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DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

October 16, 1998

MEMORANDUM

TO: ASSISTANT SECRETARY WILCOX *Bill Schuerch signed*
FROM: DEPUTY ASSISTANT SECRETARY SCHUERCH
SUBJECT: **USG Economics Agency positions on Climate Change Negotiations**

This office agrees with most of the points made in the set of 6 draft position papers on climate change negotiations prepared by the team from Treasury, State/EB, and CEA. In particular, we agree with all of the positions indicated in the draft paper on the Clean Development Mechanism (CDM), as far as they go. We would like, however, to add two points to those made on CDM, and register a dissenting voice on certain points in the "Registries" and the "Sinks" papers, as follows.

1) "Bilateral" vs. "Multilateral" trading system under CDM. The private sector and many economists argue for a bilateral approach, in which companies and developing countries negotiate directly over deals, to keep bureaucracy and transaction costs low. The GEF has specifically been mentioned as a model to be avoided. Many NGOs, developing countries, and some academics argue for an ambitious multilateral approach, giving existing international financial institutions what strikes me as an overly intrusive mandate. The World Bank's proposed Prototype Carbon Fund is an example of this. We would favor a more limited engagement of multilateral institutions to: (a) serve as project clearinghouses, facilitating information transfer and access to the broadest possible array of potential partners, and (b) provide technical assistance to the developing countries, to make sure there is a level negotiating field.

2) Registry Transparency. A major OASIA mandate from Congress is to increase the transparency of international economic agencies and their transactions; and this basic policy objective has been aggressively reinforced by negotiations over the Administration's request for IMF funding. I believe that a voluntary registry system with partial information (e.g., excluding either price, quantity, or trader identity data) as proposed would not function effectively, and would not even be considered viable by other USG agencies (including perhaps the SEC), let alone other countries. How can we maintain an accurate international reporting system with only a partial, non-required domestic reporting system? How could we accurately determine U.S. compliance costs if only some trades are reported? How could regulatory agencies assure compliance and enforce seller liability if they do not have access to such basic information? If it's not required, why would anyone report?

The U.S. has ample precedents for full reporting or registries of pollution without undue disclosure of significant competitive/proprietary information - e.g., Toxic Releases Inventory,

Sulfur Permit trading. While it has been argued that CO₂ is not as toxic as these other pollutants, almost any effort to reduce CO₂ emissions from energy sources also reduces other (more immediately harmful) local pollutants, and U.S. law probably (and public opinion certainly) provides little room for a distinction between the types of pollution that people have a right to know about. There are people/countries who are suspicious of trading. We believe it can work. A reasonable amount of transparency is in everyone's interest to demonstrate this, and should facilitate acceptance by those who are wary.

3) Sinks Accounting. Another major USG goal is to reduce tropical deforestation, which is usually ecologically, socially, and economically harmful in the long run. As it stands, the Kyoto Protocol provides for counting the CO₂ sequestered by replanting trees (a credit), but not subtracting the debit of CO₂ lost when trees are cut in the first place, if they are replanted within or after a certain timeframe. It has been estimated that such "net" CO₂ accounting would increase US compliance costs by about 10%. It has also been predicted that one of the major opportunities for progress at Buenos Aires is in elaborating on the rules for work regarding sinks.

Leaving this loophole in place would create a strong perverse incentive for developing countries with large amounts of forest - they could cut, or even just burn, their existing forests, then replant immediately (e.g. as has been done for palm oil plantations in Indonesia), and thereby collect a sellable CO₂ credit, thereby making tropical deforestation even more profitable in the short term than it is now. Current World Bank policy, which has strong USG support, is that no tropical moist forests should be cut for the purpose of establishing new plantations - they should only be planted on already degraded land. Following the principle embodied in the Kyoto agreement would make calculations of short-term returns from some already notorious agriculture/forestry projects look even better, exacerbating a problem we are already extremely concerned about. We believe the USG should work with other countries who are interested in closing this loophole, rather than perpetuate it.

4) Cautionary note on CDM Policy Hazard. If CDM focuses as proposed just on projects to allow cheaper achievement of CO₂ reductions, it could allow developing countries to maintain perverse incentives (such as energy subsidies) to continue to waste energy and CO₂ in other ways, so as to keep baseline emissions high and therefore get more financial gains from selling "hot air." On the other hand, (1) there has been mention of provisions, the details of which remain to be worked out, for gradually ratcheting LDC carbon efficiency baselines downward via standards for technology advances over time, etc., which could prevent this problem, if done right; (2) adding a policy police function to the project-oriented CDM would inevitably make it a bigger multilateral bureaucracy, which we don't want; and (3) if we want a cap-less CDM on our side, we shouldn't harp on something that looks to LDCs like we are imposing caps on their side. We should therefore keep this concern in the backs of our minds for now, but not raise it in international settings.

Sustainable Development and the CDM

Issues

1. Whether to support international sustainable development criteria for projects?
2. Whether to include/exclude certain project categories?

Background

The question of whether the CDM is consistent with broader sustainable development and environmental objectives is likely to become increasingly prominent in the negotiations. To date, we have said that it is up to the host country to determine whether a project furthers its sustainable development objectives. While most countries have taken a similar position (in particular, the Umbrella Group and G-77), a few countries have proposed addressing the issue of sustainable development in one (or both) of two ways:

- (1) Through internationally-agreed environmental and sustainable development criteria that would apply to a broad variety of projects.
- (2) By excluding certain project categories (specifically nuclear) or giving priority to other types of projects (e.g., renewable energy or energy efficiency)

Issue 1: General international sustainable development criteria for projects

Most countries (including the UG and G-77) have taken the position that the determination of whether a proposed activity contributes to the host Party's sustainable development priorities should be made solely by that Party. The EU and a few other countries (e.g., Switzerland) are supporting general sustainable development criteria for all projects.

Potentially, rules to address the issue of sustainability could be of two general types:

- (1) Procedural requirements on host countries, for example, to scrutinize projects and certify that they are consistent with national sustainable development strategies and objectives and/or relevant international agreements (for example, the Biodiversity Convention). So long as these procedural requirements were met, the determinations by the host country could not be second-guessed by the CDM institutions.
- (2) Substantive requirements relating to sustainable development, which would be applied by the CDM institutions directly – for example, by OEs, the EB, or the COP/moP.

In its mechanism submissions, the EU has proposed requiring that the host Party provide in writing that a proposed project:

- is consistent with all relevant international agreements relating to sustainable development to which the Parties involved are Party;
- assists in achieving sustainable development, taking into account (a) a Party's economic, environmental and social conditions, (b) the need to minimize adverse environmental, social and economic effects; and (b) existing guidance for sustainable development;
- contributes to the ultimate objective of the Convention.

The Swiss have also proposed that the CDM rules include sustainable development criteria. Under the EU proposal, it appears (although it is not clear, since the EU has not made its position on registration entirely clear) that operational entities would substantively review a proposed project's consistency with sustainable development criteria. The Swiss have proposed that all aspects of the project proposal, including sustainable development, be subject to EB review.

The UG has proposed a decisionmaking framework for CDM involving OE decisionmaking, but with a right of appeal to the EB. Building sustainable development criteria into that framework would mean that NGO comments and Party appeal could involve issues of sustainable development as well as environmental additionality. Because sustainable development issues are likely to be more subjective than those associated with environmental additionality, inclusion of sustainable development criteria would place a greater burden on OEs. The EB review process of OE decisions could help address this problem; however, it may mean that more EB reviews would be necessary, thereby creating a potential bottleneck.

Under the Swiss proposal, all projects would go to the Executive Board for approval, with an opportunity for NGO comment. Again, given the non-technical nature of many comments, if there were sustainability criteria, the EB may be the most appropriate venue for comments relating to sustainable development.

Issue for decision:

Should the US change its current position to support either:

- (1) procedural requirements that host countries assess and report on the consistency of proposed projects with the host country's sustainable development objectives; and/or
- (2) substantive requirements that CDM projects be consistent with internationally-defined sustainable development criteria, along the lines of the EU proposal?

Pros:

- Either approach would help address concerns that the CDM could work against broader environmental goals.

Cons:

- Sustainable development is country dependent; therefore, it is hard to come up with international criteria that are sufficiently objective to be meaningful at the international level.
- Substantive requirements would likely require greater centralization of the project process, since OEs could not be expected to make determinations on sustainable development issues.
- We can expect strong G-77 resistance. This currently is one of the few issues, like sinks in the CDM, on which we are closer to the G-77 than the EU.
- We could not expect UG support for proposing substantive requirements, so we would have to go it alone (as we have with respect to unilateral CDM projects). Agreement on procedural requirements may be easier to achieve.

Other:

- G-77 likely to insist that the same requirements be imposed on JI projects.

Issue 2: Exclusion of, or priority for, certain project categories

Nuclear power is currently employed in many developing countries, including China and India. However, different countries clearly have different capacities for managing nuclear power in a manner that is safe and does not pose proliferation concerns. The fact that CDM rules might not be able to distinguish between "safe" and "unsafe" projects poses a potential problem for CDM, both in the short and long term.

Thus far, AOSIS is the only group on record against nuclear power. Germany and some other European countries oppose nuclear projects, while the UK strongly supports its inclusion. It appears likely that the EU will come to a formal decision in the coming months. The Commission has asked us to consider joining them in opposing nuclear projects, perhaps in exchange for inclusion of sinks projects in the CDM. In the Umbrella Group, Canada and Japan appear to be actively supporting nuclear's inclusion, and we understand that Japan is considering building nuclear power plants in China. Both the nuclear power industry and environmental NGOs have also been strongly engaged on this issue, for and against.

There are tactical considerations associated with our position on nuclear power. If the EU comes out against it, and Japan and Canada are strongly in favor, then we may be able to hold a middle position. As we get closer to COP-6, we can continue to gauge the merits of moving off this position (i.e., what would we get in return? what are the politics of holding onto the position?).

In addition to nuclear power projects, large hydro and clean coal projects are other project types likely to draw NGO attention, and about which the US has weighed in elsewhere. At present, however, we are not aware of any governments proposing controls on large hydro projects under the CDM.

Rather than rule out certain types of projects altogether, another option would be to impose international sustainable development criteria on disfavored project types. This approach might be difficult to negotiate if proposed too early, but might be successful as a compromise later in the negotiations.

The notion of giving priority to, or only including, certain project categories - in particular renewables - is supported by AOSIS. WWF has been pressing to include only renewable and energy efficiency projects in the CDM, and appears to be making some headway in Europe. We were told by our Portuguese interlocutor that they may support giving priority to these types of projects.

As a practical matter, it is unclear what it would mean to give priority to certain project categories, unless this meant implicitly excluding other categories. One possibility would be to give priority to certain project categories in the development and approval of baselines. Methodological work to establish baselines for other types of projects (for example, clean coal and sinks) could be put on a back burner.

Issue for decision: Should we change our position, either to:

- (1) Exclude certain project categories, such as nuclear?
- (2) Accord priority to certain project categories?

Pros:

- Either approach would help address concerns that the CDM could work against broader environmental goals.
- Exclusion of nuclear would help address concerns that nuclear CDM projects would work against broader non-proliferation goals.

Cons:

- Clean coal and sinks projects are the kinds of projects that some U.S. companies (in particular EEI) are looking to undertake. Disadvantaging these project categories would be a major change in position, and could make ratification more difficult.
- Because such projects are likely to generate more credits than most renewables projects, excluding them would likely mean that the CDM would be smaller.
- A change in our position would be interpreted by our Umbrella Group partners as a sign that the U.S. is moving away from them.

Sinks in CDM

Issue

What special rules, if any, are needed for inclusion of sinks in the Clean Development Mechanism (CDM)?

Background

We have strongly supported the inclusion of land-use, land-use change and forestry (LULUCF) projects in the CDM, including both:

- (1) Projects that *enhance sequestrations* in forests or agricultural soils, such as afforestation or improved forest management;
- (2) Projects that *reduce emissions* from land-use change, such as forest conservation (also sometimes referred to as "avoided deforestation").

Our position in favor of including sinks in the CDM has been supported by the Umbrella Group, many developing countries (including most African and Latin American countries), and some environmental NGOs (in particular, the Nature Conservancy and Environmental Defense). Article 12 of the Kyoto Protocol does not expressly include, but also does not preclude, sinks projects under the CDM.

AOSIS, the EU and many environmental NGOs have strongly opposed the inclusion of sinks in the CDM, arguing that (1) the potential for sinks projects is so large (particularly for avoided deforestation) that sinks projects could swamp other types of CDM projects; and (2) sinks projects are inferior to other types of CDM projects, due to the problems of reversibility and leakage. At the recent IPCC meeting, Brazil was particularly vociferous in opposing the inclusion of avoided-deforestation projects in CDM.

In elaborating our position on sinks in CDM, we will need to address the following issues, among others:

- (1) Permanence
- (2) Leakage
- (3) Implications for sustainable forest management
- (4) Potential EU proposals to limit to the amount of CERs that could be generated by sinks projects.

The leakage issue is common to all project-based activities and is not unique to sinks; the permanence issue, in contrast, is particularly pronounced for sinks projects. Because sinks projects implicate other environmental and sustainable development issues (for example, protection of biodiversity), the relationship between sinks in the CDM and the ongoing work concerning sustainable forest management also needs to be considered.

Permanence

The climate benefits of sinks projects are potentially reversible due to:

- human activities (e.g., deforestation of land that had previously been afforested or conserved);
- natural disturbances (e.g., forest fires); or
- environmental change, including climate change (some climate models indicate that global warming will lead to significant emissions from terrestrial ecosystems).

Although avoided fossil fuel emissions can also be reversed – for example, if an oil field is later burned or if a renewable energy project is later replaced by a coal-fired power plant – the problem of permanence is particularly pronounced for sinks projects.

Several approaches have been proposed to address the permanence/reversibility issue:

- (1) The CDM rules could specify a *minimum duration* for sinks projects (for example, 100 years, in order to reflect the IPCC's 100 year reference time-frame for calculating global warming potentials; or a time-frame similar to the typical duration of energy or transportation projects).

If a project did not last as long as the required time frame, and the GHGs sequestered by the project were emitted to the atmosphere, *then liability or insurance arrangements* could be used in order to ensure that an equivalent number of credits are returned to the system.

- (2) An alternative approach would be to issue CERs, not based on the actual carbon stock changes associated with a sinks project, but using what has been referred to as "tonne-year accounting." Tonne-year accounting is quite complex, but attempts to compute the climate benefits of sequestration on a yearly basis, rather than assuming that a ton of carbon sequestered will be kept out of the atmosphere for the entire 100-year average atmospheric lifetime of carbon dioxide. The result of tonne-year accounting is that sinks projects would generate very few credits in their early years, and more credits towards the end of the time-frame used for the accounting system.
- (3) Projects could also be designed in order to provide other socio-economic benefits to local communities, in order to create incentives to maintain projects.

Trigg is doing a page on permanence.

Leakage

The problem of leakage is not unique to sinks projects, but may be more pronounced, to the extent that deforestation is driven by global demand for wood products. The IPCC Special Report discusses several approaches to address the problem of leakage, including:

- (1) Incorporating components in projects that supply the resource needs of local communities (e.g., establishing fuelwood plantations to reduce pressures on other forests).
- (2) Expanding the project boundaries, for example, to the national level.
- (3) Quantifying the level of leakage (for example, by monitoring key indicators or using standard risk coefficients developed for project types and regions), in order to recalculate the emission reduction credits attributable to a project.

Sustainable management issues

Sinks projects can have substantial co-benefits – for example, forest conservation can help protect biodiversity and improve air and water quality. Critics argue, however, that some sinks projects can also have negative impacts – for example, through the replacement of native forests by intensively-managed, monoculture plantations.

Proposals to address these potential issues relating to sustainability fall into two general categories:

- (1) Procedural requirements on host countries, for example, to scrutinize projects and certify that they are consistent with sustainable development goals and/or relevant international agreements (for example, the Biodiversity Convention). So long as these procedural requirements were met, the determinations by the host country could not be second-guessed by the CDM institutions.
- (2) Substantive requirements relating to sustainable development, which would be applied by the CDM institutions directly – for example, by OEs, the EB, or the COP.

Thus far, we have opposed EU proposals to include substantive sustainability criteria in the CDM. We have not taken a strong position, as yet, concerning procedural requirements.

One possible procedural approach for sinks projects would be to require host countries to assess proposed projects using the criteria and indicators (C & Is) developed internationally to assess sustainable forest management. There are now various international C & I's for sustainable forest management. The US is an active participant in the Montreal Process, which addresses boreal and temperate forests, and includes Argentina, Australia, Canada, Chile, China, Japan, Korea, Mexico, and Russia. In 1995,

the Montreal Process countries adopted the Santiago Declaration, which sets forth a comprehensive list of seven criteria and 67 indicators for the conservation and sustainable management of temperate and boreal forests. These C & I's could be used by host countries to assess proposed projects. This could enhance transparency and help ensure that host countries focus on sustainable management issues in their project approval process. In deciding whether to adopt a C & I approach for sinks projects, consideration would also need to be given to the possible implications for other types of CDM projects.



Joseph E. Aldy

04/27/2000 09:10:18 PM

Record Type: Record

To: "Talley, Trigg (OES)" <TalleyT@state.gov>
cc: See the distribution list at the bottom of this message
bcc: Records Management@EOP
Subject: Re: FW: CDM transparency and participation issues 

As I noted in our discussion on this issue, I am concerned that we are trying to solve a perceived problem with OE behavior through project review that I believe can be handled much more efficiently through OE accreditation and re-accreditation. We have a lot of experience ensuring that auditors do not collude with the firms they audit to produce bogus financial statements. While I certainly support transparency (I think it is critical for the credibility of the institution, and I would like to expand per my discussion below), I believe we should be careful not to overburden the system. Doing so would only reduce participation by developing countries and increase Annex I costs of compliance.

Based on our discussion of the GEF model in the last meeting, I believe we should use the GEF review process as a starting point. Specifically, it is not clear to me what is gained by requiring OEs to respond to comments received during the 60-day review process. Compiling a response for every project an OE certifies could be resource- and time-intensive. This would thus delay project approval, increase the costs of projects, and reduce project volume and emissions abatement through the CDM. Instead, I believe that the OE should have to defend its decisions in light of received comments when it undergoes re-accreditation.

To promote transparency, the comments received on a project should also be posted on the website envisioned in this proposal. Doing so could accomplish several goals:

- 1) It may discourage bogus comments designed to burden the CDM or to advance political objectives that are not relevant to the CDM.
- 2) It would make information available about the project prior to an OE determination. This could allow parties to understand a project prior to determination, and this could promote a shorter turnaround time in the case that parties want to trigger the dispute resolution mechanism.
- 3) It could provide more information to entities and parties considering future CDM projects about what would be considered good practice by other parties and NGOs.

I am also concerned about the bracketed time periods for review and for the dispute resolution trigger. These add 1/2 a year to project approval, and that doesn't even include the time it would take for the EB to review a project determination. What is the current comment period and dispute resolution period for GEF projects? What is the need for lowering the standard for the number of parties necessary to trigger the dispute resolution mechanism relative to the GEF? Making comments public as noted above may allow us to shorten the 4 month period envisioned for triggering the dispute resolution process. Do we believe that a shorter review period would be sufficient? What "rights" are conveyed to parties and NGOs that comment on a project? Sorry, I've never seen Truth or Consequences.

Comments on these thoughts are welcome. Have a good one.

Joe

Proposal for Transparency and Participation in CDM Decision-Making

The U.S. supports a CDM that has environmental integrity, operates efficiently, and builds public confidence in action to combat climate change. CDM decision-making should be transparent and allow for participation by Parties and, where appropriate, environmental and business non-governmental organizations (NGOs). The following proposals address transparency and participation by Parties and accredited NGOs¹ in three key stages of CDM decision-making.

(1) OE Accreditation/Review

Operational Entities (OEs) should be required to apply to the Executive Board (EB) (or an accreditation body working under its authority²) for accreditation and periodic re-accreditation.³ A transparent process for making sound accreditation/re-accreditation decisions could have the following features:

- An OE seeking accreditation or re-accreditation must show that it has the necessary qualifications relating to expertise, lack of conflict of interest, etc.
- When an OE seeks re-accreditation, its performance to date in registering projects and certifying emission reductions will also be reviewed. This performance review will be based in part on an audit of its past registration and certification decisions.
- The EB (or its accreditation body) will maintain a website on which it gives notice of each application for OE accreditation or re-accreditation and includes the available information relating to the OE's qualifications and, where applicable, the review of its past performance.
- Parties and accredited NGOs will have an opportunity to submit relevant comments on the applicant's qualifications and, where applicable, its past performance. Comments must be submitted within [60] days after a complete application (including the

¹ The term "accredited NGOs" is used in this paper to indicate a process for the CDM like the NGO accreditation process now operated by the Secretariat for meetings of the COP and the subsidiary bodies.

² The U.S. believes the EB will need support structures to assist it in performing the accreditation/re-accreditation function, as well as certain other functions. The nature of these support structures require further discussion.

³ The U.S. supports requiring a positive re-accreditation at the end of a specific term. How long a term is acceptable may depend on what process is provided for project-level decision-making under headings (2) and (3), below.

performance review where applicable) is posted on the website.

- When granting or denying an application, the EB (or its accreditation body) will post on the website a written decision that addresses any significant issues raised. (If the application or comments raise issues that are not relevant under Article 12 or that have already been decided in previous cases, those issues may be disposed of summarily.)

(2) Project-Level Review

Accredited OEs will register projects and certify their emission reductions or sequestrations. The registration step involves up-front review and approval of a project's proposed baseline and monitoring plans. The certification step involves periodic review of monitoring information during the life of the project, to determine how many tons of beyond-baseline reductions or sequestrations have been made. A transparent process for making sound registration and certification decisions could have the following features:

- Project participants must apply for registration, submitting required information on their proposed baseline and monitoring plans to the OE.
- The OE will post the application and relevant supporting information⁴ on a website maintained by the EB. Parties and accredited NGOs will have an opportunity to submit relevant comments to the OE on the proposed registration. Comments must be submitted within [60] days after a complete application (including supporting information) is posted on the website.
- When granting or denying an application for registration, the OE will post on the website a written decision that addresses any significant issues raised. (As above, the OE may summarily dispose of issues that are not relevant under Article 12 or that have already been decided.)
- A similar application, comment, and decision procedure will be provided for requests to certify emission reductions or sequestrations during the life of the project.

(3) Project Level Dispute Resolution

The Umbrella Group submissions call for development of a process to resolve disputes that may arise regarding OE registration or certification decisions. The U.S. supports a procedure under which a OE registration or certification decision may be raised to the EB if such review is requested by a Party or Parties within a specified period. A transparent process for such review

⁴ While confidential business information will not be disclosed, information relevant to determining a project's baseline or its emissions and sequestrations must be made public and is not considered confidential. See submission of Australia et al., Appendix F, 1/31/00.)

could have the following features:

- The EB (or a review body working under its authority⁵) will review an OE registration or certification decision if a request for review is made by a Party represented on the EB or by [three] Parties not represented on the EB. If enough Party requests for review are not made within [120] days after an OE decision is posted on the EB website, the decision will be considered final.
- Project participants or accredited NGOs that are dissatisfied with an OE registration or certification decision may not seek EB review directly, but may request that Parties do so.
- When reviewing an OE decision, the EB (or its review body) will examine all available information and determine whether the original decision was correct or should be changed. The determination of the EB (or its review body) will be issued on the website and will be considered final.

Note: The Umbrella Group has also proposed that some decisions (e.g., first-of-a-kind multi-project baselines) should be made by the EB, rather than the OEs. Currently, Parties are discussing ways to assist in developing methodologies and baseline information as inputs to such decisions (sometimes referred to as the baselines “handbook” process). The U.S. sees the need to include appropriate transparency and participation provisions in that process. This requires further discussion.

⁵ As already indicated, the U.S. believes the EB will need support structures to help it carry out certain functions. The EB itself may not have the necessary expertise or sufficient time to review OE decisions itself. A special body might be established to do so working under the EB’s authority.



United States Department of State

*Assistant Secretary of State for Oceans and
International Environmental and Scientific Affairs*
Washington, D.C. 20520

April 18, 2000

TO: DISTRIBUTION LIST ATTACHED
FROM: David B. Sandalow
SUBJECT: Assistant Secretaries Climate Meeting

There will be a Climate Meeting tomorrow Wednesday, April 19 at 3:30-5:00. Agenda papers attached.

There will be another Climate Meeting on Friday, April 21 at 11:00-12:00.

Please confirm your attendance to Lilly Wiggins at 647-1554.

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Transparency Issues in CDM

Issue

What opportunities should CDM processes provide for third party input?

Background

The CDM will contain two levels of oversight: 1) Operational Entities (OEs) act to ensure that emission reduction units have occurred, through assessment of baselines, project monitoring, and certification of emission reductions; and 2) the Executive Board (EB) accredits and reviews OEs for competence and integrity, and to promote consistency in decisions. Some have noted that, despite this two-tiered oversight structure, there remains an inherent confluence of interests among CDM participants to overestimate credits, as well as a problem of ensuring consistency across OEs. Transparency has been identified as an important check against such-a ~~tendency~~ problems. The U.S. has stated that it sees transparency as important, but we have not been specific to this point.

One area where the IWG (and presumably most countries) has agreed is that meetings of the EB will generally be open to observers and accredited NGOs. To the extent that the EB sets general CDM policy, accredits OEs, and approves baseline methodologies, NGOs will have an opportunity to provide their views. The IWG has also agreed on some form of input into the OE review/re-accreditation process. The question has been whether this is sufficient. In this context, Options 2 and 3 should be considered as add-ons to Option 1.

Option 1) OE Accreditation/Review: The EB would notify that an OE is under review, and provide for comment by accredited NGOs. Pros/cons address whether Option 1 is sufficient.

Pros.

- Would likely significantly enhance OE accountability.
- Provides mechanism for NGO input into CDM processes.
- Has less potential for bottlenecks or delays than options below.

Cons

- No review of OE project-level decision-making before CERs are issued ~~Problems generally identified only after CER generation;~~ could undermine CDM credibility.
- Alone, reaccreditation focus would emphasize punishing OEs, rather than fixing projects; problems more difficult to fix once CERs have been issued; raises profile of "bad" CERs.

Option 2) Require notification and comment during the registration and certification phases of the project. Information on projects could be made available through a website early in the registration and certification phases, and a period of comment (e.g., 30-60 days) could be provided to Parties and/or NGOs. ~~could be provided.~~ OEs would have authority to deal summarily with comments that are legally irrelevant or that have already been addressed. ~~Relevant and non-repetitive comments would be considered by the OE in making the registration or certification determination.~~ Combined with Option 1, OE responsiveness could be a factor (either implicitly or perhaps explicitly) in review and reaccreditation. Combined with Option 3, OE responses would be considered in dispute resolution.

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4/18/99

Option 2(a) Parties and ~~accredited~~ NGOs accredited by the Convention.

Pros

- Helps allow problems to be identified before they contribute to bad CERs.
- To extent that OE is responsive, promotes credibility in system.

Cons

- Without rules for summary treatment of irrelevant or repetitive comments, Potential for capricious or otherwise problematic comments to slow down projects.
- Compared with option 3, NGOs and Parties can't actually stop bad projects.
- Could necessitate more guidance about confidentiality rules if project information was to be made public – some risks involved, and difficult to achieve by COP-6.
- Puts OE in a potentially difficult position, since NGO comments are likely to have policy/political implications. If linked with reaccreditation and/or liability for "bad" CERs, this approach could result in overly conservative decisions, and/or fewer OEs in the system.

Option 2(b) Parties only: Any NGO comments would need to come through Parties.

Pros:

- Would allow for comments prior to key decision points, but limit capricious comments.
- Gives U.S. more influence in policing system to ensure credibility.

Cons:

- Might limit appropriate comments from NGOs from some countries
- More resource intensive than 2(a); Parties would need to arbitrate their NGO comments.
- Same issues with confidentiality above.

Option 3. Project Dispute Resolution-Third Party Challenge. ~~The current Umbrella~~ The current Umbrella Group position acknowledges the need for a process to resolve disputes arising in the registration or certification stages. Presumably, this would involve a limited period of time (e.g., 30-60 days) to take disputed OE registration or certification decisions to the Executive Board or to some body operating under its aegis. Although most UG members see this as a procedure involving project participants and perhaps Host Parties, it would also be possible to allow third parties (either Parties or accredited NGOs) to raise challenges to the Executive Board as well.

Option 3(a) Parties and accredited NGOs

Pros

- Provides high degree of transparency and public input, which would be consistent with the environmental objective of the CDM (as well as Article 12)
- Compared to Option 2, takes some burden off OEs to make calls about decisions that could have policy/political ramifications.

