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Clean Development Mechanism Design and Operation Options Paper

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

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 opposite 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 have a similar motivation to overstate the CERs generated from a project. Thus, in establishing the mechanisms and procedures that underpin the CDM, it is important to balance incentives – pursuit of cost-effective projects and procedures that result in protection of the environment.

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. The design and operation of the CDM will determine how the above objectives are met, and greatly influence the environmental effectiveness and equity of this flexibility mechanism. Since the greatest challenge of the CDM is to balance the need for an environmentally credible mechanism with the objective of low transaction costs and bureaucracy, the institutional structure and functions of the CDM will prove critical. For each following topic area, an additional section is included which identifies those policy issues requiring further analysis and discussion to ensure that appropriate policies are developed.

Institutional Structures

The functions of the CDM are to support sustainable development in developing countries and to provide a means for Annex B Parties to reduce the costs of meeting their targets under the Kyoto Protocol. The CDM is subject to the authority and guidance of the Conference of Parties serving as the Meeting of Parties to the 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. Operational entities will also play a critical role in the functioning of the CDM, but little consensus has been achieved in terms of who may serve as an operational entity, how they will be approved, and in what order they will carry out their functions. The recommendations below provide some guidance on this matter, however, further discussion is needed to identify and stress the linkages of institutional issues to other methodological and technical aspects of the CDM.

Policy Recommendations:

- **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. The Board would function as a separate standing body of the COP/MOP and report to the SBI.

- **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 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; 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.

Policy Issues Needing More Discussion:

- **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, it may be useful for operational entities to be independent and decentralized but required to use standard, consistent and transparent methodologies in evaluating and certifying projects. Although it would be appropriate for the Executive Board to certify operational entities, it needs to be determined who would develop this criteria for certification and the guidelines used by the operational entities in carrying out their duties. In order to avoid conflict of interest, operational entities which certify project activities, should not be involved in project development, promotion, financing or implementation.
- **Operational Entity Selection:** Operational entities should be qualified to ensure that certified emission reductions (CERs) are credible and selected to ensure broad coverage of all regions. Although efforts should be made to avoid creating new entities, a number of existing institutions may potentially serve as operational entities, including: private sector institutions (e.g., international accounting firms); international financial institutions; other multilateral organizations; or a combination of these (see Annex A). More discussion is needed to determine what institutions may best carry out the functions outlined above, but particular institutions may be ruled out due to opposition from particular Parties. For example, the role of multilateral banks or UN agencies such as UNDP or UNEP should most likely not be considered due to developing country opposition.

Operation of the CDM

The central challenge in developing the CDM is ensuring the environmental integrity of the mechanism without creating an overly burdensome and costly structure. The assessment of emissions additionality will play a key role in resolving this dilemma, since the rigor of the emissions additionality assessment can potentially lead to a failure of the CDM either through standards which are too strict to attract investment or too weak to ensure environmental

credibility. As a result, each stage in the design and operation of the CDM should employ standardized procedures and methodologies to approve and assess projects even if the actual functioning of the CDM is carried out in a relatively decentralized fashion.

Policy Recommendations:

- **Comprehensive Inclusion** - All 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), should be included. Opinions on inclusion of sinks activities in CDM are divided at this time, and it is unclear if substantial progress will be made by COP6. The USG needs to decide the importance of this policy issue. Policy makers should ensure that the development of positions on sinks works in parallel with the IPCC process on this issue. As for AII projects, they should be eligible for CDM certification, however, they must meet the CDM criteria that are eventually established, including additionality criteria.
- **Participation of Parties** - Eligibility to participate in CDM by Annex I Parties should be no less strict than to participate in Annex I trading. There is a need to explore means by which non-Annex I Parties would have eligibility requirements (e.g., compliance with all reporting requirements, submission of National Communication that meets guidelines, establishment of a national inventory in sector proposed for the project).
- **Transaction Relationships** - All transactional relationships should be allowed under the CDM (e.g. bilateral, multilateral, or national governments). In addition, both public and private institutions should be able to participate in project development or CER transactions and non-Annex I Parties and companies should be able to generate CERs without an Annex I partner.
- **Unit of Measure for Certified Emission Reductions** - CERs shall 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 fungible with other tradeable units at their full value. Depending on how CERs are brought into the market and whether CERs can be "decertified", CERs will need to be serialized to some degree for identification and tracking.
- **Definition of "part of" under the CDM** - "Part of" should mean anything less than 100% of the abatement required by Annex I Parties in order to achieve compliance with Parties' quantified emission limitation and reduction commitments under Article 3 of the Protocol.
- **Sustainable Development Criteria** - Determination of sustainable development criteria should be the sole responsibility of the host country of a project activity. In order to address any transboundary environmental or socioeconomic effects of a project, a facilitative mechanism could be established. At the same time, it may be prudent not to explicitly state a position on this issue since it may serve as a point of leverage in negotiations.
- **Prompt-Start Approach to the CDM** - It is likely that the CDM may initially move forward in those sectors where experience has already been gained, while other sectors may



not have established baselines or methodologies for calculating reductions. In these cases, methodological or technical problems in any single project category should not hold up inclusion of other project categories for CDM activity. In other words, methodologies do not need to be established for all sectors before the CDM can become operational.

Policy Issues Needing More Discussion:

- **Eligibility Requirements** – We may need to explore whether it is advantageous to require additional eligibility requirements of non Annex I Parties, who currently have only one requirement – a first National Communication under the FCCC. Some options: should developing countries be Parties to the Kyoto Protocol to participate in CDM or to receive “proceeds?” Should they be required to do regular inventories? The CDM may be the only hook to get developing countries to do more.
- **Project compliance under the CDM** - Further work is needed on project compliance under the CDM. For example, a CDM compliance system may require more than procedures and mechanisms to respond to non-compliance. This may include the development of rules/guidelines for: the certification of projects and certified emission reductions; the activities of the operational entities; reporting; procedures for audit/review of activities of operational entities (including occasional project audits); and the consequences for violations by Parties. These issues will need to be assessed in greater detail.
- **Compliance with Protocol** - With respect to Protocol compliance, the primary concern is parallelism - that is parallel consequences for similar violations, be they under trading, JI, CDM or the bubble. In compliance discussions to date, the question of whether violation of the rules of the flexibility mechanisms should result in any consequences other than restriction/suspension of the right to participate in the mechanism have not been resolved. This issue will need further discussion and evaluation.
- **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, may create disincentives for countries to move toward a trading regime, and should be examined in greater detail.
- **Article 12.5a** - Under Article 12.5 of the Protocol, the need for “voluntary participation approved by each Party involved” is noted. The use of “Party” raises the question of whether a country could participate in the CDM before ratifying the Protocol. This would apply to Annex I and non-Annex I countries and should be further addressed due to its legal and political implications, including options for an interim approach for participation in the mechanism. It should be noted that the USG would not need to approve projects developed by private entities. Credits should not accrue to Party, from private entity, until ratification and application of assigned amount.
- **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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likely come from private sources, these funds may be used in various ways to finance or provide support to CDM project development. A decision should be made regarding the extent to which these types of funds may be used in the context of the CDM and under what circumstances. This issue is particularly important since Japan strongly supports the use of ODA, while the EU (France in particular) opposes its use. Developing countries are particularly sensitive about reprogramming ODA away from traditional uses.

- **Verification of Reductions** – Verification is a critical step within the stages of a CDM project since it ensures the environmental legitimacy of the flexibility mechanism. A number of issues should be addressed at this point, including: who should serve as a third party verifier; what criteria should be used; what kind of an appeal process should be established; when, how, and at what frequency should verification occur; and should CERs be invalidated if project emissions are not verified.

Baselines and Benchmarking

Methodologies for calculating emission reductions will be critical to the CDM. Standardized methodologies for generating baselines (including the use of benchmarks) may provide a streamlined approach for assessing reductions from project activities. Baselines used in calculating these reductions can be developed on a project-by-project basis (bottom-up) or through a more standardized benchmarking approach (top-down). In the interest of minimizing transaction costs, top-down baselines (e.g., benchmark, performance standard, whole-sector, technology standard) should be included as an option for project assessment. In the initial stages of project development, the appropriate baseline for the project will be established during the registration of the project. Once a project is registered, its baseline becomes fixed for the lifetime of that project.

Policy Recommendations:

- **Project Registration** – In advance of actual project initiation, projects will be registered with an authorized operational entity to confirm that the project is voluntary, meets sustainability goals of the host country, and is additional. At the same time, project registration would 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 accrue. This step removes most elements of uncertainty for the investor other than actual project performance.
- **Choosing a Baseline or Benchmark** – Flexibility should be provided to project developers in developing a bottom-up baseline for determining additionality and calculating emission reductions. At the same time, if a top-down baseline based on benchmarks has been established, a project developer/host should be required to use that baseline for their calculations.
- **Additionality** – Unlike criteria established under the USJI program, programmatic and financial additionality should not be included in CDM project criteria for projects relying on private capital. This recommendation is supported by experience in the USJI, which

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indicated that both of these categories of additionality are subjective, or are too complicated to determine. Therefore, only emissions additionality should be assessed in the registration phase of the project development.

- **Rate-Based Calculations** – In some cases, baselines established during the registration phase of a project activity may be set as a rate, with the absolute quantity of CERs calculated after the reductions have accrued as the rate times the quantity of activity. For example, a project may need a rate-based calculation if it is unsure of the total production expected under actual project activity.

Policy Issues Needing More Discussion:

- **Level of Aggregation** - In order to minimize the costs and difficulties, 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 greater analysis to see in what sectors country, regional or global baselines may be feasible. The question of who develops the level of aggregation and the data one uses to assess a sector will also be critical to ensuring the quality and legitimacy of the baselines.
- **Period for Earning CERs** – More analysis is needed to determine what the appropriate period for earning CERs may be for a given project. Although CERs can be accrued against the agreed baseline for a given amount of time, this time frame is likely to vary depending on project type. Timeframe options could be based on the following criteria: capital lifetime (estimated or actual); budget periods within the protocol; average time for capital recovery; or other factors. It may also be useful to consider the accuracy of a benchmark over time in the given sector, when evaluating the period for earning credits.
- **Key Characteristics of a Top-Down Baseline** – Further discussion is needed to determine what the key characteristics of a top-down baseline should be. For example, the baseline for project types or sectors should mostly likely be updated for new projects, perhaps with periodic (e.g., 3-5 year) recalculations or as a rolling average of a given interval (e.g., rolling 5-year averages) recalculated annually. Under this recalculation, baselines (both bottom-up and top-down) will tend to decline at some rate, based on projections of improvement. However, there may be important exceptions to this trend that should be accounted for in particular sectors or countries.
- **Marginal versus Average** - The data used to create a benchmark is a major determinant of the credits allowed under the benchmark. Two key choices are between (1) marginal and total capacity and (2) average and ‘better-than-average’ choices. Marginal capacity is more likely to be representative of current trends than total capacity. Better-than-average benchmarks (e.g. top 10%, expected new technology) are likely to create a more solid incentive and allow less free riders than an average baseline which, by definition, would allow half of the existing projects to qualify for credits. The decision of which choices to employ will significantly impact the functioning of the CDM and should be analyzed in greater detail.

- **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.

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.

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 JI 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.

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.

Industrial Energy Demand <u>Data Quality:</u> 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.
Fossil Fuel Supply <u>Data Quality:</u> 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)

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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 (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	—	

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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

EPA paper - discussion draft

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Developing Country Growth Targets

One of the goals of the USG in engaging developing countries in 'meaningful participation' under the FCCC is to achieve a commitment to quantified emission obligations (targets). The approach used in setting targets for Annex 1 countries – a fixed quantity target relative to a specific base year – is not realistic for most developing countries. Realistic targets for developing countries have to accommodate some level of emissions growth (although at reduced rates from business as usual). In addition, the relative uncertainty, or outright volatility, of 10-20 year economic growth projections in most developing countries means that fixed targets relative to a base year will be impractical to assess or negotiate.

Recognizing that emissions from developing countries must be permitted to grow, some analysts have proposed "growth targets" for developing countries. A growth target is a target set higher than current emission levels, but lower than business as usual projections. Growth targets provide for economic and emissions growth in developing countries, but lower emission growth rates. In addition, adoption of growth targets would allow developing countries to participate in international greenhouse gas trading. This paper examines alternative formulations for establishing growth targets, and suggests further analysis.

Options for Establishing Growth Targets

- *Fixed Quantity Growth Targets*

The simplest formulation of a growth target would be a fixed quantity target. A fixed quantity growth target will be difficult to negotiate for most developing countries due to uncertainties in projecting future economic growth and emissions. There are inherent risks in agreeing to targets that are too small (constraining economic growth) or too big (generating paper tonnes). A good example is Korea. Last year, the Koreans appeared concerned about the danger that a fixed quantity target would underestimate economic growth and become unduly restrictive. Conversely, Korea's unpredicted, large economic slump due to the recent Asian financial crisis illustrates the risk of agreeing to too large a budget filled with hot air.

A fixed quantity growth target may be appropriate for the most developed of the non-Annex I countries (i.e. Singapore) because the stability of their economic growth would be comparable to Annex I countries. While a fixed quantity growth target might be negotiated for a few countries, this options paper will focus primarily on the following two options that: 1) allow for emissions growth; and 2) are structured to accommodate uncertainties in economic development.

- **Carbon Efficiency Targets**

A carbon efficiency target based on CO₂ emissions/dollar of GDP is an alternative formulation. A carbon efficiency target would not set an absolute target on greenhouse gas emissions, but would set a target on future emissions relative to future economic output. The target could be set as:

- 1) An averaged carbon efficiency target, e.g., commit to an average emissions/GDP ratio for a specified period of time (budget period); or
- 2) A relative growth *rate* target, e.g., commit to a target ratio of the rate of change in emissions growth relative to the rate of change in economic growth, e.g., change in CO₂ emissions/change in GDP.

Pros An emission intensity growth target would have several advantages. First, because it does not set an absolute emission target, it reduces the perceived limitation on economic growth. Second, it avoids the uncertainty inherent in economic projections. If economic growth is lower than projected, the emissions target shrinks accordingly. If countries experience more rapid growth than expected, their emissions target expands to accommodate the growth.

Finally, it builds upon and encourages the natural reduction in emission intensity that occurs as a byproduct of economic development. Although, developing countries as a whole emit more emissions per unit of economic output than developed countries, improved energy efficiency and clean technology investment inevitably lead to declining emission intensity over time.

Cons A problem with an emission intensity approach is the difficulty in measuring indicators of economic productivity comparably. Volatile exchange rates, lack of infrastructure and large informal economic sectors in many developing countries makes measurement of GDP and other indicators difficult. Adjustments for 'purchasing power parity' further complicate such estimates.

