing natural gas. In this methodology, project activities process and upgrade biogas to the quality of natural gas and distribute it as energy via natural gas distribution grid. The source of biogas, which is generated by an anaerobic decomposition of organic matter, could be landfills, liquid waste treatment, animal waste management systems, etc.

Applicability: The methodology is applicable under the following conditions:

• The biogas used in the project activity was either vented or flared prior to implementation of the project activity and would continue to be either vented or flared in the absence of the project activity;

• The geographical extent of the natural gas grid is within the host country boundaries;

• The following technologies are used to upgrade biogas to natural gas quality:

  o Pressure Swing Adsorption; or

  o Absorption with/without water circulation; or

  o Absorption with Water, with or without water recirculation;

• If the source of biogas is another registered CDM project activity, the details of the registered CDM project activity shall be provided in the CDM-PDD.

• The approved methodology can be used in conjunction with approved methodologies for capture and destruction/use of biomethane, such as ACM0001, AM0013, etc. In such cases the baseline scenario identification procedure and additionality assessment shall be undertake for the combination of the two components of the project activity, i.e., biomethane emission avoidance and displacement of natural gas.

• The methodology is only applicable if the identified baseline scenario is venting or flaring of biogas at the site where it is captured.

Baseline: The baseline is established using a three-step process. The authors of the methodology provide additional guidance and clarification for each step.

Step 1: Identify all realistic and credible alternative scenarios to the proposed project activity and eliminate alternatives that do not comply with legal or regulatory requirements

Step 2: Eliminate alternatives that face prohibitive barriers

Step 3: Conduct an investment analysis

Additionality: The additionality of the project activity shall be demonstrated and assessed using the latest version of the Additionality Tool

Leakage: No significant leakage is expected for this type of project activity under the applicability conditions stated, thus leakage can be ignored.

1.1.1.28 AM0054: "Energy efficiency improvement of a boiler by introducing oil/water emulsion technology" (v. 2)

Project Activity: This methodology reduces emissions through the introduction of oil/water emulsion technology in an existing residual fuel-oil-fired boiler for the purpose of improving energy efficiency. The introduction of the oil/water emulsion technology includes the installation and operation of equipment to mix the residual fuel oil with water and additives prior to combustion in order to improve the efficiency of the combustion process, which reduces emissions.

Applicability: The methodology is applicable under the following conditions:

- The boiler has an operating history of at least five years;
- No oil/water emulsion technology is used at the project site prior to the project activity;
- The oil/water emulsion is prepared and consumed on the premises;
- The project activity does not result in additional net heat demand for pre-heating the oil/water emulsion prior to combustion; this means that either
- With the implementation of the project activity, no significant operational, process or
- equipment modifications other than the introduction of the oil/water emulsion technology are undertaken or required (e.g. no other measures to improve energy efficiency);
- The implementation of the project activity does not result in an increase of heat generation in the boiler
- The remaining lifetime of the boiler is longer than the crediting period;
- No capacity expansions occur at the project facility during the crediting period.
- This methodology is only applicable if continuation of current practice is the most plausible baseline scenario.

Baseline: The project participants can use either of the following options to establish the baseline scenario:

Option 1: Use the latest version of the "Combined tool to identify the baseline scenario and to demonstrate additionality." The authors provide specific guidance for this process.

Option 2: Determine baseline and additionality separately. Additionality is demonstrated using the Additionality Tool. Baseline is demonstrated through the application of the following steps:

Step 1. Identify all realistic and credible alternatives to the project activity

Step 2. Consistency with applicable laws and regulations

Step 3. Eliminate alternatives that face barriers or are economically unattractive

Leakage: No leakage is applicable under this methodology.

1.1.1.29 AM0055: "Baseline and Monitoring Methodology for the recovery and utilization of waste gas in refinery facilities" (v. 1.2)

Project Activity: This methodology recovers and utilizes waste gas in refinery facilities for the purpose of generating process heat in element processes.[34]

Applicability: The methodology is applicable to project activities at existing refinery facilities that develop an alternative use for the energy content of waste gas that is currently being flared, to generate process heat in element processes. The methodology is applicable under the following conditions:

- In absence of the project activity, base on historical data, waste gases from the refining facility were flared (not vented) for the 3 years prior to the start of the project, or as long as the processing facility has been in operation.
- The recovery device is placed just before the flare header (with no possibility of diversions of the recovered gas flow) and after all the waste gas generation devices. Note: The recovered waste gas is used for replacing fossil fuel which is used for generating heat required for various processes.
- Recovered waste gases are used in the same refinery facility
- The project activity does not lead to an increase in the production capacity of the refinery
- Local regulations neither constrain the refinery facility from using the fossil fuels currently used in the existing process nor require flaring of the recovered gas.
- Waste gas volume and composition are measurable.
- There should be no addition of fuel gas or refinery gas in the waste gas pipeline between the point of recover and the point where it is mixed in fuel gas system or used directly in element process.

Baseline and Additionality: Determined through the application of the latest version of the "Combined tool to identify the baseline scenario and demonstrate additionality." Realistic and credible alternatives should be determined for:

- Waste gas use in the absence of the project activity;
- Steam/heat generation in the absence of project activity.

Leakage: No leakage is identified in this methodology.

[34] An element process is defined as a fuel combustion or heat utilized in equipment at one point of an industrial facility, for the purpose of providing thermal energy.

1.1.1.30 AM0056: "Efficiency improvement by boiler replacement/rehabilitation and optional fuel switch in fossil fuel-fired steam boiler systems" (v. 1)

Project Activity: This methodology improves the efficiency of fossil fuel-fired steam boiler systems through boiler replacement or rehabilitation and optional fuel switch. It applies to project activities in existing facilities that:

1) Completely replace one or more boilers with some remaining lifetime; and/or
2) Implement fitting of additional new equipment to an existing steam generating system (retrofitting); and
3) Implement optional switch in fossil fuel

Applicability: this methodology is applicable under the following conditions:

1) Steam generation in the project activity is carried out through the use of fossil fuel fired steam boilers;
2) National/local regulations do not require the replacement or retrofit of the existing equipment. The project participants shall demonstrate this through documented evidence. These documents shall be submitted to a DOE at the time of validation;
3) There are no enforced national/local regulations or standards on minimum efficiency ratings for the boilers included in the project boundary. Project participants shall confirm this through proper documentation, to be submitted to a DOE at the time of validation;
4) National/local regulations do not constrain the facility from using the fossil fuel being used prior to fuel switching;
5) Steam quality is the same before and after the start of the project activity;
6) The existing steam generating system in the facility may consist of multiple boilers;
7) Only one type of fossil fuel is used in all boilers included in the project boundary;
8) If the fossil fuel switch is implemented, only those project activities are eligible to use this methodology where both energy efficiency measures and the fuel switch are additional.

The methodology is not applicable to project activities:

1) That include energy efficiency improvement measures in a steam distribution system and steam consuming processes;
2) Where before the implementation of the project activity waste heat recovery takes place outside the project boundary for processes other than the steam generating process;
3) That replace or rehabilitate boilers in a combined heat and power (CHP) generation system
4) That involve fossil fuel switch only.

Baseline and additionality: Determined through the application of the latest version of the "Combined tool to identify the baseline scenario and demonstrate additionality."

1.1.1.31 AM0057: "Avoided emissions from biomass wastes through use as feed stock in pulp and paper production or in bio-oil production" (v. 2.2)

Project Activity: This methodology uses agricultural wastes as feed stock for pulp and paper or bio-oil production, eliminating methane emissions of the previously-unused waste. The end product of such a process must be similar in characteristics and quality to existing high quality products in the market and must not require special use or disposal methods.

Applicability: The methodology is applicable under the following conditions:

- The project activity is the construction of a new pulp and paper or bio-oil production facility that uses agricultural wastes as feedstock.
- The waste should not be stored in conditions that would lead to anaerobic decomposition which results in the generation of CH_4.
- During the production of pulp and paper, no significant additional process leading to emissions of greenhouse gas compared to the baseline scenario, except for electricity and fossil fuel consumption, is envisaged. If this is the case, the participant must submit a request for deviation to include emissions from this source.
- Emission reductions are only claimed for avoidance of methane emissions when it can be demonstrated that the agricultural residues are left to decompose anaerobically.
- In the case of bio-oil, its production that does not involve a process that leads to emissions of greenhouse gas except for those arising directly from pyrolysis, or associated with electricity or fossil fuel consumption.
- In the case biomass is combusted for the purpose of providing heat or electricity to the plant, the biomass fuel is derived from biomass residues, as specified in ACM0006.
- In the case of bio-oil, the pyrolsed residues (char) will be further combusted and the energy derived thereof used in the project activity. The residual waste from this process does not contain more than 1% residual carbon.