~~This option envisions a different approach to the scope of OE responsibility than recent UG submissions. The UG draft envisions that an OE would undertake all functions relating to registration and certification, except in cases in which a project proponent proposes a new baseline methodology or multi-project baseline. Since the choice of baseline methodology will often~~

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~~involve considerations that are inherently subjective or political, we have proposed that new baseline methodologies or benchmarks be approved by the EB. NGOs could weigh in on these decisions. OEs would approve any baseline using a methodology already approved by the EB.~~

~~This approach takes from the OE the most subjective aspect of CDM projects, and helps promote consistency among decisions. However, it also carries the danger of an EB bottleneck, and we have been discussing ways to minimize these without an entirely satisfactory answer.~~

~~The following alternative approach has been proposed. Instead of requiring all new baseline methodologies to go through the EB, OEs would be allowed to make provisional determinations of the baseline, as well as all other aspects of registration and certification, on their own. These provisional determinations would be made publicly available on a website, and could be challenged within a certain period of time (again, either by Parties or by accredited NGOs). If not challenged by the end of the period, decisions would stand. If challenged, determinations would be made by the EB on aspects that are challenged. Consistency would be achieved over time through an evolution in EB determinations.~~

Option 3(a) Parties and accredited NGOs

Pros

☐ Eliminates need to have EB approve baselines

Cons

- Would necessitate relevance and repetitiveness criteria to preclude capricious challenges; even so, could lead to delayed projects, since projects could be questioned on many grounds.
- Likely that UG will not accept.

Option 3(b) Parties only

Pros

- Provides ~~some~~ less transparency and public input a significant opportunity for input into projects, which would be consistent with the environmental objective of the CDM (as well as Article 12).
- Puts the "burden" of raising issues on Parties. Since the U.S. is more likely to engage in serious technical review of projects than other Parties, we would likely carry the stigma of frequently raising issues.
- Less likelihood of capricious delays than option 3(a), and could find favor on the basis that it eliminates need for EB approval of baselines.
- Project information still transparent (as with Option 2 and 3(b))

Cons

- While dynamics would likely be different than 3(a), this new approach to baselines would still be less effective way to achieve consistency than our current position.
- Delays still possible compared with current approach (although uncertainty likely to be greatly reduced).
- Would likely be less difficult to negotiate than 3(a), but will be considerable resistance from UG and others.

US position

accreditation + re-accreditation of OEs; anyone can submit comments at project challenge of CERs by parties directly involved in transaction registration + certification
Drafter to draft paper on challenge by other parties (not NGOs)

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Pre-commitment Period Review of Eligibility Requirements

Issue: Whether to initiate the eligibility requirements for the mechanisms before the commitment period?

Background

We have long advocated compliance with Articles 5 and 7 as an eligibility requirement for participation in the Kyoto Mechanisms. We have also taken an “innocent until proven guilty approach” under which a Party would be deemed eligible to participate unless the compliance body determined it to be in non-compliance with Articles 5 and 7.

The European Union and various environmental groups have expressed the concern that under the US approach, eligibility requirements would not get reviewed until after the commitment period begins. This presents the possibility that a Party could begin trading without meeting the basic eligibility requirements of 5 and 7. The earliest that a non-compliance body could find 5,7 non-compliance and suspend eligibility would be 2010 – the middle of the commitment period.

Discussion

This problem could be resolved by advancing the date of the mechanism eligibility requirements to a date prior to the commitment period. For instance, by 2006¹, any Party that wishes to participate in the mechanisms would be required to have:

- A national system for ghg estimation under Article 5.1;
- A national registry for tracking assigned amount under Article 7.4; and
- An inventory/annual report prepared in accordance with criteria in Articles 5.2 and 7.1;

Parties' implementation of these requirements would be reviewed under the normal Article 8 review process, and reports forwarded to the non-compliance body. If the non-compliance body does not find a Party to be in non-compliance with 5 and 7, then that Party would be eligible to trade. We anticipate that the length of time between submission and completion of the review/compliance process will be less than one year.

Pros

- Promotes environmental integrity by preventing Parties from participating without having met eligibility requirements;
- Would increase the likelihood of securing an innocent until proven guilty approach, and seller liability; with the EU;
- Allows trading to begin prior to the commitment period;
- More certainty for the market, because any country that meets the eligibility requirements up front, would have a high likelihood of remaining in compliance through the commitment period.

Cons

- Would create a one-year difference between when mechanism-using Parties are required to implement obligations and when non-mechanism-using Parties are required to meet the same obligations.

Recommendation: For the above reasons, we propose that the US support pre-commitment period review of eligibility requirements for the mechanisms, and that this issue be raised for discussion at the Umbrella group meeting in May.

¹ Note that a 2006 date would provide sufficient time for eligibility to be reviewed prior to 2008. Parties wishing to begin participation in the mechanisms prior to 2008 could voluntarily undergo review at an earlier date.

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POSITIVE EXTERNALITIES, PROPERTY RIGHTS, AND RENT-SEEKING ISSUES IN THE DESIGN OF THE CLEAN DEVELOPMENT MECHANISM.

(~~confidential~~-draft for comments)

By Thomas Black Arbelaez

Conceptually, the Clean Development Mechanism (CDM) represents adequate incentives to induce economic actors in developing nations, who generally have very low marginal costs of abatement of atmospheric greenhouse gases (GHG), to dynamically explore their alternatives, innovate and implement the most cost-effective GHG reduction projects available to them. In an efficient international market for emission rights, high abatement cost emitters from industrialized nations could reduce their costs dramatically if the least cost CDM options are implemented: in the case of the US, MIT estimates that the marginal cost of compliance with the US target could fall from \$186 to \$23 per ton of CO₂ abated.

However, developing nations' political processes associated with the implementation of the CDM program threaten to be very inefficient, leading to distorted allocations of resources, higher costs than necessary and less GHG abatement than could be possible under an efficient allocation scenario. As several authorities have noted, high transactions costs imposed by inefficient institutions may negate many of the potential gains from trading. However, rent-seeking in developing world institutions may be the worst distortion, siphoning off large resource flows from CDM transactions, reducing the flow of resources to emissions reductions projects enough to render many uninteresting to investors. This will probably occur in most developing nations, which suffer from weak institutions and political systems that use rent seeking activities to maintain power and satisfy constituencies.

The key to preventing the rent-seeking problem in the CDM may lie in the clear allocation of property rights associated with the generation of the positive externality in the reduction or sequester of emissions, an issue that has not yet been addressed by the UNFCCC. Certainly, negative externalities and property rights allocations has been amply explored: many excellent papers abound have been published on the allocation of tradeable property rights as a means to efficiently reduce total contaminant loadings since Professor Dales' original work. The theoretical literature has been complemented by working examples such as the Acid Rain program, some performing remarkably well both in environmental and in efficiency terms. In these programs the analysis of the negative externalities and the allocation of property rights related to emission reductions are relatively straightforward. Polluters emitting contaminants freely into the atmosphere, a public good, adversely affect the welfare of the society, imposing costs and damages. In the absence of state regulation of this activity, polluters overuse the public good as their waste disposal venue, and society suffers excessive costs.

In the negative externality case, the regulatory body should estimate a pareto optimal level of total pollutant load--a target level--and then create and transfer the property rights to regulated parties that permit the emission of pollutants at the target level. These parties then trade among themselves based on the relationship of their respective marginal costs of abatement to the

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market price of tradeable emission rights. High abatement cost polluters emit more than lower cost polluters and pay the market price for additional permits, leading to an equalization of marginal abatement costs across polluters and an efficient distribution of the total pollution load reduction. This is an efficient outcome in terms of externality theory.

Polluters that can find ways to reduce and emit below their assigned amounts are in effect providing a positive externality to society and receive a payment from the market for the benefit they generate to society. Again, efficiency in terms of externality theory.

Similarly, in the case of the Clean Development Mechanism, positive externalities generated by economic actors in developing nations would receive payment for the benefits produced for the global society. Under the CDM, a land owner in Latin America is encouraged to modify his/her production functions, optimizing processes and planting crops to maximize CO₂ sequestration and reduce CO₂ emissions. In one example, instead of continuing the traditional activity, extensive cattle grazing, a landowner can choose to plant native hardwood forests that will extract thousands of tons of CO₂ from the atmosphere annually--a positive externality because it improves the welfare of society by reducing GHG concentrations and the greenhouse effect. Taking into account that there is no national emissions limit or allocation of emissions rights under the CDM, the question arises: who is the rightful owner of the property rights associated with the emissions reductions, and with it, the right to the payments generated? The relationship between the generation of the positive externality and the right to the value thus created must be explored to clarify the property rights to the Certificates of Emissions Reductions, in order to determine a key issue, the government's right to appropriate part or all of the value generated by this activity.

In the negative externality case, the state creates tradeable rights to pollute and transfers those rights to private owners. In the positive externality case, does the state do the same? Does it create the right to sequester atmospheric contaminants and transfer them to private owners?

In the above example, the investors plan the project, finance the capital and the labor, manage the project and assume the risks. If the project and/or the CDM program fails, the investors assume all the losses. Besides approval, what is the role of the state, and what rights does it have to a share of the CERs generated under a positive outcome?

The analysis of property rights associated with positive externalities becomes a central issue in the design of the Clean Development Mechanism (CDM). If the investors that generate the positive externality own the property rights manifested in CERs and the values associated, they can defend their interests successfully in most developing nations against politicized rent-seeking. The government should not be able to easily expropriate those rights. In contrast, if the state has a legitimate claim on the property right, the governing institutions and the political and interest groups allied with it can easily extract large shares of the CERs generated (or their monetary value) for any reason they choose.

In many developing nations, environment ministries will operate the CDM and make the decisions over CER sharing. Ministers and their courts change frequently, often yearly, and with

these changes come radical policy and program shifts that favor the interests of the groups in or near power at any given time. Financial resources for pet programs of powerful lobbies are scarce and are the object of political battles which rarely bow to efficiency arguments. In these volatile, politicized environments, politicians and lobbyists will be rapidly tempted to tap the flow of CER values. As the share extracted by the state increases, the share to project investors decreases proportionately. Returns to investment are reduced, many projects on the margin will become unprofitable. Less projects may be equated with less sustainable development. The cost per ton reduced rises, shifting the supply curve up and increasing the cost of compliance for annex I nations. With a rent seeking state extracting as much as it can get away with, uncertainty increases. Depending on the degree of rent seeking and the distortions it imposes, the impact could be devastating to the CDM, distorting the allocative efficiency of abatement resources, reducing the incentives to investors to carry out projects, and reducing the amount of Greenhouse Gas capture in the process.

In summary, the efficiency and effectiveness of the CDM may hinge on the issue of property rights. This issue and its theoretical foundations should be thoroughly explored before implementation.

CDM "Process and Governance" Issues

Questions mainly regarding the roles of the Executive Board and the Operating Entities

How to best meet three goals:

- Integrity (quality control)
- Transparency
- Efficiency (low transaction costs)

Who makes decisions? (On baselines, on CER accruals, on OE accreditation and revocation)

- "Pushed down" or "top down"? (I.e., do the OEs make decisions, subject to EB review? Or do they make only recommendations to the EB, which makes the decisions?)
- Does it make a difference what the topic is?
- Does it make a difference whether the decision is one of "first impression" vs. application of established rule or precedent?

Should the decision-making process be transparent or closed?

- Should there be a difference between "rulemaking" (i.e., establishing standardized methodologies and multi-project baselines) and "case-by-case" decisions (i.e., project-specific baselines, periodic accrual of reductions)?
- What information should be public, and what should be kept confidential? (Status of information relevant to baseline decisions, other emissions-related information)
- How should public information be published? (Internet?)
- Do the OEs and the EB have to provide written explanations of their decisions? To just the participants? To the public?

Who can participate in OE/EB decisionmaking?

- Just project participants? (I.e., private sector investor, host country)
- Other Parties?
- International organizations? (I.e., World bank, UNDP)
- NGOs?
- Some subset of NGOs?
- Do those other than project participants get some notice and opportunity to comment?
- Can they appeal OE decisions to the EB?

Assuming OEs make decisions, how are OE decisions reviewed by the EB?

- Are **all** decisions reviewed?
- Those **audited for cause**?
- Those chosen for **random audit**?
- Those **appealed**? (By whom?)
- When are baseline and accrual decisions **final**?

Process for review/revocation of OE accreditation

- Qualifications and characteristics – independence/conflict of interest issues
- Who accredits? Who revokes? (Presumably the EB, not the COP/moP)
- What triggers revocations? (Regular audits? Random audits? Complaints?)
- What happens to previously issued CERs? (Liability issue)
- What happens to previously registered projects?

Possible answers:

- ▶ Fully independent OEs
 - New, specialized institutions – privately-owned but governmentally-chartered
 - Strict conflict of interest rules – not affiliated with project participants or with Parties
 - Not allowed any participation in any projects
- ▶ “Pushed down” decision making with an appeals process.
 - OE’s make most decisions, subject to EB review.
 - An OE decision that is not appealed within a set time becomes a “final” decision.
 - If appealed, the EB’s decision becomes the “final” decision.
 - Appeals will focus high-level decision-making on the important and difficult issues; promote consistency, etc.
 - CERs are issued after “final” decisions – irrevocable and fully fungible.
 - ▶ How to address later-discovered malfeasance by project participants or OE (i.e. fraud)
- ▶ High transparency
 - A public file on all projects – use Internet
 - All baseline- or emissions-related information should be public
 - Broad participation (see below)
 - Written, public explanation of decisions
- ▶ Broad “standing” rule, appeals process
 - Anyone should be allowed to comment on a project decision
 - Most decisions are not likely to be challenged
 - Manage frivolous or obstructive participation with summary procedures
 - ▶ “failure to state a claim”
 - ▶ invocation of precedent

Result: Process that promotes “integrity of CDM” – high-quality decisions, consistency – with reasonable efficiency

- More efficient than a “universal-review” requirement -- non-controversial decisions or settled issues will not be appealed or can be dismissed summarily
- Precedents and rules will emerge from EB review without excessive delay

7. Baselines for project activities must address all relevant gases and sectors/source categories included in Annex A to the Kyoto Protocol in the context of the specific project activity. Project participants should report aggregate emissions of greenhouse gases expressed in CO₂ equivalent terms using the global warming potentials (GWPs) defined by Dec.2/CP.3 or as subsequently revised in accordance with Article 5 as appropriate.
8. Project-specific baselines must include the following elements:
 - a. the historic data set or a projection³ of future trends;
 - b. the specific geographic region used as the reference case;
 - c. determination of CDM project activity lifetime (i.e., time period during which CERs may accrue);
 - d. whether the baseline is static or dynamic;
 - e. if the baseline is determined to be static, the interval between updates and revisions of the baseline;
 - f. how baseline addresses potential for leakage;
 - g. identify and make fully transparent all assumptions made that may affect the baseline; and,
 - h. other elements identified by the Executive Board.
9. Multi-project baselines must include the following elements:
 - a. the level of aggregation (e.g., sector, sub-sector, technology);
 - b. the historic data set or a projection of future trends;
 - c. the geographic region covered by the baseline (e.g., country-specific, regional within a country, regional for a group of countries with a similar set of circumstances or conditions for specific sectors;
 - d. whether the baseline is static or dynamic;
 - e. if the baseline is determined to be static, the interval between updates and revisions of the baseline;
 - f. how baseline addresses potential for leakage;
 - g. identify all assumptions made that may affect the baseline; and,
 - h. other elements identified by the Executive Board.

Institutional Roles

Role of Executive Board

10. The Executive Board establish a process by which to review and accept or reject each Project-specific or Multi-project baseline in accordance with the procedures outlined in this Appendix until such time that standardized methodologies for baselines are established.

³ If a projection is used, then the operational entity must review the methodologies and assumptions to ensure data quality and reasonable application of methodologies.

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Discussion Paper Options for How to Proceed on CDM Baseline Methodologies

Issue

The U.S. position on CDM envisions the development of standardized methodologies for developing single-project and multi-project baselines (i.e., benchmarks). Taking into account what is achievable by COP-6, we will need to determine: 1) the appropriate level of detail to press for in including baselines in the mechanisms decisions, as well as 2) any appropriate follow-up process to develop more detailed guidance. Options 1 and 2 outline options for inclusion in COP-6 decisions without any specific follow-on; Option 3 includes options for follow-on activities.

Option 1: Identify Key Elements Only

This is the level of detail in the current US draft appendix. Key “elements” are identified for Project-specific and Multi-project (benchmark) baselines. Project Participants or host countries must include “key” elements for Project-specific and multi-project (i.e., benchmark) baselines in project proposals. Examples of key elements include:

- geographic region used as a reference case
- whether baseline is calculated to be static or dynamic
- historic data set or projection of future trends
- how baseline addresses potential for leakage
- specific geographic region used as a reference case
- for multi-project baselines, the level of aggregation

These elements would not be further elaborated in the guidelines. Project Participants and host countries would interpret these elements as they saw fit. The methodologies and the calculations would still need to be reviewed by the Executive Board. Once approved by the EB, any specific methodology could then be applied to future projects. Minimal guidance, such as using IPCC GWP factors, could be recommended up front. A major advantage of

Advantages	Disadvantages
• Provides an outline of the type of information required	• Methodology approval is likely to be time consuming and costly.
• Does not exclude any project category	• Interpretations of elements may be subjective and inconsistent.
• Minimal negotiations needed to approve	• Low investor certainty that investor/host country interpretation of elements will be acceptable to review body

Option 2: Elaborate general guidance for Key Elements

Same as option 1, except that general guidance could be developed to articulate more precisely what is required for each element proposed. For example, guidance could be developed to specify general criteria by which elements would be analyzed (for example, guidance for choosing a geographic region, or for choosing a static or dynamic baseline).

Advantages	Disadvantages
• Provides more guidance as to how to develop information, fostering greater compatibility among initial proposals	• Though guidance may help, without further elaborated guidance (e.g., sector- or technology-specific methodologies) methodology approval will remain

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	relatively time consuming and costly. Interpretations of elements may still be subjective and inconsistent.
Negotiations will be more involved than option 1, but are likely to be manageable	Even this level of detail may be a challenge to achieve <i>to our liking</i> by COP-6.
Does not exclude any project category	Remaining uncertainty that investor/host country interpretation of elements will be acceptable to review body, although better than option 1.

Option 3: Key Elements and a Follow-On Process for Developing Detailed Guidelines

Identify/elaborate key elements as in options 1 or 2 and establish a process to develop detailed methodologies. Project Participants/host countries could create project-specific or multi-project baselines using the key elements until the detailed methodologies have been created. The detailed methodologies would be created in a technical group. Possibilities for such a group include:

- Technical Group under UNFCCC (e.g.; SBSTA).* Since SBSTA itself does not undertake sustained technical work, a "roster of expert" process could be utilized for this purpose, or a panel could be created.
- Annex I Experts Group.* The Annex I Experts Group developed the guidelines for the inventory methodologies that were eventually adopted by the IPCC and are now being revised. This group may be perceived as too exclusionary.
- IPCC.* The IPCC is a well-respected technical body and may be capable of creating guidelines, although as a peer review organization its processes are not designed for this kind of exercise.

Methodologies developed in the technical group would be submitted to the Executive Board for approval and if accepted would be used by all projects in the relevant project category unless the project or host country was granted approval to use an alternative methodology.

Advantages	Disadvantages
Manageable work load for COP-6, provides a process for pressing forward with this work after COP-6.	Issues may arise associated with how to prioritize sectors, although this would not be a problem as long as activities within other sectors are not excluded.
Does not exclude any project category	May create incentive to wait until methodologies are created in the relevant project category, particularly if participants were excluded from using comparable methodologies
Lower investor risk and cost where methodologies are created	Could disallow some projects if participants were excluded from using comparable methodologies.

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Clean Development Mechanism Design and Operation Recommendations Paper

The Clean Development Mechanism (CDM) offers the opportunity to generate credits for greenhouse gas emissions reductions beginning in the year 2000. This paper is intended to help policymakers make decisions on key issues involved in establishing an operational CDM.

In establishing the mechanisms and procedures that underpin the CDM, it is important to pursue a balance between two key objectives - a sufficient number of cost-effective projects and protection of the environment. A proper balance will lead to a viable CDM acceptable to a wide range of Parties.

The following sections outline key CDM design and operation issues by topic area. The policy recommendations stress the core objectives of establishing the CDM on a timely basis; achieving real and verifiable GHG reductions; assuring environmental additionality; maintaining low transaction costs; and engaging developing countries.

1. Institutional Structures

The institutional structure of the CDM should support sustainable development in developing countries and provide a means for Annex B Parties to reduce the costs of meeting their targets under the Kyoto Protocol. The recommendations below provide specific guidance on key institutional aspects of the CDM.

(1a) Executive Board Functions: As mandated by the Kyoto Protocol, the Executive Board supervises the CDM and implements guidance provided by the Conference of Parties serving as the meeting of Parties (COP/MOP) to ensure transparency, efficiency and accountability. The COP/MOP should provide overall guidance for the CDM, with the option of relying on outside experts or technical panels for assistance. The Executive Board should: ensure that the methodological and operational guidance agreed upon by the COP/MOP is followed; provide oversight of CDM activities and operational entities; and, arrange for independent auditing and verification of the mechanism. Emphasis should be placed on developing CDM rules through SBSTA/SBI that can be agreed upon by the COP at COP-6. We should oppose any delay in negotiation of methodologies and procedures needed to complete work on the CDM in the near term. We must also bear in mind that only the COP/MOP has authority to establish rules for the CDM, which along with the CDM itself will become operational following entry into force of the Protocol. Therefore, any decisions by the COP (as opposed to by the COP/MOP) have the status of recommendations to the COP/MOP, which could take decisions on relevant points different from those recommended by the COP.

(1b) Executive Board Structure: The U.S. favors a relatively small Executive Board (e.g., 12-14 members). The Executive Committee of the Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol may be used as an example. In this case, the Executive Board should be comprised of seven members each from Annex I and non-Annex I Parties, each member serving two-year terms with the ability to serve consecutive terms. The chair and vice-chair of the Board would alternate each year between the two groups. Nominations of Annex I

members would be limited to Annex I Parties and nomination of non-Annex I members would be limited to non-Annex I Parties. Decisions would be made by consensus of the Board.

(1c) Operational Entity Functions: Operational entities should be responsible for registration of projects and the certification of emission reductions resulting from project activities under the CDM. The U.S. supports the development of standard and transparent methodologies to evaluate and certify projects in order to ensure environmental legitimacy and low transaction costs. The Executive Board would ensure that these guidelines are followed through periodic evaluation of operational entities by third party verifiers reporting to the Executive Board. To lower costs and make the best possible use of the project-specific expertise developed within operational entities, the U.S. should continue to propose that the same operational entities be allowed to perform both registration and certification functions.

(1d) Operational Entity Selection: The U.S. supports a decentralized network of specialized private sector institutions to serve as operational entities. Criteria for the selection (and accreditation) of operational entities would be developed by SBSTA through technical papers and discussion and agreed upon by the COP by COP-6. These criteria would ensure that operational entities are qualified to certify the quality and credibility of Certified Emission Reductions (CERs) and to ensure broad coverage of all regions. Strict measures should be taken to avoid conflict of interest among participating institutions. These measures should clearly restrict any operational entity from involvement in CDM project development, promotion, financing or implementation. Additionally, operational entities would be required to use standardized criteria and procedures for evaluating all projects and certifying CERs. These criteria and their related procedures should also be developed through SBSTA for agreement by the COP at COP-6.

2. Transparency and Review

The central challenge within the CDM is to ensure the environmental integrity of the mechanism without creating an overly burdensome and costly structure. U.S. policy should support clear procedures for ensuring transparency and review of transactions under the CDM that will help to achieve both of these objectives.

(2a) Transparency and Accountability – The U.S. supports clear and standardized rules for all elements and institutions operating within the CDM. Those rules should be developed through SBSTA for agreement by the COP at COP-6. Such rules would cover: registration of projects by operational entities; technical criteria and procedures for the certification of emission reductions by operational entities; selection/accreditation and on-going evaluation of operational entities; reporting and disclosure of information; and protection of proprietary information.

(2b) Third Party Verification – The U.S. supports independent auditing and verification of project activities by third parties to ensure transparency, efficiency and accountability. SBSTA should develop guidance on how verification is undertaken for agreement by the COP by COP-6. These rules should identify: the frequency and intensity of audits conducted; the actors to be audited (projects or operational entities); the repercussions if CERs are found invalid; guidelines and procedures for requesting audits and/or appealing decisions; and, procedures for rectifying

invalid baseline registration or emission certification. On these procedural points, the U.S. supports the position that audits should be conducted at the operational entity level on a periodic basis through random and/or statistical sampling. The Executive Board may also request an audit of a particular operational entity if discrepancies in project registration or CER certification are identified. Options for the frequency of audits should be explored, including a predetermined total number of CERs certified by an operational entity that initiate an audit or a system of more regular audits until an operational entity has demonstrated consistent compliance. Each option will have a direct impact on both the cost and the credibility of the verification regime.

(2c) Project compliance under the CDM – The U.S. supports the development of a transparent and standardized set of rules to promote project compliance under the CDM. These requirements should include rules for: the registration of projects and accrual of CERs; oversight of activities of operational entities; and consequences for violations of CDM rules. The procedure for determining non-compliance with CDM rules should be established up front, as should any consequences for violations of such rules.

(2d) Party compliance with Protocol – The EU has proposed that a determination of noncompliance with non-CDM Protocol obligations could lead to a loss of access to the CDM. For example, a Party whose emissions exceed its target could lose access to one or more mechanisms, which might include CDM, however, the United States does not favor this option. In any event, any loss of CDM access would need to be spelled out in advance as the consequence for exceeding targets. We could not agree that a non-compliance body would have the discretion to apply such a consequence on a case-by-case basis.

3. Operational Issues

The U.S. seeks the resolution of many operational issues related to the CDM by COP-5. The following are policy recommendations on key operational issues.

(3a) Party Eligibility Requirements – The U.S. does not support additional CDM eligibility requirements of non-Annex I Parties other than a requirement of a first National Communication to participate in the CDM. At the same time, the U.S. recognizes that some data availability requirements (particularly for updated inventories) may be necessary in non-Annex I countries in order to establish accurate baselines for CDM projects in particular sectors. These types of requirements should not affect a Party's eligibility, but should be built into rules relating to establishing benchmarks/baselines and certifying reductions.

(3b) Comprehensive Inclusion – The U.S. supports comprehensive inclusion of all project categories (both reduction and sequestration) and all gases, unless one or more is agreed by the COP/MOP to be ineligible (e.g., because of high potential for leakage from individual projects).

(3c) Project Registration – The U.S. supports a project registration phase prior to project development. Projects should register with an authorized operational entity to confirm that the project has host country acceptance, meets sustainability goals of the host country, and its emission reductions are additional. Project registration should identify the baseline or benchmark to be used for the *ex-post* calculation of credits. Actual emissions reductions would be certified

by operational entities only after they occur. This step removes most elements of uncertainty for the investor other than actual project performance. Other countries believe that the registration (or validation) step could occur at any time before certification at the project participants' discretion (i.e., registration may take place after a project is underway but before any CERs have been issued). The U.S. should be open to using the term "validation" for this stage since it avoids confusion with the registry function. The term validation also implies that this step is a formal approval process, not simply a voluntary filing of a planned project.

(3d) Sustainable Development Criteria – The U.S. does not support standardized methodologies to determine sustainable development criteria for projects. Although determination of sustainable development should be the sole responsibility of the host country of a project activity, the U.S. may seek requirements for transparency in this process. To address any transboundary environmental or socioeconomic effects of a project, a facilitative mechanism could be established in order to resolve these types of issues in a flexible and non-regulatory manner between affected Parties. The USG should not take a public stance on this issue at this time, in order to leave open the option of pushing for such criteria as a tactical matter.

(3e) Transaction Relationships – All transactional relationships should be allowed under the CDM (e.g., bilateral, multilateral, or host generated/financed). Both public and private institutions should be able to participate in project development or CER transactions, and non-Annex I Parties and private entities should be able to generate CERs without an Annex I partner.

(3f) Definition of "part of" under the CDM - The U.S. does not support limiting the amount of CDM credits that can be used to meet Annex B targets. "Part of" should mean anything less than 100% of the reductions required by Annex I Parties in order to achieve compliance with Parties' quantified emission limitation and reduction commitments under Article 3 of the Protocol.

(3g) Prompt-start for CDM – The U.S. favors a prompt-start for the CDM. Methodologies need not be established for all sectors before the CDM can become operational. The CDM may initially move forward in sectors with greenhouse gas quantification methodologies, while other sectors may not have established benchmarks, baselines, or methodologies for calculating reductions until a later date. Methodological or technical problems in any single project category should not restrain other project categories from CDM activity. The development of an "interim CDM" should be discouraged, since it will detract from efforts to establish permanent rules and procedures for this flexibility mechanism.