- **Sectoral Targets**

A third option is the concept of sectoral growth targets. These might be formulated as: 1) absolute targets; 2) carbon efficiency targets; or 3) performance standard targets but would apply only to specific economic sectors or subsectors. Examples include targets set as emissions per kilowatt-hour of electricity generated; emissions per unit of industrial production, such as tons of steel; miles per gallon (liters per 100 kilometers) for its vehicle fleet, or energy consumption per unit of building floor area.

Pros Individual economic sectors or industries in developing countries may be more developed and more stable than their economies as a whole. For this reason, developing countries which oppose national targets may be willing to adopt sectoral targets. If a country with a small, inefficient and predominantly coal-based utility sector is poised to add a lot of capacity over the next decade or so, it would be comparatively easy to secure an agreement to achieve an improvement in the nation's average carbon/kilowatt hour. This would be especially true if we commit economic and technical assistance – through trading or other investment – to reach the target.

Cons While a sectoral target formulation would avoid the inherent difficulty of making national economic and emission projections, such an approach would still require measurement or projection of sectoral baselines. With a performance based target, such as miles per gallon or energy efficiency standards, translating performance to emission reductions could be inherently difficult.

Additionally, the potential for carbon leakage -- emission reductions in one place or program -- are offset by emission increases elsewhere -- may be exacerbated under a sectoral approach. Investment and emission reductions in one sector might be offset by emission increases in other sectors. Alternatively, industrial emission controls in one country may lead to increased production in the same industry within other countries in the region.

Next Steps

In conclusion, a combination of carbon efficiency and sectoral targets provides a workable framework for further analysis and development of developing country growth targets. The overall US strategy should guide decisions as to whether these targets should be pursued as uniform for all developing countries, differentiated by classes of developing countries, or on a case by case basis.

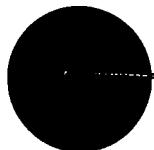
Technical issues which need to be further analyzed and addressed include:

- availability of accurate data;
- carbon leakage;
- cross-comparability of indicators or proxies for emissions and economic development;
- implications for costs; and
- implications for GHG trading .

USAID



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*cc: AM
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SA*

February 12, 1998

FAX -10 pages

TO: Distribution

FROM: David Hales, USAID

SUBJECT: Request for Comments on USAID's Discussion Paper on
Defining "Meaningful Participation" for Developing
Countries

Attached is a discussion paper that was circulated two weeks ago at David Sandalow's Assistant Secretaries' meeting. You may recall that EPA also circulated a paper on growth baselines at this meeting. At this morning's Sherman/Eizenstat level meeting, USAID and EPA were tasked with updating these papers with Agency comments and integrating them into one discussion paper for next week's Sandalow meeting. It is with this in mind, that we ask for any additional comments that your agency may have so that we can provide the White House with the latest version of the paper. Because of the holiday next week, we must ask for comments by COB Friday, 13th.

Please contact Leslie Black Cordes or Carla Koppell with questions or comments at 712-0552.

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Discussion Paper on Defining "Meaningful Participation" by Developing Countries: "Progressive Differentiation"

Summary

In his announcement of USG climate change policy, the President called for meaningful participation by developing countries. In later testimony before Congress, Administration witnesses refined the concept to focus on those developing countries that are significant emitters of greenhouse gases (GHGs).

Developing country participation is critical to the success of the Framework Convention on Climate Change (FCCC) in reducing the climate change threat; the majority of annual global emissions are expected to come from developing nations by the middle of the next century. This will largely be the result of economic development and increased demand for energy.

This paper outlines a framework for defining meaningful participation. It proposes USG support for an approach to defining developing country commitments that differentiates among nations based upon total equivalent GHG emissions and per capita GDP. The proposed approach is consistent with the precedent for differentiation among Annex 1 countries that was set in Kyoto. Additionally, it guarantees flexibility by ensuring that nations' obligations will increase as their economies develop and grow.

Background

The further definition of "meaningful participation by developing countries" will be critical to the success of the FCCC. It will determine whether or not the Framework Convention on Climate Change will help reduce sufficiently the rate of growth in GHG emissions in order to reverse the expected negative consequences of climate change. It also will be central in determining whether the Protocol is acceptable to the United States. Ratification of the Kyoto Protocol by the Senate will require a practical, consistent, understandable and rational definition of "meaningful participation".

To be viable, strategic and fair, the U.S. approach to defining "meaningful participation" should meet a range of criteria. It must:

- promote the fundamental goal of greenhouse gas stabilization at a safe level;
- advance the USG goal of legally binding commitments for all Parties;

- reinforce the comprehensive USG strategy for strengthening the Protocol;
- reinforce and remain consistent with USG development assistance policy;
- advance and strengthen the full and effective implementation of environmental standards for bilateral and multilateral investment in developing countries;
- promote reliance on market mechanisms, and advance opportunities for U.S. trade and investment;
- incorporate and advance the use of "win-win" or "no-regrets" approaches;
- clearly include the concept of advancement, or "evolution" for all Parties; and,
- be premised on data that is reliable and verifiable.

The Proposed Approach

There is substantial consensus within the USG that Parties should develop a flexible definition of "meaningful participation" that is based upon differentiated indicators. USAID proposes the concept of *Progressive Differentiation* as one such approach.

The underlying philosophy of *Progressive Differentiation* is that the responsibilities of all Parties will evolve and progress over time, and that their efforts will decelerate GHG emissions, ultimately reducing the consequences of climate change. (In some discussions in Kyoto, we referred to this as "co-evolution".)

The definition of obligations under *Progressive Differentiation* is premised on the assumption that those nations that are relatively wealthier and those that have the highest level of annual net greenhouse gas emissions have a greater capacity and a greater obligation to contribute to GHG mitigation efforts. This obligation must be complemented by a recognition that there are significant economic, social and political differences among nations; to be effective in the long run, each country must be given the flexibility to determine the most appropriate approach for its contribution within a target.

For example, if countries are arrayed graphically based upon their per capita gross domestic product (GDP) (x-axis) and their level of net greenhouse gas emissions (y-axis), the relative position of nations with regard to emissions and GDP per capita can be viewed (see Attachment A). Countries roughly fall into four categories: high emissions and high per capita GDP (Category I--predominantly Annex I countries); low emissions and low per capita GDP (Category II--such as many African nations); high emissions and low per capita GDP (Category III--such as India and

China); and low emissions and high per capita GDP (Category IV-- such as Singapore and Israel) (see Attachment B).

- Category I includes most Annex I countries. All countries in this Category have accepted legally binding limits on GHG emissions.
- Category II contains the majority of the Parties to the FCCC. These countries contribute relatively little to global anthropogenic GHG emissions and have limited financial resources. As a result, these countries are least responsible for increasing concentrations, least capable of changing the course of events, and often most vulnerable to the impact of climate change.
- Category III contains those rapidly developing countries that will, in a later budget period of the Protocol, contribute a majority of global net GHG emissions each year. Countries in Category III must control their emissions if the FCCC is to achieve its goals. These countries should be urged to take paths to climate-friendly development that are in their economic and social interest so that climate change is not the cost of their economic development.
- Category IV includes countries that do not directly contribute significantly to increasing emissions, but which, because of their wealth, consumption and investment patterns, as well as their regional influence, may have important direct and indirect impacts on emission patterns.

Using *Progressive Differentiation*, each category would have different obligations under the FCCC. Depending upon the category within which a nation fell, its responsibilities would vary.

- Category I- In addition to existing commitments to "quantified emissions limitation or reduction obligations" (QELROS), nations in Category I could develop and fund aggressive research and development efforts, commit to and promote flexible, market-based incentives to implementation, promote domestic energy efficiency measures, expand use of renewable energy, and provide financial and technical assistance to nations in the other three categories. These nations could also be asked to ensure that their overseas investment programs are fully consistent with GHG emissions reductions goals, and use their influence

with multilateral lenders to ensure that international lending policies and practices are consistent with international goals. Countries in category I should serve as models of what needs to be done.

Category II- For nations in Category II, the implementation of actions to which they have already committed under the FCCC would represent meaningful participation. Nonetheless, there are strategies these countries could pursue that would promote their national interests and contribute to the stabilization of GHG concentrations. Many of these countries might also find it in their interests to accept QELROS in order to participate in emissions trading. Their participation could benefit industries in countries with emissions reduction targets, and provide funds to phase-out economically marginal GHG-producing industries, replacing them with more environmentally and economically sustainable activities. In ways that are fully consistent with their current obligations, these nations could commit to undertaking an analysis that would lead to development of national climate change strategies with timeframes for implementation.

Category III - For countries in Category III, movement toward QELROS would be essential. "Meaningful participation" at this time could be defined as:

- commitment to move toward a QELRO as they "graduate" into Category I;
- commitment to a growth baseline reduction and implementation schedule;
- commitment to develop a national strategy for introducing specific programs and actions that includes a detailed implementation schedule; and,
- commitment to commit, under the auspices of the FCCC, to an implementation schedule for a growth baseline and a national strategy.

Because of the vast differences among countries in Category III, substantial flexibility and differentiation of strategies would be needed to allow the approach of each country to be tailored to meet local opportunities and constraints.

Category IV- For countries in this category "meaningful participation" would include the same measures as for those in Category III, as well as additional commitments. These could include:

- an analysis that identifies the impacts of domestic consumption and investment patterns on emissions in other countries, and the development of strategies for reducing those impacts; and
- an obligation to provide financial and technical assistance to other countries via contributions to multilateral assistance efforts.

By categorizing countries based upon this matrix and assigning each category different obligations under the FCCC, the Protocol could differentiate among Parties in an objective manner, and create a framework through which countries could progressively "graduate" from one level of obligations to another, as their per capita GDP and level of net emissions changed.

This flexibility and differentiation should not imply anarchy. It should be structured to ensure verifiability and some degree of commonality among Parties. It would recognize that there are national conditions that will determine the appropriate paths to reducing the rate of growth in net GHG emissions.

This is an outline of one approach, providing a basis for further development and discussion. The Department of State has suggested the formation of a "meaningful participation task force" to which we might like to refer this outline for follow-up. If the premise of this paper is correct, that reducing emissions and stabilizing concentrations of GHGs, and ratification of the Kyoto Protocol require a practical, consistent, understandable and rational definition of "meaningful participation", this concept may provide a starting point.

Issues

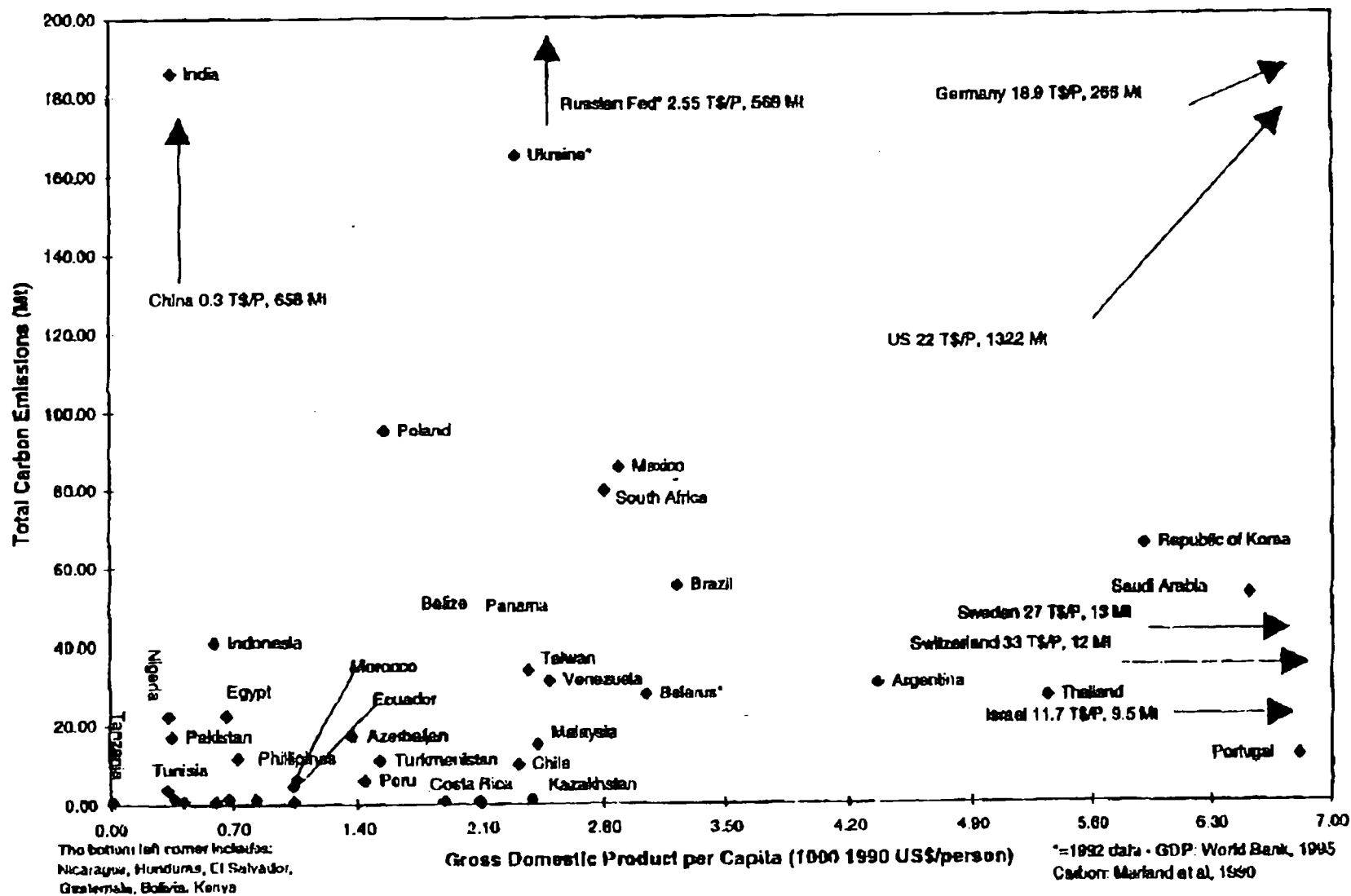
- . Are "total net emissions" and "GDP per capita" the appropriate measures?
- . Does a per capita figure for GDP capture per capita emissions? (That is, do per capita emissions rise in parallel with per capita GDP?)

If not, how can we capture each of the three important dimensions-- total emissions, per capita emissions, and national wealth?
- . How can the borders between categories be set? (We would advocate leaving them undefined as long as possible to provide flexibility in discussion and negotiation, and to let the concept mature and gain support.)

What is an alternative approach to presentation? Is the element of "progressive" commitments better captured in a different way? (See alternative diagram for discussion.)

Data is currently for emissions rather than net emissions. The division of countries/categories should be revisited and refined as data improves, and definitions for "sinks" are finalized.