The on-site energy generation source supplying energy to the production plant can be a CDM project activity. To allow this option, only the amount of agricultural wasted used as feedstock in the project activity shall be considered for the purpose of calculating baseline emissions.

Baseline and Additionality: Determined using the latest version of the "Combined tool to identify the baseline scenario and demonstrate additionality." Realistic and credible alternatives should be developed separately regarding the baseline use for the project waste and the baseline source of pulp or bio-oil that would be offset by the project.

1.1.1.32 AM0058: "Introduction of a new primary district heating system" (v. 2)

Project Activity: This methodology installs a new primary district heating system to supply heat to residential and commercial consumers with the goal of increasing energy efficiency and reducing emissions. The heat can come:

1) Predominately from an existing cogeneration plant (CHP) with three years' operating history. The project may also involve introduction of new modern heat only boilers to supplement heat from CHP; or
2) From heat-only boilers, in which case the project boundary includes existing buildings.

Applicability: The methodology is applicable under the following conditions:

- The geographical extent of the project boundary can be clearly established, in terms of location of existing and new buildings connected to the district heating system, identification of boilers and sub-stations and connected isolated heating networks as well as location and interconnections of cogeneration units at the power plant;
- The power plant, from which heat is extracted for the district heating network, must operate in accordance with the following conditions:
    - The heat is extracted from a grid-connected fossil fuel fired power plant;
    - Only one type of fuel is used (a maximum of 1% of auxiliary fuel may be used for start-up, etc.). The same type of fossil fuel is fired in the power plant in the baseline and project scenarios;
    - The project activity does not lead to the increase in the technical lifetime of the power plant and does not result in any major integrated production changes at the power plant;
    - There should be no diversion of heat or steam, which was extracted prior to the start of the project activity for other purposes such as industrial production,3 to the district heating network.
- All fossil fuel fired heat-only boiler(s) must operate according to the following conditions:
    - The heat supplied to the district heating system is only used for heating of buildings and/or hot tap water supply in the residential and/or commercial sector, but not for production processes;
    - Only one type of fuel is used in each of the boilers included in the project boundary. (A maximum of 1% of auxiliary fuel may be used for start-up, etc.)

Baseline and Additionality: Demonstrated using a combination of the "Combined tool to identify the baseline scenario and demonstrate additionality" and the "Tool for the demonstration and assessment of additionality."

Leakage: No calculation of leakage is required for project activities using the same fossil fuel type in the project activity and in the baseline scenario. In cases where the project activity results in a fuel switch from predominantly coal or oil to predominantly natural gas, leakage should be considered.

1.1.1.33 AM0061: "Methodology for rehabilitation and/or energy efficiency improvement in existing power plants" (v. 2)

Project Activity: This methodology incorporates various rehabilitation and/or energy improvement measures[35] in order to increase efficiency and reduce emissions.

Applicability: This methodology is applicable to project activities which implement rehabilitation and/or energy efficiency measures in an existing fossil fuel fired power plant for electricity generation. The methodology also applies to rehabilitation and energy efficiency improvements that implement a fuel switch (partial or total), but not emission reductions will be credited to the fuel switch. In addition, the following conditions apply:

The project activity power plant supplies electricity to the electricity grid;

- The project activity is implemented in an existing power plant and does not involve the installation of new electricity generation units. The installed power generation capacity of each unit may increase to a maximum of 15%;
- The existing power plant has an operation history of at least ten years and data on fuel consumption and electricity generation for the five most recent years prior to the implementation of the project activity are available;
- Only rehabilitation and/or energy efficiency improvements which require capital investment shall be included;
- The methodology is applicable if the most plausible baseline scenario is the continuation of the operation of the project activity power plant, using all generation equipment previously in use, and undertaking business as usual.

The methodology is not applicable to Greenfield power plants or cogeneration power plants.

Baseline and Additionality: Demonstrated through the use of the latest version of the "Combined tool to identify the baseline scenario and demonstrate additionality." The only eligible barrier for project activities is the investment barrier; no other barrier shall be used to identify the baseline scenario or demonstrate additionality.

Leakage: There is no leakage that results from this methodology.

[35] Rehabilitation and/or energy efficiency improvement measures refer to an investment in an existing power plant, whose performance has deteriorated over the years, with the purpose to upgrade its performance without adding new generating units. Rehabilitation does not include the complete replacement of major components such as turbines or boilers.

1.1.1.34 AM0062: "Energy efficiency improvements of a power plant through retrofitting turbines" (v.1.1)

Project Activity: This methodology involves retrofitting steam and gas turbines with components of improved design for energy efficiency in existing fossil fuel power plants.

Applicability: The methodology is applicable to project activities where steam turbines and gas turbines are retrofitted with component(s) of improved design for energy efficiency improvements in an existing fossil fuel power plant. The methodology is only applicable if the following conditions are met:

- The electricity is generated using fossil fuels; no biomass or waste heat is used;
- The power plant where the project activity is applied supplies electricity to a grid only;
- In case of steam turbines, the steam supply and electricity generation should be separately measurable for each turbine retrofitted under the project activity;
- Activities covered under the following two categories are NOT eligible as CDM activity under this methodology:
    - All the recommended regular of preventative maintenance activities as provided by the manufacturer of the turbine;
    - A superior practice of preventative maintenance resulting in improved efficiency after maintenance;
- Project activities are only eligible when:
    - The operational parameters of turbines, that affect the energy efficiency of the turbine, remain the same (subject to a variation of +/- 5%) in the baseline and the project scenario
    - The project activity does not increase the lifetime of the existing turbine during the crediting period – the methodology is applicable up to the end of the lifetime of the existing turbine, if shorter than the crediting period

The methodology is not applicable:

- To project activities that involve fuel switch;
- To combined cycle power plants, cogeneration plants, or a power plant that is part of an industry and a portion of the electricity is used to meet internal demand in that industry.

Baseline and Additionality: Determined using the latest version of the "Combined tool to identify the baseline scenario and to demonstrate additionality." Furthermore, the methodology is only applicable if the most plausible baseline scenario is determined to be the continuation of current practice.

Leakage: No leakage is identified under this methodology.

1.1.1.35 AM0063: "Recovery of CO_2 from tail gas in industrial facilities to substitute the use of fossil fuels for production of CO_2" (v. 1.1)

Project Activity: This methodology recovers CO_2 from tail gas in industrial facilities in order to produce CO_2, reducing the use of fossil fuels for the purpose of CO_2 production.

Applicability: The methodology is applicable to project activities that reduce emissions associated with conventional CO_2 from the tail gas coming out of an industrial facility. The off gas, produced as a result of the extraction of CO_2 from the tail gas, is supplied back to the industrial facility where it is either utilized as fuel or flared. The methodology is applicable in the following scenarios:

- Use of tail gas from an existing industrial facility for substitution of the combustion of fossil fuels at a specific existing conventional CO_2 production facility; or
- Use of tail gas from an existing industrial facility in a new CO_2 production plant established as part of the project activity.

The following conditions apply to both scenarios:

- The tail gas from the industrial facility has been produced for as long as the industrial facility has been in operation;
- Prior to the implementation of the project activity, the tail gas has either been used as fuel in the industrial facility without extraction of CO_2 or has been flared;
- There are no substantial changes in the industrial facility as the result of the project activity;
- If the tail gas was used as fuel prior to the start of the project activity, the off gas has to be used as fuel in the project activity and cannot be flared;
- There exist historical records of at least three years of data related to the operation of the facility from which the tail gas is extracted;
- The project activity does not result in a significant change in the composition of the tail gas generated at the facility – generally, no more than a 5% variation is allowed when comparing levels before and after start of project activity;
- The total amount of CO_2 produced at the facility has to be sold within the host country;
- The methodology is NOT applicable to project activities where CO_2 is produced for own consumption at the project facility (i.e. for manufacturing of chemicals).
- **NOTE:** There are unique applicability conditions for each project scenario. Please see the methodology itself if the proposed project activity survives the above conditions.