(3h) AIJ and the CDM - AIJ projects should be eligible for participation under the CDM; however, they must meet all established CDM criteria. Operational entities may retroactively certify emissions resulting from an AIJ project begun before the CDM is operational, but credit should be given only for those reductions accruing from the year 2000.

4. Equity Concerns

As a market-based mechanism, the CDM will provide low-cost opportunities for GHG reductions while simultaneously promoting the flow of private capital toward GHG reduction projects in less developed nations. Since the vast majority of financing for CDM projects will be

private, it is likely that the market will largely determine the distribution of projects. At the same time, some developing countries are concerned that the majority of projects will be developed only in countries where investment is already going, or where abatement costs are very low. In order to address this equity concern, the structure of the CDM should ensure broad participation of developing countries without market distortions.

(4a) Measures to Ensure Broad Participation - U.S. policy seeks broad inclusion of CDM projects in a range of host countries. Several non-market distorting policy measures could be used to achieve this objective. These measures include: a CDM clearinghouse function to match hosts with potential investors; the inclusion of a comprehensive range of project types in the CDM; and the provision of U.S. financial and technical assistance to support capacity building in countries interested in hosting projects.

(4b) Measures to Assist Financing – The U.S. supports project bundling for smaller countries or the creation of CDM “mutual funds” led by private sector institutions to provide unique opportunities to facilitate financing of projects in countries where they may otherwise not occur.

(4c) Projects Initiated by Developing Countries - In addition to hosting CDM projects using financing from project developers, non-Annex I countries may unilaterally develop CDM projects in their country. U.S. policy supports individual Party project development, but stresses that standardized registration criteria as well as monitoring, verification and certification protocols be used for assessing these projects. In addition, unilaterally generated projects would be subject to the CDM administrative and adaptation fees.

(4d) Other Incentives - Other financial incentives could be used to ensure regional dispersion of CDM projects such as quotas, differentiated baselines, CER bonuses, and valuing CERs from select countries at a higher rate. Although useful, U.S. policy does not favor these policy options since they may raise costs, promote activities where abatement costs are not low, and distort the market functioning of the CDM.

(4e) Use of ODA and/or Public Funds - The context and circumstances under which public funds should be used will be identified in coordination with international negotiations. Policy makers should note that this issue is particularly important since Japan strongly supports the use of ODA. The G-77 and the EU insist that CDM not result in any diversion of funds from ODA or the GEF. Developing countries are also particularly sensitive about reprogramming limited ODA away from traditional uses. Some developing countries therefore call for CDM projects to demonstrate financial additionality; i.e. if ODA is used for these purposes, the Annex I Party must show that this ODA is new and additional. Several G-77 countries called for the development of specific indicators and reporting requirements to demonstrate this financial additionality. For these reasons, the U.S. does not support taking a firm position on this issue at this time and is engaging Japan bilaterally to explore this issue further.

(4f) Earning CERs through Policies or Measures – CERs should be earned only through project level reductions and not through policies or measures. Policies and measures can be difficult to monitor and verify, allow leakage and gaming, and create disincentives for countries

to take on a target. At the same time, the U.S. should work with other Parties to explore how non-traditional projects might be considered under the CDM.

5. Division of CERs and Share of Proceeds

As a commodity with market value, CERs may be traded, sold or banked for future use by both Annex I and non-Annex I Parties. The U.S. does not support predetermined rules on how credits should be divided between Parties or public/private entities involved in a project activity. After a percentage of CERs is taken to cover CDM administrative costs and to support adaptation, the remainder shall be apportioned between the project host and developer based on private arrangements. Operational entities will be responsible for the certification of these credits and will report total CERs issued to the Executive Board for each project.

(5a) Unit of Measure for Certified Emission Reductions - CERs should be measured in tonnes of carbon equivalent and be calculated using the appropriate GWP for all gases included in Annex A of the Kyoto Protocol. CERs should be serialized to some degree for identification and tracking, including at a minimum - information on country of origin, year of certification, and the certifying operational entity.

(5b) Share of Proceeds – The U.S. supports between 1-3 percent share of CERs generated by project activities to be allocated for administrative costs of the Executive Board and toward the adaptation fund to support activities in the most vulnerable countries. The U.S. supports the position that the majority of this share should go towards the adaptation fund since administrative costs of the Executive Board are expected to be low. A sliding scale, depending on project size, may also be considered for determining the CER share charged to projects. The EU similarly supports basing the share of the proceeds on the CERs generated by the project. Many G-77 members, however, believe that the share of the proceeds should at least include some fees imposed on project developers even if the project never generates any emission reductions. They assert that such fees are, at a minimum, necessary to cover the up-front administration costs of the CDM and to ensure a more stable resource base for the adaptation fund. Efforts should be made to estimate future administrative costs faced by the Executive Board, so that a 1-3 percent share proposal is defensible in light of G-77 concerns.

(5c) Disbursement of Adaptation Funds - The disbursement of adaptation funds should be conducted through appropriate international institutions. U.S. policy should consider which institution (including possibly the GEF or the Executive Board) could carry out these functions with the greatest efficiency, equity and transparency. Rules should be developed by SBSTA and agreed upon by the COP (and later the COP/MOP) to guide this process. While not going so far as to endorse the GEF as the appropriate manager of these funds, several small island states have noted the need to take advantage of the GEF's experience on adaptation issues. The EU also cautioned against creating new institutions to manage these funds and have privately stated that they are thinking of calling for the GEF to assume this role.

(5d) Use of Adaptation Funds – Adaptation funds should only be used to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation. U.S. policy supports an objective process for the selection of particularly

vulnerable countries based on standardized criteria to be agreed upon by the COP/MOP and implemented by the Executive Board. In addition to criteria for country eligibility, the U.S. should support the development of specific criteria for the disbursement of funds on a project-by-project basis that would link the use of these funds to addressing the specific vulnerabilities of a particular developing country. AOSIS is interested in developing specific criteria for access to these funds and so may support the development of more tightly focussed eligibility criteria. A few countries that believe they will be able to host a number of CDM projects, such as Nigeria, have suggested that these funds be available for adaptation projects only in the countries in which the project was located. Other G-77 members are opposed to developing new forms of conditionality on the use of these funds, and propose having the funds turned over to developing countries directly.

(5e) Role of Private Entities – The CER share awarded to the investor and the host should be determined by private contract between the investor/investor or investor/host country Party. These CERs shall be the property of each private party and may be held for future use, traded, or sold. The procedures and mechanisms under which the use, sale and banking of CERs by Annex I, non-Annex I, and private entities is conducted and tracked should be addressed by the MOP. Rules should be developed by SBSTA for agreement by the COP at COP-6.

6. Baselines and Benchmarking

The U.S. supports standardized methodologies for generating emissions baselines to determine CERs under the CDM. Standardized baselines (e.g., benchmark, performance standard, whole-sector, technology standard) should be considered for defined types of projects. For sectors where standardized baselines are not possible or have not yet been constructed, project specific baselines should be used. Project baselines should be established during the registration (validation) of the project. Reference and project baselines should be fixed for the lifetime of the project.

(6a) Choosing a Baseline or Benchmark – If a standardized baseline based on benchmarks has been established, a project developer/host should be required to use that baseline for its calculations. Where no such standardized baseline applies, project developers should develop a project specific baseline based on accepted procedures.

(6b) Additionality – The U.S. supports the view that only emissions additionality should be assessed in the CDM. Programmatic and financial additionality should not be assessed for projects relying on private capital. Experience with USJI has shown both of these categories of additionality to be subjective, and too complicated to determine. Emphasis should therefore be placed on determining baseline technologies and emissions, and verifying emission reductions/removals against some performance measure (whether standardized or case-by-case), not on financial or programmatic additionality. There is general agreement among countries that work on developing baseline methodologies should begin soon, although the G-77 states that any such work is subject to later revision depending on agreement on the principles underlying CDM and the other mechanisms.

(6c) Other Technical Elements – Other technical elements of baselines are currently being addressed in an USG inter-agency process. At the technical level, the Umbrella Group is also

interested in cooperation on baseline methodologies and guidelines prior to the June SBSTA/SBI meetings in order to determine if we can support an intergovernmental technical effort prior to COP-6. Key issues will need to be clarified so that standardized methodologies may begin to be developed by January 2000. These issues include:

- **Level of Aggregation** - Project-specific methodologies and standardized baselines should be set at the highest level of aggregation that still provides reasonable accuracy. In this context, greater definition of “sector” and “sub-sector” is needed as well as identification of sectors where country, regional or global baselines are most appropriate and/or feasible.
- **Period for Earning CERs** - The time frame for accruing CERs against the initial baseline will vary depending on project type, but should be based on the estimated capital lifetime of a project (based on a standard depreciation schedule), and may need to be limited to budget periods under the Protocol. The option to use standard depreciation schedules may be considered as a means to promote early action if a project’s period for earning CERs is limited to the budget period ending in 2012. Approaches taken on this issue will significantly affect incentives for replacing out-dated and/or inefficient technologies under the CDM scheme.
- **Choice of Data** (applies to standardized baselines only) - Standardized baselines should be based on historic data of a limited time frame and using a rolling average of the selected years.
- **Updates** (applies to standardized baselines only) - Standardized baselines will need to be updated periodically to incorporate new trends and technologies (applied to new projects only). The appropriate update cycle will depend on the cost of benchmark construction and the expected rates of change in a given sector.
- **Average versus Better-than-average** (applies to standardized baselines only) Better-than-average benchmarks provide more assurance that emission reductions/sequestration are truly additional, while average benchmarks would include more projects. A balance must be sought based on U.S. government objective for the CDM.
- **Who Establishes Baselines** - Project-specific baselines should be developed by the project developer and approved by an operational entity. Standardized baselines should be developed with cooperation from, but not solely by, the host country. Other involved parties could include: the Executive Board; a body designated by the Executive Board; or operational entities.

Draft Benchmarking Scoping Paper for the AIXG Meeting

* note: *Figures will be labeled in final draft.*

BACKGROUND

The Clean Development Mechanism (CDM) allows countries with greenhouse gas emissions targets (Annex 1) to meet these targets through greenhouse gas (GHG) emission reduction/sequestration projects in countries without GHG emissions targets (non-Annex 1). In order for CDM to be effective, both environmentally and economically, it must meet several criteria. According to the Kyoto Protocol, creditable emission reductions (CERs) must be "real, measurable, and long term." The CDM, however, will be effective only if transaction costs are kept low to encourage greater participation.

Meeting these objectives is largely reliant on baseline methodology. An effective baseline will ensure the following:

High Environmental Integrity. A baseline will have high environmental integrity if it allows minimal non-additional credits.

Low Transaction Costs. Creating a baseline will incur some costs that can be added to the overall transaction costs of the CDM. The fewer permutations needed, the lower the cost of the benchmark system. In the following graphs, 'high' means that the option ranks well for low transaction costs (i.e., has relatively low transaction costs).

- High Participation. High participation in CDM will allow more tradable credits and therefore reduce the overall cost of compliance with the Kyoto protocol.
- High Investor Certainty. Theoretically, CDM credits will provide incentives to reduce emissions. Prior to making an investment, the investor will want to increase the certainty of the amount of credits that will eventually be awarded. High investor certainty will generally lead to greater participation.

Creating a baseline to meet the above criteria is very difficult. One of the most difficult factors is accurately estimating what would have occurred anyway. The need for environmental integrity often competes with retaining low transaction costs, encouraging broad participation, and ensuring high investor certainty.

This paper explores the use of benchmarks as a means of assessing emissions ^{sp} additionally¹ in CDM projects while lowering transaction costs and decreasing the subjectivity of project-by-project baselines. Benchmarks have potential to create effective baselines for some sectors, but are not likely to apply to all projects. Other baseline methods, including project-by-project baselines, will remain viable options in many instances.

¹ Demonstrating 'additionality' refers to proof that emissions reductions would not have occurred in the absence of incentives provided by the CDM.

explicitly
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PROJECT-BY-PROJECT BASELINES

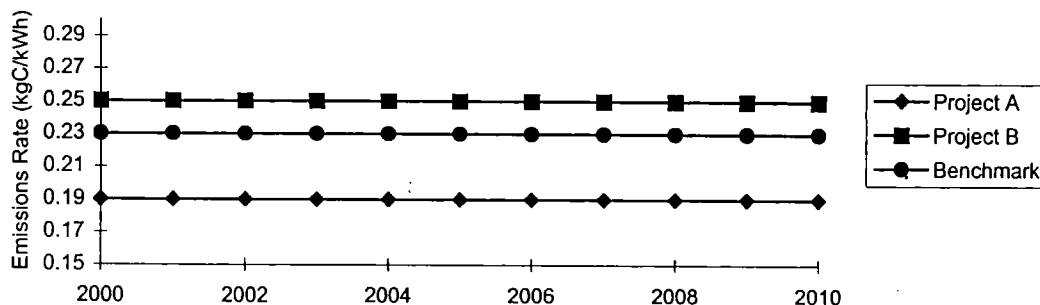
Project-level greenhouse gas (GHG) emissions reductions have historically been evaluated using project-by-project baselines. Under this approach, the project developer evaluates what would have happened without the project and then estimates resulting emissions from this project. The difference between these two numbers is the net GHG reductions or removal from the project. Experience has indicated that this process is extremely time intensive and can be quite subjective. It is difficult to estimate what would have happened in the absence of the project and involved parties can manipulate these assumptions.

Establishing a more straightforward method to determining additionality would lower transaction costs, provide a greater degree of environmental stringency, and streamline the crediting process.

THE BENCHMARK APPROACH

One approach that might satisfy the above criteria is the *benchmark* approach, which is sometimes referred to as the “sector baseline” method in contrast to the standard “project baseline” method. A benchmark sets a standardized emissions/sequestration performance standard across a sector. Any project that is more carbon efficient than the benchmark can be considered additional. For the CDM, certified emissions reductions (CERs) could be determined based on the difference between the benchmark and the project performance. Thus the benchmark serves as the baseline for an entire sector or sub-sector, eliminating the need for project-specific baselines. Figure 2 illustrates a simple example of a benchmark

sector -
specific?
- fairly
aggregated



In this example, a benchmark is set for electricity generation. Project A would not be considered additional, but project B would be considered additional. Project B would accrue credits for the generation under the benchmark (i.e., 0.04kg of C/kWh).

Benchmarks, often referred to as “indicators” or “performance metrics,” have been considered for many other applications that involve assessing and comparing environmental or financial performance of firms, plants, or sectors. Benchmarks have also been used to gauge compliance with environmental regulations, for internal auditing of plant productivity, for assessing financial viability, and for developing industry-wide reporting formats.

The benchmark approach could potentially help the CDM meet the goals set forth above. Set correctly, a benchmark would improve additionality estimates because the crediting process is

less subjective and less open to gaming. A benchmark is likely to provide greater transparency, since a single sector-wide, baseline-setting exercise is easier to review than a multitude of project-specific, potentially idiosyncratic analyses. In addition, benchmarks increase investor certainty because project developers will be able to identify their benchmark without having to go through the creation and review of a project-specific baseline. Finally, benchmarking provides an important means to reduce transaction costs to project developers. Although benchmarks will require up-front sector-wide analysis, benchmarks would lower the costs and complexity of analyzing and agreeing upon baselines for individual projects.

TYPES OF BENCHMARKS

A benchmark will take different forms depending on the constraints and needs of individual sectors. Types of benchmarks include:

- *Output-based benchmark.* An output-based benchmark for GHG emissions sets a standard for the amount of carbon per output. This type of benchmark can be used when a wide sector has a definable homogenous output. For example, the electricity production benchmark can be defined as carbon/ kWh.
- *Binary benchmark.* Some activities are not effectively portrayed by output. In this case, the benchmark would be a 'yes' or 'no', where 'yes' indicates that all GHG benefits from the project are additional. For example, forestry conservation projects either occur or do not. No rate is involved. In this case, the benchmark may set forth basic criteria to determine if the conservation project is likely to have occurred anyway. If these criteria are met, then the project is additional and all carbon sequestration may be credited.
- *Technology-based benchmark.* Output based benchmarks are not effective for some sectors either because they do not have a definable homogenous output or because adequate data is not available. In these cases, technology-based benchmarks may be applicable. A technology benchmark credits GHG efficient technologies as compared to a benchmark technology. In this case, average efficiency of a standard technology could be used as the benchmark. The credits could be based upon either: (a) the assumed efficiency of the approved technology, or (b) actual performance of the approved technology. For example, super efficient industrial boilers may be credited based either on the engineering efficiency estimate or actual fuel in and energy out would be measured for the project and compared to the benchmark technology. This benchmark method circumvents the need to measure total output. On the other hand, technology-based benchmarks do not create an incentive for total process efficiency gains.

ISSUES IN CONSTRUCTING BENCHMARK BASELINES

A benchmark has the potential to create effective and efficient baselines, however, the degree to which a benchmark meets these goals depends on how it is designed. There are a wide variety of possible methodologies for constructing benchmarks. Constructing the methodology for benchmarks will demand decisions and judgements. There are few clear answers and most decisions will entail a trade-off between competing goals. Environmental integrity of the benchmark will need to be weighed against low transaction costs and high participation.

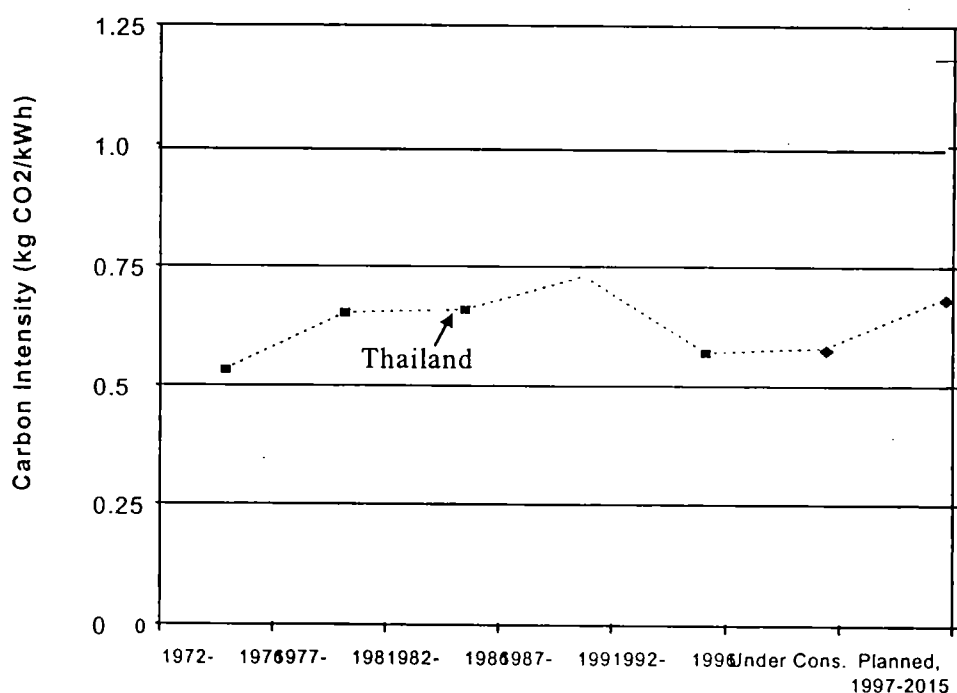
Choosing Appropriate Data for the benchmarks—A benchmark can be based on many different types of data. The data that is chosen should be the best reflection of current trends without allowing unrepresentative years to drive the estimate or allowing too much subjectivity in the methodology.

Historic benchmarks – Historic benchmarks are based on measurements of past performance of existing facilities. In many countries and sectors, systems are already in place for collecting and assembling data regarding key indicators such as amount and type of fuels consumed, physical amount or economic value of product output, and type of process used. These data are a logical starting point for constructing benchmarks, providing that reliable data are available and that past performance is an accurate indicator of future performance.

Historical data can be further divided into total existing capacity or trends, or new capacity additions or trends.

- Total existing capacity is the capacity in operation at any given time. In many sectors, equipment lasts for 30 years or more. Therefore, equipment choices 30 years ago would influence the benchmark. In the forestry sector, relevant data would focus on harvesting, growth, and conservation trends.
- New capacity additions or trends would incorporate only those trends or capacity addition for a given set of years. Rolling averages can be used for a given set of years. This option would reduce the impact of old, outdated technologies, while still accounting for unrepresentative years. As you increase the years, you lower the impact of any one given year, but also increase the effect of older technologies.

The choice of years is important. The last few capacity additions are not necessarily more efficient than the last ones. Figure X shows that the carbon efficiency for Thailand's fossil fuel electricity generation has increased and decreased over the past 25 years.



Projection-based benchmarks - Projection-based benchmarks attempt to project future behavior in light of emerging and expected changes: demand growth, market responses to resource prices, capital stock turnover, sector restructuring, availability of capital, and policies relating to greenhouse gas and other environmental objectives. Although they are, by design, more representative of "what would otherwise occur" than historically based benchmarks, projection-based benchmarks are also easier to game, more subjective, and are difficult to construct. As a result, different projections can vary significantly both in magnitude and direction.

Average versus Better-than-Average. -- A benchmark can represent average performance or some degree better-than-average. Historical 'average' benchmark would allow any project that has better than average carbon intensity to qualify for CDM credits. By definition, this would allow half of the existing production in any given sector to qualify as additional.

A better-than-average benchmark sets a higher standard and limits the amount of non-additional credits. It does run the risk of excluding valid reductions from attaining credits. Better-than-average benchmarks include:

- Top 25 percentile of new or existing capacity.
- Top 10 percentile of new or existing capacity.
- Most efficient new capacity addition
- Best Available Technology/Practice (the most carbon efficient alternative available to that situation regardless of price)

✓ The magnitude of trade-offs between these choices will depend on how each sector is aggregated. For example, in the United States electricity sector, if all types of generation are included, the lowest 25th percentile of GHG emissions is zero. On the other hand, if you use a fossil-only benchmark, veering into lower percentiles is likely to yield a more appropriate benchmark.

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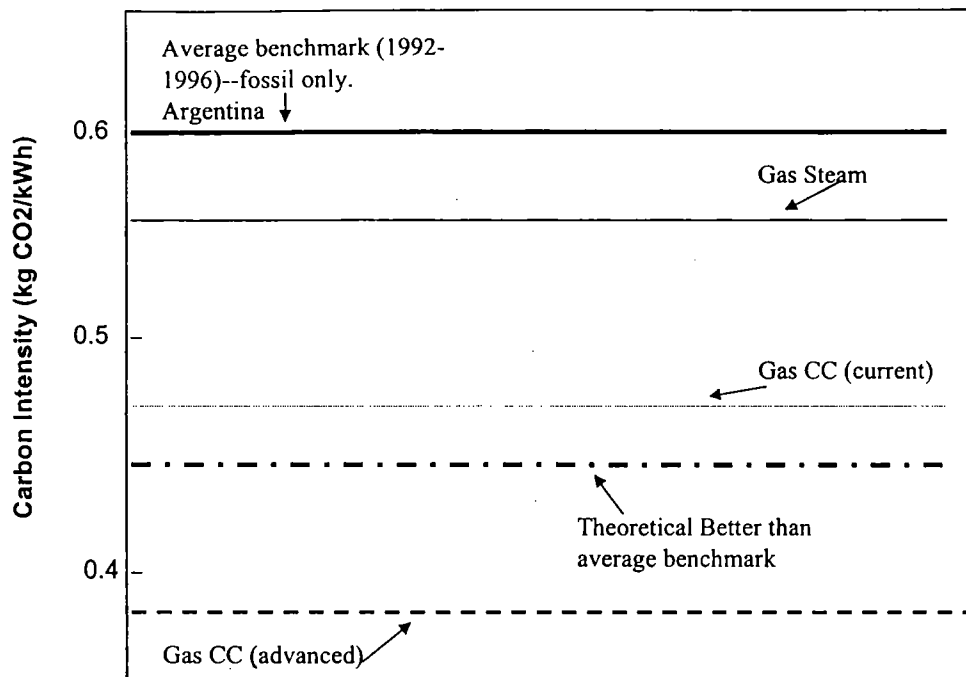


Figure X above shows illustrates the potential effects of an average or a better-than-average benchmark. Argentina's average emissions rate for fossil electricity generation from capacity additions between 1992 and 1996 is approximately 0.6kg of CO₂/kWh. Argentina's new capacity is likely to be gas combined cycle regardless of CDM. This would mean that almost all new capacity is likely to receive CDM credit. The theoretical better-than-average benchmark would create an incentive to move from the average gas combined cycle to the more advanced gas combined cycle. If a better-than-average benchmark were to be more stringent than the gas combined cycle, then it is unlikely that most projects would be able to qualify, thus eliminating the incentive for to move from the current natural gas technologies to more advanced ones.

Level of Sectoral Aggregation -- Benchmarks could be created at various levels of aggregation for a given sector. Disaggregation leads to more precision, but at a greater transaction cost. The level of aggregation will vary among sectors, however, there is often too much dispersion within individual sectors to aggregate across an entire sector.

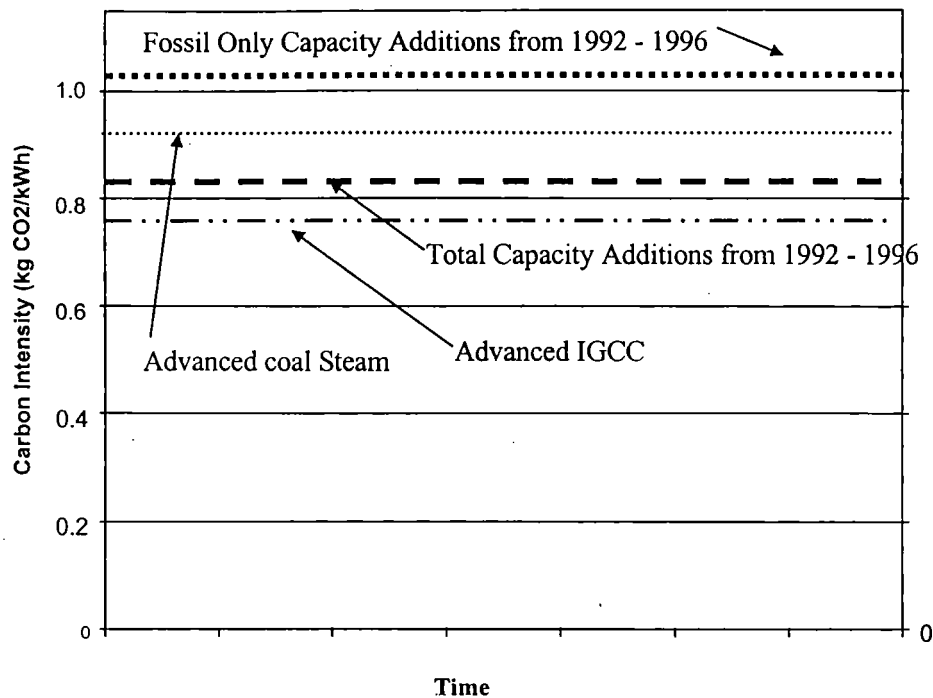
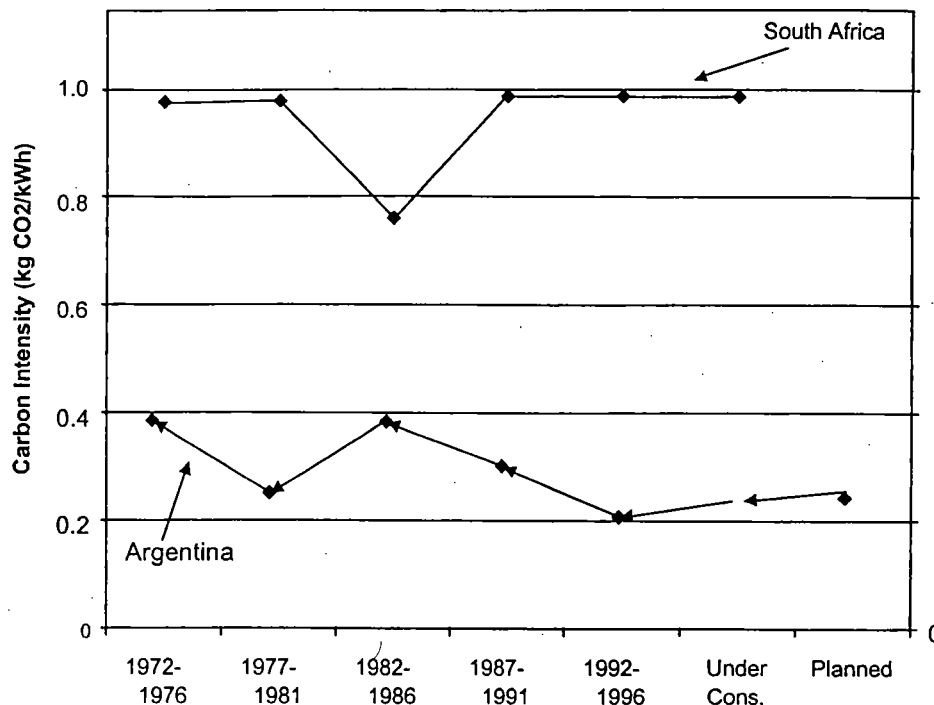


Figure X illustrates electricity generation in China which is mostly coal and hydro. A fully aggregated benchmark would incorporate all the hydro (~25% of new capacity from 1992-1996), and therefore be below most efficiencies for coal-based production (except the IGCC (gassification combined cycle) which is not a possibility in many cases. In this case, two benchmarks may need to be developed in order to appropriately reflect efficiencies for both coal and hydro within the electricity power generation sector.