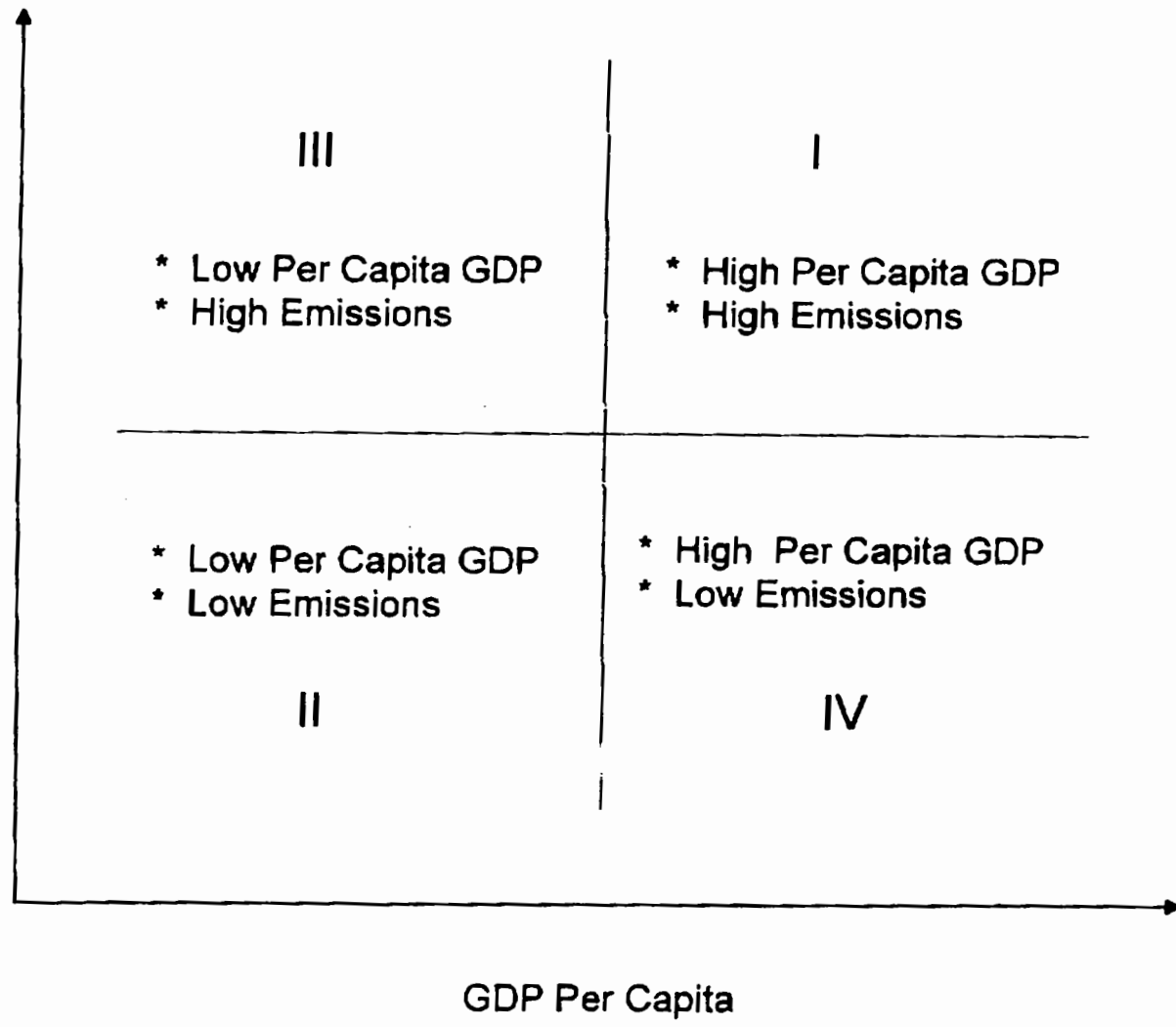
Gross Domestic Product Per Capita vs. Total Carbon Emissions (1990)
DRAFT



Attachment B

- Progressive Differentiation -
Emissions & Income Categories

Total Net
GHG Emissions





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cc: Am
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JA

MEMORANDUM FOR DISTRIBUTION

TO: Melinda Kimble, AAS OES
David Sandalow, CEQ

FROM: David F. Hales, DAA
Jeff Seabright, G/ENV/EET

SUBJECT: USAID's Programs and Activities that Support the USG
Developing Country Strategy

Summary

This memo provides a brief summary of USAID's current and prospective climate change programs. USAID's activities complement the broader USG diplomatic strategy for achieving "meaningful participation" from developing countries, and are consistent with the types of activities that would need to be undertaken by developing countries under a "growth baseline" scenario. We will continue to keep you informed of new climate change programs and activities in order to take advantage of the synergies many of our programs bring to the diplomatic process.

Background

USAID's climate change policy goals are closely related to the United States' policy of engaging developing countries in the pursuit of sustainable development. They are:

- Decreasing the rate of growth in net greenhouse gas emissions by decreasing greenhouse gas sources and maintaining or increasing greenhouse sinks;
- Increasing developing and transition country success ("meaningful participation") in achieving the goals of the United Nations Framework Convention on Climate Change (FCCC); and
- Decreasing developing country vulnerability to the threats posed by climate change.

As a critical element of the U.S. development assistance effort, USAID's bilateral assistance program provides developing countries with the institutional, regulatory and technical assistance they need to address climate change. USAID's contribution falls into two broad categories: bilateral programs and global activities. Our bilateral programs are guided by the Action Plan developed in response to the President's Global Climate Change Initiative for developing countries. This Initiative, designed in consultation with the State Department and relevant domestic agencies, focuses on "win-win" opportunities to promote sustainable energy, urban and forest management practices, and reliance on market forces -- activities that offer climate change benefits while promoting other sustainable development and environmental objectives. This approach has helped build and maintain support for U.S. policies among members of the business and NGO communities in developing countries even when their official policy stances are directly contrary. They represent a valuable asset in USG effort to affect "meaningful participation" by developing countries.

USAID's Climate Change Initiative will focus its programs and activities in key developing nations and regions with a relatively large potential to mitigate or sequester greenhouse gas emissions. Our key countries include: Mexico, Brazil, Central America (regional), India, Indonesia, Philippines, Russia, Ukraine, Central Asia (regional), Poland, South Africa and Central Africa (regional). In all but China, where USAID is prohibited from working, USAID's key countries are consistent with the focus the State Department has taken in its diplomatic efforts to affect "meaningful participation" from developing countries.

USAID's Climate Change Programs and Activities

As Agencies begin to implement their obligations under the FY 1998 Budget, and plan for future budgets, an effort should be made to coordinate and leverage the efforts of the USG. As resources grow scarcer, an effort to develop an interagency consultative process to develop and synchronize programs grows more critical.

The following is a short summary of USAID's current activities and programs in the area of climate change, as well as some potential activities for your consideration. For a complete description of our current climate change activities, we invite your review of USAID's Climate Change Initiative which has detailed sectoral and country specific descriptions.

USAID's Environment Center in Washington maintains a range of technical and policy programs in such areas as coastal zone management, energy, urban and infrastructure planning,

biodiversity, forestry, land use planning, transportation, and water that support USAID field missions in their climate change work. With expert support from universities, consulting firms, NGOs, multilateral development banks, think tanks, and trade associations, USAID provides assistance for policy development, regulatory reform and sector restructuring, training, private sector partnerships, research, and information management.

Current Activities

USAID's Climate Change Initiative is the framework for most of the Agency's long term climate change activities and is designed to help developing countries plot a "climate friendly" path to development. The primary component of the Initiative will be a five-year minimum of at least \$150 million per year in bilateral foreign assistance for climate change-related programs. In addition, USAID has the potential to use development credits to leverage at least \$250 million over five years in additional funds dedicated to "climate friendly" investment projects.

* **"Win-Win" Workshops** -- USAID is planning workshops in several key countries (TBD) on the threats posed by climate change and the opportunities to reap other benefits by taking action to combat climate change. These workshops offer an opportunity to engage key country leaders and policy makers in focussed dialogue well before COP-4. Preliminary planning on three workshops began last year.

* **Economic Development and Climate Change** -- USAID is working with the Harvard Institute for International Development on economic growth and climate change issues. A workshop for senior policy makers from developing countries, including senior UN diplomats, is scheduled to take place at Harvard, July 6-17, and represents an excellent opportunity to target key decision makers and key issues.

* **Technology Cooperation Agreements** -- USAID, together with other U.S. agencies and the U.S. Country Studies Program, initiated a pilot project in August 1997 to develop frameworks for climate change technology cooperation with developing countries. These pilot projects are designed to evaluate the potential efficacy of an approach toward developing bilateral and multilateral agreements for technology cooperation to reduce greenhouse gas emissions. A November kick-off workshop, attended by participants from several key developing countries, the International Energy Agency, the Donor Assistance Committee and the European Union, has generated a high level of interest and enthusiasm on the part of participating countries, international donors and the private sector investment community. An informal session at Kyoto highlighted initial pilot projects in Indonesia, Brazil and Kazakstan.

* **Vulnerability Analyses** -- USAID is about to undertake a series of studies to identify geographic areas and sectors in which developing countries will be particularly vulnerable to the threats posed by climate change. USAID will convene experts and commission studies that help specify the vulnerabilities developing nations face as well as key strategies for adaptation. These reports initially will focus on threats to coastal zones, food security, public health and biodiversity. They will be complemented by assessments of the importance of early warning systems, disaster preparedness and surveillance.

* **Partnership Program with the Private Sector** -- USAID will expand its private sector partnerships to include an industrial partnership program in the hopes of demonstrating to the U.S. business community and developing countries the benefits of private sector investment in meeting the climate challenge. A "summit" of the 36 USAID-funded international utility partnerships will be held in Houston on September 10-11 (as part of the World Energy Congress) and will involve over 200 developing country participants.

* **Research on Sinks and Developing Countries** -- USAID also is continuing its funding of research on the linkages between sinks and developing country issues, following up on the Winrock research on carbon sequestration analysis.

* **Southeast Asia Climate Prediction Program** -- In cooperation with NOAA and State, USAID is working to promote the development of an early warning and response system for major weather-related anomalies in SE Asia.

Proposed Activities

* **"Growth Baselines" Analytical Work** -- USAID is exploring the concept of Growth Baselines in conjunction with other agencies. Under this approach, developing country emissions would not be capped in absolute terms, but countries would have to ensure that their GHG emissions grew at a slower rate than their economic output -- in other words growth would not be restrained but countries would commit to improving the carbon efficiency of this growth. EPA began funding this important work last year, and we have received proposals for follow-on activities. We will coordinate with EPA and State to assure that our follow-on support for this work is appropriately targeted. One possible approach would be an effort focused on piloting the application of alternative growth baselines in one or two countries.

* **Analytical Work on Emissions Projections** -- USAID has been asked by the State Department to provide data on projected greenhouse gas emissions (especially the non-CO2 gases) in developing countries for use in the negotiation of future

commitment targets. USAID, in consultation with Lawrence Berkeley National Laboratory, has begun initial work in this area, some of which was used as the appendix to our policy paper on "meaningful participation".

*** Emissions Trading** -- Making the umbrella a reality will require extensive work with Russia and Ukraine to develop a basic understanding of the concept of emissions trading in order to enable them to collaborate in its realization. Embassies and USAID missions in Moscow and Kiev are interested in supporting this activity. We will be sure that it is fully coordinated with OECD/IEA efforts along the same lines to avoid duplication and leverage both investments.

*** Clean Development Mechanism Building Blocks** -- USAID, taking its lead from the State Department, will focus specific attention on the potential for hemispheric collaboration on climate change. The US-Brazil "Common Agenda" meeting in March and the Santiago Hemispheric Summit of the Americas in April are being discussed as fora for the advancement of USG policies, with a special emphasis on market mechanisms. Relevant USAID research includes analysis of the potential volume of CDM transactions in IAC or key countries to demonstrate the benefits of CDM to developing countries and give the USG a better grasp of the potential scale of credits that might be exchanged through this mechanism.

*** Carbon Backcasting Study Follow-up** -- USAID plans to continue work with the World Bank on its global overlays program, carbon pricing and the Carbon Fund. USAID funded the scoping work on the Bank's carbon backcasting study and we are in discussions with the Bank on follow-on options that will focus on developing practical methodologies for calculating positive and negative externalities in Bank decisions prior to funding commitments.

*** GCC focus for CGIAR Annual Meeting** -- USAID is working with the World Bank to help sharpen the focus of the CGIAR system on links between agriculture and climate change. In support of this effort, USAID is supporting an analysis of the relevance of the current CGIAR research portfolio to climate change sequestration and adaptation that will lead to recommendations for new research directions.

*** International Conference on Urbanization and Climate Change** -- Today's investments in urban and transportation infrastructure and buildings may determine patterns of energy use for the next century. Most investments have a lock-in effect of two to four decades. USAID is scheduling a conference later this year to detail the problem, and develop specific action and policy recommendations for key decision makers.

6

* **International Donor Conference on Technology and Developing Countries** -- At the suggestion of the State Department, USAID is considering the prospect of convening a senior policy-maker level donor/MDB conference on technology transfer and developing countries. There has been a lack of systematic donor coordination on the subject and discussions in Kyoto suggest that this might be an excellent way to initiate a larger donor collaborative effort on climate change.

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February 12, 1998

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Treasury	Ion Gruber	622-2633	622-0563
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	Jim Rubin	514-0557	514-2701
Interior	Brooks Yeager	208-4561	208-6182
	Brooke Shearer	208-1873	208-6291
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NEC	Peter Orszag	456-2223	456-5358
	Bill Antholis	456-5334	456-2198
CEQ/NSC	David Sandalow	456-2710	456-6224

FROM: USAID/G/ENV/DAA, David F. Hales

SUBJECT: USAID's Programs and Activities that Support USG
Developing Country Strategy

Attached is a copy of memo on above subject.

Attachment: A/S

QUANTITATIVE COMMITMENTS: SOME TECHNICAL CONSIDERATIONS

Making progress on the implementation of the Climate Convention and completing the unfinished business of the Kyoto Protocol requires much discussion—technical and political—of numerous issues. Such progress requires not only an awareness of the problems but also a firm technical understanding of the many options that are available for solving them. The Annex I Experts Group (AIXG) has served to improve that understanding of technical issues. This paper focuses on another such technical issue that the AIXG might usefully consider.