Baseline: Establishment of the baseline requires an evaluation of compelling alternatives. The methodology includes a list of alternatives that must be considered, which differs depending on the specific project activity. See document for details.

Additionality: Determined through the use of the Baseline and Additionality Tool.

1.1.1.36 AM0067: "Methodology for installation of energy efficient transformers in power distribution grid" (v. 2)

Project Activity: This methodology increases the energy efficiency of power distribution grids through the installation of new, high-efficiency transformers. These transformers can be employed in the creation of a new distribution grid or can be used to replace existing low-efficiency transformers.

Applicability: The methodology is applicable to the following project activities:

- Replacement of existing lower-efficiency transformers with higher efficiency transformers in an existing distribution grid
- Installation of new high efficiency transformers in the new areas covered by expansion of the distribution grid, where in the absence of the project lower efficiency transformers would have been installed.

One important note about the applicability of this methodology: For each type of transformer installed, the rated load losses for project activity transformers are equal to or lower than baseline transformer load losses.

Baseline: The baseline scenario is identified using the latest version of the Combined Tool. There are four scenarios which must be considered to determine the baseline scenario:

- Replacement of installation of transformers adopting a more efficient technology than the technology of the project activity;
- Continuation of current practice. Rather than using project activity transformers, the most commonly-used transformers in the geographical region are installed;
- Regulation. Replacement or installation of transformers as per new performance levels enforced by regulation;
- Transformers using project activity technology are installed/replaced without CDM.

Barriers to the installation of project activity transformers exist on three levels: technological, investment, and prevailing practice.

Additionality: Demonstrated using the latest version of the "combined tool to identify baseline scenario and demonstrate additionality."

Leakage: No significant leakage is expected, provided that it can be ensured that the replaced transformers are not used elsewhere.

1.1.1.37 AM0068: "Methodology for improved energy efficiency by modifying ferroalloy production facility" (v.1)

Project Activity: The methodology is applicable to projects which aim at improving energy efficiency of an existing (≥ 3 years) ferroalloy production facility by implementing the two modifications to the production process outlined below.

- Improving energy efficiency by modifying furnaces from submerged electric arc smelting furnaces to open slag bath smelting furnaces;
- Improving energy efficiency by modifying rotary kilns from co-currenty rotary kilns to counter-current rotary kilns.

Project activities consisting of modification of rotary kilns alone are not eligible for CDM credits until the point in time when the furnace is replaced with open slag bath furnace. Such projects can only be credited from the time of the smelting furnace replacement.

The project participant should submit the facility's plan for energy improvements in its entirety. If the two modifications called for in this methodology are to occur at two separate times, it must be specified in the initial proposal, otherwise the facility is not eligible for CDM credits.

There are five conditions which must exist in order for the methodology to be applicable:

- The facility produces one type of ferroalloy, using submerged electric arc smelting furnace(s) and rotary kilns.
- The type and quality of ferroalloy produced is not affected by the project activity and remains unchanged throughout the crediting period;
- Data for at least three years preceding the implementation of the project activity must be available to estimate baseline emissions;
- Emission reduction credits can only be claimed throughout the lifetime of the existing equipment;
- The most plausible baseline scenario is the continued operation of the ferroalloy production facility that was already used prior to the implementation of the project activity, without major modification or overhaul to the facility or business practices.

Baseline and Additionality: Determined through the use of the latest version of the "Combined tool to identify the baseline scenario and demonstrate additionality." If it cannot be demonstrated that both measures are interdependent[36], project participants must identify the baseline scenario for each measure separately in order to demonstrate additionality.

Leakage: No leakage is anticipated through the application of this methodology.

[36] Measures are considered to be interdependent when the project participant can demonstrate that it is not technically feasible to implement one measure without implementing the other.

1.1.1.38 AM0070: "Manufacturing of energy efficient domestic refrigerators" (v. 1)

Project Activity: This methodology is applicable to project activities undertaken by manufacturers of refrigerators that increase the energy efficiency of manufactured refrigerators via technical measures.

Conditions which must be fulfilled to apply the methodology:

- Refrigerators targeted under this methodology are not designed to be switched on and off and are used by households on a continuous basis;
- The methodology only accounts for refrigerators that are produced by a manufacturer, involved in the project activity, and that are produced and sold in the Host country. Project activities that involve import or export of refrigerators from or to other countries are not eligible under this methodology;
- The project participants have the necessary historic data on the quantities of refrigerator models manufactured and sold in the Host country during that period and their standard electricity use and adjusted storage volume;
- The Global Warming Potential (GWP) of refrigerants and foam blowing agents used by the manufacturer to produce refrigerators under the project activity is not larger than GWP of refrigerants and foam blowing agents used by the manufacturer during the three most recent historical years prior to the start of the project activity;
- To avoid potential double counting of emission reductions, the DOE performing validation of the project activity shall confirm in the validation report that no other project activity, involving the same refrigerator models as the proposed project activity, has been registered as a CDM project activity, submitted for registration or uploaded for public comments.
- Under this methodology emission reduction credits cannot be claimed for reducing refrigerant emissions by switching from a refrigerant or a foam blowing agent with a higher GWP to a substance with a lower GWP. Project participants wishing to claim credits for such a switch may refer to the approved methodology AM0071.
- Emission reduction credits can also not be claimed for the replacement of existing types of refrigerator models by a different type of refrigerators (e.g. replacement of "Frost Free" refrigerators by "Direct Cool" ones, or refrigerator/freezer by refrigerator etc.).

Baseline: A benchmark approach is applied to establish the baseline scenario and demonstrate additionality. It is considered that the baseline scenario is the manufacturing of refrigerators with the specific electricity consumption corresponding to the calculated benchmark for the respective storage volume class, taking into account autonomous energy efficiency improvement.

Additionality: As long as the specific electricity consumption of refrigerators produced and sold in the Host country by the manufacturer, involved in the project activity, is lower than the benchmark for specific electricity consumption during each year of the crediting period, the project activity is deemed additional.

Leakage: No leakage is accounted.

1.1.1.39 AM0072: "Fossil Fuel Displacement by Geothermal Resources for Space Heating" (v. 1)

Project Activity: The methodology is applicable for space heating in buildings by introducing centralized geothermal heat supply system.

Conditions which must be fulfilled to apply the methodology:

- The geographical extent of the project boundary can be clearly established, in terms of the location of buildings connected to existing heating systems and new buildings to be constructed that will use geothermal heat;
- Project will use geothermal resources for centralized space-heating system of residential areas, commercial areas and/or industrial areas;
- The methodology is applicable for installing new heating systems in new buildings and replacing existing fossil fuel space heating systems. Current use of fossil fuel(s) for space heating is partially or completely replaced by heat drawn from geothermal water;
- The installed heat capacity may increase as a result of the project activity. But this increase is limited to 10% of the previous existing capacity; otherwise a new baseline scenario has to be determined for the new capacity;
- All fossil fuel heat-only boilers(s) used in the baseline must operate to supply the heat to the district heating system which is only used for heating of buildings and/or hot tap water supply in the residential and/or commercial sector, but not for industrial processes;
- The use of GHG emitting refrigerants is not permitted under this methodology.

Baseline and Additionality: Apply the "Combined tool to identify the baseline scenario and demonstrate additionality". The following alternative baseline scenarios must be considered: Implementation of the project activity without the benefits of the CDM; Introduction of a new integrated district heating system(s) connected by a new primary network; Continued operation or rehabilitation of an existing [isolated] district heating network(s) or establishment of a new [isolated] district heating network(s). Such [isolated] district heating network(s) employ the following technologies; and Continued use or introduction of individual heat supply solutions.

Leakage: No leakage emissions have been identified.

1.1.1.40 ACM0001: "Consolidated baseline and monitoring methodology for landfill gas project activities" (v. 9)

Applicability:

This methodology is applicable to landfill gas capture project activities, where the baseline scenario is the partial or total atmospheric release of the gas and the project activities include situations such as:

a) The captured gas is flared; and/or

b) The captured gas is used to produce energy (e.g. electricity/thermal energy);

c) The captured gas is used to supply consumers through natural gas distribution network. If emissions reductions are claimed for displacing natural gas, project activities may use approved methodology AM0053.

Baseline: The baseline is the most plausible alternative scenario to the project activity. The methodology is only applicable if the baseline scenario is either the total atmospheric release of landfill gas or the partial capture and subsequent flaring of landfill gas. The electricity in the baseline scenario can be obtained from an existing/new fossil based captive power plant or from the grid, and heat in the baseline is obtained from an existing/new fossil fuel based boiler.