Global versus Regional/national/local— More regionally specific benchmarks may lead to higher accuracy, but also higher transaction costs. Resources and situations vary by country and this one benchmark may not fit all countries. Figure X shows the variance of electricity generation for two very different countries, Argentina and South Africa.



why not do fuel-specific benchmarks for electricity generation.

If a global benchmark were to be created for all of electricity, it is conceivable that all new capacity in some countries would be considered additional.

Avoiding Perverse Economic Incentives. —The CDM must actively avoid perverse economic incentives wherever possible. For example, crediting electricity production projects could subsidize the electricity sector, thus lowering the price of electricity and increasing demand. Ideally, CDM credits will cover only the incremental cost of more carbon-efficient technologies and practices. Thus, the total cost of production will remain the same as without the CDM credit.

Baselines in general and benchmarks specifically, play an important role in affecting the degree of perverse economic incentives. First, setting a benchmark to allow significant amounts of non-additional credits may create the wrong effect. In this case, the credits are granted to activities that would have occurred anyway. Production as opposed to incrementally improved investment is subsidized.

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? [Second, a benchmark must account for competitiveness issues between countries. Regional benchmarks could create an incentive to move investment toward countries with higher benchmarks in order to receive more credits. Realistically, credits are unlikely to drive location decisions for new investments. Most location decisions are based upon demand for the good and labor costs. Particularly in the first budget period where credit prices are very uncertain, CDM credits will probably not be high enough to change existing investment patterns.

Third, we must consider the total cycle effects of credits. Fossil fuel use leads to GHG emissions far before the fuel is burned. Extraction and distribution are sources of GHG emissions and therefore, are potential categories for CDM projects. If the CDM allows credits for projects throughout a fuel cycle, we may create a compounded subsidy for fossil fuels. A potential

example of this could be awarding credits for (1) methane recapture from oil extraction, (2) then for efficient petroleum refining practices and, (3) then for efficient oil burning electricity generation. Even if individual processes do not effect the price of oil, the compounded result may drive oil prices down and affect demand.]

Updating the Benchmark - The benchmark established for any given year should apply to any project that qualifies for the CDM in that year. Updated benchmarks for future projects, however, will be needed to account for new trends and technologies. Frequent updates (such as yearly updates) will cost more, but are likely to result in fewer non-additional credits. Infrequent updates (such as every 10 years) will cost more, however, are likely to yield fewer non-additional credits.] ?

The intervals in which benchmarks are updated will depend largely on the level of effort needed to create the benchmarks. If the cost is high, then the intervals between updates will be longer. It is possible to tighten the benchmarks using an automatic deflator to account for technology improvements. Although trends in developing countries have not suggested that efficiencies historically improve over time, decreasing the benchmark between updates could create the correct incentive for efficiency improvements.]

Length of Time that A Given Benchmark applies to a Project-- Benchmarks will be revised periodically. The benchmark will apply to the project for a given amount of time. The length of time that a project is measured against its initial benchmark will affect the level of investor certainty about how many credits the project may yield. Examples of choices include: (1) the full lifetime of a project; (2) until capital recovery; (3) estimated lifetime of a project; (4) until new update.

Allowing a benchmark to apply for longer periods of time increases investor certainty, however, it prolongs the effect of non-additional credits and may inadvertently create an incentive to retain old, obsolete equipment.] ?

Label -

Sector	Sub-Sector (Level of Aggregation)	Type of Baseline	Regional or Global	Discussion
Electricity Generation (Data Quality: Good)	Fossil Fuel	Benchmark	<u>Regional</u> : If benchmark applies to total fossil fuel. <u>Global</u> : If specific for fossil fuel (e.g. coal benchmark, oil benchmark, natural gas benchmark).	Some countries (e.g., Argentina, Thailand) use different fossil fuels for electricity generation. In these cases, one benchmark may create an incentive for fuels with moderate carbon intensity, but low carbon fuels would automatically qualify (without really being additional). High carbon fuels would not be close enough to create an incentive to be more efficient. Therefore, global fuel-specific benchmarks may be more appropriate, however, they would not create any incentive for fuel switching. The key determinant in setting the benchmarks is the elasticity of substitution between different types of fossil fuels in most developing countries.
	Emerging Renewable	Benchmark	Global	One global benchmark for all emerging renewables would create an equal incentive for projects regardless of the location. In addition, one benchmark is less onerous to create.
	Large-scale Hydro and Nuclear	Project Specific	--	Large scale hydro and nuclear should not be completely excluded from CDM since each has significant potential to reduce GHG emissions. However, including them in a benchmark creates additionality problems since many countries already have significant portions of large-scale hydro and nuclear. For example, just under half of electricity projects under construction in 1996 in China are large-scale hydro. All of these would qualify under any benchmark since they result in zero emissions.

Sector	Sub-Sector	Type of Baseline	Regional or Global	Discussion
Fossil Fuel Supply (Data Quality: See Subsector)	Coal bed methane <u>Data Quality:</u> Good, but since there have not been many projects, it may not be a representative sample	Benchmark or Project Specific	Depends on method	Benchmarks could be either: (1) set at zero where all projects get credit. This would be a global benchmark. Given the low number of existing and planned projects, this is a viable possibility. (2) set at best practice. Global efficiencies are at about 25% and could be increased to about 30%. Could do global benchmark that varies depending on the gassiness of the mine, or regional benchmarks. The cost of the benchmark will need to be weighed against the number of estimated projects in this field.
	Natural gas production <u>Data Quality:</u> Poor	Project by project	--	It is unlikely that the reduction in transaction costs needed to justify benchmarks would be achieved in this sector because of the wide range of project options and the dominance of only one country (China)
	Natural gas distribution <u>Data Quality:</u> Poor	Project by project	—	Getting good data on natural gas transmission and distribution is very difficult because the source is spread out along the distance of the pipeline.
Industrial Energy Demand (Data Quality: Questionable)	Iron and Steel, Cement, Petroleum Refining (?)	Benchmark (possible)	Global	Benchmarks for industrial demand sectors should be global for two reasons: (1) to create an equal incentive for efficient projects among countries. Unlike electricity supply, commodity production is less regionally tied. It therefore makes sense to create an incentive in countries that can produce the commodity more efficiently (2) Each subsector would need to be disaggregated further in order to create an effective benchmark (e.g. type of steel) since carbon intensity varies by type of end-use product. Global benchmarks would significantly cut down the transaction costs.
	Pulp and Paper Chemicals	Benchmark or Project Specific*	Global	These subsectors may have so many different products (that are not fungible between each other) that benchmarks are not possible. Any decision would need more investigation.

Sector	Sub-Sector	Type of Baseline	Regional or Global	Discussion
Transportation (Data quality: ?)	Policies	Whole-Sector	—	Transportation policies to lower GHG emissions such as fuel taxes, reformulated gasoline, etc. could lower GHG emissions, but would be difficult to quantify. Whole-sector CDM would be the only way to estimate these emissions. However, creating a baseline for a whole sector would exclude any other projects within that sector from qualifying for CDM.
	Infrastructure	Project Specific	--	Projects such as HOV lanes, public transportation, etc. have the potential to lower GHG emissions, but would be difficult to benchmark
	Fleets	Benchmarks or Project Specific	Regional	It could be possible to benchmark fleet performance, but the cost of creating the benchmark may be high since the benchmarks would need to be regional. The benefit of a benchmark approach would hinge on the cost versus the number of potential projects.
Residential and commercial energy use	Appliances and Equipment	Benchmarks	Global	Global benchmarks based on the best available technologies could be created for residential and commercial appliances and equipment. Further work needs to be done to determine the regional dispersion of such equipment to determine if benchmarks are applicable.
Building	Energy efficient buildings	Project Specific	—	
Forestry and Land use ** Additional work needs to be done to assess the potential for forestry benchmarks	Conservation	Project Specific	--	Benchmarks are difficult for conservation projects because determining additionality is based upon too many site specific factors.
	Management practices	Benchmarks (??)	Global	Management practices such as sustained yield and high crop rotation may be considered for benchmarks. The actual carbon benefits, however, may be difficult to assess in aggregate since each forest is different.

*Either a benchmark or a project specific baseline would apply. The project would not have the opportunity to choose.

** Assumes forestry projects are eligible in the CDM

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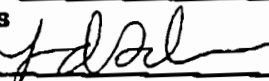
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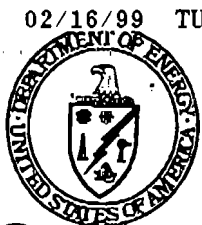
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February 16, 1999

TO: DISTRIBUTION

FROM: Mark Mazur

SUBJECT: CDM Papers for Tuesday, February 16 Meeting

Attached you will find a redraft of DOE's example paper that will be discussed at this afternoon's meeting with Todd Stern.



Example of Step-by-step Process for CDM Power Plant Project in China

This paper provides an example of how a project might go forward under CDM using one benchmarking approach to calculate certified emissions reductions (CERs) generated from a project. Appendix I lists issues that have been identified for further consideration. Appendix II contains an example of calculations that establish a range of baselines that might be chosen as benchmarks. Note that each of these choices would lead to a different value for emissions additionality.

Step I: Company Develops Project

- **Description of a potential Project:**

An 800 megawatt IGCC coal-fired power plant is being planned in Shandong Province in China. It will be partially financed by a U.S. company, say Southern Company, and owned and operated by the Shandong International Power Company (SIPC), which is the local planning commission. SIPC plans to use the electricity generated from the project for Shandong's electric grid. Approval for the project must come from China's State Power Corporation (which oversees power plants and grids for China) and China's State Development Planning Commission (which approves projects in excess of \$30 million). Southern Company and SIPC are using a highly efficient technology and expect that the carbon emissions per megawatt hour (MWh) for this plant will be lower than the carbon emissions associated with the approved benchmark for power-plant projects in China.

- **Provide Calculations of Project's Projected Emissions:**

The project developers (Southern Company and SIPC) estimate emissions based upon the plant design, expected operating parameters, and analysis of the carbon content of the intended fuel source. They estimate emissions to be 417 pounds of carbon per MWh of output. The plant's life expectancy is 40 years. Given that the developers expect the plant to be baseload with a 90 percent availability factor, annual generation from the plant is projected to be:

$800 \text{ MW} (8760 \text{ Hr/Yr}) (0.90) = 6.3 \text{ million MWh}$

Annual carbon emissions: $417 \text{ lbs} \times 6.3 \text{ million MWh} = 2627 \text{ million lbs}$ or
1.1941 million metric tons of carbon (MMT) per year

- **Develop Proposal and Estimate "Emissions Additionality"**

The CERs generated from a project will vary considerably depending upon the exact specifications of the baseline used to determine the benchmark (e.g., average or better than average of last 5 units, coal-fired plants in last 5 years only, all plants in last 5 years). Thus, benchmarks could vary significantly depending on the data used. See Appendix 2.

The project developers collect information from the China's State Power Corporation to estimate the range of possible benchmarks. Based upon Executive Board guidelines for power plants of this project's type and size range, the rate of emissions from all power plants built in the past 5 years will be used to establish baseline conditions for this example.

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The appropriate benchmark would be 504 lbs of carbon per MWh of output. The expected number of CERs generated, therefore, would be:
 $[(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh})] \times 6.3 \text{ million MWh} = 548 \text{ million lbs}$ or 0.249 million tons of carbon per year.

Assuming a market price of \$20/CER, the value of the expected CERs generated per year is estimated to be worth \$5.48 million.

- Southern Company negotiates with Shandong International Power Corporation to determine division of CERs. In this case, Shandong agrees to keep 25 percent of the CERs generated after 2 % is collected for "proceeds." Southern Company will keep 75 percent of the CERs generated after payment of "proceeds."
- No CERs are generated at this time; actual CERs are generated annually after certification (see Step VI)

Step II: Submit to Host Government for Approval

- The project developers submit the project for approval to China's designated approving authority, the State Development Planning Commission (SDPC). The SDPC has established a set of guidelines that must be met before it grants approval, including consideration of how this project meets China's sustainable needs and objectives.
- The Chinese Government approves the project. Such approval implies that the project is consistent with China's sustainable development needs and objectives.

Step III: Submit to Operational Entity for Registration:

- The project developers provide a letter from China's SDPC to the Operational Entity that indicates China's approval of the project. China's approval implies "voluntary participation by both Parties," a requirement of Article 12.5a of the Kyoto Protocol
- The project developers provide calculations from Step I to demonstrate that the project provides "real, measurable, and long-term benefits" and that the estimated savings in emissions are "additional."
- Baseline is approved by Operational Entity.

Step IV: Emissions Monitoring, and Reporting:

- The project developers use monitors to ascertain CO2 flows from the project on a real-time basis, consistent with guidelines set forth by the COP/MOP.
- The project developers report on emissions and emissions saved annually to the Operational Entity based on the approved benchmark. For year Y, the project developers report that the plant actually operated at an 80 percent availability factor, and reported the following:
 $800 \text{ MW} (8760 \text{ Hr/Yr})(0.80) = 5.6 \text{ million MWh}$
 Actual emissions: $5.6 \text{ million MWh} \times 417 \text{ lbs} = 2335.2 \text{ million lbs}$ or 1.06 MMT
 Saved emissions for year Y are:
 $[(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh})] \times 5.6 \text{ million MWh} = 487.2 \text{ million lbs}$ or .22 MMT

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Step V: Verification

- The project is subject to random, independent audit. Auditor X has been certified by the Executive Board to do random, third-party audits for Chinese CDM projects to verify information contained in annual reports. In this case, the project developers' year Y report was audited by Auditor X, which verified the emissions generated and saved as reported by Southern Company and SIPC. Auditor X communicates its conclusions to the Operational Entity.

Step VI: Certification

- Operational Entity "checks" submitted report to ensure that the project developers have completed correctly the standard format approved by the Executive Board. An additional "check" for this project has occurred in the form of a random audit by Auditor X.
- Once the Operational Entity approves the report, thereby certifying the results, it transfers the CERs, minus the 2% deducted for "proceeds," to SIPC. SIPC, in meeting its contract with Southern Company, then transfers 75 percent of the remaining CERs to Southern Company.
- The Operational Entity reports all CERs to the Executive Board.
- Southern Company reports its CERs [$.75 \times .98 \times .22 \text{ MMT} = .16 \text{ MMT}$] to the U.S. National Registry for adjustment of its holding of CERs. Shandong International Power Corporation reports its CERs [$.25 \times .98 \times .22 \text{ MMT} = .05 \text{ MMT}$] to China's National Registry (assuming there is one).

Step VII: Appeal Process (if necessary):

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Appendix I

Issues that Arise for Further Consideration**Step I: Company Develops Project**

- Some of the benchmarking issues: Who determines benchmark? For historical information about Chinese power plants, who provides information? If Chinese government is charged with responsibility, what happens if it doesn't cooperate or work fast enough? How to prove accuracy? Who is responsible for proving accuracy? What is the appropriate level of aggregation for the benchmark (e.g., electric power generation vs. coal-fired electricity)? For industrial projects, level of aggregation will be even bigger problem? Should benchmarks be determined by province, country or region?
- What is the process for case-by-case determination of a project's baseline?
- In determining additionality, should baseline calculations be based on the average or better than average plant? Should these calculations be based on total existing capacity/trends or new capacity/trends?
- Is calculation of proceeds for developers' use only or should it be required in submission to operational entity?

Step II: Submit to Host Government for Approval

- Is host government required to have CDM point of contact with decision-making authority?
- Should there be a deadline for host government approval process?

Step III: Submit to Operational Entity for Registration

- Who should provide proof of host government approval?
- What is the nature of registration? Is it pro-forma or is there an evaluation?
- Should there be a requirement for a submission on other environmental implications, such as transboundary effects?
- Regarding "voluntary participation approved by each Party involved" (section 12.5a of KP), how is this proved? Is host government certification enough or must each government provide such a certification (this could involve more than 2 if a multinational company wanted to divide CERs among more than one Annex B Party)? Does this language imply that only Parties to the Kyoto Protocol can engage in CDM projects? [Need State/Legal to evaluate]

Step IV: Emissions Monitoring and Reporting.

- Must every CER be entered into a national registry (to ensure double entry accounting and verification) or could developers sell CERs without notifying national authority? Who reports CERs to national registry?

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Step V: Verification

- Does verification occur before or after certification?
- Which independent entities will be allowed to verify emissions reductions (operational entity or other third-party verifier)?
- Will each project be subject to a verification process, or will projects be verified selectively?

Step VI: Certification

- Is certification of CERs by operational entities automatic (unless an audit determines inappropriate calculation) or should an affirmative decision to certify be required by the operational entity each year? Should the IRS random audit model be used?
- Does operational entity have a formal auditing process? If so, does Executive Board write the rules for this or does the COP/MOP? If there is an auditing process, who does audits? Third-Parties or Operating Entity?
- Should Operational Entity report CERs to Executive Board or the UNFCCC to allow third parties to verify that CERs were indeed certified?

Step VII: Appeal Process (if necessary):

- What type of audit can overturn certification of CERs?
- Should there be a review process established that allows Executive Board to overturn CERs?
- What type of appeal process should be established?
- Would a project developer or its government represent its interests in an appeal?
- If appeal process imposed, should there be a deadline for resolution of appeal?
- Is revocation of CERs the worst consequence? Is Executive Board the final authority?

Appendix II

Hypothetical Alternatives for Calculating CERs Using Benchmarks

[note: numbers in calculations are hypothetical because detailed information was not available]

Historical information used to develop benchmark

- Hypothetical average and marginal emissions per unit of output [note that a "better than average" performance standard could have been used here, but for simplicity, average performance is used]:
From coal-fired facilities of 200 MW built [commissioned] in the last five years: 660 lbs/MWh
From the last ten coal-fired facilities of 200 MW or more: 620 lbs/MWh
From all coal-fired facilities in the past year: 620 lbs/MWh
From the last five coal-fired facilities of 200 MW or more: 600 lbs/MWh.
From all units (coal, nuclear, oil, gas-fired, hydro, wind) of 200 MW or more built in the last five years: 504 lbs/MWh [*Benchmark used in example*]
From last (marginal) coal-fired unit built: 417 lbs/MWh

Range of "Emissions Saved" (or CERs generated) based on benchmark chosen [based on above values]

Based upon coal-fired units built (commissioned) during last five years:
 $(660 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1531 \text{ million lbs or } .70 \text{ MMT}$
or 700,000 CERs

Based upon last ten coal-fired units:
 $(620 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1279 \text{ million lbs or } .58 \text{ MMT}$
or 580,000 CERs

Based upon all coal-fired units built during past year:
 $(620 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1279 \text{ million lbs or } .58 \text{ MMT}$
or 580,000 CERs

Based upon last five coal-fired units:
 $(600 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1153 \text{ million lbs or } .52 \text{ MMT}$
or 520,000 CERs

Based upon all units (including nuclear, gas, oil, etc.) built during last five years:
 $(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 548 \text{ million lbs or } .25 \text{ MMT}$
or 250,000 CERs [*Benchmark used in example*]

Based upon last coal-fired unit built:
 $(417 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 0 \text{ lbs or } 0 \text{ MMT}$

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COMMENTS:

Attached is a copy of the paper on benchmarks for next Wednesday's meeting on CDM. This paper is an attachment to the paper that was previously faxed to you, *CDM Design and Operations Recommendations*.

David

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Draft: Do not Cite or Quote**ATTACHMENT:****Issues Associated with Creating Effective Benchmarks for the CDM
February 10, 1999*****Background***

Project-level greenhouse gas (GHG) emissions reductions have historically been evaluated using project-by-project baselines. Under this approach, the project developer evaluates what would have happened without the project and then estimates resulting emissions from this project. The difference between these two numbers is the net GHG reductions or removal from the project. Experience with US IJI has indicated that this process is extremely time intensive and can be quite subjective. It is difficult to estimate what would have happened in the absence of the project and assumptions made can be manipulated by the parties involved. Establishing a more straightforward method to determining additionality would lower transaction costs and streamline the crediting process.

Benchmark Concept:

Benchmarks can be used to determine certified emission reductions resulting from projects within the Clean Development Mechanism (CDM). The purpose of benchmarks, rather than project specific counter-factual baselines is to lower transaction costs and reduce subjectivity. Any project that is more efficient than the benchmark will be considered additional. Certified emission reductions (CERs) can be determined based on the difference between the benchmark and the project performance.

Benchmark Development:

Once guidelines are established, developing the benchmark could be quite straightforward. Agreeing upon the guidelines, however, may be a difficult process. There are few clear answers and most decisions will entail a trade-off between competing goals. EPA has evaluated the options theoretically and by using real data for selected developing countries. This analysis can help frame the trade-offs and the implications of different choices. Additional analysis is needed to choose the appropriate method that will help the U.S. meet its environmental and economic priorities within the CDM.

The main characteristics of an effective CDM benchmark will be:

- High Environmental Integrity. A benchmark will have high environmental integrity if it allows minimal non-additional credits.
- Low Transaction Costs. Creating a benchmark will incur some costs that can be added to the overall transaction costs of the CDM. The fewer permutations needed, the lower the cost of the benchmark system. In the following graphs, 'high' means that the option ranks well for low transaction costs (i.e., has relatively low transaction costs).
- High Participation. High participation in CDM will allow more tradeable credits and therefore reduce the overall cost of compliance with the Kyoto protocol.
- High Investor Certainty. Theoretically, CDM credits will provide incentives to reduce emissions. Prior to making an investment, the investor will want to increase his or her certainty of the amount of credits that will eventually be awarded.
- Incorporates New Technologies and Trends. New technologies and trends may change our estimate of what would have occurred in the absence of CDM credits.

The following paper outlines some of the choices and the associated trade-offs among the above goals.

Draft: Do not Cite or Quote***Issues and Trade-offs*****Global versus Regional Benchmark**

More regionally-specific benchmarks may lead to higher accuracy, but also higher transaction costs. Resources and situations vary by country and thus one benchmark may not fit all countries. Equity issues between countries may also be a consideration.

Choices:

- *Global benchmarks:* Lower transaction costs and perhaps the appearance of greater equity among countries. Lower accuracy of benchmark for most countries.
- *Regional/national/local benchmarks:* higher transaction costs, but higher accuracy. May appear inequitable for some sectors.
- *Vary by sector:* Adjust the regional specificity according to the individual sector's situation. Regional disaggregation should be balanced between the transaction costs and the level of accuracy. (Equity?)

	Global Benchmarks	Country-specific Benchmarks
Environmental Integrity	Low	High
High Participation	No Impact	No Impact
Low cost to create benchmark	High	Low
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

Average versus better-than-average benchmark

A historical 'average' benchmark would allow any project that has better than average carbon intensity to qualify for CDM credits. By definition, this would allow half of the existing production in any given sector to qualify as additional. A better-than-average benchmark risks being so stringent that few projects can qualify.

Choices:

- *Average:* A benchmark based on an average of the activity data, by definition, will credit half of the capacity within that sector without any changes in behavior. This choice is likely to allow a significant amount of non-additional credits to be awarded.
- *Better-than-average:* A better-than-average benchmark sets a higher standard and limits the amount of non-additional credits that are awarded. It does run the risk of not allowing some valid reductions from being credited. Better-than-average choices include:
 - Top 25 percentile of new or existing capacity.
 - Top 10 percentile of new or existing capacity.
 - Most efficient new capacity addition
 - Best Available Technology/Practice (the most carbon efficient alternative available to that situation regardless of price)

The magnitude of trade-offs between these choices will depend on how each sector is aggregated. For example, in the United States electricity sector, if all types of generation are included, the lowest 25th percentile of GHG emissions is zero. On the other hand, if you use a fossil-only benchmark, veering into lower percentiles is likely to yield a more appropriate benchmark.

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	Average	Better-than-average
Environmental Integrity	Low	High
High Participation	High	Low
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

Updating the benchmark.

The benchmark established for any given year will apply to any project that qualifies for the CDM in that year. Updated benchmarks for future projects, however, will be needed to account for new trends and technologies. The intervals in which benchmarks are updated will depend largely on the level of effort needed to create the benchmarks. If the cost is high, then the intervals between updates will be longer. It is possible to tighten the benchmarks using an automatic deflator to account for technology improvements. Although trends in developing countries have not suggested that efficiencies historically improve over time, decreasing the benchmark between updates could create the correct incentive for efficiency improvements.

Choices:

- *Frequent Updates* (every year). High transaction costs, fewer non-additional credits.
- *Infrequent Updates* (every 10 years). Low transaction costs, more non-additional credits. (Note: benchmarks could be established at longer intervals, with estimated slopes between updates).

	Infrequent updates	Frequent Updates
Environmental Integrity	Low	High
High Participation	No Impact	No Impact
Low cost to create benchmark	High	Low
Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

Note: Incorporating New Technologies is ranked low for frequent updates because projects may take a while before they begin operation. Longer periods between updates may allow a project to apply under the benchmark that exists during the initial stages of project development (prior to benchmark lock-in)

Length of Time that A Given Benchmark Applies to a Project

Benchmarks will be revised periodically. The benchmark will apply to the project for a given amount of time. The length of time that a project is measured against its initial benchmark will affect the level of investor certainty about how many credits the project may yield.

Choices:

- *Full lifetime of a project:* Allowing benchmarks to apply to the lifetime of the project may continue to credit obsolete equipment that should be retired.

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- *Benchmark applies to estimated capital recovery of project.* This would provide the incentive to upgrade technologies once the investment is paid off, however, it is unlikely that the promise of new credits will prompt capital turnover prior to some profit yield.
- *Benchmark applies to estimated lifetime of project.* Each project and technology has an estimated lifetime. The estimated lifetime could be determined at the pre-certification phase.
- *Until New Update:* Applying each new update to a given project lowers the investor certainty of the number of credits.

	Actual Lifetime of Project	Until New Update
Environmental Integrity	Low	High
High Participation	High	Low
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

Level of Sectoral Disaggregation

Benchmarks could be created at various levels of aggregation for a given sector. Disaggregation leads to more precision, but at a greater transaction cost. The level of aggregation will vary among sectors, however, there is often too much dispersion within individual sectors to aggregate across an entire sector. For example, electricity generation in China is mostly coal and hydro. A fully aggregated benchmark would incorporate all the hydro (~25% of new capacity from 1992-1996), and therefore be below any possible efficiencies for coal-based production. In this case, two benchmarks may need to be developed in order to appropriately reflect efficiencies for both coal and hydro within the electricity power generation sector.

Choices:

- *Aggregate:* Lowers transaction costs, but most sectors have distinct sub-sectors or activities that vary significantly in carbon intensity/benefit.
- *Disaggregate:* Increases transaction costs since more benchmarks need to be made. However, the accuracy improves since aggregate sectors often subsume sub-sectors with distinct markets and carbon reduction opportunities.
- *Level of aggregation varies by sector.* Adjust the sectoral aggregation according to the individual sector's situation. Sectoral disaggregation should be balanced between the transaction costs and the level of accuracy.

	Aggregate	Disaggregate
Environmental Integrity	Low	High
High Participation	Undetermined	Undetermined
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

Draft: Do not Cite or Quote**Data Used: Total Past Emissions/Trends or New Capacity/Trends.**

Some countries' emissions/sequestration within a sector have remained consistent over time, however new capacity in other countries is completely different than past trends. For example, historically, Argentina's electricity generation was largely oil based. However, recent trends are toward natural gas and large-scale hydro. The choice entails a trade-off between incorporating new technologies/trends and using a large enough sample to minimize the effect of unrepresentative years.

Choices:

- *Total existing capacity/trends:* Total existing capacity is the capacity that is in operation at any given time. In many sectors, equipment lasts for 30 years or more. Therefore, equipment choices 30 years ago would influence the benchmark. In the forestry sector, relevant data would focus on harvesting, growth, and conservation trends.
- *Rolling average of selected years (3 year, 5 year, 10 year).* This option would reduce the impact of old, outdated technologies, while still accounting for unrepresentative years. As you increase the years, you lower the impact of any one given year, but also increase the effect of older technologies. The effect of each option will vary by sector and region.
- *Last year of available data.* While capturing the most recent potential technologies, using only one year could risk allowing a benchmark to be set on a year that is not representative of the current trends.