There are many ways in which all Parties can contribute to the goals of the Climate Convention, e.g., Annex I and non-Annex I Parties can participate in the Clean Development Mechanism, etc. If, among these many options, a non-Annex I Party were to express an interest in adopting a quantitative commitment – an emissions target – how could it do so in a way that is consistent with its sustainable development objectives and with the objectives of the Climate Convention? To what extent can a target that entails a deflection from business as usual (BAU) emissions contribute to these multiple objectives? Is there an objective basis and sound methodology for establishing whether a quantitative commitment could be feasibly attained, consistent with the development objectives of the Party? These technical considerations include the following:

I. Calculating Baseline Emissions

- If a Non-Annex I Party were to express interest in taking on a quantitative commitment to abate the increase in its greenhouse gas emissions, how would its baseline be calculated?
- How might Non-Annex I Parties' baselines be differentiated from other non-Annex I Parties or from Annex I Parties? By unit of measurement, year, or basket of gases?
- What, if any, sinks would be included?
- What are the environmental and economic implications of various baselines? ?

II. Projecting BAU Emissions

The BAU projection provides a foundation for the analytical process. Once a country has determined what its emissions would otherwise have been, it can begin to assess the costs and benefits of policies to abate its emissions.

- What methodology for this projection will be most appropriate in different circumstances?
- If no one methodology is always appropriate what common principles can guide the process?
- How can the projection incorporate a comprehensive view of the economy?
- How will it reflect trends in the macroeconomy, such as aggregate economic output, structural change over time, etc. as well as sector- and industry-specific trends, such as technological improvements or other changes in production practices that affect energy consumption and energy mix?
- Where are the greatest potentials for growth, and how will that affect the structure of the economy?
- How can the sectoral and industry projections be made consistent with the overall economy projections?
- What are the data requirements for the formulation of a BAU projection?

III. Deviations from the Baseline

After formulating a BAU emissions projection, how would Party elaborate alternative possible targets that further the objectives of the Climate Convention and support its own environmental and economic objectives?

How can these objectives be met in a mutually supportive manner?

- What is the range of possible abatement measures available?
- How can a Party identify the technologies, processes, and policy options that can curb emissions?
- How can the costs and benefits of these actions be estimated?

- Which abatement measures are likely to provide a net economic benefit (i.e., no regrets measures), which are likely to provide local environmental (ancillary) benefits and what is the cost-effectiveness of other potential actions?
- How can these measures be considered in an integrated manner?

A. No Regrets Measures

- What do the industry and sector specific emissions projections tell us about the underlying relationships between output and emissions?
- What specific characteristics of each sector or industry – e.g. energy profile, production technologies and practices, role in international trade, regulatory framework, pricing structure, age of capital stock, and projected investment demand – are most influential on that relationship between output and emissions?
- What specific measures are suggested by this relationship?
- What other distortions or inefficiencies exist that might provide both economic and environmental benefits? For example, elimination of subsidies on fossil fuel consumption or production.

B. Other Deviations

- In addition to no-regrets measures and measures that provide ancillary benefits, what other options for reducing emissions exist for non-Annex I Parties considering a quantitative commitment?
- What are the relative costs and benefits – both economic and environmental – of such options?
- What are the potentially offsetting benefits from participation in international emissions trading?

C. Ancillary Benefits

Apart from the direct effect on climate, there are other potential local benefits of abatement. For example, some actions to abate greenhouse gases can improve local air quality.

- What are the links between public health benefits and abatement of greenhouse gas emissions?
- How do those links vary by greenhouse gas? By fuel mix?
- What are the analytical tools and sources of data that a country can use to elaborate these specific benefits?

D. Integrated Analyses

Since so many sectors of an economy are intricately related to activities in other sectors, trying to assess the effects of policies on each sector independently without an integrating tool could result in a misunderstanding of the effects of potential abatement policies.

- How can all the feedbacks and relationships in an economy be modeled, both across end-use sectors as well as up and down the energy supply stream?
- How can such models be integrated with existing international models to evaluate the opportunities for participation in international trading?

IV. Risk and Uncertainty

Even under the best analytical circumstances, e.g., where accurate data and integrating tools are widely available, much uncertainty surrounds BAU emissions projections and estimates of the total costs and benefits of deflecting from these projections. A country that takes on a fixed commitment faces the risk, for example, that its economy will grow more rapidly than expected, resulting in an inadvertently stringent target. On the other hand, a country's economy could grow less rapidly than expected, resulting in an inadvertently lax target. Non-Annex I governments may be particularly averse to the former type of risk.

- How could quantitative commitments be designed to reduce uncertainty and mitigate these risks?
- Could targets be indexed to future values of economic or other, possibly demographic, values?

- Alternatively, could targets be made subject to later review based on specific changes in economic or other values?
- How could indexing be achieved without creating perverse incentives and in a manner that facilitates participation in international emissions trading?

V. Future Work

The AIXG could quickly review the literature on calculations of emission baselines and projections. Then it could work to develop in much more detail the analysis of potential deviations from baseline, adapting existing work to the specific characteristics of non-Annex I Parties.

***** U N C L A S S I F I E D *****

FACSIMILE COVER SHEET
U.S. DEPARTMENT OF TREASURY
OFFICE OF ECONOMIC POLICY

DATE: 4-20-99

NUMBER OF PAGES TO FOLLOW: 4

FAX TO: Joe Aldy

ADDRESSEE'S FAX NUMBER 395-6870

ADDRESSEE'S CONFIRMATION NUMBER 395-1455

FAX FROM: Adele Morris

SENDER'S FAX NUMBERS: (202) 622-1294

SENDER'S CONFIRMATION NUMBER: 622-2350

COMMENTS/SPECIAL INSTRUCTIONS:

I like your approach to the options & the layout of the pros & cons. Thanks for the opportunity to comment. My new email is

adele.morris@do.treas.gov.

Could you send me the next version?

Cheers -
Adele

p.s. We should put in something about dev. countries being able to choose between the two approaches, maybe with an x% vs. x-y% requirement for opt. 2 vs. opt. 3.

For use in international negotiations; close hold; do not cite or quote; preliminary draft 4/12/99

Nature of Commitment: Binding Emissions Target Related to Economic Performance

A binding emissions target for a developing country would be a quantitative restriction on emissions, but would be contingent on economic indicators, such as GDP growth, in the future. There are two sub-options for this approach that are conceptually similar:

- Indexed Quantitative Target. Agree to a quantitative target now with a publicly announced forecast of economic growth for 1999-2007. In 2007, for every percentage point that GDP turns out to be higher (or lower) than forecast, the emissions target is raised (or lowered) by X%. If a developing country claimed that other economic or demographic indicators would better predict its emissions, then these indicators could be used as a substitute for GDP growth.
 - The target would be a percentage of a specific base year, however, a base year other than 1990 is recommended for developing countries. *Explain why at some point*
 - The target would be set above current emission levels but below projected BAU emissions levels. Hence, it would allow for some growth in emissions.
- Greenhouse Gas Intensity Ratio. Agree to a ratio of greenhouse gas emissions per unit of GDP now, and convert this ratio into a quantitative target for the commitment period based on GDP throughout the 2008-2012 commitment period.
 - The ratio when converted should provide a target set above current emission levels but below projected BAU emissions levels.
 - The target ratio would be set well in advance of the 2008-2012 commitment period, but "adjustments" would occur throughout the commitment period.

Common to both options are:

- The target would be binding over 2008-2012.
- The ^{commitment made} target would be set well in advance of the 2008-2012 commitment period, and the ^{target set in 2007} amount
- The target could serve as the basis for participation in international trading and joint implementation.

PELOS

options for approaches to 2nd commitment period.

- indexed?
- fixed?
- can't opt out later

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By eliminating the risk associated with uncertain future economic performance, this approach can address most, if not all, developing country concerns about targets limiting economic development and most, if not all, EU concerns about targets generating "tropical hot air." The indexed option would address uncertainty between now and the beginning of the commitment period, while the intensity option would address uncertainty between now and the end of the commitment period. To the extent that either option addresses these concerns, this approach could gain more traction in negotiations than the "status quo." In the case of the intensity option, however, the benefits of additional flexibility could be offset by the costs of complications for trading.

A binding target could provide substantial environmental benefits. If set slightly below BAU, it could result in lower emissions than would occur otherwise and forestall leakage.

Large ancillary benefits, too.

A binding target would likely allow developing countries to participate in international emissions trading and joint implementation. This could provide economic gains to developing and industrialized countries alike.

Some on the Hill may complain that developing countries have more flexibility in achieving their targets than industrialized countries, i.e., the United States. (The intensity target provides even more flexibility as elaborated than the indexed target.) They may not consider the commitment comparable or acceptable, especially in the case of the greenhouse gas intensity ratio.

While the intensity ratio would be converted into tons at the end of the period, and could presumably serve as the basis for trading, there could be complications for trading. If trading rules include some form of buyer or hybrid liability, the uncertainty regarding a country's actual target could serve as a disincentive for potential buyers to engage in trading arrangements with this country. If trading rules include some form of seller liability, the uncertainty could serve as a deterrent for potential sellers. Internationally, some potential buyers, e.g. Umbrella Group countries, have already expressed concerns that so-called "soft" targets would impede trading.

(Doubles measurement capacity req's.)

There may be difficulties in explaining and negotiating the basis for indexing targets, e.g., the percentage "X". Likewise, there may be difficulties in explaining and negotiating the basis for an emissions to GDP ratio.

This approach may not gain traction with countries arguing for "moral obligation." Although addressing uncertainty, this approach does not address developing country and EU concerns that industrialized countries must "go first."

Need to set a BAU for economic growth — difficult where there are "official est." (Although you can choose X accordingly)

Economic growth is not perfectly correlated with emissions. We could check your growth data to see how it has been historically.

Relies on two uncertain measures, both now poorly constructed.

& the lag, even if certain would tons be available?

split out

U.S. will have annual true-up, possibly.

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Option 3: Transitional Targets

Overall Strategy:

- This option would provide quantitative aims for developing countries, in the form of non-binding transitional targets. A target could cover a short period (e.g., two years). An evaluation of performance during this period could serve as the basis for trading. This approach is analogous to country-wide CDM. With transitional targets, credits would be generated only during an ex post evaluation and there would be no downside risk if efforts to abate emissions were not successful.

Nature of Commitment: Non-Binding Emissions Target with Ex Post Trading Opportunities

A non-binding quantitative commitment for a developing country could take the following form:

- The commitment would consist of a set of fixed targets. Each target would be specified as a percentage of the same base year. We would, however, recommend a base year other than 1990.
→ for a continuous set of commitment periods
 - The targets would be set above current emission levels but below projected BAU emissions. Hence, the targets would allow for some growth in emissions.
 - The duration of each target would be less than a full Annex B commitment period. Thus, a developing country would have multiple non-binding targets during the 2008-2012 period. These targets would trace a path slightly below BAU emissions.
 - The targets would be set well in advance of the 2008-2012 commitment period. *] See previous comment.*
 - After each target is evaluated, the developing country may sell the emissions representing the difference between its actual emissions and its non-binding cap. *] Same lag problem, especially for annual domestic true-up countries who buy abroad.*
- PROS
- This approach would lower the bar for developing countries. It could generate momentum in negotiations with developing countries.

→ Couldn't you index your set of targets? or would that be too generous? Maybe index them down only?

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- Non-binding targets would provide developing countries the opportunity to experiment with policies and measures to abate emissions, as well as attract investment for abatement activities and projects.
- Transitional targets provide only upside gains and could prepare developing countries for binding targets. The opportunity for gain also applies to industrialized countries, because these countries would benefit from developing countries generating credits from their transitional targets and selling them internationally.
- Short transitional target periods (e.g., two years) provide the basis for developing countries to sell emissions allowances throughout the first Annex B commitment period, much as they are able to sell CDM certified emissions reductions. There would, however, be more uncertainty in the trading system with non-binding transitional targets than with binding emissions targets. Even longer transitional periods could create greater uncertainty in the trading system.

CONS

- Some on the Hill may criticize this non-binding approach as providing developing countries with too much flexibility. Since this option carries no downside risk for developing countries, the Hill may not consider these commitments to be comparable or acceptable.
- Setting targets several years in advance could risk generating "tropical hot air," especially if the targets are set close to today's projection of BAU emissions, although there is also a risk that the CDM would generate "anyway tons." The risks attributed to the transitional targets could stimulate criticism by the EU and environmental NGOs. (Could index down)
- The opportunity to trade without risk could create a disincentive to take on binding targets.
- This approach may not generate significant emissions reductions based on the Annex I experience of this decade. However, the potential economic gains from the opportunity to engage in trading may be substantial enough to provide the incentive necessary to stimulate action even in a voluntary regime.
- Short commitment periods lower the expected period to recoup returns on capital investments that

Option 4: PAMs and CDM in 2008-2012

Overall Strategy:

lower emissions,
depending on how certain
continued participation (w/binding targets)

11 is.
- Separate option to evolve set of targets to binding.
(Like gradual lowering of tariffs under GATT?)

DEPARTMENT OF STATE
BUREAU OF ECONOMIC AND BUSINESS AFFAIRS
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2201 C Street, NW
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FAX COVER SHEET

TO:	<i>Joe Aldy</i>	PHONE:	395 1455
		FAX:	395 6870
FROM:	Victoria A. Greenfield	PHONE:	202-647-6985
		FAX:	202-647-5713
DATE:	2/19/99	TIME:	

Number of pages including cover sheet: 4

Subject:

Messages:

DRAFT

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2/19/99

QUANTITATIVE COMMITMENTS: SOME TECHNICAL CONSIDERATIONS

Making progress on implementing the Climate Convention and completing the unfinished business of the Kyoto Protocol requires much discussion – technical and political – of numerous issues. Such progress requires not only an awareness of the problems but also a firm technical understanding of the many options that are available for solving them. In view of the Annex I Experts Group's (AIXG) contribution to the technical understanding of such options, this paper focuses on another option that the AIXG might usefully consider.

There are many ways in which all Parties can contribute to the goals of the Climate Convention, e.g., Annex I and non-Annex I Parties can participate in the Clean Development Mechanism, etc. If, among these options, a non-Annex I Party were to express an interest in adopting a quantitative commitment – an emissions target – how could it do so in a way that is consistent with its sustainable development objectives and with the objectives of the Climate Convention? To what extent can a target that entails a downward deflection from business as usual (BAU) emissions contribute to these multiple objectives? Is there an objective basis and sound methodologies for establishing whether a quantitative commitment could be attained feasibly, consistent with the sustainable development objectives of the Party? These technical considerations include the following:

I. Baseline Emissions Calculations

Commitments for Annex I Parties are expressed as a percentage of baseline emissions. Calculations of baseline emissions involve base years (e.g., 1990), specific units of measurement (CO₂ equivalent emissions), and particular gases (CO₂, methane, N₂O, HFCs, PFCs, and SF₆). For some Parties they also involve land use change and forestry.

- If a Non-Annex I Party were to express interest in taking on a quantitative commitment to abate the increase in its greenhouse gas emissions, how would its baseline be calculated?
- How might a Non-Annex I Party's baseline be differentiated from other non-Annex I Parties that take on targets, or from Annex I Parties? By year, unit of measurement, or basket of gases?
- What, if any, emissions and sequestration from land use change and forestry would be included?
- What are the environmental and economic implications of various baselines?