Additionality: Shall be demonstrated and assessed using the latest version of "Tool for the demonstration and assessment of additionality."

Leakage: No leakage effects need to be accounted for under this methodology.

1.1.1.41 ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (v. 7)

Project Activity: This methodology is applicable to grid-connected renewable power generation project activities that involve electricity capacity additions. The project activity is the installation or modification/retrofit of a power plant/unit of one of the following types: hydro power (either with a run-of-river reservoir or an accumulation reservoir), wind power, geothermal power, solar power, wave power or tidal power.

Applicability: The methodology is applicable under the following conditions:

- In case of hydro power plants:
  - The project activity is implemented in an existing reservoir, with no change in the volume of reservoir.
  - The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.
  - The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available;
- Applies to grid connected electricity generation from landfill gas to the extent that it is combined with ACM0001; and
- 5 years of historical data (or 3 years in the case of non-hydro project activities) have to be available for modification/retrofit project activities at existing plants.

The methodology is not applicable to the following:

- Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity
- Biomass fired power plants;
- Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m^2.

Baseline: For projects that do not modify or retrofit an existing electricity generation facility, the baseline scenario is that electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and the addition of new sources. For projects that modify or retrofit existing facilities, the baseline scenario is that the existing facility would have continued to provide electricity to the grid at historical average levels until the time at which the facility would have likely been replaced or retrofitted in the absence of the project activity.

Additionality: Demonstrated using the latest version of the additionality tool.

Leakage: Does not need to be considered.

1.1.1.42 ACM0003: "Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture" (v.7.2)

Project Activity: The methodology is applicable to project activities in the cement industry where fossil fuel(s) used in an existing clinker production facility are partially replaced by less carbon intensive fossil fuel(s) and/or alternative fuels.

Applicability: The following conditions shall apply:

- A significant investment is required to enable the use of the proposed new fuel(s);
- No alternative fuels have been used in the three years prior to the project activity;
- Project only applies to installed capacity that exists at time of validation of the project.

In case of project activities using biomass residues or renewable biomass:

- The biomass may not be not chemically processed prior to combustion. Moreover, any preparation of the biomass does not cause other significant GHG emissions
- The biomass used by the project facility is stored under aerobic conditions.

In cases where renewable biomass from a dedicated plantation is used:

- The site preparation does not cause longer-term net emissions from soil carbon.
- After harvest, regeneration will occur either by direct planting or natural sprouting;
- Grazing will not occur within the plantation;
- In the absence of the project activity, natural revegetation would not result in growth of a forest due to natural or human pressures;
- Prior to the implementation of the project activity, no fuel wood has been collected from the land area where the dedicated plantation will be established;
- The proposed plantation site has not been forested for at least 10 years;
- If relevant, workers for any activities on the land prior to project implementation continue to be employed for the biomass plantation activity;
- The land area where the dedicated plantation will be established is, prior to project implementation, either being severely degraded or has been used for agricultural purposes.

Baseline and Additionality: Demonstrated using Combined Tool. The methodology is only applicable if the baseline is either the continued use of the current fuel mixture or a different fossil fuel mix. There are other specific requirements, depending on the exact implementation of the project. See pp. 6-8.

For this type of project activity, two leakage sources have to be considered:

• In case of project activities using biomass residues, the project activity may result in an increase in emissions from fossil fuel combustion or other sources due to diversion of biomass residues from other uses to the project plant as a result of the project activity;

• In case of project activities using (a) less carbon intensive fossil fuel(s), leakage may result from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution

of fossil fuels outside of the project boundary. This includes mainly fugitive CH4 emissions and CO2 emissions from associated fuel combustion and flaring.

1.1.1.43 ACM0005: "Consolidated Baseline Methodology for Increasing the Blend in Cement Production" (v. 4)

Project Activity: The project activity is the increase in the share of blending materials used in the production of cement (i.e. a reduction of the amount of clinker per ton of blended cement). The project activity accounts only for GHG emission reductions associated with the increased level of blending – other measures such as energy efficiency improvements should be considered as a separate project activity.

Applicability: The methodology is applicable under the following conditions:

- There is no shortage of additives related to the lack of blending materials. Project participants should demonstrate that there is no alternative allocation or use for the additional amount of additives used in the project activity. If the surplus availability of additives is not substantiated the project emissions reductions (ERs) will be discounted as outlined below.
- This methodology is applicable to domestically sold output of the project activity plant and excludes export of blended cement.
- Adequate data are available on cement types in the market.

Baseline: Project participants should identify the most plausible baseline scenario among all realistic and credible alternatives(s), and use barrier and financial analysis to assess which of these alternatives should be excluded from further consideration. Where more than one credible and plausible alternative remains, project participants shall, as a conservative assumption, use the alternative baseline scenario that results in the lowest baseline emissions as the most likely baseline scenario.

Additionality: Demonstrated using the latest version of the "Tool for the demonstration and assessment of additionality." Where project proponents use the barrier analysis, they must demonstrate that there exist real and demonstrable barriers to the increase in the additive blend. Such barriers may include technological, financial, and market acceptability barriers (in the case that there is a perception that blended cement is of inferior quality).

Baseline Emissions: For the sake of conservativeness, baseline emissions will be defined as the lowest of the following:

(i) The average (weighted by production) mass percentage of clinker for the 5 highest blend cement brands for the relevant cement type in the region; If the region comprises of less than 5 blend cement brands, the national market should be used as the default region;

(ii) The production weighted average mass percentage of clinker in the top 20% (in terms of share of additives) of the total production of the blended cement type in the region. If

20% falls on part capacity of a plant, that plant is included in the calculations; or

(iii) The mass percentage of clinker in the relevant cement type produced in the proposed project activity plant before the implementation of the CDM project activity, if applicable.

Leakage: Leakage can result from the transportation of additives to the project site.

1.1.1.44 ACM0007: "Baseline methodology for conversion from single cycle to combined cycle power generation" (v. 3)

Project Activity: This methodology reduces emissions through the utilization of previously-unused waste heat in single-cycle power generation facilities. Projects use this heat to produce steam for another turbine, thus making the facility combined-cycle, and increase the amount of electricity produced.

Applicability: This methodology is applicable:

- When waste heat generated on site is not utilizable for any other purpose on-site;
- Where the project activity does not increase the lifetime of the existing gas turbine during the crediting period (i.e. this methodology is applicable up to the end of the lifetime of existing gas turbine, if shorter than crediting period);
- Where project developers have access to appropriate data to estimate the combined margin emission factor.

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Baseline and Additionality: Demonstrated using the Combined Tool. The baseline scenario is that in the absence of the proposed project activity the electricity, to meet the demand in the grid system, will be generated:

1) By the operation of the existing power plant in open cycle mode;

2) By the operation of existing grid-connected power plants; and

3) By the addition of new generation sources to the grid.

This methodology is only applicable where it can be demonstrated that the baseline scenario is as described above.

Leakage: Main potential sources are natural gas use increases and construction emissions.

1.1.1.45 ACM0009: "Consolidated baseline methodology for fuel switching from coal or petroleum fuel to natural gas" (v. 3)

Project Activity: This methodology is applicable to project activities that switch in one or several *element processes* from coal or petroleum fuel to natural gas. Element processes are processes where fuel is combusted the purpose of thermal energy generation, using mainly a single fuel to produce a single output, such as steam or hot air. The fuel switching is undertaken in processes for heat generation that are located at and directly linked to an industrial process with a main output other than heat or that provide heat to a district heating system by means of heat-only boilers.[37]

Applicability: This methodology is applicable under the following conditions:

- Prior to the implementation of the project activity, only coal or petroleum fuel (but not natural gas) have been used in the element processes;
- Regulations/programs do not constrain the facility from using the fossil fuels being used prior to fuel switching;
- The use of natural gas or any other fuel in the element processes is not required;
- The project activity does not increase the capacity of thermal output or lifetime of the element processes during the crediting period (i.e. emission reductions are only accounted up to the end of the lifetime of the relevant element process), nor is there any thermal capacity expansion planned for the project facility during the crediting period;
- The proposed project activity does not result in integrated process change;
- Also: This methodology is only applicable if the baseline is the continuation of the use of coal or petroleum fuel throughout the crediting period.