	Total Existing Capacity	Last Year of Available Data
Environmental Integrity	Undetermined	Undetermined
High Participation	Undetermined	Undetermined
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

Sectors Conducive to Benchmarks

Sectors that are most conducive to benchmarks have a homogenous output, quantifiable reductions, and available data. It is also important that these sectors attract enough CDM projects to warrant the cost of creating a benchmark. Electricity, some industrial demand sectors, energy supply (e.g., natural gas pipelines or coal mining methane recapture), energy consuming equipment may qualify for benchmarks. Land use change and forestry are sectors that need further investigation.

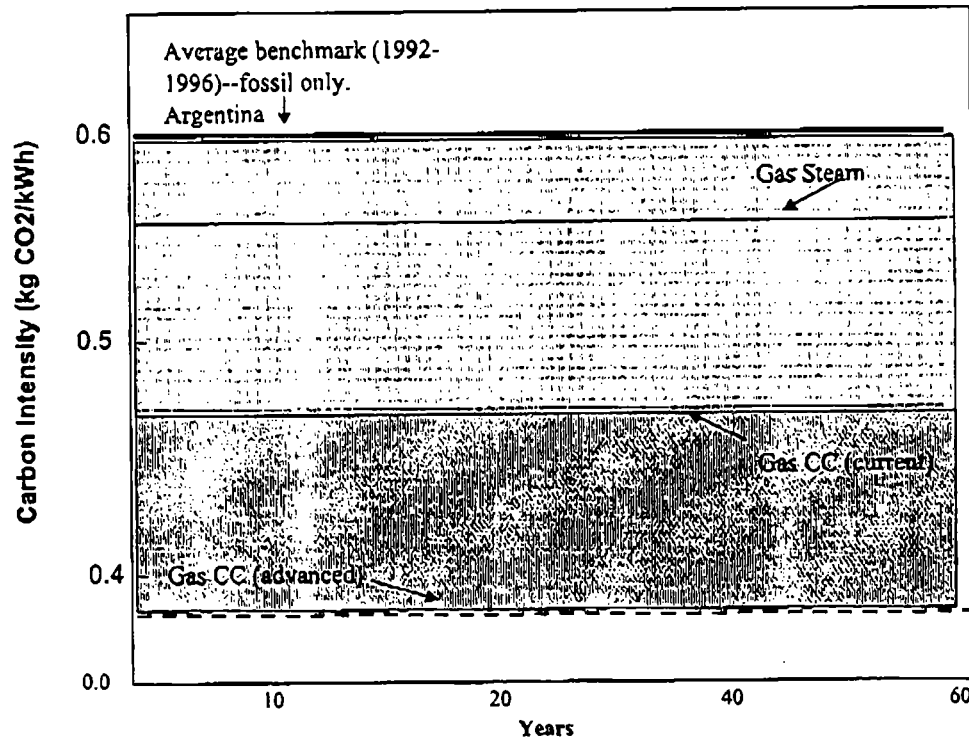
- Electricity sector
- Industrial sectors
- Forestry
- Coal bed methane
- Energy consuming equipment

Draft: Do not Cite or Quote**EXAMPLES**

The following are two examples of benchmarks in the electricity sector and a brief discussion of the related trade-offs.

Benchmark #1:

- By country (example: Argentina)
- Average of last 5 years of capacity additions
- For fossil only
- Updated every 10 years
- Benchmark lasts for the lifetime of the project

Benchmark Example #1: Argentina

In this example, the number of credits allowed for a current technology combined cycle are illustrated by the checked box. Argentina's new capacity is likely to be gas combined cycle regardless of CDM. This would mean that most of the awarded credits for this project are not really additional. Using a fossil only benchmark increases the overall benchmark above many new natural gas technologies since Argentina's historic mix for the 5 year period includes oil. Also, allowing the credits to be awarded for the lifetime of the project exacerbates the number of non-additional credits. If capital recovery occurs at 20 years, then these credits may be sustaining an inefficient plant (in comparison to modern technologies) for an additional 30 - 40 years.

The darker box illustrates the additional credits that may be gained by moving from a typical natural gas combined cycle to an advanced model. A combined cycle natural gas plant would accrue the additional credits, plus all the non-additional credits in the above box. Although some of these credits are additional for the time the capacity was built, the plant may not be carbon efficient compared to future electricity generation options. Extending the life of the benchmark to the full life of the plant may help keep an obsolete plant in operation.

Since this benchmark is fossil only, large-scale hydro and nuclear don't apply and therefore the amount of

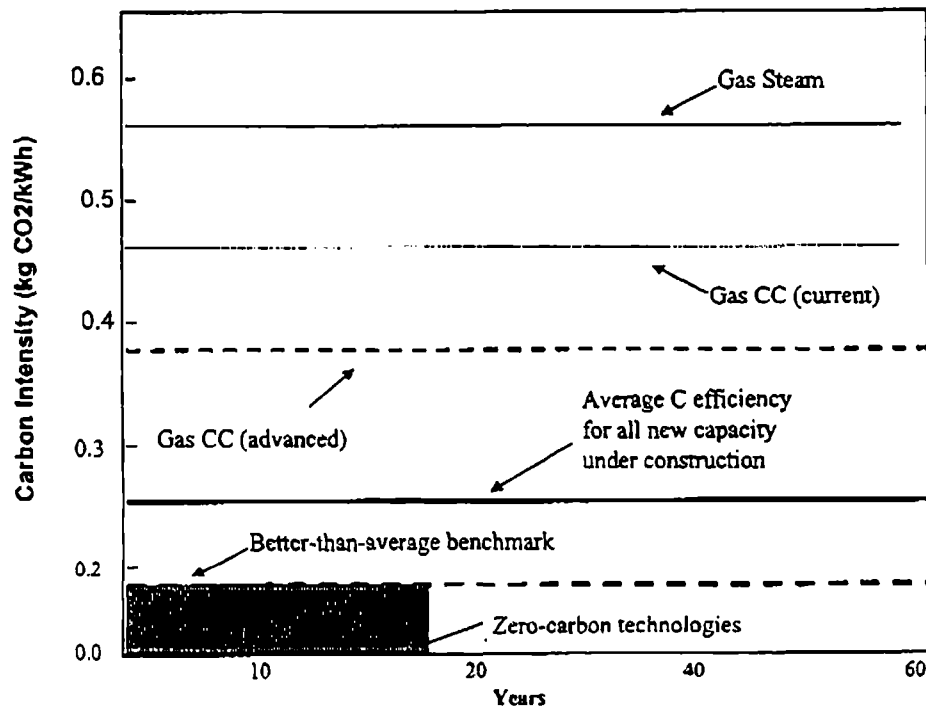
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non-additional credits is limited to the upper box.

If the benchmark is updated every 10 years, then the number of non-additional credits will continue to flood the market. While additional credits lower the overall cost of compliance for Annex B countries, they also lower the environmental effectiveness of the Kyoto Protocol.

Benchmark #2:

- By country (example: Argentina)
- Better than average of new capacity additions under construction
- For all generation (all types of fossil, all zero-carbon)
- Updated every year
- Benchmark lasts until capital recovery

Benchmark Example #2: Argentina

Benchmark #2 is so environmentally stringent that even the most advanced and carbon efficient fossil technology does not get credit. Under this benchmark, only zero-carbon technologies are credited. It is unclear whether these technologies are additional or not since Argentina already has significant portions of hydro and nuclear. In this case, even if the benchmark is set at the average carbon efficiency for all new capacity under construction, it would still be lower than most carbon-efficient fossil technology. In this case, the driving factor is the mix of zero-carbon technologies in an average electricity benchmark.

The benchmark is updated every year which will increase the cost of creating a benchmark to which very few projects will qualify.

Since the benchmark for each project is only applicable until the point of capital recovery, any non-additional emissions from hydro or nuclear will be limited.

FAX COVER SHEET

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COMMENTS:

Attached is a copy of the draft *CDM Design and Operation Recommendations Paper* for next Wednesday's meeting. The paper on benchmarks will follow under separate fax cover.

David

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Clean Development Mechanism Design and Operation Recommendations Paper

The “flexibility mechanisms” included in the Kyoto Protocol (international emissions trading, the Clean Development Mechanism, and Joint Implementation) are key to meeting the emissions targets in the Protocol at a modest cost. The Clean Development Mechanism (CDM) offers the opportunity to generate greenhouse gas emissions credit beginning in the year 2000, adding to the global stock of emissions credits required by developed countries to meet their targets under the Kyoto Protocol. This paper is intended to help policymakers decide on key issues involved in devising rules for an operational CDM.

A major difference between the CDM and emissions trading is the motivations of agents involved in the transaction. Participants in an emissions trading transaction have opposing motivations – one wishes to purchase tons and one wishes to sell; in entering into this transaction, each will provide a check on the other. In a CDM transaction, however, both parties involved in the project may have a similar motivation to overstate the Certified Emission Reductions (CERs) generated from a project. Thus, in determining the framework for the CDM, it is important to strike a balance between the pursuit of a sufficient number of cost-effective projects and procedures that result in protection of the environment. We need to make policy choices somewhere on this spectrum of distinct objectives. Identifying this position will also help inform the discussion about the extent to which the U.S. should lead internationally on CDM issues versus allowing the agenda to be developed primarily by other Parties.

The following sections outline key CDM design and operation issues by topic area. The policy recommendations stress the core objectives of establishing the CDM on a timely basis; achieving real and verifiable GHG reductions; maintaining low transaction costs; and engaging developing countries.

1. Institutional Structures

The institutional structure of the CDM should support sustainable development in non-Annex 1 countries and provide a means for industrialized countries to reduce the costs of meeting their targets under the Kyoto Protocol. The recommendations below provide specific guidance on key institutional aspects of the CDM.

(1a) Executive Board Structure – The U.S. favors a relatively small Executive Board (e.g., 12-14 members); the UNFCCC should provide administrative support for the Board.

The Executive Committee of the Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol may serve as an example. In this case, the Executive Board should be comprised of seven members each from Annex I and non-Annex I Parties, each member serving two-year terms with the ability to serve consecutive terms. The chair and vice-chair of the Board alternate each year between the two groups. Nomination of Annex I members is limited to Annex I Parties; nomination of non-Annex I members is limited to non-Annex I Parties. Decisions are made by consensus of the Board.

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(1b) Executive Board Functions -- The U.S. position is that the Conference of Parties would set overall guidance for the CDM; the Executive Board should implement this guidance and elaborate on methodological, operational and technical issues.

As mandated by the Kyoto Protocol, the Executive Board supervises the CDM and implements guidance provided by the Conference of Parties through the Subsidiary Bodies to ensure transparency, efficiency and accountability. In some cases, the Executive Board may rely on outside experts or technical panels to develop methodological or technical guidance. Decisions of the Executive Board should represent the interests of both developed and developing countries.

(1c) Operational Entity Selection -- The U.S. supports a decentralized network of specialized private sector or non-profit institutions to serve as operational entities.

Standardized criteria should be used by the entities for evaluating all projects and certifying CERs. Operational entities will be selected to ensure broad coverage of all regions and qualified to ensure that CERs are credible. Strict measures should be taken to avoid conflict of interest among participating institutions. These guidelines should clearly restrict any operational entity from involvement in CDM project development, promotion, financing or implementation.

(1d) Operational Entity Functions -- Operational entities should be responsible for registration of projects and the certification of emission reductions in accordance with standard and transparent methodologies to evaluate and certify projects.

The Executive Board should develop these guidelines and ensure that they are followed through periodic evaluation of operational entities.

2. Transparency and Review

The central challenge within the CDM is to ensure the environmental integrity of the mechanism without creating an overly burdensome and costly structure. U.S. policy should support clear guidelines for ensuring transparency and review of transactions under the CDM that will help to achieve both of these objectives.

(2a) Transparency and Accountability -- The U.S. supports clear and standardized rules/guidelines for all elements and institutions operating within the CDM.

Consistent rules/guidelines will promote equitable treatment of participants.

(2b) Third Party Verification -- The U.S. supports third-party verification as a key element under the CDM.

The Executive Board should provide guidance to determine what institutions may request third-party verification, how verification is undertaken, and identify repercussions for project developers, hosts and operational entities if CERs are found invalid through the verification process. A time limitation for both requesting audits and appealing decisions as well as an efficient and equitable system for appealing decisions should be established.

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The most desirable form of this verification still needs to be worked out. Options will be identified in an interagency process with recommendations forwarded by late March 1999.

(2c) Project compliance under the CDM – The U.S. supports the development of a transparent and standardized set of rules and guidelines to ensure project compliance under the CDM.

These requirements should include rules/guidelines for: the registration of projects and accrual of CERs; the oversight of activities of operational entities; and the consequences for violations by Parties or private entities participating in the CDM.

(2d) Compliance by Parties -- The U.S. may want to seek parallel consequences for similar violations under any of the flexibility mechanisms, including CDM.

Consequences beyond restriction/suspension of the right to participate in a flexibility mechanism have not been resolved in the negotiations. Options will be identified in an interagency process with recommendations forwarded by late March 1999.

3. Operational Issues

The U.S. seeks the resolution of many operational issues related to the CDM by COP5. The following are policy recommendations on key operational issues.

(3a) Project Registration – The U.S. supports a project registration phase prior to project development.

Projects should register with an authorized operational entity to confirm that the project is voluntary, meets sustainability goals of the host country, and that emission reductions are additional. Project registration should identify the baseline or benchmark to be used for the ex-post calculation of credits. Actual emissions reductions would be certified by operational entities only after they occur (e.g., after the end of the year, project performance will be compared to the baseline and emissions reductions calculated accordingly). This step removes most elements of uncertainty for the investor other than actual project performance.

(3b) Comprehensive Inclusion – The U.S. supports comprehensive inclusion of project categories (reduction and sequestration) and all gases, unless one or more is shown to be ineligible (e.g., because of high potential for leakage from individual projects).

All categories should be eligible from the start of the CDM using project-by-project baselines, but benchmarks may be applied to sectors at different stages in the development of the mechanism. Although the U.S. has supported the inclusion of sinks as allowable CDM projects (a controversial position in the international negotiations), a final position on this issue should work in parallel with IPCC technical discussions on developing sound methodologies for assessing sinks.

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(3c) Eligibility Requirements – The U.S. does not support additional CDM eligibility requirements of non-Annex I Parties other than the existing requirement of a first National Communication to participate in the CDM.

(3d) Sustainable Development Criteria – The U.S. does not support standardized methodologies to determine sustainable development criteria for projects.

Determination of sustainable development should be the sole responsibility of the host country of a project activity. It may be prudent not to explicitly state a position on this issue since it may serve as a point of leverage in negotiations with developing countries.

(3e) Transaction Relationships – All transactional relationships should be allowed under the CDM (e.g. bilateral, multilateral, or national governments).

Both public and private institutions should be able to participate in project development or CER transactions. Non-Annex I Parties and private entities should be able to generate CERs without an Annex I partner.

(3f) Definition of “part of” under the CDM – The U.S. does not support limiting the amount of CDM credits that can be used to meet Annex B targets.

“Part of” should mean anything less than 100% of the abatement required to achieve compliance with Parties’ quantified emission limitation and reduction commitments under the Protocol.

(3g) Prompt-start for CDM – The U.S. favors a prompt-start for the CDM.

Complete methodologies need not be established for all sectors before the CDM can become operational. The CDM may initially move forward in sectors with greenhouse gas quantification experience, while other sectors may not have established benchmarks, baselines, or methodologies for calculating reductions. Methodological or technical problems in any single project category should not restrain other project categories from CDM activity. In addition, the U.S. should seek opportunities to promote capacity building in those countries interested in hosting projects.

(3h) AIJ and the CDM – AIJ projects should be eligible for inclusion under the CDM, however, they must meet all established CDM criteria.

4. Equity Concerns

As a market-based mechanism, the CDM will provide low-cost opportunities for GHG reductions while simultaneously promoting the flow of private capital toward GHG reduction projects in less developed nations. Because the vast majority of financing for CDM projects will be from the private sector, the market will largely determine the distribution of projects. At the same time, some developing countries are concerned that the majority of projects will be developed only in countries where investment is already going, or where abatement costs are very low. In order to address this equity concern, the structure of the CDM should ensure broad participation of developing countries without market distortions.

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(4a) Measures to Ensure Broad Participation -- The U.S. supports non-market-distorting measures to ensure broad inclusion of CDM projects in a wide range of host countries.

Several non-market distorting policy measures could be used to achieve this objective. These measures include: a CDM clearinghouse function to match hosts with potential investors; the inclusion of a comprehensive range of project types in the CDM; and the provision of U.S. financial and technical assistance to support capacity building in countries interested in hosting projects.

(4b) Measures to Assist Financing -- The U.S. supports project bundling for smaller countries or the creation of CDM "mutual funds" led by private sector institutions to provide opportunities to facilitate financing of projects in countries where they may otherwise not occur.

(4c) Projects Initiated by Developing Countries -- The U.S. believes that non-Annex I countries may unilaterally develop CDM projects in their country or in another non-Annex I country.

Standardized registration criteria as well as monitoring, verification and certification protocols should be used for assessing these projects. Unilaterally generated projects would be subject to the CDM administrative and adaptation fees just like projects bilaterally.

(4d) Other Incentives -- The U.S. does not support using other financial incentives to ensure regional dispersion of CDM projects such as quotas, differentiated baselines, CER bonuses, and valuing CERs from select countries at a higher rate.

These incentives may raise costs, promote activities where abatement costs are not low, and distort the market functioning of the CDM.

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(4e) Use of ODA and/or Public Funds -- The U.S. does not support the use of Official Development Assistance (ODA) for the purchase of CERs, directly or indirectly through a "laundering" process under the CDM.

ODA or other public funds may play a role in supporting capacity development or technical assistance that supports host countries in participating in the CDM. This issue is particularly important since Japan strongly supports the use of ODA for developing CDM projects, while the EU opposes its use. Developing countries are also particularly sensitive about reprogramming limited ODA away from traditional uses.

The context and circumstances under which these funds are used will be identified with interagency recommendations by the beginning of March 1999. In addition, the Japanese will be engaged bilaterally to assess their thinking on this matter.

(4f) Earning CERs through Policies or Measures -- The U.S. has not yet developed a position on the inclusion of government policies in the CDM.

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Two options exist: (1) CERs are earned only through project level reductions and not through policies or measures. Policies and measures can be difficult to monitor and verify, allow leakage and gaming, and create disincentives for countries to take on a target; (2) allow CERs to be earned under policies and measures but with specific parameters for assessing and crediting reductions. This option would provide more opportunities for developing countries to participate in the CDM.

An interagency group will analyze this issue and report back by the end of March 1999.

5. Division of CERs and Share of Proceeds

As a commodity with market value, CERs may be sold or banked for future use by both Annex I and non-Annex I Parties. The U.S. does not support pre-determined rules on how credits should be divided between involved parties. After a percentage of CERs is taken to cover CDM administrative costs and the fund for adaptation, the remainder shall be apportioned between the project host and developer based on private contractual arrangements. Operational entities will be responsible for the certification of these credits and will report total CERs issued for each project to the Executive Board.

(5a) Unit of Measure for Certified Emission Reductions – CERs shall be measured in tonnes of carbon dioxide equivalent and be calculated using the appropriate GWP for all gases included in Annex A of the Kyoto Protocol. CERs should be fungible with other tradable units at their full value. CERs should be serialized to some degree for identification and tracking, depending on how CERs are brought into the market and whether CERs can be “de-certified.”

(5b) Share of Proceeds – The U.S. position is that between 1-3 percent share of CERs generated by project activities should be allocated for administrative costs of the Executive Board and toward the adaptation fund to support activities in the most vulnerable countries

The majority of this share should go towards the adaptation fund since administrative costs of the Executive Board are expected to be low. A sliding scale, depending on project size, may also be considered for determining the CER share charged to projects.

(5c) Use of Adaptation Funds – Adaptation funds should only be used to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change.

The Executive Board should develop an objective process for the selection of particularly vulnerable countries based on standardized criteria. The disbursement of these adaptation funds should be conducted through appropriate international institutions.

(5d) Role of Private Entity – The CER share awarded to the investor and the host should be determined by private contract between participants. These CERs shall be the property of each private party and may be held for future use, traded, or sold.

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6. Baselines and Benchmarking

In general, the U.S. supports standardized methodologies for generating emissions baselines to determine CERs under the CDM. Top-down baselines (e.g., benchmark, performance standard, whole-sector, technology standard) should be considered. For sectors where top-down baselines are not possible or have not yet been constructed, project specific baselines should be used. Project baselines will be established during the registration of the project. This baseline should be fixed for the lifetime of the project.

(6a) Choosing a Baseline or Benchmark – The U.S. supports flexibility to project developers for bottom-up baseline development. However, if an appropriate top-down baseline has been established, a project developer/host should be required to use that baseline for their calculations.

(6b) Additionality – The U.S. believes that only emissions additionality should be assessed in the CDM.

Programmatic and financial additionality should not be assessed for projects relying on private capital. Experience with USJI has shown both of these categories of additionality to be subjective, and too complicated to determine.

(6c) Other Technical Elements – While there is strong agreement on the desirability of baselines and benchmarks, other technical elements of baselines are currently being addressed in an inter-agency process. The interagency technical group will make recommendations by May 1999 in advance of the June SBSTA/SBI sessions. The USG should have a position on key issues by COP5 so that top-down baselines can begin to be developed by January 2000. The interagency group will address issues such:

- **Level of Aggregation** - Project-specific methodologies and top-down baselines should be set at the highest level of aggregation that still provides reasonable accuracy. In this context, greater definition of “sector” and “sub-sector” is needed as well as identification of sectors where country, regional or global baselines are most appropriate and/or feasible.
- **Period for Earning CERs** - The time frame for accruing CERs against the initial baseline will vary depending on project type. Timeframe options being considered include criteria based on: capital lifetime (estimated or actual); budget periods within the protocol; average time for capital recovery; and other factors.
- **Choice of Data** (applies to top-down only) - Top-down baselines should be based on historic data. This data could be for projected installed capacity during the last year, all existing capacity, or a rolling average of selected years.
- **Updates** (applies to top-down only) - Top-down baselines will need to be updated periodically to incorporate new trends and technologies (applied to new projects only). The appropriate update cycle will depend on the cost of benchmark construction and the expected rates of change in a given sector.

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- **Average versus Better-than-average** (applies to top-down only) - Better-than-average benchmarks provide more assurance that emission reductions/sequestration are truly additional, while average benchmarks would include more projects. A balance must be sought based on U.S. government objective for the CDM.
- **Who Establishes Baselines?** - Project-specific baselines should be developed by the project developer and approved by an operational entity. Top-down baselines should be developed with cooperation from, but not solely by, the host country. Other involved parties could be: the Executive Board; a body designated by the Executive Board; or operational entities.

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**Addendum to the Note:
Cost-curves approach**

Jayant Sathaye and Steve Meyers
Lawrence Berkeley National Laboratory
Berkeley, CA

The cost curves approach would establish such curves at the sectoral level for a defined geographic region. Below, we provide two examples of how the approach might work.

1. Supply-side options: For the Shandong, China IGCC plant example, one would compare the IGCC plant with what it would have displaced in the system. Most, if not all, utility companies in the developing countries have system expansion plans that are continually updated. These expansion plans include estimation of the least-cost set of power plant options (a cost-curve, if you will) and their environmental implications. In principle, the Shandong utility system could let project developers know what the carbon reduction would be for displacing power generated by the system during particular hours of operation on certain days or seasons of the year for the next 10-20 years. The developer would use this information to estimate the carbon reduction based on the operating characteristics of the IGCC plant. Thus there does not appear to be a need for doing the five- or ten-year averaging or other types of such approaches.

The carbon displacement indicators provided by the Shandong utility company for its system could be reviewed by an independent panel of experts to ensure that the company is not providing incorrect (low) values for displaced carbon from its system. The independent review could be done once a year or as new plans are announced by the utility company. Reporting of inflated expansion plans has happened for several utility systems in the developing world, where the utility company tends to inflate its planned capacity in order to show the need for higher budgetary allocation from the government or to inflate its asset base. An independent review would help keep these types of things in check.

2. Demand-side options: For demand-side options there is no single entity that is responsible for overseeing these options. Here one would estimate a cost of conserved energy (CCE) or carbon (CCC) curve (Figure 1). The curve would provide a variety of options that could be pursued at increasing unit cost. Options that are below the price of energy would be cost effective and ought to be pursued by a company on its own. But the company may not implement them because of barriers, such as lack of information or financing. Which are the options that the company would pursue in its next marginal plant without CDM would need to be decided by an expert panel

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Figure 1 illustrates a cost curve for a sector (say the steel industry). The cost of conserved energy depends on the capital cost and the rate of discount, but not the price of energy. The seven options along the curve may include things like continuous casting, hot charging, coke dry quenching, etc. A steel company (China Steel) may propose the installation of the cost-effective options and wish to claim credit say up to Point B on the curve. The question we would need to ask is whether it deserves credit from Point A to B, or something less than that since China Steel might have implemented some of these options anyway.

As in the supply-side example above, an expert panel would determine which of these actions are incremental to a without CDM project case. It may choose say Point C on the curve noting that actions with a CCE below this level would have happened anyway. China Steel would then be given credit for the carbon savings between Points B and C. Under other circumstances the expert panel could choose Point A, stating that industry conditions are such that no company would take action without CDM. China Steel would then be given credit between Points B and A.

There would be one such curve for the Chinese steel industry, which would be used by project developers to estimate their carbon savings. The curve would have been developed in consultation with the Chinese steel industry and other independent experts. The curve may be updated periodically.

The amount of carbon offset by the electricity saving measures of China Steel would be estimated using the carbon parameters that the Shandong utility company would provide. For the carbon offset for fuels, China Steel would estimate it on its own.

The cost curves have the benefit of providing an approach that is consistent across countries and sectors, technically sound, readily verifiable, objective, and transparent. They would need to be used in conjunction with expert judgment, *however*.

Typical Cost Curve

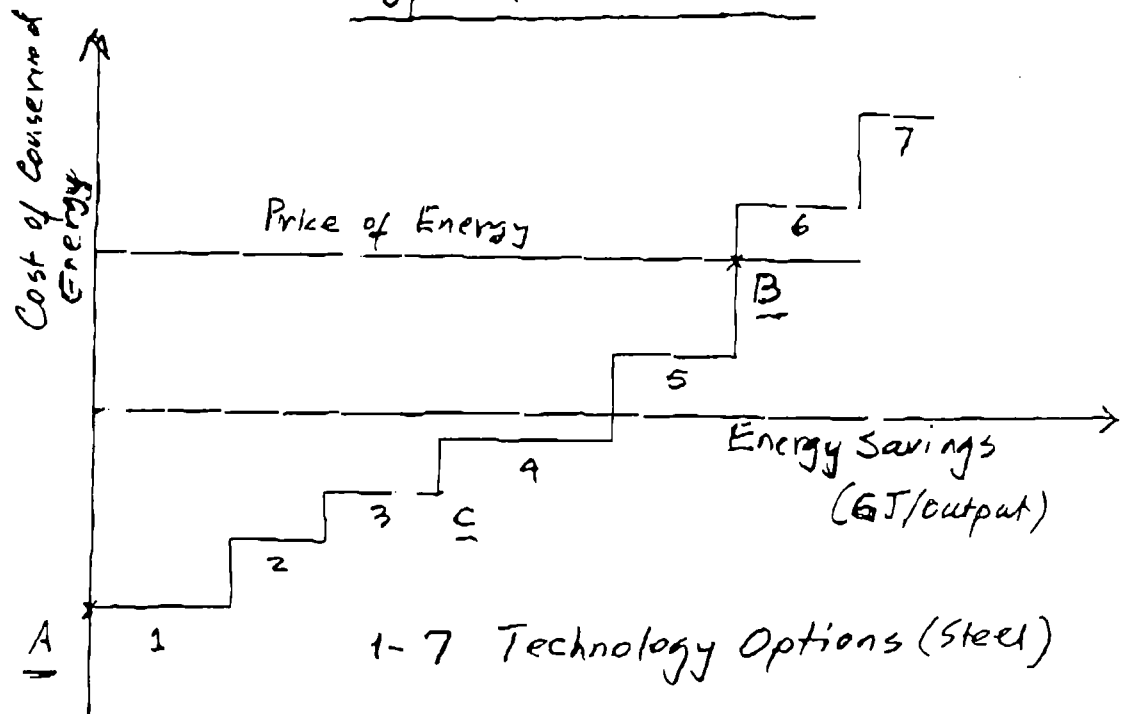


Figure 1

Establishing Benchmarks for CDM Project Baselines: The Cost Curve Approach

- A benchmark should provide a reasonable estimate of the technology that would be used in the absence of CDM projects
- Simple approach: draw on appropriate independent experts or institutions that could provide such estimates based on their judgement, or on analysis
- More rigorous and informative approach: conduct a cost analysis of various technologies that could be adopted in various subsectors
- Cost curves of conserved energy and carbon show the energy or carbon savings per unit of output against the unit cost of conserved energy or carbon for alternative technology packages in various subsectors.
- By providing information on the cost-effectiveness of various alternatives, they provide guidance as to what may be adopted in the real world, and what may be desirable
- Estimation of cost curves requires information on technical performance and cost of technologies.
- The cost curve approach is likely to be more expensive than simply relying on expert judgement. Under what conditions cost curves are useful, and for which sectors, will need some investigation: most likely useful for energy-efficiency projects.
- Cost curves have the benefit of providing an approach that is consistent across countries and sectors, technically sound, readily verifiable, objective, and transparent.
- Cost curves also have the potential to support the process of planning for sustainable development by providing guidance to policymakers regarding opportunities in a given sector.
- The cost of developing cost curves could be split between two objectives: (1) providing information for establishing baseline benchmarks for CDM projects, and (2) providing information for sectoral policymaking.