II. BAU Emissions Projections

The BAU projection provides a foundation for the analytical process. Once a country has determined what its emissions would otherwise have been, it can begin to assess the costs and benefits of policies to abate its emissions.

- What methodology for this projection will be most appropriate in different circumstances?
- If no one methodology is always appropriate, what common principles can guide the process?
- How can the projection incorporate a comprehensive view of the economy?
- How will it reflect trends in the macroeconomy, such as aggregate economic output, structural change over time, etc. as well as sector- and industry-specific trends, such as technological improvements or other changes in production practices that affect energy consumption and energy mix?
- Where are the greatest potentials for growth, and how will that affect the structure of the economy?
- How can the sectoral and industry projections be made consistent with the overall economy projections?
- What are the data requirements for the formulation of a BAU projection?
- To what extent should current policies and measures to address climate change, air quality, or energy efficiency be included in the BAU emissions projection?

III. Downward Deflections from BAU Emissions

After formulating a BAU emissions projection, how would a Party elaborate possible targets that further the objectives of the Climate Convention and support its own environmental and economic objectives?

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How can these objectives be met in a mutually supportive manner?

- What is the range of possible abatement measures available?
- How can a Party identify the technologies, processes, and policy options that can curb emissions?
- How can the costs and benefits – both economic and environmental – of these actions be estimated?
- Could some abatement measures provide a net economic benefit? What other measures are available? Which measures are likely to provide local environmental benefits?
- How can these measures be considered in an integrated manner?

A. Identifying and Assessing Abatement Opportunities

- What do sector and industry specific emissions projections tell us about the underlying relationships between output and emissions?
- What specific characteristics of each sector or industry – e.g., energy profile, production technologies and practices, role in international trade, regulatory framework, pricing structure, age of capital stock, and projected investment demand – influence the relationship between output and emissions?
- What specific opportunities are suggested by this relationship?

A1. No-Regrets Measures

- Could some measures provide a net economic gain, independent of their impact on climate?
- Can existing distortions or inefficiencies be removed to provide both economic and environmental benefits? For example, elimination of subsidies on fossil fuel consumption or production.

A2. Other Measures

- In addition to no-regrets measures, what other options for reducing emissions exist for a non-Annex I Party considering a quantitative commitment?
- What are the relative costs and benefits – both economic and environmental – of such options?
- What are the potentially offsetting benefits from participation in international emissions trading?

B. Identifying and Assessing Ancillary Benefits

Apart from the direct effect on climate, there are other potential local benefits of abatement. For example, some actions to abate greenhouse gases can improve local air quality.

- What are the links between public health benefits and abatement of greenhouse gas emissions?
- How do those links vary by greenhouse gas? By fuel mix?
- What are the analytical tools and sources of data that a country can use to elaborate these benefits?

C. Integrating the Analyses

Since so many sectors of an economy are intricately related to activities in other sectors, trying to assess the effects of policies on each sector independently without an integrating tool could result in a misunderstanding of the effects of potential abatement policies.

- How can all the important feedbacks and relationships in an economy be modeled, both across end-use sectors as well as up and down the energy supply stream?
- How can such models be integrated with existing international models to evaluate the opportunities for participation in international trading?

IV. Risk and Uncertainty

Even under the best analytical circumstances, e.g., where accurate data and integrating tools are widely available, much uncertainty surrounds BAU emissions projections and estimates of the total costs and benefits of deflecting from these projections. A country that takes on a fixed commitment faces the risk, for example, that its economy will grow more rapidly than expected, resulting in an inadvertently stringent target. On the other hand, a country's

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economy could grow less rapidly than expected, resulting in an inadvertently lax target. Non-Annex I governments may be particularly averse to the former type of risk.

- How could quantitative commitments be designed to reduce uncertainty and mitigate these risks?
- Could targets be indexed to future values of economic variables?
- Or, could targets be made subject to later review based on specific changes in economic variables?
- How could indexing be achieved without creating perverse incentives?
- Would some manner(s) of indexing facilitate participation in international emissions trading?

V. Future Work

The AIXG could quickly review the literature on baseline emissions calculations and BAU emissions projections. Then it could work to assess data needs and modeling capacity and to develop a detailed analysis of potential downward deflections from BAU emissions, adapting existing work on abatement opportunities and risk mitigation to the characteristics of non-Annex I Parties.

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Miotke, Jeffery A

From: Covington, Philip S
Sent: Wednesday, August 25, 1999 8:28 PM
To: Kimble, Melinda L; Hambley, Mark G; Miotke, Jeffery A; DeRosa, Barbara M
Cc: Rocha, V Manuel; Burton, Guy; Warren, Glenn S
Subject: Argentine Target - Need for Early USG In

As you know, with the help of our inter-agency teams led by Dan Reifsnyder,

Argentina is in a technically sound position to decide on a GHG growth-reduction target of potentially great significance. As of course you're also aware, we have purposefully confined our assistance to technical matters, leaving the ultimate decision on the target, its format, and manner of presentation at COP-V to Pres. Menem and his advisors.

However, in recent conversations with Dr. Vicente Barros, the Director of the technical team advising Maria Julia Alsogaray and the Argentine National Commission led by her to establish the target, I've become convinced that we should make available to Barros our thinking on the form of the target. This should happen by early September, either through me or (preferably, I think) by videoconference.

Very confidentially and informally, Barros has let me know that what he thinks will emerge from the work of his team is roughly the following:

Argentina may be able realistically to plan to reduce by 25-30 MMT of CO2 equivalent the growth of its emissions from its present (1997 baseline year)

270 MMT to a no-mitigation projection of 390 MMT in 2010 (not include effects

from sinks, which they are not factoring in.) This would represent

a commitment to hold emissions growth to about 33% over 1997, vis-a-vis the least ambitious of the Kyoto commitments, Australia's + 28% of 1990.

(Of course another, probably more diplomatically palatable way of looking at these numbers would be to see them as an 8-10% reduction from the business-as-usual scenario.)

In addition, in part because of our encouragement, Vicente has been thinking about an "indexed target," which would have the advantage of providing insurance against external and other variables beyond their capacity to predict/moderate. The particular indices that Vicente is thinking of make lots of sense for Argentina: energy consumption and meat production (methane), which together, he believes, account for roughly 85% of Argentine emissions. In addition, he is thinking about including growth of

be Aldy
395-6870

GNP as an index, more or less to moderate/generalize the effect of swings in the first two.

I don't think Vicente is at all clear on how an indexed target would work, but maybe something like this: Argentina will reduce by X% the projected growth of its GHG emissions, with X equalling 10% less than the percentage change in (an average or other formula of) its 1997-"2010" growth in secondary energy, meat production, and GNP.

I personally like the idea of indexing quite a lot. It not only provides insurance for vulnerable/volatile developing countries, it might also be sold to countries worried about "tropical hot air" as ensuring actual mitigation even in the event of economic contractions. So especially since other developing countries may want to base targets on "the Argentina model" perhaps we want to encourage Vicente in this direction.

There are other issues in play here. For instance, a "split-level" target could be announced, with a "domestic/national" commitment along with one for deeper cuts if/when eligible for flexmex.

I bringing these considerations to your attention because I think it ideal that Vicente's team deliver to Maria Julia before Frank Loy's arrival on or about Sept. 11 -- a package that steers her in a good direction. Once "the target" is out of the hands of Vicente and his people -- and in the many hands of the National Commission -- Maria Julia will be ill-equipped, in terms of technical understanding and otherwise, to engineer changes in what it recommends. Much better that we do what we can to gently influence the technical team's product before its delivered. Then Frank Loy will be in a position to say we think what they've recommended to her and the Commission is great.

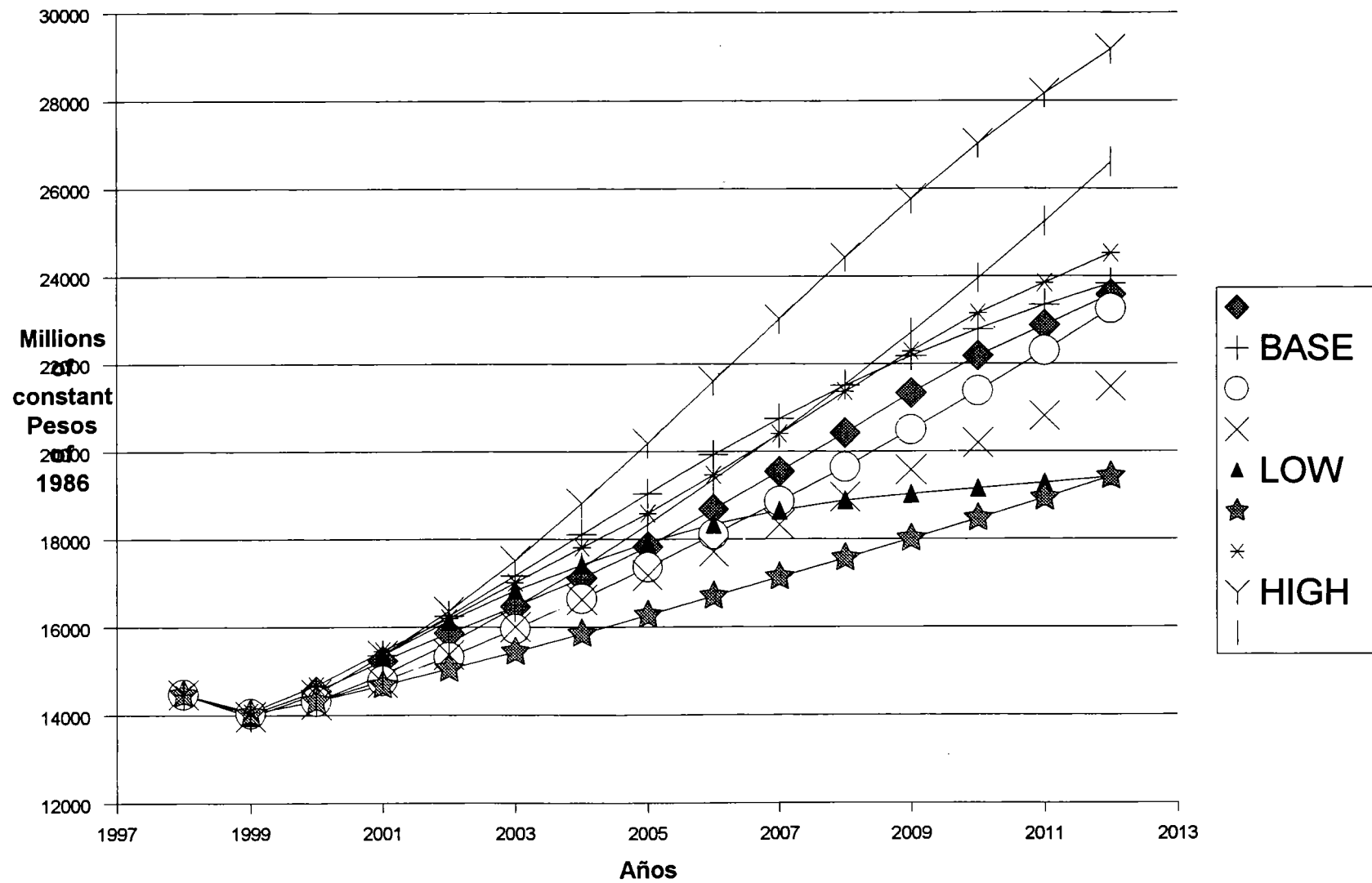
My goal in sending this message is really no more than to get somebody better qualified and positioned than me to think about these issues in time to make our thoughts available to Vicente Barros by the end of next week if at all possible. With even informal direction, I'd be happy to carry the mail (perhaps the most discreet way of weighing in) or we could set up a videoconference, probably for the week of Sept. 6, subject: "target format and presentation."

Thanks for hearing me out. Philip

PS Dan's report recommended business and congressional visitors here to

support,consensus. Any prospects?

GNP PROJECTIONS (CEMA;FIEL &FLACSO)



		BASE		
year	base FIEL	base (CEMA)		low FIEL
1998	14472.3	14472.3	14472	14472.3
1999	14021.5	13963.1	14035	13968.4
2000	14539.2	14478	14318	14241.6
2001	15231.3	15356.6	14784	14737.1
2002	15859.4	16252.9	15317	15363.1
2003	16466.9	17169.3	15958	16006.4
2004	17116	18108.9	16643	16623.3
2005	17826.3	19035.3	17358	17173.3
2006	18677.8	19923.9	18101	17711.7
2007	19542.4	20746.2	18858	18330.1
2008	20421.6	21506.8	19638	18952.8
2009	21332.2	22177.6	20490	19576.2
2010	22181	22789.3	21376	20188.9
2011	22877.9	23343.7	22297	20803.7
2012	23576.5	23829.9	23252	21476.5

LOW			HIGH	
CEMA		High Fuel	CEMA	
14472.3	14472	14472.3	14472.3	14472
13963.1	14035	14071.6	13963.1	14035
14478	14318	14670.1	14478	14318
15356.6	14677	15453	15356.6	14910
16144.6	15046	16199.3	16361.3	15631
16830.6	15435	17010.9	17508.7	16456
17414.2	15846	17812.6	18816.4	17349
17925.4	16270	18582	20184	18332
18338.3	16700	19463.9	21605.1	19356
18648.8	17132	20396.8	23025.1	20409
18881	17561	21362.4	24427.8	21529
19026.4	18006	22283.9	25763.3	22709
19153.3	18464	23151.9	27020.7	23945
19282.5	18935	23845.1	28164.8	25241
19412	19421	24520.5	29160.1	26595



REPUBLIC OF BOLIVIA
MINISTRY OF SUSTAINABLE DEVELOPMENT AND PLANNING

**BOLIVIAN POSITION ON
INCLUSION OF FORESTS WITHIN THE
CLEAN DEVELOPMENT MECHANISM OF
THE KYOTO PROTOCOL**

Working Paper

*Meeting of Environment and Forestry Ministers
from the Amazon Basin Countries on
the Clean Development Mechanism
Cohabamba, Bolivia.
June 14 and 15, 1999*

1. The Kyoto Protocol and the Clean Development Mechanism (CDM)

The Kyoto Protocol (KP) is the legal mechanism adopted by the Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) as a means to help Annex I countries to achieve compliance with their greenhouse gas (GHG) emission reduction commitments, in view of the evidence that these countries would not attain the expected reduction goals stated in the text of the UNFCCC, for the year 2000.

The Kyoto Protocol (KP), which has not entered into force because it is still under process of being ratified by a sufficient number of Parties, in its Article 3, paragraph 1 mandates that, in the first commitment period that runs from 2008 to 2012, Annex I Parties should ensure, either individually or jointly, that their GHG emissions will be at least 5% below 1990 emissions level. Commitments assumed by Annex I countries under Annex B of the KP represent an average of 5.2% of reduced GHG emissions for the years 2008-2012, as referred to 1990 emissions.