Baseline: Demonstrated using normal procedure. These steps should be applied to every element process being considered within a facility:

Step 1: Identify all realistic/credible alternatives for the fuel use in the element process

Project participants should at least consider the following alternatives:

- Continuation of the current practice of using coal or petroleum fuel;
- Switching from coal or petroleum to a different fuel than natural gas (such as biomass);
- The project activity not undertaken under the CDM (switching from coal or petroleum fuel to natural gas);
- Switching from coal or petroleum fuel to natural gas at a future point in time during the crediting period;

Step 2: Eliminate alternatives that are do not comply with applicable law/regulations

Step 3: Eliminate alternatives that face prohibitive barriers

Step 4: Compare economic attractiveness of remaining alternatives

Additionality: Demonstrated using the latest version of the additionality tool.

[37] The author considers this previous sentence very important to the formulation of this methodology, but its meaning is unclear to me. What industrial facilities are not permitted to use this methodology?

Leakage: Main sources of leakage to be considered are fugitive CH4 emissions associated with the increased use of natural gas and (if applicable) emissions due LNG production and processing if LNG is used in the project activity.

Project Activity: This methodology is applicable to manure management on livestock farms where the existing anaerobic manure treatment system, within the project boundary, is replaced by one or a combination of animal waste management systems (AWMSs) that result in less GHG emissions.

Applicability: This methodology is applicable to manure management projects with the following conditions:

- Farms where livestock populations, comprising of cattle, buffalo, swine, sheep, goats, and/or poultry, are managed under confined conditions;
- Farms where manure is not discharged into natural water resources, like rivers/estuaries.
- In case of anaerobic lagoons treatments systems, the depth of the lagoons used for manure management under the baseline scenario should be at least 1m.
- The annual average temperature in the site where the anaerobic manure treatment facility in the baseline existed is higher than 5℃.
- In the baseline case, the minimum retention time of manure waste in the anaerobic treatment system is greater than 1 month.
- The AWMS/process in the project case should ensure that no leakage of manure waste into ground water takes place, e.g., the lagoon should have a non-permeable layer at the lagoon bottom.

Baseline: The methodology determines the baseline scenario through a combination or barriers and investment analysis.

The methodology suggests that proponents consider the complete set of possible manure management systems listed in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories as possible baseline scenarios, as well as combinations thereof.

Monitoring: One monitoring parameter, the average animal weight of a defined livestock population at the project site, is defined using a statistical sampling procedure.

1.1.1.46 ACM0011: "Consolidated baseline methodology for fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation" (v.2.2)

Project Activity: This methodology reduces emissions through fuel switching from coal and/or petroleum to natural gas in existing power plants, with ≥ 3 years of operating history using the baseline fuel.

Applicability: This methodology is applicable under the following conditions:

- The PAPP[38] either supplies electricity to the grid or to a captive consumer;
- Prior to the project, no natural gas was used to generate electricity;

[38] Project Activity Power Plant

- Under the project activity, only natural gas is used in the PAPP except for auxiliary fuel consumption (e.g., for start-ups) which shall not exceed 1% of total fuel consumption.
- Coal/petroleum fuel is available in the country/region for electricity generation;
- Regulations/laws and programs do not specify fuels used to generate electricity;
- The captive consumer or electricity grid, to which the electricity generated by the PAPP is sold, if applicable, is not restrained by regulations/law to purchase of electricity generated from different type of fuels, (i.e., it is not prohibited to purchase electricity generated using a higher GHG intensity fuel during the crediting period)
- The project activity does not involve major retrofits/modifications of the power plant other than the fuel switch, such as new gas turbines, etc.;
- The project activity does not result in a significant change in the capacity (≤5% change);
- The project activity does not result in an increase of the lifetime of the PAPP during the crediting period. If the lifetime of the PAPP is increased due to the project activity, the crediting period shall be limited to the stated pre-project lifetime of the power plant,
- This methodology is only applicable if the most plausible baseline scenario is the continuation of the use of high carbon intensive fuels like coal and/or petroleum fuels for electricity generation in the PAPP.

The methodology is not applicable in following situations:

- Greenfield plants that would have used a less efficient fuel absent CDM benefits;
- This methodology is neither applicable to fuel switch for cogeneration projects nor to energy efficiency improvement projects.

Baseline: The baseline is identified using these steps, which are all discussed thoroughly:

Step 1a. Identify all realistic and credible alternatives to the project activity

Step 1b. Consistency with applicable laws and regulations

Step 2. Eliminate alternatives that face prohibitive barriers

Step 3. Comparison of economic attractiveness of the remaining alternatives

Additionality: Procedure provided may be used to assess additionality, or project participants may use the latest “Tool for the demonstration and assessment of additionality” approved by the CDM Executive Board.

Leakage: The main leakage concerns are fugitive CH4 emissions and CO2 emissions from fuel combustion and flaring. The methodology includes processes to identify and measure leakage.

1.1.1.47 ACM0012: "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" (v. 3)

Applicability: The consolidated methodology is for project activities that utilize a Waste Energy Carrying Medium (WECM), in the form of heat, chemical energy or pressure, as an energy source for Cogeneration; or Generation of electricity; or Direct use as process heat source; For generation of heat in element process (e.g. steam, hot water, hot oil, hot air); or For generation of mechanical energy. Some restrictions apply (see the methodology for details).

The project may be of Type 1 or Type 2.

Type-1: All the waste energy in identified WECM stream/s, that will be utilized in the project activity, is, or would be flared or released to atmosphere in the absence of the project activity at the existing or new facility.

Type-2: An existing industrial facility, where the project activity is implemented, that captures and utilizes a portion of the waste gas stream(s) considered utilized in the project activity.

The methodology is applicable under the following conditions:

- If the project activity is based on the use of waste pressure to generate electricity, electricity generated using waste pressure should be measurable;
- Energy generated in the project activity may be used within the industrial facility or exported from the industrial facility;
- The electricity generated in the project activity may be exported to the grid or used for captive purposes;
- Energy in the project activity can be generated by the owner of the industrial facility producing the waste energy or by a third party (e.g. ESCO) within the industrial facility;
- Regulations do not constrain the industrial facility that generates waste energy from using fossil fuels prior to the implementation of the project activity;
- The methodology covers both new and existing facilities. For existing facilities, the methodology applies to existing capacity. If capacity expansion is planned, the added capacity must be treated as a new facility;
- The emission reductions are claimed by the generator of energy using waste energy;
- In cases where the energy is exported to other facilities, an official agreement exists between the owners of the project energy generation plant (henceforth referred to as generator, unless specified otherwise) with the recipient plant(s) that the emission reductions would not be claimed by recipient plant(s) for using a zero-emission energy source;
- For those facilities and recipients included in the project boundary, that prior to implementation of the project activity (current situation) generated energy on-site (sources of energy in the baseline), the credits can be claimed for minimum of the following time periods:
    - The remaining lifetime of equipments currently being used; and
    - Credit period.

Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the plant shall not be accounted for.

1.1.1.48 ACM0013: "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" (v. 2)

Project Activity: The construction and operation of a new fossil fuel, grid-connected electricity generation plant that uses a more efficient power generation technology than would have otherwise been used. There is no fuel-switching involved.[39]

Applicability: The methodology is applicable under the following conditions:

- The project activity is not a co-generation power plant;
- Regional efficiency data for recently constructed power plants is available;
- The identified baseline fuel is used in more than 50% of total generation by utilities in the area.
- This methodology is only applicable to new plants.
- See "please note" below for another important applicability condition.

Additionality: Demonstrated using the latest version of the additionality tool.

Baseline:

I) First, identify potential alternatives. This should at least include:
   a) non-CDM implementation of the project activity;
   b) alternative methods of producing electricity, including:
      i. use of the same fuel but different generation technologies;
      ii. use of different fuel(s);
   c) importing electricity from connected or connectable grids.

II) Identify the most economically attractive baseline scenario. Specific instructions are provided in the methodology itself on pp. 3-4. Participants will be expected to conduct a robust financial analysis.

III) **Please note:** The methodology is only applicable if the most plausible baseline scenario is the construction of (a) new power plant(s) using the same fossil fuel type as used in the project activity. This means that if the most likely baseline scenario identified through the baseline identification procedure is the import of electricity or the construction of a new power plant(s) that (partly) use renewable energy sources, nuclear sources or other types of fossil fuels than the fossil fuel type fired in the project activity plant, then this methodology is not applicable.