Department of Energy

Washington, DC 20585

February 9, 1999

TO: DISTRIBUTION

FROM: Mark Mazur

SUBJECT: CDM Papers for Wednesday, February 10 Meeting

Attached you will find a redraft of DOE's example paper that will be discussed at David Sandilow's meeting on Wednesday, February 10.



DOE DRAFT – Do Not Cite or Quote 02/09/99

Example of Step-by-step Process for CDM Power Plan Project in China

This paper provides an example of how a project would go forward under CDM using one benchmarking approach to calculate certified emissions reductions (CERs) generated from a project. We provide only the CDM-related issues as this is the only variable in a potential CDM project. Appendix I contains a list of issues that have been identified for further consideration. Appendix II contains an example of calculations to establish the range of baselines that might be chosen as benchmarks, which would then lead to different values for emissions additionality.

Step I: Company Develops Project

- **Description of a potentially real Project:**
A 800 megawatt IGCC coal-fired power plant is being planned in Shandong Province in China. It will be partially financed by a U.S. company, say Southern Company, and owned and operated by the Shandong International Power Company (SIPC), which is the local planning commission that plans to use the electricity generated from the project for Shandong's electric grid. Approval for the project must come from China's State Power Corporation (who oversees power plants and grids for China) and China's State Development Planning Commission (who approves projects in excess of \$30 million). Southern Company and SIPC expect that the carbon emissions from this plant per megawatt hour (MWh) will be lower than the carbon emissions associated with the approved benchmark for power-plant projects in China.
 - **Provide Calculations of Project's Projected Emissions:**
The project developers (Southern Company and SIPC) estimate emissions based upon the plant design, expected operating parameters, and analysis of the carbon content of the intended fuel source to be 417 pounds (lbs) of carbon per MWh of output. The plant's life expectancy is 40 years. Given that the developers expect the plant to be baseload with a 90 percent availability factor, annual generation from the plant is projected to be:

$$800 \text{ MW} (8760 \text{ Hr/Yr}) (0.90) = 6.3 \text{ million MWh}$$

$$\text{Annual carbon emissions: } 417 \text{ lbs} \times 6.3 \text{ million MWh} = 2627 \text{ million lbs or}$$

$$1.1941 \text{ million metric tons of carbon (MMT) per year}$$
 - **Determine "Emissions Additionality"**
The CERs generated from a project will vary considerably depending upon the exact specifications of the baseline used to determine the benchmark (i.e., average or better than average of last 5 units, last 5 years, coal-fired plants only, all plants in last 5 years). Thus, benchmarks could vary significantly depending on country/regional circumstances. See Appendix 2.
- The project developers collect information from the China's State Power Corporation to estimate the range of possible benchmarks. Based upon Executive Board guidelines for power plants of this project's type and size range, the rate of emissions from all power plants built in the past 5 years will be used to establish baseline conditions.

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The appropriate benchmark would be 504 lbs of carbon per MWh of output. The expected number of CERs generated, therefore, would be:

$$[(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh})] \times 6.3 \text{ million MWh} = 548 \text{ million lbs or } 0.249 \text{ million tons of carbon per year.}$$

Assuming a market price of \$20/CER, the value of the expected CERs generated per year is estimated to be worth \$5.48 million.

- Southern Company negotiates with Shandong International Power Corporation to determine division of CERs. In this case, Shandong agrees to keep 25 percent of the CERs generated after 2 % is collected for "proceeds." Regal Power will keep 75 percent of the CERs generated after payment of "proceeds."

Step II: Submit to Host Government for Approval

- The project developers submit the project for approval to China's designated approving authority, the State Development Planning Commission (SDPC). The SCPC has established a set of guidelines that must be met before it grants its approval, including consideration of how this project meets China's sustainable needs and objectives.
- The Chinese Government approves the project. Such approval implies that the project is consistent with China's sustainable development needs and objectives.

Step III: Submit to Operational Entity for Registration:

- The project developers provide a letter from China's SDPC to the Operational Entity that indicates China's approval of the project. China's approval implies "voluntary participation by both Parties," a requirement of Article 12.5a of the Kyoto Protocol
- The project developers provide calculations from Step I to demonstrate that the project provides "real, measurable, and long-term benefits" and that the savings in emissions are "additional."

Step IV: Emissions Monitoring, and Reporting:

- The project developers use monitors to ascertain CO2 flows from the project on a real-time basis, consistent with guidelines set forth by the COP/MOP.
- The project developers report on emissions and emissions saved annually to the Operational Entity based on the approved benchmark. For year Y, the project developers report that the plant actually operated at an 80 percent availability factor, and reported the following:

$800 \text{ MW} (8760 \text{ Hr/Yr})(0.80) = 5.6 \text{ million MWh}$

Actual emissions: $5.6 \text{ million MWh} \times 417 \text{ lbs} = 2335.2 \text{ million lbs or } 1.06 \text{ MMT}$

Saved emissions for year Y are:

$[(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh})] \times 5.6 \text{ million MWh} = 487.2 \text{ million lbs or } .22 \text{ MMT}$

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Step V: Verification

- The project is subject to random, independent audit. Auditor X has been certified by the Executive Board to do random, third-party audits for Chinese CDM projects to verify information contained in annual reports. In this case, the project developers' Year Y report was audited by Auditor X, which verified the emissions generated and saved as reported by Southern Company and SIPC. Auditor X communicates its conclusions to the Operational Entity.

Step VI: Certification

- Operational Entity "checks" submitted report to ensure that the project developers have completed correctly the standard format approved by the Executive Board. An additional "check" for this project has occurred in the form of a random audit by Auditor X.
- Once the Operational Entity approves the report, thereby certifying the results, it transfers the CERs, minus the 2% deducted for "proceeds," to SIPC. SIPC, in meeting its contract with Southern Company, then transfers 75 percent of the remaining CERs to Southern Company.
- The Operational Entity reports all CERs to the Executive Board.
- Southern Company reports its CERs [$.75 \times .98 \times .22 \text{ MMT} = .16 \text{ MMT}$] to the U.S. National Registry for adjustment of its holding of CERs. Shandong International Power Corporation reports its CERs [$.25 \times .98 \times .22 \text{ MMT} = .05 \text{ MMT}$] to China's National Registry (assuming there is one).

Step VII: Appeal Process (if necessary):

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Appendix I

Issues that Arise for further consideration**Step I: Company Develops Project**

- Some of the benchmarking issues: Who determines benchmark? For historical information about Chinese power plants, who provides information? If Chinese government is charged with responsibility, what happens if it doesn't cooperate or work fast enough? How prove accuracy? Who is responsible for proving accuracy? Should historical information create a baseline for sector (i.e., electric power generation) or sub-sector (coal-fired electricity)? For industrial projects, level of aggregation will be even bigger problem? Should benchmarks be determined by province, country or region? What is process for case-by-case determination of a project's baseline?
- In determining additionality, should baseline calculations be based on the average or marginal plant?
- Regarding division of CERs, should this be between project developers in both countries, between U.S. partner and Chinese government, or should be left to host government to decide?
- Is calculation of proceeds for developers' use only or should it be required in submission to operational entity?

Step II: Submit to Host Government for Approval

- Is host government required to have CDM point of contact with decision-making authority?
- Should there be a deadline for host government approval process?

Step III: Submit to Operational Entity for Registration

- Who should provide proof of host government approval?
- What is the nature of verification? Is it pro-forma or is there an evaluation? Does operational entity do verification or authorize third party verification? Or are project developers required to submit verification plan?
- Should there be a requirement for a submission on other environmental implications, such as transboundary effects?
- Regarding "voluntary participation approved by each Party involved" (section 12.5a of KP), how is this proved? Is host government certification enough or must each government provide such a certification (this could involve more than 2 if a multinational company wanted to divide CERs among more than one Annex B Party)? Does this language imply that only Parties to the Kyoto Protocol can engage in CDM projects? [Need State/Legal to evaluate]

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Step IV: Emissions Monitoring and Reporting.

- Must every CER be entered into a national registry (to ensure double entry accounting and verification) or could developers sell CERs without notifying national authority? Who reports CERs to national registry?

Step V: Verification

- Does verification occur before or after certification?
- Which independent entities will be allowed verify emissions reductions?
- Will each project be subject to a verification process, or will projects be verified selectively?

Step VI: Certification

- Is certification of CERs by operational entities automatic (unless an audit determines inappropriate calculation) or should an affirmative decision to certify be required by the operational entity each year? Should the IRS random audit model be used?
- Does operational entity have a formal auditing process? If so, does Executive Board write the rules for this or does the COP/MOP? If there is an auditing process, who does audits? Third-Parties or Operating Entity?
- Should Operational Entity report CERs to Executive Board or the UNFCCC to allow third parties to verify that CERs were indeed certified?

Step VII: Appeal Process (if necessary):

- What type of audit can overturn certification of CERs?
- Should there be a review process established that allows Executive Board to overturn CERs?
- What type of appeal process should be established?
- Would a project developer or its government represent its interests in an appeal?
- If appeal process imposed, should there be a deadline for resolution of appeal?
- Is revocation of CERs the worst consequence? Is Executive Board the final authority?

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Appendix II

Hypothetical Alternatives for Calculating CERs Using Benchmarks

[note: numbers in calculations are hypothetical because detailed information was not available]

Historical information used to develop benchmark

- Hypothetical average and marginal emissions per unit of output:
 From coal-fired facilities of 200 MW built [commissioned] in the last five years: 660 lbs/MWh
 From the last ten coal-fired facilities of 200 MW or more: 620 lbs/MWh
 From all coal-fired facilities in the past year: 620 lbs/MWh
 From the last five coal-fired facilities of 200 MW or more: 600 lbs/MWh
 From all units (coal, nuclear, oil, gas-fired, hydro, wind) of 200 MW or more built in the last five years: 504 lbs/MWh [*Benchmark used in example*]
 From last (marginal) coal-fired unit built: 417 lbs/MWh

Range of "Emissions Saved" (or CERs generated) based on benchmark chosen [based on above values]

Based upon coal-fired units built (commissioned) during last five years:
 $(660 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1531 \text{ million lbs or } .70 \text{ MMT}$
 or ~~70,000~~ ^{100,000} CERs

Based upon last ten coal-fired units:
 $(620 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1279 \text{ million lbs or } .58 \text{ MMT}$
 or 580,000 CERs

Based upon all coal-fired units built during past year:
 $(620 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1279 \text{ million lbs or } .58 \text{ MMT}$
 or 580,000 CERs

Based upon last five coal-fired units:
 $(600 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1153 \text{ million lbs or } .52 \text{ MMT}$
 or 520,000 CERs

Based upon all units (including nuclear, gas, oil, etc.) built during last five years:
 $(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 548 \text{ million lbs or } .25 \text{ MMT}$
 or 250,000 CERs [*Benchmark used in example*]

Based upon last coal-fired unit built:
 $(417 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 0 \text{ lbs or } 0 \text{ MMT}$

Example of Step-by-step Process for CDM Power Plan Project in Country X

Step I: Company Develops Project

CDM Related Requirements:

- Description of Project: A 500 megawatt IGCC coal-fired power plant is being planned for country X. Project developers expect that the carbon emissions from this plant per unit of electricity output will be lower than the carbon emissions associated with the benchmark for power-plant projects in country X.
- Provide Calculations of Project's Projected Emissions: (note: numbers in calculations are contrived)
 - 1) Estimate emissions using standard methodologies from the plant. Since plant emissions will be a function of actual plant performance, projected emissions need to be cast in the form of an operational variable such as units of carbon per kWh. Based upon the plant design, expected operating parameters, and analysis of the carbon content of the intended fuel source, the developers project emissions to be 50 units per kWh.
 - 2) Given that the developers expect the plant to be baseload with a 90 percent availability factor, annual generation from the plant is projected to be:
 $500 \text{ MW} (8760 \text{ Hr/Yr}) (0.90) (1000\text{kW/MW}) = 3,942 \text{ million kWh}$
Annual carbon emissions being: $3,942 (50 \text{ units/kWh}) = 197,100 \text{ million units}$
- Determine "Emissions Additionality" [note: numbers in calculations are contrived]

[Note: calculation is crucially dependent on the specification of the baseline (i.e., average of last 5 units, last 5 years, coal-fired plants only, all plants in last 5 years), which could vary significantly depending on country/regional circumstances]

Hypothetical average and marginal emissions per unit of output:

From the last five coal-fired facilities of 200 MW or more: 70 units/kWh.

From the last ten coal-fired facilities of 200 MW or more: 80 units/kWh

From coal-fired facilities of 200 MW built [commissioned] in the last five years: 90 units/kWh

From all coal-fired facilities in the past year: 75 units/kWh

From all units (coal, nuclear, oil, gas-fired, hydro, wind) of 200 MW or more built in the last five years: 60 units/kWh

From last (marginal) coal-fired unit built: 55 units/kWh

Hypothetical "savings":

Using the above hypothetical average and marginal values, significantly different "savings" would result as follows:

Based upon last five coal-fired units:

$(70 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 78,840 \text{ million units}$

Based upon last ten coal-fired units:

$(80 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 118,260 \text{ million units}$

Based upon coal-fired units built (commissioned) during last five years:

$(90 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 157,680 \text{ million units}$

Based upon all coal-fired units built during past year:

$(75 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 98,550 \text{ million units}$

Based upon all units (including nuclear, gas, oil, etc.) built during last five years:

$(60 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 39,420 \text{ million units}$

Based upon last coal-fired unit built:

$(55 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 19,710 \text{ million units}$

- Project developers negotiate with appropriate entity in country X to determine division of CERs
- Project developers calculate estimate of annual "proceeds" for own use

Issues that Arise for further consideration:

- Some of the benchmarking issues: Who determines benchmark? For historical information about country X's power plants, who provides information? If country X's government is charged with responsibility, what happens if it doesn't cooperate or work fast enough? How prove accuracy? Who is responsible for proving accuracy? Should historical information create a baseline for sector (i.e., electric power generation) or sub-sector (coal-fired electricity)? For industrial projects, level of aggregation will be even bigger problem? Should benchmarks be determined by province, country or region? What is process for case-by-case determination of a project's baseline?
- In determining additionality, should baseline calculations be based on the average, better than average or marginal plant?
- Regarding division of CERs, should this be between project developers in both countries, between U.S. partner and country X's government, or should be left to host government to decide?
- Is calculation of proceeds for developers' use only or should it be required in submission to operational entity?

Step II: Submit to Host Government for Approval

CDM Related Requirement:

- Project developers submit for project approval to country X's Government's self-defined guidelines.
- Country X's Government would approve the project. Such approval would, by implication, indicate that the project is consistent with country X's sustainable development needs and objectives.

Issues that Arise for further consideration:

- Is host government required to have CDM point of contact with decision-making authority?
- Should there be a deadline for host government approval process?

Step III: Submit to Operational Entity for Registration:

CDM Related Requirements:

- Project developers provide host government certification [implies "voluntary participation by both Parties"]
- Project developers prove "real, measurable, and long-term benefits"
 - baseline and projected emissions will demonstrate this
- Project developers demonstrate how project meets "additionality" requirements
 - saved emissions should satisfy "additionality" test

Issues that arise for further consideration:

- Who should provide proof of host government approval?
- What is the nature of verification? Is it pro-forma or is there an evaluation? Does operational entity do verification or authorize third party verification? Are project developers required to submit verification plan?
- Should there be a requirement for a submission on other environmental implications, such as transboundary effects?
- Regarding "voluntary participation approved by each Party involved" (section 12.5a of KP), how is this proved? Is host government certification enough or must each government provide such a certification (this could involve more than 2 if a multinational company wanted to divide CERs among more than one Annex B Party)? Does this language imply that only Parties to the Kyoto Protocol can engage in CDM projects?

Step IV: Emissions Monitoring, Reporting:

CDM Requirements:

- Project developers monitor project on a regular basis, using guidelines set forth by the COP/MOP
- Project developers report on emissions and emissions saved annually to Operational Entity

Step V: Certification

- Operational Entity “checks” report to ensure consistency with standard format approved by the Executive Board
- Operational Entity reports all CERs to [Executive Board?UNFCCC?]
- CERs are considered verified
- Project Developers report CERs to National Registry(ies)

Issues that arise for further consideration:

- Is certification of CERs by operational entities automatic (unless an audit determines inappropriate calculation) or should an affirmative decision to certify be required by the operational entity each year? Should the IRS random audit model be used?
- Must every CER be entered into a national registry (to ensure double entry accounting and verification) or could developers sell CERs without notifying national authority? Who reports CERs to national registry? Should CERs be reported by the Operating Entity beyond the Executive Board, to the UNFCCC or an international registry?
- Does operational entity have a formal auditing process? If so, does Executive Board write the rules for this or does the COP/MOP? If there is an auditing process, who does audits? Third-Parties or Operating Entity?

Step V: Appeal Process (if necessary):

Issues that Arise for further consideration:

- What type of audit can overturn certification of CERs?
- Should there be a review process established that allows Executive Board to overturn CERs?
- What type of appeal process should be established?
- Would a project developer or its government represent its interests in an appeal?
- If appeal process imposed, should there be a deadline for resolution of appeal?
- Is revocation of CERs the worst consequence? Is Executive Board the final authority?

Meeting on Benchmarking
Monday, February 8, 1999

Purpose of Meeting:

- Share current data on benchmarking
- Begin to address some of the key questions
- Set up a time line for future work.

This paper is meant to facilitate discussion at this meeting and is not a comprehensive explanation of benchmarking or the related issues.

Should the Benchmark be based on total existing capacity/trends or new capacity/trends?

- Considerations: Should the benchmark be determined based on past or future trends? This is not solely a matter of environmental stringency since carbon efficiency trends do not necessarily go down. For example, South Africa's electricity sector has been more carbon intensive during the past 5 years than the average of total existing capacity.
- Choices:
 - *Total existing capacity/trends:* Total existing capacity is the capacity that is in operation at any given time. In many sectors, equipment lasts for 30 years or more. Therefore, equipment choices 30 years ago would influence the benchmark. In the forestry sector, relevant data would focus on harvesting, growth, and conservation trends.
 - *New capacity additions/trends:* 'New' could be defined as the past year, the past 5 years, etc. The relevant time period would depend on the sector.

Should the benchmark be based on average or better-than-average carbon efficiencies/trends/equipment?

- Considerations: Is it more important to reduce the risk of allowing non-additional credits to be certified or potentially disallow a creditable project from earning credits?
- Choices:
 - *Average:* A benchmark based on an average of the activity data, by definition, will credit half of the capacity within that sector without any changes in behavior. This choice is likely to allow a significant amount of non-additional credits to be awarded.
 - *Better-than-average:* A better-than-average benchmark sets a higher standard and limits the amount of non-additional credits that are awarded. It does run the risk of not allowing some valid reductions from being credited.

Updating the benchmark

- Considerations: How much certainty do we want to provide to investors regarding their potential to earn credits? Should the benchmark reflect future improvements (e.g. new technologies) in the sector as compared to static project reductions? What is the correct balance between high transaction costs (frequent updates of the benchmark) and allowing non-additional CERs to be granted (infrequent updates of the benchmark).
- Options:
 - Applying to new projects*
 - Benchmark locked in at registration (pre-certification) phase for the lifetime of the project. Updates apply only to new projects (high investor certainty).
 - Benchmark locked in for a set amount of years and then the project is subject to a new benchmark (low investor certainty).
 - Frequency of Updates*
 - Update benchmarks frequently (every year). High transaction costs, fewer non-additional credits.
 - Update benchmarks less frequently (every five years). Low transaction costs, more non-additional credits. (Note: benchmarks could be established at longer intervals, with estimated slopes between updates).

Which sectors are the highest priority for benchmarks?

- Considerations: Of the sectors that allow benchmarks, which characteristics are highest priority for the first benchmarked sectors: ease of creating benchmarks, likely equal distribution of potential projects, high number of likely projects, political considerations.
- Options:
 - Electricity sector
 - Industrial sectors
 - Forestry
 - Coal bed methane
 - Energy consuming equipment

Level of Sectoral and Geographic Specificity

- Considerations: More regionally and sectorally specific benchmarks may lead to higher accuracy, but also higher transaction costs. Equity issues between countries may also be a consideration.
- Options:
 - Geographic specificity*
 - *Sector-specific*: Adjust the regional specificity according to the individual sector's situation. Regional disaggregation should be balanced between the transaction costs and the level of accuracy. (Equity?)
 - *Global benchmarks*: Lower transaction costs and perhaps the appearance of greater equity among countries. Lower accuracy of benchmark for most

countries.

- *Regional/national/local benchmarks:* higher transaction costs, but higher accuracy. May appear inequitable for some sectors.

Sectoral Specificity

- *2 digit SIC code:* Lowers transaction costs, but most sectors have distinct sub-sectors or activities that vary significantly in carbon intensity/benefit.
- *Level of aggregation varies by sector.* Adjust the sectoral aggregation according to the individual sector's situation. Sectoral disaggregation should be balanced between the transaction costs and the level of accuracy.

Issues Associated with Creating Effective Benchmarks for the CDM

February 10, 1999

Background

Project-level greenhouse gas (GHG) emissions reductions have historically been evaluated using project-by-project baselines. Under this approach, the project developer evaluates what would have happened without the project and then estimates resulting emissions from this project. The difference between these two numbers is the net GHG reductions or removal from the project. Experience with US JJI has indicated that this process is extremely time intensive and can be quite subjective. It is difficult to estimate what would have happened in the absence of the project and assumptions made can be manipulated by the parties involved. Establishing a more straightforward method to determining additionality would lower transaction costs and streamline the crediting process.

Benchmark Concept:

Benchmarks can be used to determine certified emission reductions resulting from projects within the Clean Development Mechanism (CDM). The purpose of benchmarks, rather than project specific counter-factual baselines is to lower transaction costs and reduce subjectivity. Any project that is more efficient than the benchmark will be considered additional. Certified emission reductions (CERs) can be determined based on the difference between the benchmark and the project performance.

Benchmark Development:

Once guidelines are established, developing the benchmark could be quite straightforward. Agreeing upon the guidelines, however, may be a difficult process. There are few clear answers and most decisions will entail a trade-off between competing goals. EPA has evaluated the options theoretically and by using real data for selected developing countries. This analysis can help frame the trade-offs and the implications of different choices. Additional analysis is needed to choose the appropriate method that will help the U.S. meet its environmental and economic priorities within the CDM.

The main characteristics of an effective CDM benchmark will be:

- High Environmental Integrity. A benchmark will have high environmental integrity if it allows minimal non-additional credits.
- Low Transaction Costs. Creating a benchmark will incur some costs that can be added to the overall transaction costs of the CDM. The fewer permutations needed, the lower the cost of the benchmark system. In the following graphs, 'high' means that the option ranks well for low transaction costs (i.e., has relatively low transaction costs).
- High Participation. High participation in CDM will allow more tradeable credits and therefore reduce the overall cost of compliance with the Kyoto protocol.
- High Investor Certainty. Theoretically, CDM credits will provide incentives to reduce emissions. Prior to making an investment, the investor will want to increase his or her certainty of the amount of credits that will eventually be awarded.
- Incorporates New Technologies and Trends. New technologies and trends may change our estimate of what would have occurred in the absence of CDM credits.

The following paper outlines some of the choices and the associated trade-offs among the above goals.



Issues and Trade-offs

Global versus Regional Benchmark

More regionally-specific benchmarks may lead to higher accuracy, but also higher transaction costs. Equity issues between countries may also be a consideration.

	Global Benchmarks	Country-specific Benchmarks
Environmental Integrity	Low	High
High Participation	No Impact	No Impact
Low cost to create benchmark	High	Low
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

Average versus Better-than-average data

A benchmark can be set at either an average or a better than average level. The associated trade-off is between environmental integrity and high participation.

	Average	Better-than-average
Environmental Integrity	Low	High
High Participation	High	Low
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

The benchmark could be set at a range of better-than-average benchmarks. For example: the best 25th percentile, the best 10th percentile, the last most efficient unit, the best available technology/practice. As you move toward more strict benchmarks, you risk less participation. The magnitude of trade-offs among these choices will also depend on how each sector is aggregated. For example, in the U.S. electricity sector, the best 25th percentile is zero emissions (due to the high portion of hydro and nuclear). This problem would be less severe if you used a fossil only benchmark.

Frequency of Benchmark Updates

Benchmarks will need to be periodically updated to account for new technologies and trends. The frequency of these updates depends on the relative value of higher costs as opposed to the accuracy of benchmarks. More frequent updates will increase the cost of benchmarks. Infrequent updates will not account for new technologies and trends. Note that this is not necessarily a matter of environmental stringency since carbon efficiencies within a sector do not necessarily go down over time.

	Every 10 years	Every year
Environmental Integrity	Low	High
High Participation	No Impact	No Impact
Low cost to create benchmark	High	Low
Investor Certainty	High	Low

Incorporating New Technologies or Trends	Low	High
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Note: Incorporating New Technologies is ranked low because projects may take a while before they begin operation. Longer periods between updates may allow a project to apply under the benchmark that exists during the initial stages of project development (prior to benchmark lock-in)

Length of Time that A Given Benchmark Applies to a Project

Benchmarks will be revised periodically. The benchmark will apply to the project for a given amount of time. The length of time that a project is measured against its initial benchmark will affect the level of investor certainty about how many credits the project may yield. Allowing benchmarks to apply to the lifetime of the project may continue to credit obsolete equipment that should be retired. Applying each new update to a given project lowers the investor certainty of the number of credits.

	Actual Lifetime of Project	Until New Update
Environmental Integrity	Low	High
High Participation	High	Low
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

Additional choices may provide a good compromise between allowing

- *Benchmark applies to estimated capital recovery of project.* This would provide the incentive to upgrade technologies once the investment is paid off, however, it is unlikely that the promise of new credits will prompt capital turnover prior to some profit yield.
- *Benchmark applies to estimated lifetime of project.* Each project and technology has an estimated lifetime. The estimated lifetime could be determined at the pre-certification phase.

Level of Sectoral Disaggregation

The appropriate level of sectoral disaggregation will vary by sector. Higher sectoral aggregation will lower the cost to develop the benchmark, however, highly aggregated sectors may not create the correct incentive. For example, China's electricity is largely coal and hydro. Establishing a benchmark for all fossil fuel will create one line for a bi-modal distribution. This would credit all hydro (whether additional or not) and create a benchmark that is too stringent for the cleanest coal to qualify.