To assist Annex I Parties in achieving compliance with their commitments, the KP defined three flexibility mechanisms: **a)** Joint Implementation (JI), based on Article 6, by which they acquire or transfer certified emission reduction units (CERU) and/or carbon sequestration units derived from specific projects implemented between Annex I countries; **b)** International Emissions Trading (IET), based on Article 17 of the KP; and **c)** the Clean Development Mechanism (CDM) which is designed for joint participation of Annex I countries and Non - Annex I countries, as defined by Article 12 of the PK¹.

The CDM is an instrument to certify GHG emission reductions² achieved through specific projects, for the compliance of commitments by Annex I Parties.

2. Specific provisions of Article 12 of the Kyoto Protocol on the Clean Development Mechanism

Article 12 of the PK defines the CDM as a mechanism to assist Parties not included in the UNFCCC Annex I to achieve sustainable development and to contribute to the ultimate objective of the Convention³ and, at the same time,

¹ Some analysts consider even a fourth "flexibility" mechanism, the "joint fulfillment", also called or the "bubble mechanism" through which some Annex I countries may jointly achieve their GHG reduction goals. This fourth mechanism is not explicitly defined under any article of the KP, but is based on Article 3.1 which states: *"The Parties included in Annex I should, individually or jointly, ..." ensure that their aggregate GHG emissions do not exceed their assigned amount defined for the first commitment period.* (Highlighted by the editor).

² And, eventually, carbon sequestration units, as analyzed later.

³ Article 2 of the UNFCCC defines the ultimate objective of the Convention, and any related legal instruments that the Conference of Parties (COP) may adopt, in the following way: *"...to achieve... the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system..."*

to assist Annex I countries to comply with their quantified emission limitation and reduction commitments, as defined under Article 3 of the KP.

Within the CDM framework, Non - Annex I Parties will benefit from projects resulting in "*certified emission reductions*" (CERU), and Annex I Countries may use reductions accruing from such project activities to contribute to compliance "*with part of their quantified emission limitation and reduction commitments*".

The CDM shall be subject to the authority and direction of the Conference of the Parties acting as Meeting of the Parties of the Kyoto Protocol (COP/MOP), and shall be supervised by an Executive Board. Reduced emissions resulting from projects must be certified by the operational entities nominated by the COP/MOP, on the basis of the following criteria:

- a) Voluntary participation approved by each Party involved;
- b) Real, measurable and long-term benefits related to the mitigation of climate change; and
- c) Reductions in emissions that are additional to any that would occur in the absence of the certified project activity (this is sometimes defined as *additionality*).

The Kyoto Protocol determines that the CDM will assist in arranging funding of certified project activities, as necessary. Besides, it defines that the COP/MOP, during its first period of sessions, must establish the rules and procedures of CDM, to ensure transparency, efficiency, and the accountability of project activities through independent auditing and verification.

On the other hand, the KP defines that the COP/MOP shall assign a share of the proceeds from certified projects for administrative expenses, as well as for the assistance to developing countries that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation. Article 12, paragraph 9 of the KP provides for the trading operations of CERU by public or private entities, under the guidelines established by the Executive Board. Paragraph 10 of the same Article establishes that CERU achieved between the year 2000 and 2008 may be used to comply Annex I GHG reduction goals within the first commitment period, that is, from 2008 to 2012.

Besides these general provisions, the KP does not further define the CDM. At the Fourth Conference of the Parties (COP4) held in Buenos Aires, Argentina, on November 1998, it was not possible to define a specific list of issues related to the CDM implementation, for analysis and further definition by the Parties. Instead, the COP ended up with an open list, which meant a step backwards with regard to what was agreed in the UNFCCC Subsidiary Bodies meeting, held in Bonn on June 1998.

During the 10th Session of the Subsidiary Body on Scientific and Technological

Advice (SBSTA) and the Subsidiary Body on Implementation (SBI), held in Bonn from May 31 through June 11, 1999, discussions were focused on procedures and mechanisms corresponding to compliance with the KP; the mechanisms defined by Articles 6, 12, and 17 of the KP were particularly discussed. At this time, some of the participating countries submitted their proposals on principles, rules, procedures and guidelines.

The Group of 77 and China (G77) submitted a proposal on Article 12 of the KP, which is now under discussion within the Group. Such proposal is based on COP4 Decision Nr. 7, which provides for a working program for the KP mechanisms, including a list of elements. This proposal analyzes the principles, nature and scope of the CDM.

3. Bolivian position at the Fourth Conference of the Parties of the UNFCCC.

The Minister of Sustainable Development and Planning exposed the Bolivian position at the Fourth Conference of Parties (COP4) of the UNFCCC, during his speech at the High Level Segment of the COP. This speech highlighted the following major issues:

- Bolivia fully respected self-determination and sovereignty of the countries and Parties to the Convention and the Kyoto Protocol. In this sense, we understand that any country, in exercising its rights of sovereignty, may establish internal levels of GHG emissions and negotiate projects involving specific commitments, in accordance with its national plans for sustainable development.
- Bolivia considered that the definition of internal levels of GHG emissions and commitments, assumed under specific projects by Non-Annex I Parties, do not represent a premise for the assuming of legally binding commitments of the involved Parties, nor compromises the position of any other Non-Annex I Parties, either individually or jointly, as this issue corresponds to self-determination of the countries⁴.
- At the time, Bolivia was not ready for a binding commitment towards GHG emissions limitation. Nevertheless, this could not be considered a political excuse to undertake development without any regard for the pollution of the environment and the degradation of our natural resource base. In accordance with UNFCCC principles of equity and common but differentiated responsibilities, Bolivia would seek to attain its development the most sustainable manner, by introducing adequate

⁴ Note that the Bolivian position does not exclude the possibility that some Non-Annex I countries may want to assume a binding commitment under the UNFCCC and the KP. In fact, some Non-Annex I countries, such as Argentina and Kazakhstan have announced their intention to do so. This issue raises questions on the legal status of those countries within the Convention and the Protocol. Are these countries Non-Annex I or Annex I Parties? Is there a need to create a new category for these countries? Is this possible while the KP has not yet entered into force?

measures to preserve its environmental quality and conserve its natural resource base⁵. Moreover, Bolivia was confident that such principle would guide Non-Annex I Parties decisions and actions, and Bolivia would act accordingly.

- At this point, it was stressed that several Non-Annex I countries had been taking meaningful actions towards net reductions of their GHG emissions and the mitigation of climate change caused by anthropogenic activities. It was acknowledged that, in the long term, some Non-Annex I Parties would have to take specific measures for reducing their GHG emissions⁶. However, it was stated that an eventual discussion on this issue, within the framework of the Convention, could only be made possible if Annex I Parties started to comply their commitments assumed under the UNFCCC, which include the ratification of the Kyoto Protocol by those same Parties⁷.

In accordance with the position described above, Bolivia already considered necessary, before the COP4 and while it was held, to include forest conservation and regeneration activities within the CDM⁸, based on the following reasons:

1. All countries, in exercising their sovereignty, may prioritize those sectors, which they believe would be best suitable to consider for their sustainable development. Consequently, those sectors must be included within the CDM⁹.
2. Forest conservation and regeneration activities have the effect of reducing net GHG emissions at the national and global level.
3. There is legal background for protection of carbon sinks under the

⁵ Or increment this base, as needed.

⁶ Specially as it is envisaged that net GHG emissions by Non-Annex I countries will reach the same levels as those of Annex I countries in the year 2035, according to the most reliable estimates, if actual emissions growth trends are not promptly modified.

⁷ As, for example, those commitments included in Article 4, number 2, paragraphs a) and b) of the UNFCCC.

⁸ Forest conservation and rehabilitation may be assimilated under the category of sustainable forestry ordination, which, according to the definition accepted by the UN is equivalent to "a forestry ordination regime with multiple purposes (which include biodiversity conservation, timber and non-timber forestry production, soil and water conservation, tourism, recreation and the use of nature services) based on an ecosystem approach which would allow to utilize forests resources in such a way as to preserve their benefits for present and future generations" (Chandrasekharan, C. Costs, Incentives and Obstacles to the practice of a Sustainable Forestry Ordination, UNEP, mimeo, 1996). Although this concept of Sustainable Forestry Ordination includes conservation and regeneration of primary forests, it has a broader scope but, for the present discussion, we prefer to focus the attention on specific projects designed to address conservation and regeneration.

⁹ The Forum of Ministers of the Environment of Latin American and the Caribbean (FMALC) decided, in its March 1998 Meeting, to convene a CDM Working Group. This Group met in Lima on May 12 and 13, 1998 with the objective to identify common areas of interest for the Region in relation with the CDM, without compromising the position of any of these countries within the Convention. In this context, the CDM Working Group agreed that each individual country must define the sustainable development criteria for the CDM, in a sovereign manner. It is the understanding of Bolivia that the document on this issue initially produced by the Working Group, and approved thereafter by the Ministers at their Extraordinary Meeting of September 1998 in New York, constitutes a basis for the negotiation to define a common regional position.

UNFCCC and, on the other hand, a necessary consistence between the KP, Agenda 21 and other UN Conventions on environmental issues must be kept¹⁰.

4. Conservation and regeneration of forests, as well as protection of endangered national parks¹¹, contribute to achieve the ultimate objective of the Convention, and also contribute to sustainable development and environmental management, in view of their important collateral effects.

4. Political, legal, and economic grounds to include forests in the CDM

GHG emission reductions can be achieved through the development of projects with additional benefits in terms of effectively certified reductions, for categories such as the sustainable re-planting¹², agroforestry, sustainable forest management and preservation of natural forests. Under these general categories, the Bolivian State considers that, the following activities are eligible for CDM projects, provided that guidelines for additionality¹³, transparency, verification, and compliance with sustainable development criteria are followed:

- Conservation¹⁴ of natural forests, including Reduced Impact Logging (RIL), and non-timber products¹⁵.
- Forest regeneration
- Reforestation or re-planting
- Commercial forestry plantations¹⁶

¹⁰ This issue is further discussed along this document.

¹¹ Bolivian position acknowledges that forest conservation projects are essentially from projects of protection of endangered national parks, as the first type of projects are not necessarily executed in protected areas. However, what should be clearly demonstrated in the project baseline, for both types of projects, is that areas assigned for the project reach additionality in the capture of GHG and/or that the same areas are endangered by deforestation or land use change processes. It should be noted that, under the Bolivian legislation, the general category of "protected area" is used to include all categories of national parks.

¹² Including reforestation and commercial plantations.

¹³ This comprises the utilization of the UNFCCC approved methodology for the determination of a project-by-project baseline.

¹⁴ The concept of "conservation" is used here in the same meaning as that accepted in the UN system (applied in this case, to natural resources from the forests), that is, "*conservation of ecosystems and natural habitats and the maintenance and recovery of viable species population in their natural environment*" (Biodiversity Convention, Article 2, UNEP, 1992). Bolivia understands (and its strategic documents so state) that conservation includes the **sustainable use of natural resources**, in the sense of "*the use of the components of biodiversity in such ways and intensity so as not to cause long-term reduction of this same biodiversity*." (Biological Diversity Convention, Article 2, UNEP, 1992). This position is based on the Agenda 21, Chapter 15, whose title is "Conservation of Biological Diversity", and in which there is an objective included for the development of national strategies for biodiversity conservation and the sustainable use of biological resources, as a conceptual unit. It is fully understood that projects eligible for the CDM, besides having a conservation objective, must have the explicit objective of mitigating climate change, under specific technical criteria approved by the IPCC

¹⁵ This is referred to timber production in which carbon emissions can be reduced up to 50% during the cutting activities, as compared to conventional projects, through careful planning of cut down and adequate training of the staff

¹⁶ Providing that its environmental impact evaluation results in net positive effects.

- Protection of endangered national parks.¹⁷
- Utilization of biomass as an energy source
- Increase of carbon sequestration in soils.

There are a series of political, legal and economic grounds to support this position. Among the political grounds¹⁸, we have the following:

- (a) Deforestation and other land use changes have resulted, from 1850 through 1990, in accumulated emissions of 122,000 million of tons of carbon into the atmosphere¹⁹. Net emissions from this sector reached approximately 1,600 million of tons of carbon per year, during the 80's. Some estimates indicate that, nowadays, deforestation causes 23% of global GHG emissions, which accounts for the second most important cause of emissions, after energy sector and industrial process emissions²⁰. It was also estimated, as a result of deforestation, more than 75,000 million of carbon equivalent tons will be emitted into the atmosphere, from 1998 through 2050, which represents more than 1,000 million tons of equivalent carbon per year²¹.
- (b) Inclusion of projects of forest conservation and regeneration, as well as those of endangered national parks, meets the CDM objective of promoting sustainable development of the countries involved in such specific projects.
- (c) Consistency between UN Agreements and Conventions calls for the inclusion of forest conservation and regeneration activities within the CDM, taking into account the necessary compatibility of objectives, mainly between Agenda 21, the UNFCCC, and the Conventions on Biodiversity, Desertification, and Wetlands (also known as Ramsar).

¹⁷ In many developing countries, due to diverse socioeconomic and environmental variables, management of national parks and other protected areas is endangered by many causes, which are an effect of over-exploitation of natural resources, poverty and lack of economic opportunities in neighboring areas. Among the causes, we can count on a) deforestation; b) desertification; c) migration pressure on parks and protected areas; d) unplanned urbanization, including the construction of basic service infrastructure; e) deterioration of supply of water resources and its degradation; and f) forest fires. Due to the great geographical extension of some of these areas, budget restrictions, and economic, social, environmental and political factors, such areas can become endangered and thus be converted into potential sources of GHG emissions. Consequently, an intervention with fresh and additional financial resources can avoid these emissions and sustain that administration of these areas and parks.

¹⁸ We understand political arguments as those arguments in regard to adherence to the ultimate objective of the Convention, UNCED agreements, and the two major purposes of the CDM, taking into account global sustainable development.

¹⁹ The error rank for these figures, either by excess and/or defect, is 40 thousand million tons of carbon (source IPCC, 1994, *CO2 and the Carbon Cycle*).

²⁰ Estimates for the rank of accumulated emissions related to land use and forestry activities under business as usual scenarios, from 1990 to 2100, oscillate between 30,000 million tons of carbon and 320,000 million tons. For scenarios under an emission reduction policy, estimates oscillate between 30,000 to 150,000 million tons of carbon, for the same period. (Source: *An Evaluation of the IPCC 1992, Emission Scenarios*, IPCC, 1994).