Leakage: Leakage should be measured using the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion."

[39] For project activities involving a switch to a less GHG intensive fossil fuel in existing power plants use ACM0011. For project activities involving construction and operation of a new power plant with less GHG intensive fossil fuel, use AM0029.

1.1.1.49 AMC0014: "Mitigation of greenhouse gas emissions from treatment of industrial wastewater" (v. 2.1)

Project Activity: This methodology reduces emissions from industrial wastewater. It applies in two distinct scenarios, which involve different project activities. In both cases, however, reductions are achieved through the use of an anaerobic digester.

Scenario	Baseline Situation	Project activity
1	The wastewater is not treated, but directed to open lagoons that have clearly anaerobic conditions.	The wastewater is treated in a new anaerobic digester. The biogas extracted from the anaerobic digester is flared and/or used to generate electricity and/or heat. The residual from the anaerobic digester after treatment is directed to open lagoons or is treated under clearly aerobic conditions (e.g. dewatering and land application).
2	The wastewater is treated in a wastewater treatment plant. Sludge is generated from primary and/or secondary settlers. The sludge is directed to sludge pit(s) that have clearly anaerobic conditions.	The wastewater is treated in the same wastewater treatment plant as in the baseline situation. The sludge from primary and / or secondary settler is treated in one or both of the following ways: (a) The sludge is treated in a new anaerobic digester. The biogas extracted from the anaerobic digester is flared and / or used to generate electricity and / or heat. The residual from the anaerobic digester after treatment is directed to open lagoons or is treated under clearly aerobic conditions (e.g. dewatering and land application). (b) The sludge is treated under clearly aerobic conditions (e.g. dewatering and land application).

Applicability: The methodology is applicable under the following conditions:

- The average depth of the open lagoons/sludge pits in the baseline scenario is ≥ 1 m;
- Heat and electricity requirements per unit input of the water treatment facility remain largely unchanged in the baseline scenario and the project activity;
- Data requirements as laid out in this methodology are fulfilled.

The following applicability conditions are for scenario 1:

- The residence time of the organic matter in the open lagoon should be ≥ 30 days;
- Local regulations do not prevent discharge of wastewater in open lagoons.

The following applicability condition is for scenario 2:

- The sludge produced during the project activity is not stored onsite before land application to avoid methane emissions from anaerobic degradation.

Baseline: The baseline is identified through an analysis of a variety of potential alternatives to several aspects of the project activity, including wastewater treatment, sludge treatment, and electricity generation. The methodology provides a very detailed procedure which should be examined if considering projects of this type. Please note the following requirements:

Scenario 1: The methodology is only applicable if the most likely baseline scenario is the (continued) use of open lagoons for the treatment of the wastewater.

Scenario 2: The methodology is only applicable if the most likely baseline scenario is the (continued) use of aerobic wastewater treatment facilities.

Leakage: No leakage is expected beyond that which is measured as project emissions.

1.1.1.50 AMC0015: "Consolidated baseline and monitoring methodology for project activities using alternative raw materials that do not contain carbonates for clinker manufacturing in cement kilns" (v.1)

Project Activity: Emissions are reduced by using "Alternative Materials that **do not** contain Carbonate," or AMC, to produce clinker. The AMC fully or partially replaces carbon-based materials, thereby reducing the carbon emissions associated with cement manufacture.

Applicability: This methodology is applicable under the following conditions:

- Switching to AMC increases neither the capacity nor the lifetime of the facility;
- Type and quality of produced clinker are unchanged by project activity;
- Alternative raw materials have never been used in the clinker manufacturing facility prior to the implementation of the project activity;
- The project activity does not cause a shortage of AMC in the region of the project activity. See the methodology for a more specific articulation of this condition if necessary.

This methodology is not applicable for the following activities:

- Energy efficiency initiatives for improvements in process equipment (up-grade towers, grinding separators, burners, expert control systems, etc.);
- Fuel switching.

Additionality: Demonstrated using the latest version of the additionality tool.

Baseline:

First, identify potential alternatives. This should at least include:

- Continuation of current practice;
- Alternative methods/quantities of AMC-substitution;
- The project activity not undertaken as a CDM project

Subject these alternatives to a barrier analysis;

Perform an investment analysis of remaining alternatives.

Please note: This methodology is applicable only if the most likely baseline scenario is the continuation of the production practice using current processes.

Leakage: Leakage is extensively discussed on pp. 19-22 of this methodology, including a list of potential sources of leakage and methods for quantifying leakage in each case. This discussion should be reviewed prior to project origination.

APPENDIX 9: EDAMA GREENHOUSE GASES TRADING

Essential Background

The Kyoto Protocol

The Kyoto Protocol (KP) is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC). The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions (called Annex I countries). These amounts to an average of five per cent against 1990 levels over the five-year period 2008-2012. The major distinction between the Protocol and the Convention is that while the Convention *encouraged* industrialized countries to stabilize GHG emissions, the Protocol *commits* them to do so.

Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

The Kyoto Protocol was adopted in Kyoto, Japan, on 11December 1997 and entered into force on 16 February 2005. A total of 184 Parties of the Convention have ratified its Protocol to date, with Australia being the most recent addition (the US is still not a ratified Party). The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the "Marrakesh Accords."

The Kyoto Mechanisms

The central feature of the Kyoto Protocol is its requirement that countries limit or reduce their greenhouse gas emissions. By setting such targets, emission reductions took on economic value. To help countries meet their emission targets, and to encourage the private sector and developing countries (called Non-Annex I countries) to contribute to emission reduction efforts, negotiators of the Protocol included three market-based mechanisms. The Kyoto mechanisms are:

* Emissions trading – known as "the carbon market"
* Joint implementation (JI)
* Clean development mechanism (CDM).

The mechanisms help stimulate green investment and help Parties meet their emission targets in a cost-effective way. They are discussed below in order of importance to Jordan, least to most important.

Joint Implementation

Joint Implementation (JI) provides for Annex I parties to implement projects that reduce emissions in other Annex I parties, in return for emission reduction units (ERUs). These ERUs in turn can be used by the Annex I party to meets its own emissions target under Kyoto. In practice, this means facilities being built in Eastern Europe and Russia, which are considered "economies in transition," primarily by industrialized Western European parties.

A fundamental idea behind JI is that of transfer: the sponsoring governments will receive credits that may be applied to their emissions targets, while the recipient nations will receive foreign direct investment and will "leapfrog" their technology to a higher level. Because of the entrenched infrastructure that often characterizes these industrialized parties, it is often cheaper to carry out energy-efficiency projects in these transitioning countries.

Emissions trading

Emissions trading provides for Annex I Parties to acquire carbon credits from other Annex I and Non-Annex I Parties and use them towards meeting their respective emissions targets under the Protocol. This enables all parties involved to make use of lower-cost opportunities to reduce emissions, irrespective of where those opportunities exist.

In practice, the Protocol allows countries that have emissions units to spare (whether they be assigned amount units (AAUs), ERUs, or certified emissions reductions (CERs) from the Clean Development Mechanism) to sell this excess capacity to countries that are over their targets. This market has been informally dubbed the "carbon market" – as emissions of all gases are counted in terms of carbon dioxide – and is both flexible and realistic. Parties unable to meet their commitments will be able to purchase credits for compliance, but at market prices. The higher the cost, the more pressure they will feel to use energy more efficiently domestically and to research and promote the development of alternative sources of energy.

Although a simple concept, a global market where emissions units are bought and sold has been complicated to set up. Details weren't specified in the Protocol originally, so additional negotiations were held in order to establish clear procedures as elucidated in the Marrakesh Accords. These details includ countries' actual emissions and precise records guaranteeing them, as well as trades carried out, the creation of registries, as well as accounting procedures dedicated solely to the carbon market commodities, international transaction logs, and review teams to ensure and police compliance among parties.

In addition to assigned amount units (AAUs), countries with credits created through JI projects and/or the Protocol's Clean Development Mechanism, which involves funding activities to reduce emissions by developing nations, are also fungible in the carbon market. All of these various units may be bought and sold in the emissions market or banked for future use according their respective rules.

Emissions trading schemes may also be established as policy instruments at the national and regional level. Under such schemes, governments set emissions reduction targets to be met by their participants, and, depending on the rules of the scheme,

their obligations may be fulfilled. These smaller carbon markets are now established in the European Union and other groups of countries and are began operating in advance of the Protocol's entry into force in 2008. These emissions-trading systems are intended to start the process and to link up with the Protocol's global market once it becomes operational.