	Aggregate	Disaggregate
Environmental Integrity	Low	High
High Participation	Undetermined	Undetermined
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	High	Low

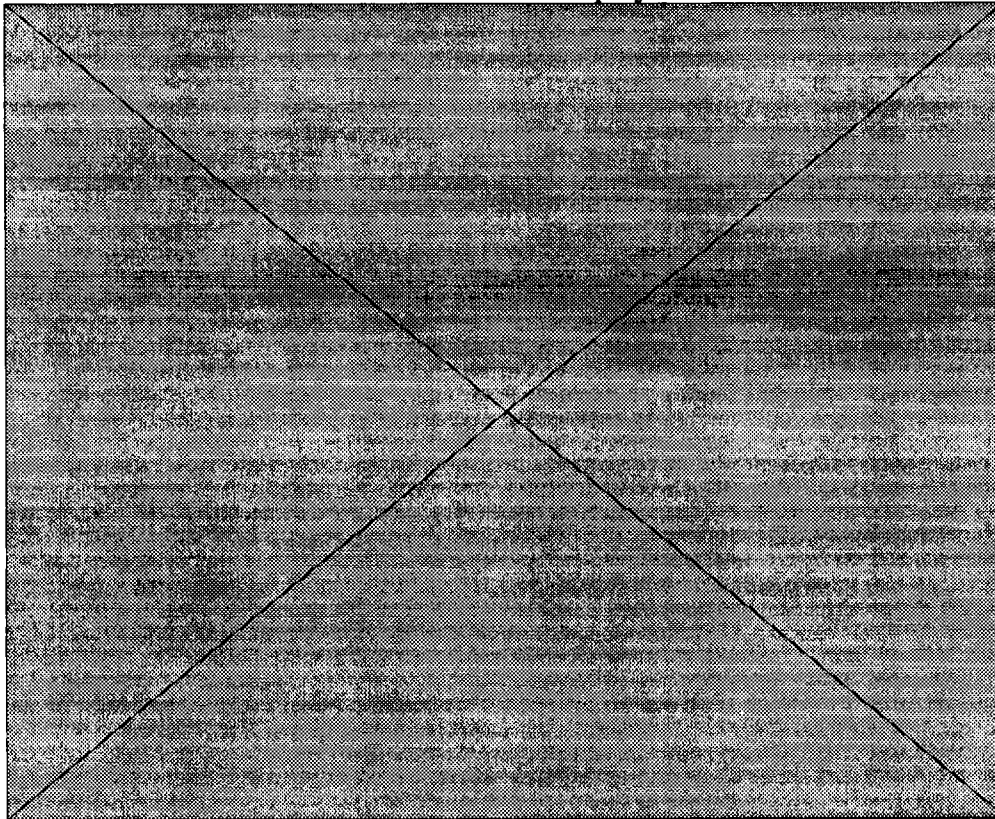
Incorporating New Technologies or Trends	Low	High
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EXAMPLES

The following are two examples of benchmarks in the electricity sector and a brief discussion of the related trade-offs.

Benchmark #1:

- By country (example: Argentina)
- Average of last 5 years of capacity additions
- For fossil only
- Updated every 10 years
- Benchmark lasts for the lifetime of the project



In this example, the number of credits allowed for a current technology combined cycle are illustrated by the checked box. Argentina's new capacity is likely to be gas combined cycle regardless of CDM. This would mean that most of the awarded credits for this project are not really additional. Using a fossil only benchmark increases the overall benchmark above many new natural gas technologies since Argentina's historic mix for the 5 year period includes oil. Also, allowing the credits to be awarded for the lifetime of the project exacerbates the number of non-additional credits. If capital recovery occurs at 20 years, then these credits may be sustaining an inefficient plant (in comparison to modern technologies) for an additional 30 - 40 years.

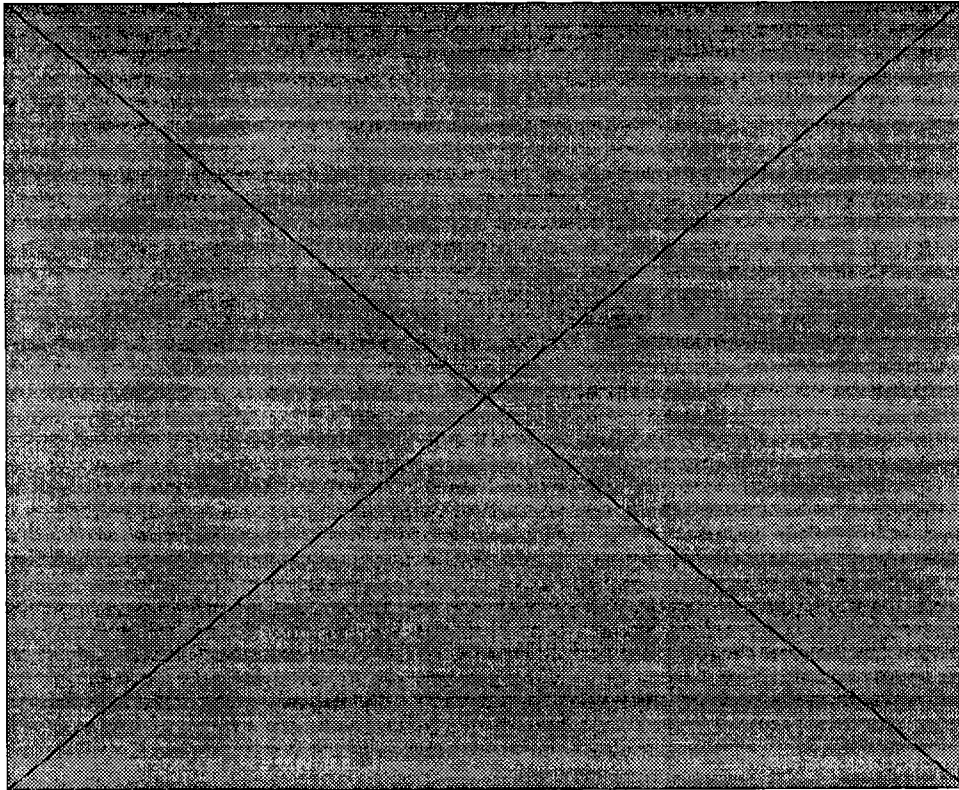
The darker box illustrates the additional credits that may be gained by moving from a typical natural gas combined cycle to an advanced model. A combined cycle natural gas plant would accrue the additional credits, plus all the non-additional credits in the above box. Although some of these credits are additional for the time the capacity was built, the plant may not be carbon efficient compared to future electricity generation options. Extending the life of the benchmark to the full life of the plant may help keep an obsolete plant in operation.

Since this benchmark is fossil only, large-scale hydro and nuclear don't apply and therefore the amount of non-additional credits is limited to the upper box.

If the benchmark is updated every 10 years, then the number of non-additional credits will continue to flood the market. While additional credits lower the overall cost of compliance for Annex B countries, they also lower the environmental effectiveness of the Kyoto Protocol.

Benchmark #2:

- By country (example: Argentina)
- Better than average of new capacity additions under construction
- For all generation (all types of fossil, all zero-carbon)
- Updated every year
- Benchmark lasts until capital recovery



Benchmark #2 is so environmentally stringent that even the most advanced and carbon efficient fossil technology does not get credit. Under this benchmark, only zero-carbon technologies are credited. It is unclear whether these technologies are additional or not since Argentina already

has significant portions of hydro and nuclear. In this case, even if the benchmark is set at the average carbon efficiency for all new capacity under construction, it would still be lower than most carbon-efficient fossil technology. In this case, the driving factor is the mix of zero-carbon technologies in an average electricity benchmark.

The benchmark is updated every year which will increase the cost of creating a benchmark to which very few projects will qualify.

Since the benchmark for each project is only applicable until the point of capital recovery, any non-additional emissions from hydro or nuclear will be limited.

U.S. Environmental Protection Agency
Office of Policy
401 M Street, SW (MC 2175)
Washington, DC 20460

facsimile transmittal

To: Assistant Secretary Climate Group Fax:

From: David Gardiner Date: 02/09/99

Re: Revised Draft of CDM Options Paper Pages: 10
for Discussion at Wednesday Meeting

CC: [Click here and type name]

☐ Urgent ☒ For Review ☒ Please Comment ☐ Please Reply ☐ Please Recycle

Attached please find two documents for your review:

- Revised draft of the CDM options paper. In order to focus discussion, the paper only addresses those issues covered in the last meeting (institutional issues) and other key issues which need to be addressed in Wednesday's meeting. These include Equity Concerns (paragraph 2), Use of ODA (paragraph 2g), and CDM as Lever for Developing Country Engagement (paragraph 3). The last page includes a final recommendation that the remainder of issues be delegated to a staff level interagency group for further analysis. It is also proposed that this group establish a timetable for producing clear recommendations on each of these issues.
- A redraft of the benchmark paper. This paper outlines implications of key policy decisions related to benchmarking. This paper is not intended to drive decisions for each issue, but to provide a framework to define priorities for benchmarking outcomes.

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Clean Development Mechanism Design and Operation Options Paper

The Clean Development Mechanism (CDM) offers the opportunity to generate greenhouse gas emissions credit beginning in the year 2000. This paper is intended as an initial effort to define the CDM and to help policymakers take decisions on key issues involved in establishing an operational CDM.

A major difference between the CDM and emissions trading involves the motivations of agents involved in the transaction. Participants in an emissions trading transaction have complementary motivations – one wishes to purchase tons and one wishes to sell; in registering this transaction, each will provide a check on the other. In a CDM transaction, however, both agents in the project may have a similar motivation to overstate the Certified Emission Reductions (CERs) generated from a project. Thus, in establishing the mechanisms and procedures that underpin the CDM, it is important to balance incentives – pursuit of a sufficient number of cost-effective projects and procedures that result in protection of the environment. Policy choices made will impact where on the spectrum our position falls relative to these two distinct, though not necessarily mutually exclusive, objectives. Identifying this position will also influence to what extent the U.S. should lead internationally on CDM issues versus allowing the agenda to be developed by other Parties.

The following sections outline key CDM design and operation issues by topic area. The policy recommendations stress the core objectives of establishing the CDM on a timely basis; achieving real and verifiable GHG reductions; maintaining low transaction costs; and engaging developing countries.

1. Institutional Structures

The institutional structure of the CDM should support sustainable development in developing countries and provide a means for Annex B Parties to reduce the costs of meeting their targets under the Kyoto Protocol. An Executive Board supervises the CDM and implements guidance provided by the Conference of Parties through the Subsidiary Bodies to ensure transparency, efficiency and accountability by overseeing activities of participating Parties, operational entities, and public/private entities. The recommendations below provide specific guidance on key institutional aspects of the CDM.

Policy Recommendations:

(1a) Executive Board Functions: The Conference of Parties would set overall guidance for the CDM; the Executive Board would implement this guidance and elaborate on methodological, operational and technical issues. In some cases, the Executive Board may need to rely on outside experts or technical panels to develop methodological or technical guidance. Decisions of the Board would represent the interests of both developed and developing countries.

(1b) Executive Board Structure: A relatively small board would be preferable (e.g., 12-14 members). The CDM Executive Board could draw upon the model of the Executive Committee of the Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol as an

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example. In this case, the Executive Board would be comprised of seven members each from Annex I and non-Annex I Parties, each serving two-year terms with the ability to serve consecutive terms. The chair and vice-chair of the Board would alternate each year between the two groups. Nominations of Annex I members would be limited to Annex I Parties and nomination of non-Annex I members would be limited to non-Annex I Parties. Decisions would be made by consensus of the Board. The UNFCCC Secretariat would provide administrative support to the Executive Board.

(1c) Operational Entity Functions: Under the Protocol, operational entities will be responsible for the certification of emission reductions resulting from project activities under the CDM. In order to ensure environmental legitimacy while maintaining low transaction costs operational entities would use standard and transparent methodologies in evaluating and certifying projects. The Executive Board would develop these guidelines and ensure that they were being followed through periodic evaluation of these entities.

(1d) Operational Entity Selection: Operational entities should be qualified to ensure that CERs are credible and selected to ensure broad coverage of all regions. A decentralized network of specialized private sector institutions may best serve these needs, but all efforts would be made to ensure that standardized criteria is used by the entities for evaluating all projects and certifying CERs. Strict measures would be taken to ensure no conflict of interest among participating institutions. These guidelines would clearly restrict any operational entity from involvement in CDM project development, promotion, financing or implementation.

how do you appeal decisions of operational entities? (transparency + review)

2. Equity Concerns

As a market-based mechanism, the CDM will provide low-cost opportunities for GHG reductions while simultaneously promoting the flow of private capital toward CDM projects in less developed nations. Because the vast majority of financing for CDM projects will be private, the distribution of projects will be determined in large part by the market. At the same time, there is a fear among many developing countries that virtually all projects will be developed in countries where investment is already going, or where abatement costs are very low. In order to address this equity concern, the structure of the CDM and related policies can be developed to ensure broad participation of developing countries in this flexibility mechanism.

Policy Recommendations:

(2a) Comprehensive Inclusion – Comprehensive inclusion of project categories (reduction and sequestration) and all gases, unless one or more is shown to be ineligible (e.g., because of high potential for leakage from individual projects), will promote broader participation in the CDM. Although the U.S. has supported the inclusion of sinks (a controversial position), the development of a position on sinks should work in parallel with the IPCC process on this issue. All projects should be eligible for CDM certification, however, they must meet established CDM criteria.

(2b) Measures to Ensure Broad Participation - Broad inclusion of CDM projects in a range of host countries may be achieved through non-market distorting policy measures. These measures include: the creation of a CDM clearinghouse function to match hosts with potential investors;

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the inclusion of a comprehensive range of project types; and the provision of technical assistance to host countries interested in hosting projects.

(2c) Measures to Assist Financing - Project bundling for smaller countries or the creation of CDM “mutual funds” led by private sector institutions may provide unique opportunities to facilitate financing of projects in countries where they may otherwise not occur. Valuing CERs from select countries at a higher rate may improve investment flows as well.

(2d) Projects Initiated by Developing Countries– In addition to hosting CDM projects using financing from project developers, non-Annex I countries may unilaterally develop CDM projects in their country or in another non-Annex I country. CERs generated from this project activity may be either traded or banked for use against future commitments. Standardized registration criteria as well as monitoring, verification and certification protocols would be used for assessing these projects. In addition, unilaterally generated projects would be subject to the CDM administrative and adaptation fees.

Policy Issues Needing More Discussion:

(2e) Other Incentives: In addition to the above options, other financial incentives could be used to ensure regional dispersion of CDM projects such as quotas, differentiated baselines, and CER bonuses. Although useful, these policies may raise costs, promote activities where abatement costs are not low, and distort the market functioning of the CDM. A decision should be made on whether incentives should be considered despite their effects on the functioning of the market.

(2f) Policies as Projects - Policies that lead to project-level reductions could also be allowed under the CDM, however, CERs would only accrue from actual project activities that resulted from the policy. Baselines for this type of CDM project may be difficult to develop and verify, and create disincentives for countries to move toward a trading regime. A decision should be made on under what specific circumstances policies may be included under the CDM, and the requirements needed to transparently assess resulting additional reductions.

(2g) Use of ODA and/or Public Funds - Although the bulk of CDM financing will come from private sources, these funds may be used in various ways to finance or provide support to CDM project development. The context and circumstances under which these funds are used need to be identified. This issue is particularly important since Japan strongly supports the use of ODA, while the EU opposes its use. Developing countries are also particularly sensitive about reprogramming limited ODA away from traditional uses.

OECD
trade-aid
policy
ODA vs.
export
financing

3. CDM as Lever for Developing Country Engagement

The CDM is unique in that it engages both Annex I and non-Annex I Parties in project activities. Although it is the U.S. position that Annex I Parties must necessarily be in compliance with Article 5 and 7 of the Protocol to use flexibility mechanisms, there is no policy position on requirements for CDM participation of non-Annex I countries. Additionally, the Kyoto Protocol does not clearly state eligibility requirements/compliance measures for non-Annex I Parties.

DRAFT – Do Not Cite or Quote – 2/9/99**Policy Recommendations:**

(3a) Eligibility Requirements - Additional CDM eligibility requirements of non-Annex I Parties should be explored as a means to ensure that the CDM helps to move developing countries to further commitments and toward participation in a trading regime. Currently only the requirement of a first National Communication under the FCCC exists. Other options include: developing countries be Parties to the Kyoto Protocol to participate in CDM or to receive proceeds; or, the requirement to do regular inventories in those sectors where CDM projects are taking place.

4. Issues Recommended for Review under an Interagency Process at the Staff Level

A large number of outstanding issues related to the CDM still need to be reviewed at the staff level. It is proposed that the following list of issues not be raised to the Assistant Secretary level at this time, but delegated to an interagency staff working group for discussion and technical analysis. This group should also establish a timetable for producing a set of recommendations on each of these issues.

CDM Eligibility and Compliance Issues

- Participation of Parties
- Independent Auditing and Verification
- Transaction Relationships
- Definition of “part of” under the CDM
- Sustainable Development Criteria
- Project compliance under the CDM
- Compliance with Protocol

Baselines and Benchmarking

- Project Registration
- Choosing a Baseline or Benchmark
- Additionality
- Prompt-Start Approach to the CDM
- Level of Aggregation
- Period for Earning CERs
- Key Characteristics of a Top-Down Baseline
- Marginal versus Average
- Design of Top-Down Baselines
- Who Establishes Baselines

Division of CERs and Share of Proceeds

- Unit of Measure for Certified Emission Reductions
- Share of Proceeds
- Use of Adaptation Funds
- Role of Private Entity

Issues Associated with Creating Effective Benchmarks for the CDM

February 10, 1999

Background

Project-level greenhouse gas (GHG) emissions reductions have historically been evaluated using project-by-project baselines. Under this approach, the project developer evaluates what would have happened without the project and then estimates resulting emissions from this project. The difference between these two numbers is the net GHG reductions or removal from the project. Experience with US LJI has indicated that this process is extremely time intensive and can be quite subjective. It is difficult to estimate what would have happened in the absence of the project and assumptions made can be manipulated by the parties involved. Establishing a more straightforward method to determining additionality would lower transaction costs and streamline the crediting process.

Benchmark Concept:

Benchmarks can be used to determine certified emission reductions resulting from projects within the Clean Development Mechanism (CDM). The purpose of benchmarks, rather than project specific counter-factual baselines is to lower transaction costs and reduce subjectivity. Any project that is more efficient than the benchmark will be considered additional. Certified emission reductions (CERs) can be determined based on the difference between the benchmark and the project performance.

Benchmark Development:

Once guidelines are established, developing the benchmark could be quite straightforward. Agreeing upon the guidelines, however, may be a difficult process. There are few clear answers and most decisions will entail a trade-off between competing goals. EPA has evaluated the options theoretically and by using real data for selected developing countries. This analysis can help frame the trade-offs and the implications of different choices. Additional analysis is needed to choose the appropriate method that will help the U.S. meet its environmental and economic priorities within the CDM.

The main characteristics of an effective CDM benchmark will be:

- High Environmental Integrity. A benchmark will have high environmental integrity if it allows minimal non-additional credits.
- Low Transaction Costs. Creating a benchmark will incur some costs that can be added to the overall transaction costs of the CDM. The fewer permutations needed, the lower the cost of the benchmark system. In the following graphs, 'high' means that the option ranks well for low transaction costs (i.e., has relatively low transaction costs).
- High Participation. High participation in CDM will allow more tradeable credits and therefore reduce the overall cost of compliance with the Kyoto protocol.
- High Investor Certainty. Theoretically, CDM credits will provide incentives to reduce emissions. Prior to making an investment, the investor will want to increase his or her certainty of the amount of credits that will eventually be awarded.
- Incorporates New Technologies and Trends. New technologies and trends may change our estimate of what would have occurred in the absence of CDM credits.

The following paper outlines some of the choices and the associated trade-offs among the above goals.

Issues and Trade-offs

Global versus Regional Benchmark

More regionally-specific benchmarks may lead to higher accuracy, but also higher transaction costs. Equity issues between countries may also be a consideration.

	Global Benchmarks	Country-specific Benchmarks
Environmental Integrity	Low	High
High Participation	No Impact	No Impact
Low cost to create benchmark	High	Low
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

Average versus Better-than-average data

A benchmark can be set at either an average or a better than average level. The associated trade-off is between environmental integrity and high participation.

	Average	Better-than-average
Environmental Integrity	Low	High
High Participation	High	Low
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	No Impact	No Impact
Incorporating New Technologies or Trends	No Impact	No Impact

The benchmark could be set at a range of better-than-average benchmarks. For example: the best 25th percentile, the best 10th percentile, the last most efficient unit, the best available technology/practice. As you move toward more strict benchmarks, you risk less participation. The magnitude of trade-offs among these choices will also depend on how each sector is aggregated. For example, in the U.S. electricity sector, the best 25th percentile is zero emissions (due to the high portion of hydro and nuclear). This problem would be less severe if you used a fossil only benchmark.

Frequency of Benchmark Updates

Benchmarks will need to be periodically updated to account for new technologies and trends. The frequency of these updates depends on the relative value of higher costs as opposed to the accuracy of benchmarks. More frequent updates will increase the cost of benchmarks. Infrequent updates will not account for new technologies and trends. Note that this is not necessarily a matter of environmental stringency since carbon efficiencies within a sector do not necessarily go down over time.

	Every 10 years	Every year
Environmental Integrity	Low	High
High Participation	No Impact	No Impact
Low cost to create benchmark	High	Low

Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

Note: Incorporating New Technologies is ranked low because projects may take a while before they begin operation. Longer periods between updates may allow a project to apply under the benchmark that exists during the initial stages of project development (prior to benchmark lock-in)

Length of Time that A Given Benchmark Applies to a Project

Benchmarks will be revised periodically. The benchmark will apply to the project for a given amount of time. The length of time that a project is measured against its initial benchmark will affect the level of investor certainty about how many credits the project may yield. Allowing benchmarks to apply to the lifetime of the project may continue to credit obsolete equipment that should be retired. Applying each new update to a given project lowers the investor certainty of the number of credits.

	Actual Lifetime of Project	Until New Update
Environmental Integrity	Low	High
High Participation	High	Low
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

Additional choices may provide a good compromise between allowing

- *Benchmark applies to estimated capital recovery of project.* This would provide the incentive to upgrade technologies once the investment is paid off, however, it is unlikely that the promise of new credits will prompt capital turnover prior to some profit yield.
- *Benchmark applies to estimated lifetime of project.* Each project and technology has an estimated lifetime. The estimated lifetime could be determined at the pre-certification phase.

Level of Sectoral Disaggregation

The appropriate level of sectoral disaggregation will vary by sector. Higher sectoral aggregation will lower the cost to develop the benchmark, however, highly aggregated sectors may not create the correct incentive. For example, China's electricity is largely coal and hydro. Establishing a benchmark for all fossil fuel will create one line for a bi-modal distribution. This would credit all hydro (whether additional or not) and create a benchmark that is too stringent for the cleanest coal to qualify.

	Aggregate	Disaggregate
Environmental Integrity	Low	High
High Participation	Undetermined	Undetermined
Low cost to create benchmark	No Impact	No Impact
Investor Certainty	High	Low
Incorporating New Technologies or Trends	Low	High

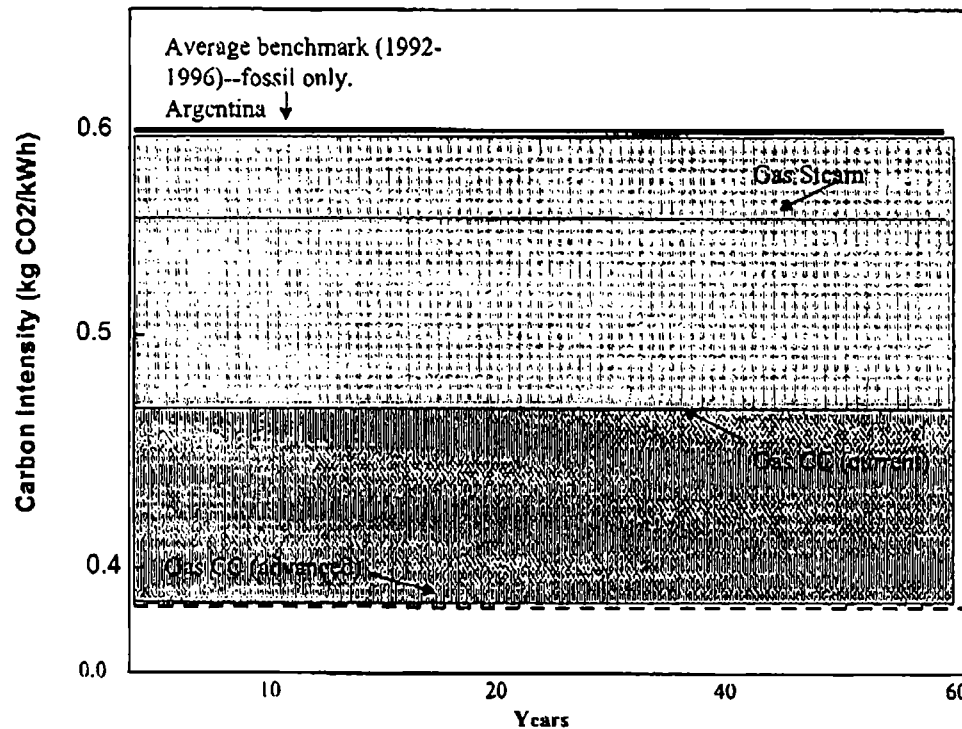
EXAMPLES

The following are two examples of benchmarks in the electricity sector and a brief discussion of the related trade-offs.

Benchmark #1:

- By country (example: Argentina)
- Average of last 5 years of capacity additions
- For fossil only
- Updated every 10 years
- Benchmark lasts for the lifetime of the project

Benchmark Example #1: Argentina



In this example, the number of credits allowed for a current technology combined cycle are illustrated by the checked box. Argentina's new capacity is likely to be gas combined cycle regardless of CDM. This would mean that most of the awarded credits for this project are not really additional. Using a fossil only benchmark increases the overall benchmark above many new natural gas technologies since Argentina's historic mix for the 5 year period includes oil. Also, allowing the credits to be awarded for the lifetime of the project exacerbates the number of non-additional credits. If capital recovery occurs at 20 years, then these credits may be sustaining an inefficient plant (in comparison to modern technologies) for an additional 30 - 40 years.

The darker box illustrates the additional credits that may be gained by moving from a typical natural gas combined cycle to an advanced model. A combined cycle natural gas plant would accrue the additional credits, plus all the non-additional credits in the above box. Although some of these credits are additional for the time the capacity was built, the plant may not be carbon efficient compared to future electricity generation options. Extending the life of the benchmark to the full life of the plant

may help keep an obsolete plant in operation.

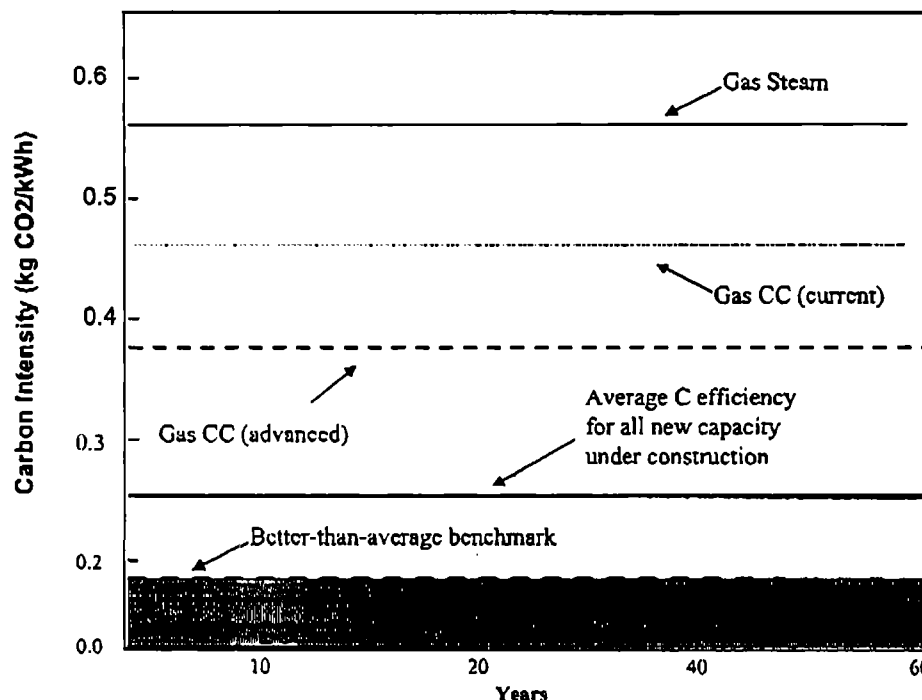
Since this benchmark is fossil only, large-scale hydro and nuclear don't apply and therefore the amount of non-additional credits is limited to the upper box.

If the benchmark is updated every 10 years, then the number of non-additional credits will continue to flood the market. While additional credits lower the overall cost of compliance for Annex B countries, they also lower the environmental effectiveness of the Kyoto Protocol.

Benchmark #2:

- By country (example: Argentina)
- Better than average of new capacity additions under construction
- For all generation (all types of fossil, all zero-carbon)
- Updated every year
- Benchmark lasts until capital recovery

Benchmark Example #2: Argentina



Benchmark #2 is so environmentally stringent that even the most advanced and carbon efficient fossil technology does not get credit. Under this benchmark, only zero-carbon technologies are credited. It is unclear whether these technologies are additional or not since Argentina already has significant portions of hydro and nuclear. In this case, even if the benchmark is set at the average carbon efficiency for all new capacity under construction, it would still be lower than most carbon-efficient fossil technology. In this case, the driving factor is the mix of zero-carbon technologies in an average electricity benchmark.