²¹ These figures coincide with those provided by the IPCC which, in its 1995 Second Evaluation Report indicates that, for the period 1995-2050, some conservation and carbon sequestration measures can be implemented, thus enabling a reduction of 60,000 to 90,000 million tons of equivalent carbon emissions in the forestry sector. One ton of equivalent carbon corresponds to 3.67 tons of CO₂.

Forest conservation and regeneration projects have very significant and positive collateral results, such as improving life quality²², biodiversity and soil conservation, protection of hydrological basins, and the promotion of the development of indigenous population.

- (d) Inclusion of forest related activities, especially those of forest conservation and regeneration, meets the purpose of minimizing costs derived from the complying of commitments in the KP for the global reduction of GHG emissions.
- (e) There are favorable circumstances to include these activities, as well as **great opportunity costs derived from its omission**. It would not be a realistic approach to expect that the US, being a country with the largest volume of GHG quantified emissions, would ratify the Kyoto Protocol without including natural parks under the CDM. Jointly with Canada, another country interested in including primary forests within the CDM, these two countries' emissions represented, in 1990, 40% of global GHG emissions. If there is a serious intention to promptly implement the KP ratification process, this reality must be taken into account. On the other hand, the Joint Implementation mechanism, as we will see below in paragraph III of the legal arguments, already permits Annex I countries to include sinks in their net reductions accounting.
- (f) May of the most influencing G77 countries will presumably foster inclusion of forests within the CDM. If some other G77 members adopt positions that are too inflexible in this issue, certain further disagreement and frictions between its members are likely to appear. Although there is no lack of internal contradictions between the Group, it was the strength of the G77 that allowed, at the Kyoto and Buenos Aires meetings, the safeguard of the interests of the developing countries and therefore, this unity of action should be preserved as long as possible.

Legal grounds for the inclusion of forest conservation and regeneration activities are found in the UNFCCC text as well as in that of the Kyoto Protocol, and they include the following:

- I. **UNFCCC, Article 4, paragraph 1**, "*All Parties, taking into account their common but differentiated responsibilities, and their specific national and regional development priorities, objectives, and circumstances shall ...d) promote sustainable management and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems*".

²² Resulting from positive socioeconomic effects, direct and indirect.

- II. **Kyoto Protocol, Article 2.1.** *"Each Party included in Annex I Parties, in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development, shall: a) Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as: ii) protection and enhancement of sinks and reservoirs of greenhouse gases²³ not controlled by the Montreal Protocol taking into account its commitments under relevant environmental agreements²⁴, promotion of sustainable forest management practices²⁵, afforestation and reforestation".*
- III. As indicated under footnote 9, some bases for the definition of a common position of the FMALC countries were developed by its Working Group at the Lima meeting. Among these bases, they included the condition that the acceptance of projects for the different sectors under Article 12 should follow the same criteria contemplated for Article 6 (Joint Implementation or JI). To this respect, Article 6, paragraph 1, b) states: "[That] *Any such project provides a reduction of emissions by sources or an enhancement of removals by sinks...*" additional to any that would occur in the absence of a project activity. If these criteria are not homogeneous for both types of projects, the CDM might have a strong handicap to overcome.

One of the main economic argument to include forest conservation and regeneration activities in the CDM is that the lower marginal cost for unit of carbon equivalent ton of these same activities makes this option a very competitive option in front of other CDM options. These other options would presumably be in disadvantage with JI projects, due to higher transaction costs deriving from the KP provisions²⁶. To level the opportunities, only projects with lower marginal cost per reduced ton of equivalent carbon will be able to compete against JI projects, and these are precisely forest conservation projects.

5 Technical grounds for crediting carbon sequestration and emissions reduction, in projects for conservation and regeneration of natural forests

There are several technical reasons for the inclusion of projects of conservation and regeneration of primary forests within the CDM. Units of sequestration and reduction²⁷ may be credited for the following reasons:

²³ This includes, naturally, primary forests (Note from the Editor).

²⁴ For example, the Biodiversity Convention (Note from the Editor).

²⁵ Includes forest conservation and regeneration (Note from the Editor).

²⁶ These transaction costs are higher for CDM, because this mechanism has to meet administrative expenses and assistance to developing countries that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation (so called "adaptation costs"), which reduces the expected marginal benefit per reduced ton of equivalent carbon.

²⁷ In this case, it would be technically more appropriate to use the term **avoiding of emissions**, but, for coherence reasons, we will conserve the use of the term **reduction**.

- a) For carbon sequestration, although it is appropriate to acknowledge that mature forests have a lower sequestration rate of CO₂, when compared with forest reforestation and regeneration activities, and the growth of secondary forests.
- b) For net reduction of GHG emissions, especially CO₂, by the diminishing and/or the reversing of deforestation processes²⁸ which, as we have seen earlier, is an important net emission activity.
- c) For net reduction of GHG emissions, as an alternative to land use change, especially with relation to traditional agriculture, which is a net emitter of CO₂ and CH₄.

Other technical reasons to carry out primary forest conservation and regeneration activities in the CDM are the following:

- Annual reductions from 1,000 to 2,000 million tons of equivalent carbon can be achieved²⁹ with an appropriate combination of activities of conservation of tropical and temperate forests, regeneration, and reforestation.
- Climate effects of preventing CO₂ emissions due to forest cut-down are the same as those acquired by preventing CO₂ industrial emissions, with a relatively lower marginal cost.
- With regards to quantification of benefits at the project level, as well as additionality, baselines and leakages, these do not represent a significant analytical problem as formerly believed, since more accurate measurement and control techniques are becoming widely available, and the remaining uncertainties can be solved in a relatively short term.

²⁸ For paragraphs b) and c), the "avoided carbon" concept may also be used, as it is used in some scientific documents in the context of UNFCCC.

²⁹ According to other estimates, this could account for between 12% and 15% of equivalent carbon emissions caused by fossil fuel burning.



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You Should Receive 13 Pages, Including This Cover Sheet

Date: December 9, 1999

To: Kate English, DOE
Barbara DeRosa-Joync, OES/EGC

Fax: (202) 586-0861

Fax: (202) 647-0191

From: Derrick M. Olsen
Political Officer

Fax: (591-2) 433-035

Dear Kate and Barbara:

Attached is a copy of the executive summary (in English) of the Bolivian National Action Plan for Climate Change for 1999, both for Energy and for Agriculture, Livestock, and Forestry.

I hope you find this information useful.

Sincerely,

A handwritten signature in black ink, appearing to read "Derrick M. Olsen".

Derrick Olsen

English translation

BOLIVIA: NATIONAL ACTION PLAN FOR CLIMATE CHANGE - ENERGY SECTOR

Executive Summary

I. Introduction

At the United Nations Conference on Environment and Development, held in 1992, the Bolivian Government signed the United Nations Framework Convention on Climate Change (UNFCCC), and ratified the same through the Law No.1576 enacted on July 25, 1994.

As part of its commitments, under the UNFCCC, Bolivia has developed a Climate Change National Action Plan (NAP) to address climate change issues in the country. This document includes mitigation and adaptation measures addressed to promote changes in policies for the energy, agriculture and forestry sectors to contribute to adaptation of vulnerable sectors to potential climate change and to reduce greenhouse gases (GHG) emissions. On the other hand, these measures represent a positive impact for the country's economy and development. This NAP will be updated from time to time to introduce new findings and results as these are available.

II. GHG Emission Inventory

The 1990 Bolivian GHG Emission Inventory established that global emissions of carbon dioxide (CO₂) in Bolivia had been estimated in 56,190.12 Gg; 89% of these emissions corresponded to land use change, and forestry sector, 10.54% to the energy sector (5,922.96 Gg), and 0.46% to industrial processes such as cement production activities (TABLE N° 1).

In terms of Global Warming Potential (GWP), GHG emissions in Bolivia have been estimated in: carbon dioxide 79.14%, methane, 20.48% , and nitrous oxide 0.38%, representing a total 71,412.45 Gg of carbon dioxide equivalent. Finally, it was established that carbon dioxide emissions produced by energy and industrial processes represented only 0.027% of the world emissions and 0.55% of the Latin American emissions, while CO₂ emissions from land use change and forestry represented only 0.85% of the world emissions.

Table 1. **BOLIVIA - GHGs EMISSIONS, 1990(*)**

SOURCES	GHGs EMISSIONS (Gg)					
	CO ₂	CH ₄	N ₂ O	NOx	CO	NMVOCS
NATIONAL EMISSIONS	56,180.14	597.99	1.047	54.44	1,282.34	24.52
ENERGY SECTOR	5,922.98	14.85	0.2	29.92	193.65	24.52
Combustion (*)	5,143.27	0.916	0.2	23,9197	193,653	24.52
- Stationary sources	2,903.59	0.158	0.15	6,3197	11,463	
- Mobile sources	2,239.68	0.76	0.05	18.6	182.19	24.52
Fugitives (*)	779.69	13.93				
- Petroleum and natural gas	779.69	13.93				
INDUSTRIAL PROCESSES SECTOR	280.46					
AGRICULTURE	457.80	0.057	2.058	86.451		
- Domestic animals	428.57					
- Rice cultivation	25.85					
- Prescribed burning of savannas	2,932	0.036	1.311	79.965		
- Agricultural residues field burning	0.452	0.021	0.747	9.488		
Land use change and forestry	50,006.72	114.54	0.79	26.46	1,002.24	
- Changes in forests and other woody biomass stocks	458.06					
- Forest and grassland conversion	49,645.49					
- On site forest burning	114.54	0.79	26.46	1,002.24		
- Abandonment of managed lands	94.89					
WASTE		10.80				

(*) Estimates based on "Bottom-up" Methodology

Source: Bolivia C8: GHG emissions Inventory, 1990

III. Selection and development of mitigation measures

This analysis indicate the need to develop specific actions for the energy sector to achieve mitigation of GHG emission sources. However, it should be noted that Bolivia --as a developing country, because of its economic reality, and being within a framework of solving priority issues such as poverty, education and health-- very hardly will be able to prioritize other works or infrastructures to solve long term problems generated by climate change and its effects on resources.

Within the above context, initial actions are basically those of instilling environmental awareness at inter-sectorial governmental levels, and incorporating non-governmental organizations, and private and academic institutions into practical enforcement of measures dealing with climate change.

Criteria for selecting and developing GHG mitigation measures in the energy sector include prioritizing actions that are consistent with national and sectorial policies, and development plans and programs; timeliness to achieve objectives; mitigation potential of emissions; implementation potential; identifying administrative bottlenecks; legislation; feasibility of benefits and cost-effectiveness.

III. a. Mitigation measures

Previously performed evaluations helped to establish some mitigation measures for the Energy Sector which should reduce GHG emissions level, and can be applied in Bolivia if international economic and technical assistance is available. (See TABLE 2, next page).

Table 2. NAP - Mitigation Measures, Impact, and Required Resources

Mitigation Measure	Leading Institution	Annual Reduction of CO ₂ (thousand tons) JT			Annual Reduction of CH ₄ (thousand tons)			Other Environmental Benefits	Required Resources & funding sources. US\$ thousands
		2010	2020	2030	2010	2020	2030		
		ENERGETIC SECTOR							
Efficiency in electric household lighting	VMEH (*)	28.74	188.31	299.88	0.0013	0.146	0.205	Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	39.29 International Financing
Efficiency in traditional cooking stoves using biomass	VMEH (*)	149.83	439.14	734.44				Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	2.28 International Financing
Efficiency in residential refrigeration	VMEH (*)	15.05	128.57	0.0007				Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	35.28 International Financing
Increase in residential use of natural gas	VMEH (*)	PD	4.82	21.86				Hydrocarbon emissions reduction, NOx, SOx and particulates	38.88 International Financing
Increase use of solar energy in residential water heating	VMEH (*)	7.38	42.41	27.43	0.0004	0.038		Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	34.11 International Financing
Efficiency in commercial & public uses of electric lighting	VMEH (*)	21.44	192.16	352.87	0.0015	0.174	0.253	Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	4.44 International Financing
Efficiency in commercial use of biomass	VMEH (*)	60.28	81.43	102.72	0.0004	0.037	0.053	Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	0.25 International Financing
Conservation of electric energy in commercial uses	VMEH (*)	32.3	145.82	255.45	0.0018	0.128	0.21	Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	44.88 International Financing
Conservation of electric energy industrial uses	VMEH (*)	276.3	773.32	1,276.33	0.0003	0.062	0.092	Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	43.28 International Financing
Increase use of natural gas in road transportation	VMEH (*)	360.74	1,075.45	3,000.49	-2.088	1.063		Reduction in CO ₂ emissions, hydrocarbons, NOx, SOx and particulates	146.21 International Financing
Reduction natural gas flaring at exploitation fields	VMEH (*)	816.39	816.19	816.15	12.36	12.36			201.98 national financing (private)
Re-distribution of the Expansion Options for the Electric Energy Generation	VMEH (*)	183.84	62.37	PD	0.026	0.026	PD	Reduction in CO ₂ emissions	73.88 national financing (private & public sources)

(*)Vice-Ministry of Energy and Hydrocarbons

TBD = to be determined

The following mitigation measures were selected:

a. Efficiency in residential electric lighting services

This measure includes introduction of compact fluorescent lamps to replace incandescent filament lamps that are now used at electrified urban centers, and rural

dispersed subsectors of the Residential Sector. Estimated average reduction of emissions would be 87.05 Gg of CO₂ /year that represents a total reduction of 3,482 Gg of CO₂ for the analyzed period of time.

b. Efficiency in biomass cooking stoves

Biomass is the energy source traditionally used by some of the Bolivian population. This measure intends to increase efficiency in biomass cooking stoves which require combustion of wood, dung (animal wastes) and vegetal wastes, for cooking and water heating purposes at non-electrified urban, populated towns, and rural dispersed, subsectors of the Residential Sector. This measure is designed to improve efficiency/quality of such traditional cooking stoves. Estimated average reduction of emissions would be 244.27 Gg of CO₂ /year that represents a total reduction of 9,770.8 Gg of CO₂ for the analyzed period of time.

c. Efficiency in residential electric refrigeration systems

This measure intends to introduce low-energy consumption refrigerators at electrified urban and rural populated towns, subsectors of the Residential Sector. Estimated average reduction of emissions would be 68.32 Gg of CO₂ /year that represents a total reduction of 2,732.8 Gg of CO₂.

d. Increase residential use of natural gas at residential areas

It is intended that households at electrified urban subsector of the Residential Sector introduce massive use of natural gas for heating and cooking purposes. For the time period 1990-2030, expected average reduction of emissions should be 1,368 Gg of CO₂ /year that represents a total estimate of 2,732.8 Gg of CO₂.

e. Increase solar energy use for water heating

Utilization of solar energy as a source of thermal energy, specially for water heating purposes may be increased at residential areas so as to reduce emissions by an estimated average of 26.46 Gg of CO₂/year that represents a total estimate of 1,058.4 Gg of CO₂.