Clean Development Mechanism

The CDM allows emission-reduction (or emission removal) projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO2. These CERs can be traded and sold, and used by industrialized countries to a meet a part of their emission reduction targets under the Kyoto Protocol.

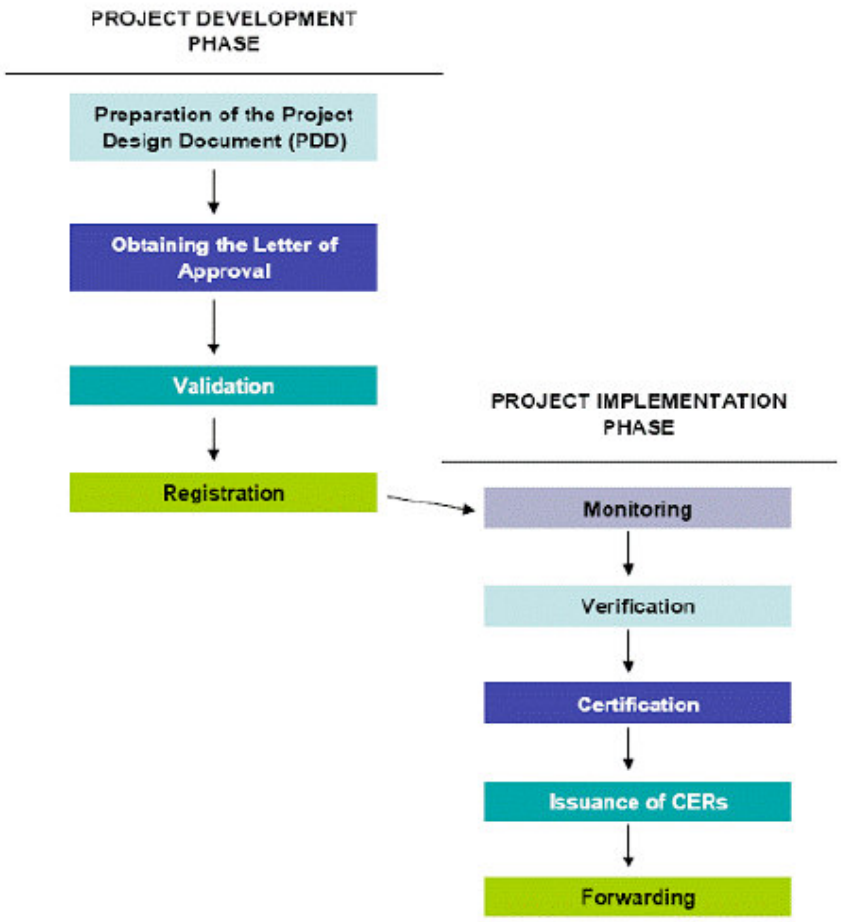
The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets.

The projects must qualify through a rigorous and public registration and issuance process designed to ensure real, measurable and verifiable emission reductions that are additional to what would have occurred to the business-as-usual. In order to be considered for registration, the Designated National Authority (DNA) of the host country must first approve a project. The CDM Executive Board, answerable ultimately to the countries that have ratified the Kyoto Protocol, oversees the mechanism.

Operational since the beginning of 2006, the mechanism has already registered more than 1,000 projects and is anticipated to produce CERs amounting to more than 2.7 billion tonnes of CO2 equivalent in the first commitment period of the Kyoto Protocol, 2008–2012.

The mechanism is seen by many as a trailblazer; it is the first global, environmental investment and credit scheme of its kind, providing a standardized emissions offset instrument, CERs.

See below for the key steps in the development of a CDM project.



CDM Participants

- Designated National Authority (DNA) – local regulatory authority
- Project Developer – project proponent
- Offtaker – purchaser of CERs
- Carbon Advisor/consultant – can be the same as Offtaker, but could also be independent
- Designation Operational Entity (DOE) – third party auditor of project documentation for validation and verification
- Legal – In-house or specialist for contract drafting and review
- Banks/financial institutions – financing of project, if required
- NGOs– advocacy and watchdogs for system and locals

Voluntary Market

In voluntary carbon markets, activities that reduce GHGs produce verified emission reductions (VERs) that can be sold to companies or individuals wishing to voluntarily reduce their carbon footprints. GHG emission reduction projects developed under the Kyoto Protocol's Clean Development Mechanism (CDM) have been highly successful in reducing emissions and generating Certified Emission Reductions (CERs), which are then purchased by governments and organizations in Europe and Japan to help meet their emission reduction targets. Although voluntary reductions are similar to regulated credits, they are different in some important ways.

VERs can be generated from projects which:

- are either based in a country that has not ratified the Kyoto Protocol or does not have the infrastructure to support CDM project development
- have not yet been registered under the CDM
- fall outside of the scope of the CDM
- are too small to warrant the costs of CDM approval
- are specifically developed for the voluntary market.

Several voluntary markets are in development around the world. However, there is no single regulating body currently enforcing quality standards in relation to the development and trading of VERs. For this reason it is important to partner with a companies that have extensive experience developing high quality emission reduction projects that deliver real and measurable emission reductions.

Situation in Jordan (Brief)

Jordan ratified the UNFCCC on 12 November 1993, and ratified the Kyoto Protocol on 17 January 2003. As a Non-Annex I Party, Jordan does not have any commitments to reduce its emissions of GHGs. Jordan is, however, actively involved in the CDM, with one large-scale project registered (fuel switch at Aqaba Thermal Power Station) with the Executive Board (EB) and several advanced projects in the CDM pipeline.

The Jordan CDM market is very new and still in the beginning stages of maturity, although it is relatively advanced and a leader in the Middle East region. The minimum national and institutional set-up for CDM project execution exists domestically, namely there is a Designated National Authority and there are projects that wish to be developed as CDM projects. The DNA, housed in the Ministry of Environment's Monitoring and Assessment Directorate, is charged with ensuring that all Jordanian CDM projects are voluntary and comply with all domestic rules and regulations, while also meeting the sustainable development needs of Jordan. They have provided official Letters of Approval to several projects, which are now advanced through the pipeline and at stages close to registration, including one registered project (ATPS). The next steps for the DNA include documenting and institutionalizing their knowledge and processes, creating e-copies of all material, and providing a forum for public access. For current and near-future needs, the DNA is adequately staffed.

Private sector entities currently active in the CDM in Jordan are mostly limited to partners and intermediaries, who serve as local contacts and liaisons for international carbon developers, as well as the actual project developers. The partner and intermediary role is mainly relegated to streamlining local processes, though there is evidence that some of these partners are beginning to expand their services beyond that of the intermediary relationship and will hopefully be bring more of the carbon value chain in to Jordan. A list of project participants can be found on page 5 above, and as listed, there are still a few gaps that could be met through domestic means.

Identification of Needs and Gaps

Separate from the regulatory component for developing CDM projects, project developers do exist (both public and private), though most lack basic awareness and knowledge of the conditions, complexities, and risks of developing CDM projects. This is normal of new market players, for any industry, and will be mitigated with time and experience. Further to this, there are few, if any, local firms that can provide advisory, consulting, and/or legal services to the industry, and as such project developers are almost entirely reliant on international carbon companies. This creates an environment in which project developers are not able to take full advantage of existing global market knowledge, weigh tradeoffs between risks and returns, assess counterparties, and capture the full value of carbon credits. Capacity building is certainly needed in this area.

Also with regards to project developers, although the Ministry of Environment and the DNA have managed to wage a limited awareness raising campaign within government entities, it is clear that there exists a lack of awareness of the CDM for many large- and medium-sized businesses. In addition to reviewing the 2nd National Communication to the Kyoto Protocol, a review of existing methodologies should be done in conjunction in order to link large emitters/energy consumers to approved methodologies. This should then be disseminated to the appropriate industries/companies by an advocacy group and shared with potential service providers (existing and future).

Jordanian banks and financial institutions are another area where further research should be performed. Several meetings are currently planned, but preliminary evidence suggests that these entities are not currently active in the carbon markers and may be unaware of their potential as a supply of new and innovative financial services. These could include sophisticated debt-service arrangements for project developers (with carbon credit revenue taken into account) to attractive loan facilities for residents to invest in renewable and clean energy products (i.e. solar water heaters) to taking principal positions in carbon trading.