The benchmark is updated every year which will increase the cost of creating a benchmark to which very few projects will qualify.

Since the benchmark for each project is only applicable until the point of capital recovery, any non-additional emissions from hydro or nuclear will be limited.

Example of Step-by-step Process for CDM Power Plan Project in China

This paper provides an example of how a project would go forward under CDM using a benchmarking approach to ascertain additionality. We provide only the CDM-related issues as this is the only variable in a potential CDM project. Appendix I contains a list of issues that have been identified for further consideration. Appendix II contains an example of calculations to determine emissions additionality.

In a future paper, we will provide an example of a project that would develop its own baseline either because its unique properties do not allow for a benchmark approach or because no benchmark is available for such a project.

Step I: Company Develops Project

- **Description of Project:**
A 500 megawatt IGCC coal-fired power plant is being planned for the province of _____ in China. Project developers expect that the carbon emissions from this plant per unit of electricity output will be lower than the carbon emissions associated with the benchmark for power-plant projects in China.
- **Provide Calculations of Project's Projected Emissions:**
Estimate emissions using standard methodologies from the plant. Since plant emissions will be a function of actual plant performance, projected emissions need to be cast in the form of an operational variable such as units of carbon per kWh.
- **Determine "Emissions Additionality"**
The "additional" CERs generated from a project will vary considerably depending upon the exact specifications of the baseline used to determine the benchmark (i.e., average or better than average of last 5 units, last 5 years, coal-fired plants only, all plants in last 5 years). Thus, benchmarks could vary significantly depending on country/regional circumstances.
- **Project developers negotiate with appropriate entity in China to determine division of CERs**
- **Project developers calculate estimate of annual "proceeds" for own use**

Step II: Submit to Host Government for Approval

- **Project developers submit for project approval to Chinese Government under its self-defined guidelines.**
- **Chinese Government would approve the project. Such approval would, by implication, indicate that the project is consistent with China's sustainable development needs and objectives.**

Step III: Submit to Operational Entity for Registration:

- Project developers provide host government certification [implies “voluntary participation by both Parties”]
- Project developers prove “real, measurable, and long-term benefits”
-- baseline and projected emissions will demonstrate this
- Project developers demonstrate how project meets “additionality” requirements
-- saved emissions should satisfy “additionality” test

Step IV: Emissions Monitoring, and Reporting:

- Project developers monitor project on a regular basis, using guidelines set forth by the COP/MOP
- Project developers reports on emissions and emissions saved annually to Operational Entity

Step V: Verification

- Independent auditor verifies the project emissions reported in Step IV.

Step VI: Certification

- Operational Entity “checks” report
- Operational Entity reports all CERs to [UNFCCC]
- CERs are considered certified
- Project Developer reports CERs to National Registry(ies) for adjustment of its holding of CERs

Step VII: Appeal Process (if necessary):

Appendix I

Issues that Arise for further consideration

Step I: Company Develops Project

- Some of the benchmarking issues: Who determines benchmark? For historical information about Chinese power plants, who provides information? If Chinese government is charged with responsibility, what happens if it doesn't cooperate or work fast enough? How prove accuracy? Who is responsible for proving accuracy? Should historical information create a baseline for sector (i.e., electric power generation) or sub-sector (coal-fired electricity)? For industrial projects, level of aggregation will be even bigger problem? Should benchmarks be determined by province, country or region? What is process for case-by-case determination of a project's baseline?
- In determining additionality, should baseline calculations be based on the average or marginal plant?
- Regarding division of CERs, should this be between project developers in both countries, between U.S. partner and Chinese government, or should be left to host government to decide?
- Is calculation of proceeds for developers' use only or should it be required in submission to operational entity?

Step II: Submit to Host Government for Approval

- Is host government required to have CDM point of contact with decision-making authority?
- Should there be a deadline for host government approval process?

Step III: Submit to Operational Entity for Registration

- Who should provide proof of host government approval?
- What is the nature of verification? Is it pro-forma or is there an evaluation? Does operational entity do verification or authorize third party verification? Or are project developers required to submit verification plan?
- Should there be a requirement for a submission on other environmental implications, such as transboundary effects?
- Regarding "voluntary participation approved by each Party involved" (section 12.5a of KP), how is this proved? Is host government certification enough or must each government provide such a certification (this could involve more than 2 if a multinational company wanted to divide CERs among more than one Annex B Party)? Does this language imply that only Parties to the Kyoto Protocol can engage in CDM projects? [Need State/Legal to evaluate]

Step IV: Emissions Monitoring and Reporting.

- Must every CER be entered into a national registry (to ensure double entry accounting and verification) or could developers sell CERs without notifying national authority? Who reports CERs to national registry?

Step V: Verification

- Does verification occur before or after certification?
- Which independent entities will be allowed verify emissions reductions?
- Will each project be subject to a verification process, or will projects be verified selectively?

Step VI: Certification

- Is certification of CERs by operational entities automatic (unless an audit determines inappropriate calculation) or should an affirmative decision to certify be required by the operational entity each year? Should the IRS random audit model be used?
- Does operational entity have a formal auditing process? If so, does Executive Board write the rules for this or does the COP/MOP? If there is an auditing process, who does audits? Third-Parties or Operating Entity?

Step VII: Appeal Process (if necessary):

- What type of audit can overturn certification of CERs?
- Should there be a review process established that allows Executive Board to overturn CERs?
- What type of appeal process should be established?
- Would a project developer or its government represent its interests in an appeal?
- If appeal process imposed, should there be a deadline for resolution of appeal?
- Is revocation of CERs the worst consequence? Is Executive Board the final authority?

Appendix II

Example of Calculation of "Additionality" [note: numbers in calculations are contrived]

Assumptions:

- Based upon the plant design, expected operating parameters, and analysis of the carbon content of the intended fuel source, the developers project emissions to be 50 units per kWh.
- Given that the developers expect the plant to be baseload with a 90 percent availability factor, annual generation from the plant is projected to be:
 $500 \text{ MW} (8760 \text{ Hr/Yr}) (0.90) (1000 \text{ kW/MW}) = 3,942 \text{ million kWh}$
Annual carbon emissions being: $3,942 (50 \text{ units/kWh}) = 197,100 \text{ million units}$

Historical information used to develop benchmark

- Hypothetical average and marginal emissions per unit of output:
From the last five coal-fired facilities of 200 MW or more: 70 units/kWh.
From the last ten coal-fired facilities of 200 MW or more: 80 units/kWh
From coal-fired facilities of 200 MW built [commissioned] in the last five years: 90 units/kWh
From all coal-fired facilities in the past year: 75 units/kWh
From all units (coal, nuclear, oil, gas-fired, hydro, wind) of 200 MW or more built in the last five years: 60 units/kWh
From last (marginal) coal-fired unit built: 55 units/kWh

Range of "Emissions Saved" based on benchmark chosen [based on above values]

Calculating the emissions saved could be based on the average or on a better than average benchmark for the above choices. Better than average choices include a given percentage below the benchmark or the BAT. For simplicity, the following example uses the average.

Based upon last five coal-fired units:

$$(70 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 78,840 \text{ million units}$$

Based upon last ten coal-fired units:

$$(80 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 118,260 \text{ million units}$$

Based upon coal-fired units built (commissioned) during last five years:

$$(90 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 157,680 \text{ million units}$$

Based upon all coal-fired units built during past year:

$$(75 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 98,550 \text{ million units}$$

Based upon all units (including nuclear, gas, oil, etc.) built during last five years:
 $(60 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 39,420 \text{ million units}$

Based upon last coal-fired unit built:
 $(55 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 19,710 \text{ million units}$

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Use of ODA and/or Public Funds - Although there is a general consensus that ODA should not be used for purchasing credits, a policy position should be made on whether ODA/Public Funds can be used for CDM projects. Although the bulk of CDM financing will mostly

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- **Design of Top-Down Baselines** – The design of top-down baselines will require greater analysis and discussion. One option for discussion would be deriving these baselines from recent historical data (e.g., the last 5 years), but aiming to approximate what the “next” unit of investment would be (e.g., the project on the margin). Projections may also be useful in checking the validity of baselines established using recent historical data.
- **Who Establishes Baselines** – Although the development of baselines should be based on standardized and transparent methodologies, there is the question of who develops and establishes the benchmark or baseline, and whether a decision on a particular baseline can be appealed by either the investor, host or a third party. This issue will need to be resolved both for project-by-project baselines and top-down baselines. In both cases, an independent review process may be necessary to ensure that baselines are methodologically sound, credible, and verifiable.

Equity Concerns

As a market based mechanism, the CDM will provide low cost opportunities for GHG reductions while simultaneously promoting the flow of private capital toward CDM projects in less developed nations. Since the vast majority of finance for CDM projects will be private, the distribution of projects will be determined in large part by the market. At the same time, there is a fear among many developing countries that virtually all projects will be developed in countries where investment is already going, or where abatement costs are very low (e.g. China). In order to address this equity concern, CDM policies may need to be developed to ensure broad participation of developing countries under this flexibility mechanism.

Policy Recommendations:

- **Measures to Ensure Broad Participation** –To promote broad inclusion of CDM projects and host countries, non-market distorting measures can be taken such as: creation of a clearinghouse function under the CDM to match hosts with potential investors; inclusion of a comprehensive range of project types; and provision of technical assistance to host countries interested in hosting projects. Many related issues arise for each option, for example if a clearinghouse function is envisioned, who should perform this role?
- **Measures to Assist Financing** - Project bundling for smaller countries or the creation of CDM “mutual funds” led by private sector institutions may provide unique opportunities to facilitate financing of projects in countries where they may otherwise not occur.
- **Projects Initiated by Developing Countries**– In addition to hosting CDM projects using financing from project developers, non-Annex I countries may unilaterally develop CDM projects in their country or in another non-Annex I country. CERs generated from this project activity may be either traded or banked for use against future commitments. Standardized registration criteria as well as monitoring, verification and certification protocols would be used for assessing these projects. In addition, unilaterally generated projects would be subject to the CDM administrative and adaptation fees.

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Policy Issues Needing More Discussion:

- **Other Incentives:** In addition to the above options, other financial incentives may also be used to ensure regional dispersion of CDM projects. Quotas, differentiated baselines, and CER bonuses for projects in particular regions may encourage project development in countries where CDM investment would otherwise not occur. The advantage of these incentives are that they send a clear message to developing countries that there is a genuine commitment to regional equity under the CDM, and would most likely achieve the desired result of broad geographic dispersion of projects. At the same time, these policies may raise costs, promote activities where abatement costs are not low, and distort the market functioning of the CDM.

Division of CERs and Share of Proceeds

Certified Emission Reductions (CERs) will be generated by each project. As a commodity with market value, CERs may be traded, sold or banked for future use by both Annex I and non-Annex I Parties. CERs should be issued after the reductions have accrued and been verified by independent auditors on an annual basis. After a percentage of CERs is taken to cover CDM administrative costs and the fund for adaptation, the remainder shall be apportioned between the project host and developer based on private arrangements. Operational entities will be responsible for the certification of these credits and report total CERs issued to the Executive Board for each project.

Policy Recommendations:

- **Share of Proceeds** – A 1-3 percent share of CERs generated by project activities will be allocated for administrative costs of the Executive Board and toward the adaptation funds to support activities in the most vulnerable countries. The majority of this share should go towards the adaptation fund since administrative costs of the Executive Board are expected to be minimal. This allocation will be based on the percentage of total CERs generated by a particular project in a given year, not on their market value or on the estimated value of the project itself. A sliding scale, depending on project size, may also be considered for determining the CER share charged to projects. For any system, a decision will need to be made on who distributes these funds.
- **Use of Adaptation Funds** – This share of proceeds will be used to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation. The selection of particularly vulnerable countries will be based on standardized criteria to be agreed upon by the Executive Board. The disbursement of these funds may be conducted through appropriate international institutions.
- **Role of Private Entity** – The CER share awarded to the investor and the host shall be determined by private contract between the investor and the host country Party. These CERs shall be the property of each private party and may be held for future use, traded, or sold.

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Example of Step-by-step Process for CDM Power Plan Project in China

This paper provides an example of how a project would go forward under CDM using a benchmarking approach to ascertain additionality. We provide only the CDM-related issues as this is the only variable in a potential CDM project. Appendix I contains a list of issues that have been identified for further consideration. Appendix II contains an example of calculations to determine emissions additionality.

In a future paper, we will provide an example of a project that would develop its own baseline either because its unique properties do not allow for a benchmark approach or because no benchmark is available for such a project.

Step I: Company Develops Project

- **Description of Project:**
A 500 megawatt IGCC coal-fired power plant is being planned for the province of _____ in China. Project developers expect that the carbon emissions from this plant per unit of electricity output will be lower than the carbon emissions associated with the benchmark for power-plant projects in China.
- **Provide Calculations of Project's Projected Emissions:**
Estimate emissions using standard methodologies from the plant. Since plant emissions will be a function of actual plant performance, projected emissions need to be cast in the form of an operational variable such as units of carbon per kWh.
- **Determine "Emissions Additionality"**
The "additional" CERs generated from a project will vary considerably depending upon the exact specifications of the baseline used to determine the benchmark (i.e., average or better than average of last 5 units, last 5 years, coal-fired plants only, all plants in last 5 years). Thus, benchmarks could vary significantly depending on country/regional circumstances.
- **Project developers negotiate with appropriate entity in China to determine division of CERs**
- **Project developers calculate estimate of annual "proceeds" for own use**

Step II: Submit to Host Government for Approval

- **Project developers submit for project approval to Chinese Government under its self-defined guidelines.**
- **Chinese Government would approve the project. Such approval would, by implication, indicate that the project is consistent with China's sustainable development needs and objectives.**

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Step III: Submit to Operational Entity for Registration:

- Project developers provide host government certification [implies “voluntary participation by both Parties”]
- Project developers prove "real, measurable, and long-term benefits"
 - baseline and projected emissions will demonstrate this
- Project developers demonstrate how project meets “additionality” requirements
 - saved emissions should satisfy “additionality” test

Step IV: Emissions Monitoring, and Reporting:

- Project developers monitor project on a regular basis, using guidelines set forth by the COP/MOP
- Project developers reports on emissions and emissions saved annually to Operational Entity

Step V: Verification

- Independent auditor verifies the project emissions reported in Step IV.

Step VI: Certification

- Operational Entity “checks” report
- Operational Entity reports all CERs to [UNFCCC]
- CERs are considered certified
- Project Developer reports CERs to National Registry(ies) for adjustment of its holding of CERs

Step VII: Appeal Process (if necessary):

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Appendix I

Issues that Arise for further consideration**Step I: Company Develops Project**

- Some of the benchmarking issues: Who determines benchmark? For historical information about Chinese power plants, who provides information? If Chinese government is charged with responsibility, what happens if it doesn't cooperate or work fast enough? How prove accuracy? Who is responsible for proving accuracy? Should historical information create a baseline for sector (i.e., electric power generation) or sub-sector (coal-fired electricity)? For industrial projects, level of aggregation will be even bigger problem? Should benchmarks be determined by province, country or region? What is process for case-by-case determination of a project's baseline?
- In determining additionality, should baseline calculations be based on the average or marginal plant?
- Regarding division of CERs, should this be between project developers in both countries, between U.S. partner and Chinese government, or should be left to host government to decide?
- Is calculation of proceeds for developers' use only or should it be required in submission to operational entity?

Step II: Submit to Host Government for Approval

- Is host government required to have CDM point of contact with decision-making authority?
- Should there be a deadline for host government approval process?

Step III: Submit to Operational Entity for Registration

- Who should provide proof of host government approval?
- What is the nature of verification? Is it pro-forma or is there an evaluation? Does operational entity do verification or authorize third party verification? Or are project developers required to submit verification plan?
- Should there be a requirement for a submission on other environmental implications, such as transboundary effects?
- Regarding "voluntary participation approved by each Party involved" (section 12.5a of KP), how is this proved? Is host government certification enough or must each government provide such a certification (this could involve more than 2 if a multinational company wanted to divide CERs among more than one Annex B Party)? Does this language imply that only Parties to the Kyoto Protocol can engage in CDM projects? [Need State/Legal to evaluate]

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Step IV: Emissions Monitoring and Reporting.

- Must every CER be entered into a national registry (to ensure double entry accounting and verification) or could developers sell CERs without notifying national authority? Who reports CERs to national registry?

Step V: Verification

- Does verification occur before or after certification?
- Which independent entities will be allowed verify emissions reductions?
- Will each project be subject to a verification process, or will projects be verified selectively?

Step VI: Certification

- Is certification of CERs by operational entities automatic (unless an audit determines inappropriate calculation) or should an affirmative decision to certify be required by the operational entity each year? Should the IRS random audit model be used?
- Does operational entity have a formal auditing process? If so, does Executive Board write the rules for this or does the COP/MOP? If there is an auditing process, who does audits? Third-Parties or Operating Entity?

Step VII: Appeal Process (if necessary):

- What type of audit can overturn certification of CERs?
- Should there be a review process established that allows Executive Board to overturn CERs?
- What type of appeal process should be established?
- Would a project developer or its government represent its interests in an appeal?
- If appeal process imposed, should there be a deadline for resolution of appeal?
- Is revocation of CERs the worst consequence? Is Executive Board the final authority?

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Appendix II

Example of Calculation of “Additionality”

[note: numbers in calculations are contrived]

Assumptions:

- Based upon the plant design, expected operating parameters, and analysis of the carbon content of the intended fuel source, the developers project emissions to be 50 units per kWh.
- Given that the developers expect the plant to be baseload with a 90 percent availability factor, annual generation from the plant is projected to be:
 $500 \text{ MW} (8760 \text{ Hr/Yr}) (0.90) (1000 \text{ kW/MW}) = 3,942 \text{ million kWh}$
 Annual carbon emissions being: $3,942 (50 \text{ units/kWh}) = 197,100 \text{ million units}$

Historical information used to develop benchmark

- Hypothetical average and marginal emissions per unit of output:
 From the last five coal-fired facilities of 200 MW or more: 70 units/kWh.
 From the last ten coal-fired facilities of 200 MW or more: 80 units/kWh
 From coal-fired facilities of 200 MW built [commissioned] in the last five years: 90 units/kWh
 From all coal-fired facilities in the past year: 75 units/kWh
 From all units (coal, nuclear, oil, gas-fired, hydro, wind) of 200 MW or more built in the last five years: 60 units/kWh
 From last (marginal) coal-fired unit built: 55 units/kWh

Range of “Emissions Saved” based on benchmark chosen [based on above values]

Calculating the emissions saved could be based on the average or on a better than average benchmark for the above choices. Better than average choices include a given percentage below the benchmark or the BAT. For simplicity, the following example uses the average.

Based upon last five coal-fired units:

$$(70 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 78,840 \text{ million units}$$

Based upon last ten coal-fired units:

$$(80 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 118,260 \text{ million units}$$

Based upon coal-fired units built (commissioned) during last five years:

$$(90 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 157,680 \text{ million units}$$

Based upon all coal-fired units built during past year:

$$(75 \text{ units/kWh}) - (50 \text{ units/kWh}) \times 3,942 \text{ million kWh} = 98,550 \text{ million units}$$

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Based upon all units (including nuclear, gas, oil, etc.) built during last five years:
(60 units/kWh) - (50 units/kWh) x 3,942 million kWh = 39,420 million units

Based upon last coal-fired unit built:
(55 units/kWh) - (50 units/kWh) x 3,942 million kWh = 19,710 million units

Baselines:**The potential for using Benchmarks to determine additionality
in the Clean Development Mechanism*****Background***

Project-level greenhouse gas (GHG) emissions reductions have historically been evaluated using project-by-project baselines. Under this approach, the project developer evaluates what would have happened without the project and then estimates resulting emissions from this project. The difference between these two numbers is the net GHG reductions or removal from the project. Experience with US IJI has indicated that this process is extremely time intensive and can be quite subjective. It is difficult to estimate what would have happened in the absence of the project and assumptions needed can be manipulated by the parties involved. Establishing a more straightforward method to determining additionality would lower transaction costs and streamline the crediting process.

Benchmark Concept:

Benchmarks can be used to determine certified emission reductions resulting from projects within the Clean Development Mechanism (CDM). The purpose of benchmarks, rather than project specific counter-factual baselines is to lower transaction costs and reduce subjectivity. Benchmarks would create a rate-based baseline for an entire sector. Any project that is more efficient than the benchmark would be considered additional. Certified emission reductions (CERs) can be determined based on the difference between the benchmark and the project performance.

Policy Issues and Options:***General (applies to all sectors):***

- Should the benchmark be based on total past emissions or new capacity? Some countries have remained consistent over time, however new capacity in other countries is completely different than past trends. For example, historically, Argentina's electricity generation was largely oil based. However, recent trends are toward natural gas and large-scale hydro. Since the additionality criteria applies to what would have happened next, current trends (e.g., new capacity additions) are more applicable.
- Should the benchmark be based on historical average, projections, or normative values? Normative values (e.g., percentile approach, BAT, etc.) are likely to create the most effective benchmark. A historical 'average' benchmark would allow any project that has better than average carbon intensity to qualify for CDM credits. By definition, this would allow half of the existing production in any given sector to qualify as additional. Projections, while correct in intent, rely on many factors that are difficult to predict. Projections can vary not only in magnitude, but directionally as well.
- Updating the benchmark. The benchmark established for any given year will provide the baseline for the lifetime of a project that qualifies for the CDM in that year. Updated benchmarks for future projects, however, will be needed to account for new trends and technologies. The intervals in which benchmarks are updated will depend largely on the level of effort needed to create the benchmarks. If the cost is high, then the intervals between updates will be longer. It is possible to tighten the benchmarks using an automatic deflator to account for technology improvements. However, the trends in developing countries have not suggested that efficiencies historically improve over time. Decreasing the benchmark between updates, however could create the correct incentive for efficiency improvements.

Sector Specific:

- Which sectors are most conducive to Benchmarks? Sectors that are most conducive to benchmarks have a homogenous output, quantifiable reductions, and available data. It is also important that these sectors attract enough CDM projects to warrant the cost of creating a benchmark. Electricity, some industrial demand sectors, energy supply (e.g., natural gas pipelines or coal mining methane recapture), residential appliance may qualify for benchmarks. Land use change and forestry are sectors that needs further investigation. See chart below for further explanation.
- Level of Aggregation for the sector. Benchmarks could be created at various levels of aggregation for a given sector. Disaggregation leads to more precision, but at a greater cost. The level of aggregation will vary among sectors, however, there is often too much dispersion within individual sectors to aggregate across an entire sector. For example, electricity generation in China is mostly coal and hydro. A fully aggregated benchmark would incorporate all the hydro (~25% of new capacity from 1992-1996), and therefore be below any possible efficiencies for coal-based production. In this case, two benchmarks may need to be developed in order to appropriately reflect efficiencies for both coal and hydro within the electricity power generation sector.
- Should the benchmark be global or regional? For the electricity sector, regional (e.g., country specific) benchmarks are likely to be more effective. Each country will have some electricity production, however, the available resources and existing infrastructure will vary among countries. If a global benchmark is created for historical marginal capacity, all electricity production from some countries would be considered additional. Global benchmarks for the electricity sector could be effective if the benchmark is technology-fuel based (e.g., coal benchmark). In this case, incentives for lower-carbon fuels could be provided by looser benchmarks or by discounting credits for high carbon intensive fuels.

Commodity-based sectors (e.g., iron and steel), although also varying greatly between countries, have more tradeable products. Therefore, it may make more sense to have global commodity benchmarks to encourage production in more energy-efficient countries. Global commodity benchmarks would also allow more disaggregation without higher costs.

The following table outlines how baselines may be formulated for potential CDM sectors. Our analysis has relied on existing data. Time constraints have precluded intense host country cooperation or capacity building. Data quality could improve with a clear incentive (CDM credits) and host country cooperation.

To date, EPA's work has focused primarily on the electricity sector, followed by energy supply and industrial demand. Recommendations on other sectors are preliminary. Additional analysis is necessary to allow for more concrete recommendations.

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Sector	Sub-Sector (Level of Aggregation)	Type of Baseline	Regional or Global	Discussion
Electricity Generation <u>Data Quality:</u> Good)	Fossil Fuel	Benchmark	<u>Regional:</u> If benchmark applies to total fossil fuel. <u>Global:</u> If specific for fossil fuel (e.g. coal benchmark, oil benchmark, natural gas benchmark).	Some countries (e.g., Argentina, Thailand) use different fossil fuels for electricity generation. In these cases, one benchmark may create an incentive for fuels with moderate carbon intensity, but low carbon fuels would automatically qualify (without really being additional). High carbon fuels would not be close enough to create an incentive to be more efficient. Therefore, global fuel-specific benchmarks may be more appropriate, however, they would not create any incentive for fuel switching. The key determinant in setting the benchmarks is the elasticity of substitution between different types of fossil fuels in most developing countries.
	Emerging Renewable	Benchmark	Global	One global benchmark for all emerging renewables would create an equal incentive for projects regardless of the location. In addition, one benchmark is less onerous to create.
	Large-scale Hydro and Nuclear	Project Specific	0	Large scale hydro and nuclear should not be completely excluded from CDM since each has significant potential to reduce GHG emissions. However, including them in a benchmark creates additionality problems since many countries already have significant portions of large-scale hydro and nuclear. For example, just under half of electricity projects under construction in 1996 in China are large-scale hydro. All of these would qualify under any benchmark since result in zero emissions.

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Industrial Energy Demand <u>(Data Quality: Questionable)</u>	Iron and Steel, Cement, Petroleum Refining (?)	Benchmark (possible)	Global	Benchmarks for industrial demand sectors should be global for two reasons: (1) to create an equal incentive for efficient projects among countries. Unlike electricity supply, commodity production is less regionally tied. It therefore makes sense to create an incentive in countries that can produce the commodity more efficiently (2) Each subsector would need to be disaggregated further in order to create an effective benchmark (e.g. type of steel) since carbon intensity varies by type of end-use product. Global benchmarks would significantly cut down the transaction costs.
	Pulp and Paper Chemicals	Benchmark or Project Specific*	Global	These subsectors may have so many different products (that are not fungible between each other) that benchmarks are not possible. Any decision would need more investigation.
Fossil Fuel Supply <u>(Data Quality: See Subsector)</u>	Coal bed methane <u>Data Quality:</u> Good, but since there have not been many projects, it may not be a representative sample	Benchmark or Project Specific	Depends on method	Benchmarks could be either: (1) set at zero where all projects get credit. This would be a global benchmark. Given the low number of existing and planned projects, this is a viable possibility. (2) set at best practice. Global efficiencies are at about 25% and could be increased to about 30%. Could do global benchmark that varies depending on the gassiness of the mine, or regional benchmarks. The cost of the benchmark will need to be weighed against the number of estimated projects in this field.
	Natural gas production <u>Data Quality:</u> Poor	Project by project	--	It is unlikely that the reduction in transaction costs needed to justify benchmarks would be achieved in this sector because of the wide range of project options and the dominance of only one country (China)

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	Natural gas distribution <i>Data Quality:</i> Poor	Project by project	—	Getting good data on natural gas transmission and distribution is very difficult because the source is spread out along the distance of the pipeline.
Transportation <i>Data quality:</i> ?)	Policies	Whole-Sector	—	Transportation policies to lower GHG emissions such as fuel taxes, reformulated gasoline, etc. could lower GHG emissions, but would be difficult to quantify. Whole-sector CDM would be the only way to estimate these emissions. However, creating a baseline for a whole sector would exclude any other projects within that sector from qualifying for CDM.
	Infrastructure	Project Specific	--	Projects such as HOV lanes, public transportation, etc. have the potential to lower GHG emissions, but would be difficult to benchmark
	Fleets	Benchmarks or Project Specific	Regional	It could be possible to benchmark fleet performance, but the cost of creating the benchmark may be high since the benchmarks would need to be regional. The benefit of a benchmark approach would hinge on the cost versus the number of potential projects.
Residential and commercial energy use	Appliances and Equipment	Benchmarks	Global	Global benchmarks based on the best available technologies could be created for residential and commercial appliances and equipment. Further work needs to be done to determine the regional dispersion of such equipment to determine if benchmarks are applicable.
Building	Energy efficient buildings	Project Specific	—	

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Forestry** Additional work needs to be done to assess the potential for forestry benchmarks	Conservation	Project Specific	--	Benchmarks are difficult for conservation projects because determining additionality is based upon too many site specific factors.
	Management practices	Benchmarks (??)	Global	Management practices such as sustained yield and high crop rotation may be considered for benchmarks. The actual carbon benefits, however, may be difficult to assess in aggregate since each forest is different.

*Either a benchmark or a project specific baseline would apply. The project would not have the opportunity to choose.

** Assumes forestry projects are eligible in the CDM

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