The government can also help to promote clean and renewable energy technologies by providing a long term, transparent, and consistent regulatory environment for importing, developing and operating clean and renewable energy projects. It is unclear if the new proposal to develop a Jordan Environment Fund to support RE projects will be positive or negative, as the majority of the funding is set to be sourced from a 15% surcharge on local CDM revenues. While a fund dedicated to clean and renewable projects is positive, there may be deleterious affects from the surcharge in the additionality component of CDM projects, as well as the financial viability of such projects. More research is needed in this area before a full capacity building and awareness raising program can be developed. Tendering processes and criteria also should reflect industry standards. Too often decisions for choosing counterparties are heavily weighted towards price, while CDM risks of a project and risk-mitigation skills of counterparty is discounted or under-appreciated.

On the not-for-profit side, there are currently no NGOs or advocacy groups for climate change or carbon in Jordan. While there exists a significant amount of expertise and experience in the DNA, an advocacy group should be created to raise awareness and lobby for a cleaner and more sustainable Jordan. This could be a quasi-governmental organization, but it should reside officially outside of the boundaries of the DNA in order to

avoid any conflicts of interest between supporting project developers and the regulation of those projects.

As of this writing, although no official assessment of the Jordanian voluntary market has been performed, anecdotal evidence suggests that there is currently little or no movement or awareness in this segment of the carbon market. A full study should be performed and a capacity building and awareness-raising program can be developed. Fortunately, the voluntary market has been shown to grow with an increase in the awareness of climate change and the carbon markets in general, so capacity building and awareness raising efforts in the CDM will certainly have knock-on benefits to the voluntary market.

Action Plan

The following is an action plan that can be used by EDAMA to address the needs and gaps identified above.

Category	Activities/Actions	Responsibility	Expected time required
Institutional	Conduct an assessment on the current state of affairs for the CDM market, including identification of key gaps (short-, medium-, and long-term).	EDAMA Association	30 days
	Conduct an assessment on the current state of affairs for the voluntary carbon market, if there currently is one, and identify key companies that could benefit from becoming carbon neutral.	EDAMA Association	15 days
	Review Jordan's 2nd National Communication for the UNFCCC and focus capacity building and awareness raising initiates on large scale emitters, both for CDM and voluntary markets (alternatives to fuel switch).	EDAMA Association	2 days
	Analyse current tendering processes for carbon projects and key criteria by which vendors are measured.	Tendering Committee of HKJ	5 days
Legal	Conduct a desk review of all existing renewable and clean energy legislation, including but not limited to, taxes, fees, import duties, incentives, subsidies, intellectual property rights, and technology licensing.	Ministry of Environment, EDAMA Association	15 days
	Analyse the viability of existing 15% mandatory contribution to JEF of CDM revenues in Jordan and its affect on both CDM additionality and financial viability of potential projects (i.e. wind, WHR, fuel switch, etc.)	Ministry of Energy and Mineral Resources, Ministry of Finance	10 days
	Analyse affect of existing import and governmental stamp duties on the competitiveness of renewable and clean energy technologies in Jordan	Ministry of Energy and Mineral Resources, Ministry of Finance	10 days
	Lobby the government of Jordan to enact laws that enable an increase in the usage of renewable and clean technologies in Jordan, as well as to create a legal climate that is friendly to the climate change sector, and to withdraw or repeal legislation that creates a disincentive in entering these industries.	EDAMA Association	ongoing
	Create incentives to private sector, both domestic and international, to develop emission reduction projects and products through a combination of preferential tax treatment, tariff rates, import freedom, and other financial incentives.	Ministry of Environment	45 days

Resources	Review and list all existing engineering, law, auditing, and monitoring firms, technology providers, advisory groups, and NGOs in Jordan specializing in energy.	Ministry of Environment, Ministry of Trade and Industry	5 days
	Identify specific gaps and demands in resources from above that could serve the carbon industry	EDAMA Association	2 days
	Identify business opportunities for the private sector to enter and enhance carbon trading in Jordan		2 days
	Create a post-2012 task force charged with following updates to Post-2012 carbon market developments.	Ministry of Environment, EDAMA Association	5 days
	Create an advocacy entity specific to the carbon industry (separate from the DNA) to promote CDM and the carbon industry (possibly EDAMA) and serve as a clearing house for all carbon-related information (above and beyond CDM-specific material).	EDAMA Association	25 days
	Identify existing entities that can contribute knowledge and experience, and begin creating linkages between these institutions.	EDAMA Association	5 days
	Conduct market research on regional carbon market actors (based regionally, not international companies), and identify key economies where Jordan could provide services (i.e. KSA - legal and engineering, Oman - technology, Yemen - financing and advisory, etc.)	EDAMA Association	30 days
Awareness Raising, Capacity Building, and Education & Training	Hold semi-annual seminars/workshops/roundtables on the state of CDM in Jordan	Ministry of Environment, EDAMA Association	4 days
	Organise meetings with current CDM intermediaries and partners and brainstorm methods to transfer further financial benefit of CDM to local firms	EDAMA Association	2 days
	Hold semi-annual workshops on carbon-specific legal issues for firms interested in participating and keeping up-to-date in carbon market	EDAMA Association	4 days
	Hold quarterly capacity building workshops for project developers currently in the carbon pipeline to highlight key conditions of successful projects, specifically additionality issues (financial, technology, prevailing practice).	EDAMA Association	12 days
	Hold capacity building workshops to highlight the key variables of valuing a carbon project and of assessing the merits of counterparties (i.e. for tendering process)	EDAMA Association	2 days
	Stream line public tendering processes and ensure that criteria recognize the various risks and merits to the respective components of carbon project development.	Ministry of Trade and Industry	15 days

	Hold awareness raising workshops for CDM opportunities in identified sectors of large emitters	EDAMA Association	12 days
	Create publicly available hard and soft documentation for knowledge and procedures of developing CDM projects in Jordan at the DNA	Ministry of Environment	10 days
	Create web-based portal for the above information, including FAQ and contacts	DNA, advocacy group	5 days
	Create and market material for Jordanian public on local affect of climate change and the benefits of reducing emissions, highlighting carbon footprints and carbon neutrality (in conjunction with EWE Awareness Team).	EDAMA, specialized marketing team within EDAMA	20 days
	Raise awareness on additionality issues of fuel switch to NG, and highlight opportunities in other sectors/components	EDAMA Association	2 days
	Develop awareness among domestic financial institutions to spur growth of local financial products and services for the carbon market.	EDAMA Association	12 days
	Create a newsletter to be circulated to all government offices highlighting current public CDM projects and carbon activities (circulated quarterly).	Ministry of Environment	25 days
	From identified gaps in Resources to the carbon market (listed above), provide training to respective gaps in carbon markets to enhance participation and competitiveness in Jordan.	EDAMA Association	as needed
	Train advocacy group staff in key carbon project development issues, i.e. additionality, methodologies, applicability conditions, etc.	EDAMA Association	30 days
Other	Identify cross-cutting measures being enacted in other EDAMA task forces and ensure the inclusion of carbon industry and emission reduction in any/all awareness raising, capacity building, and training and education.	EDAMA	ongoing
	*Where applicable, all above-mentioned tasks should be applied to the carbon industry as a whole. If not, then applied to the specific sectors within the carbon industry (i.e. CDM, voluntary) as appropriate.		

Carbon Trading Task Force

Chairman: Samir Murad, President, Said Murad & Sons Co.

Laith Al Qasem	USAID Jordan Economic Development Program (SABEQ)	Chief of Party
Maher Matalka	Clean Energy Consultants	Managing Partner
Rashad Othman	Jordan Climate Change Consultancy Company	Chairman
Ahmad Younis	Jordan Climate Change Consultancy Company	Vice Chairman
Nedal Zatari	Nuqul Group	Fine Solutions Director
Mohammad A'alem	Ministry of Environment	Head of State of Environment Section
Munjed Al Shareef	Jordan University of Science and Technology.	Director, Queen Rania Center for Environmental Science & Technology
Jamal Badran	Clean Energy Consultants	Board Member
Hussein Badarin	Ministry of Environment	Director of Monitoring & Assessment Directorate
Sheri Pitigala	USAID Jordan Economic Development Program (SABEQ)	Enhanced Trade & Investment Advisor
Rose Smadi	Amman Chamber of Industry	Industrial Affairs Department
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