f. Utilization of renewable energy for electric power supply in rural areas

Use of renewable energy sources, such as micro-hydroelectric, solar photovoltaic, and wind for energy supply to rural area populations has been considered to be feasible. However, such potential should be further investigated due to the unavailability of assessment of base cases, future scenarios, and data on potential use of renewable energy in the country.

g. Efficiency in commercial electric lighting services

This measure intends to introduce utilization of energy-efficient electric lamps for public and commercial lighting. This would allow to reduce emissions by an average of 102.07 Gg of CO₂/year, that represents a total estimated reduction of 4,082.8 Gg of CO₂.

h. Efficiency in commercial use of biomass

Traditionally, biomass has been an important energy source used by rural small-scale industry for different processes in Bolivia. This measure suggests increased efficiency in use of biomass to reduce its intensified use, through improved combustion processes that require use of dung (animal wastes) and firewood. An expected average reduction of emissions would approximately be 51.53 Gg of CO₂ /year, that represents a total estimated reduction of 2.061 Gg of CO₂.

i. Conservation of electric energy in commercial uses

This measure proposes to gradually introduce more efficient electrical devices for general use in the commercial sector, specially lighting appliances. It is expected that average reduction of emissions would be around 78.80 Gg of CO₂ /year, that represents a total estimated reduction of 3,152 Gg of CO₂.

j. Conservation of energy in industrial uses

Reducing intensity of energy use for industrial processes may be achieved by housekeeping measures (internal reorganization), improving maintenance systems and improving processes and technologies. This would allow a low cost reduction of emissions in heat and power processes of industrial and mining sectors. It is expected that average reduction of emissions by such sectors would be 431.79 Gg of CO₂ /year, that represents a total estimated reduction of 17,271.6 Gg of CO₂.

k. Increase use of natural gas in road transportation sector

Although utilization of compressed natural gas for road transportation sector has been introduced, its growth rates are lower than overall gasoline and diesel. Fueling for vehicles may be substantially reduced and gradually be replaced by compressed natural gas. Natural gas utilization for vehicle operation would allow an average reduction of emissions by approximately 889.24 Gg of CO₂ /year, that represents a total estimated reduction of 35,569.6 Gg of CO₂.

l. Reducing natural gas flaring at exploitation fields

Since 1995, YPFB, the Bolivian National Oil Company, has already introduced measures to reduce natural gas flaring at exploitation fields consisting of treatment, reinjecting, recycling, recovery, and separation of natural gas liquids; this shows that reducing natural gas flaring by exploitation processes is feasible. This mitigation measure proposes to reduce natural gas flaring at exploitation fields up to the minimum technical level possible. As programmed gas exports to Brazil are expected to start soon and exploitation of hydrocarbons has been capitalized by private enterprises, some measures are being slowly implemented to comply with contracted export volumes so as to reduce natural gas flaring at exploitation fields. Consequently, mitigation measures for GHG emissions is considered as one of the first measures to be implemented in the country. It is expected that average reduction of emissions would be 709.38 Gg of CO₂ /year that represents a total estimated reduction of 28,375.2 Gg of CO₂ for the analyzed period.

m. Re-distribution of the Expansion Plan in the electric energy generation sector

Above proposed measures may reduce growth rates of electric power demand in scenarios with mitigation measures addressed to reduce the GHG emissions as compared to base scenarios cases without mitigation measures. Consequently, this measure proposes a re-distribution of the Expansion Options for the electric power generation sector. Adjustments must consider extension in time terms with the same capacity scope, and include use of renewable energy. Although long term development of the electric power generation sector considering possible exports to Brazil is not yet specified, it is worth to be considered for analysis. Other factors as diesel oil substitution in/and a potential systems of co-generation of electric and thermal energy will be analyzed as well. Results for the analyzed period allow to expect an average reduction of emissions by 36.79 Gg of CO₂ /year that represents a total reduction of approximately 1,471.6 Gg of CO₂.

Estimated reduction of GHGs emissions resulting from the above mitigation measures are preliminary and conservative with a moderate level of uncertainty. However, on basis of comparisons made between base case and mitigation scenarios, it may be assumed a reduction of global energy consumption by approximately 2,856,191.46 BOE (4.80%) for year 2000; 6,402,862.45 BOE (8.96%) for year 2010; 9,330,428.59 BOE (10.91%) for year 2020; and 16,453,849.84 BOE (15.71%) for year 2030.

As indicated before, non biogenic CO₂ emissions may be respectively reduced by 8.78% for year 2000; 13.88% for year 2010; 16.95% for year 2020; and 22% for year 2030. While biogenic CO₂ emissions may be reduced approximately by 1.23% for year 2000; by 7.20% for year 2010, by 12.21% for year 2020; and by 2083% for year 2030. Similarly, reduction of other GHGs emissions may be expected, excepting N₂O that may report a slight increase.

**Table 3. BOLIVIA. Reduction of GHGs emissions to the atmosphere.
Mitigation scenario as referred to Base Case Scenario, Years 2000-2030 (Gg)**

GHG Emissions/year	2000	2010	2020	2030
Carbon Dioxide, non biogenic	702.30	1,532.97	2,463.24	4,214.75
Carbon Dioxide, biogenic	46.53	298.78	558.02	1,056.39
Carbon Monoxide, total	12.91	77.95	211.22	413.36
Hydrocarbons, total	0.88	4.93	12.16	22.76
Volatile Hydrocarbons	0.0059	0.0433	0.0915	0.1955
Methane	17.51	18.18	18.62	17.98
Nitrogen oxides, total	1.11	7.75	18.54	33.19
Nitrous oxide	0.0077	0.0184	0.0133	0.0029

Source: LEAP system data

IV. Involved Organizations on Climate Change

National Action Plan - Energy Sector

As fundamental part the Climate Change National Action Plan (NAP) premises and to attain goals as designed, the Ministry of Sustainable Development and Planning is assigned to comply with activities related to the United Nations Framework Convention for Climatic Change (UNFCCC); and the Vice-Ministry for Environment, Natural Resources and Forestry Development has under its dependence the National Climate Change Program to comply with the Country's commitments before the UNFCCC. Consequently, organizations involved in development and implementation of the National Action Plan are the following:

-Decision Level: Limited to the Ministry of Sustainable Development and Planning, through its Vice- Ministry for Environment, Natural Resources and Forestry Development.

-Operative Level: Limited to the National Climate Change Program which is under the responsibility of a Program Coordinator.

-Support and Implementation: By coordinating among governmental, academic and private sector institutions, and involved NGOs; and lead by the Vice-Ministry of Energy and Hydrocarbons' sector head representatives.

-Coordination and Consensus: Through the Interinstitutional Climate Change Committee which is responsible for designing and implementing a National Strategy for the UNFCCC in Bolivia; it is also responsible for submitting to the National Government its recommendations on the adoption of the Climate Change National Action Plan, based on cross-sectoral coordination and consensus at policy decision making level.

V. Implementing the Climate Change National Action Plan

The Climate Change National Action Plan, being a document undergoing a continued updating process, provides guidelines for all mechanisms designed to implement mitigation options. Such mechanisms will be analyzed and reviewed to suit the National Strategy to implement the UNFCCC in Bolivia as fundamental part of it, following the Kyoto Protocol decisions that established new development and financing mechanisms for activities to mitigate GHG emissions, and adaptation measures to face climate change impacts.

The Ministry of Sustainable Development and Planning, as head of the sector responsible for the Bolivia commitments before the UNFCCC --through its Vice-

Ministry of Environment, Natural Resources and Forestry Development, and the National Climate Change Program--, and as a leading institution for all processes related to the Climate Change National Action Plan, supported by the Interinstitutional Climate Change Committee, will coordinate its actions with the Vice-Ministry of Energy and Hydrocarbons which is the leading institution for implementing options under the energy sector.

Selected measures will be implemented on basis of international economic cooperation because Bolivia has no resources assigned to implement actions to address mitigation of GHG emissions, nor to enlarge existing carbon sinks. Bolivia's actual major objective is to address poverty and generate economic development to guarantee better health, education and employment rates. Consequently, financial structure of this Plan is based on international cooperation from international funding agencies and private initiatives which may facilitate financial resources through established mechanisms under the Kyoto Protocol and the Convention of Parties Conferences. Thus, it is planned that upon approval of this Plan, implementation goals and measures for the energy sector will be accomplished through inter-institutional agreements and continued efforts of corresponding institutions of the sector.

VI. Opportunities for International Cooperation

To become a reality, the Climate Change National Action Plan essentially depends on international financial assistance from UNFCCC Annex I countries since Bolivia's major priorities and national policies are focused on generating employment, improving health rates and establishing mechanisms to enhance education and productivity levels. Within this framework, Bolivia has no resources specifically assigned to solve problems arising from climate change as these are not considered as national priorities because of its status of being a developing country. However, the fact that GHG inventories, vulnerability and adaptation analyses, and other studies on mitigation options have been initiated, and a Climate Change National Action Plan was prepared, indicates that Bolivia is willing to cooperate through appropriate actions to alleviate global disasters caused by climate change.

Concluding previous statements, there is a wide variety of opportunities for international cooperation to support implementation of the Climate Change Action Plan of Bolivia. The following proposed projects would require international support:

1. Project on dissemination of efficient biomass cooking stoves and studies to increase efficiency according to fuel used, by areas.
2. Project on efficient biomass use for commercial activities, specially bricks

manufacture, supply of plaster and lime, and rice/nut processing plants.

3. Project for conservation and efficient use of energy for the industrial and mining sectors, applied to demonstration areas established at industrial centers, and to be applied in industry and mining operations.
4. Project on efficient lighting for residential and commercial sectors, and public lighting.
5. Project to increase use of compressed natural gas in road transportation
6. Project to increase use of compressed natural gas in the residential sector for cooking, water heating, and central heating purposes.
7. Project to reduce natural gas flaring at exploitation fields, and recovery.
8. Project to introduce solar energy in the residential and services sectors, for water heating and generating electric energy at rural communities.
9. Project for electric power generation based on renewable resources such as: solar, wind, and mini-hydraulic (specially designed for rural areas), and substitution of diesel oil for isolated systems.
10. Project for potential co-generation of electric and thermal energy for the industrial sector.

Above mentioned projects represent some of the possibilities needing international financial and technical assistance. These needs may also be directed to provide cooperation for developing standardization activities for efficient consumption of energy; to elaborate and carry out programs and projects to profit from non-traditional renewable energy sources; to design regulatory and consumption fee schemes; to build institutional capacity, and education programs for a wide variety of subjects related to climate change (i.e. efficient use of energy), and to sponsor and coordinate workshops, exhibitions, training courses, editing and printing of publications and information materials.

English translation

NATIONAL ACTION PLAN TO ADDRESS CLIMATIC CHANGES IN THE AGRICULTURE, LIVESTOCK, AND FORESTRY SECTORS

EXECUTIVE SUMMARY

Climate change is occurring at worldwide level and is considered to be a major issue that humanity must face. It affects not only human life, but it also represents a menace for the environment. Agriculture, hydrological resources, forestry, natural ecosystems, energy, and other socioeconomic sectors are affected by climate change.

One of the main causes for climate change is the increased emission of green house gasses (GHGs) into the atmosphere, specially carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) gasses, caused by anthropogenic activities. The increase of GHG emissions are constantly altering redistribution of energy in the atmosphere causing the climate change.

As the GHGs emissions have effect in economy of countries, including both developed and developing countries, the world community called for actions to mitigate climate change effects through the United Nations Framework Convention on Climate Change held at the World Meeting at Rio de Janeiro, Brazil on June 1992. Bolivia became a signing Party to the UNFCCC through the Republic Law No. 1576 dated July 25, 1994.

Thus, environment scenarios in Bolivia are affected by climate change, and such effects are easily perceived in the agriculture productive capacity and natural ecosystems condition. Other factors contributing to environmental damage are non-planned expansion of agriculture frontiers, and land use changes causing deforestation in forested areas. Although ecosystems inter-specific variability may allow for adaptation to changes, in some cases adaptation is not possible. This fact calls for concern and reflection by all organizations engaged in environmental issues.

The Bolivian Government according to its commitments before the UNFCCC, following its national initiatives and good disposition to carry out a sustained development policy to be in equilibrium with nature, has prepared a National Action Plan (NAP) to address climate change in the agriculture, livestock and forestry sectors. The NAP includes mitigation measures to reduce emissions of GHGs, and increase carbon sinks—in spite of the fact that according to the Kyoto Protocol Bolivia has no

commitment to reduce emissions-- and the most adequate adaptation measures to alleviate and reduce adverse effects of climate change in agriculture yields, forest species, and livestock rising.

The NAP intends to attain consensus and awareness on climate change effects at governmental decision taking levels, involving academic, public and private institutions so as to implement mitigation measures for the GHG emissions from non-energy sectors, specially those regarding agriculture, livestock and forestry, and to help developing biotic diversity conservation policies that are favorable not only to reducing GHGs emissions, but also to achieving positive economic impacts in Bolivia. For these purposes, a Interinstitutional Council for Climate Change was formed by representatives from closely related governmental institutions and non-governmental organizations involved in environmental issues.

The NAP intends to become an important instrument to promote foreign investments in Bolivia by means of specific soft credit lines granted by international organizations, and low cost technology transfer assistance. The NAP is also designed to serve as a basic document for submitting proposals on national strategies to implement the UNFCCC, and the Bolivian National Communication to be considered by the UNFCCC. From time to time, this document will be updated to include the latest technical results and developments obtained on climate change issues, and any new national policies and strategies designed to encourage plans, programs and projects.

First studies carried out in Bolivia on vulnerability, mitigation, and adaptation measures to address climate change caused by GHGs emissions, indicate that priority sectors under the non-energy sector are land use, forestry, and agriculture, which being the main sources of GHGs emissions are at the same time the most vulnerable to probable climate change effects.

The proposed mitigation measures to reduce GHG emissions in the forestry sector are to promote a sustained use of renewable resources through appropriate land use practices and adequate forest management, to encourage forestation and reforestation for developing forest masses and regenerating natural forests, to introduce alternate practices to eliminate slash-and-burning of forested areas, to encourage implementation of the New Forestry Law, and to increase carbon sinks.

In order to promote conservation of carbon in the aerial biomass of forests and to profit from a sustainable biodiversity resources, mitigation measures proposed for the forestry sector include strengthening of the planning capacity, protection and surveillance of protected areas. Mitigation measures proposed for the agriculture and livestock sectors are designed to enhance production yields, to reduce emission of carbon and methane gasses, to prevent soil degradation, and to implement agro-forestry systems by introducing practices for natural regeneration of pasture lands, and livestock rising techniques.

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The above mentioned measures have been discussed and agreed on basis of open discussions held among involved technical inter-institutional parties met to specifically analyze these issues. Some options concerning techniques employed for rainfed rice cultivation, and gradual replacement of chemical fertilizers used in rice cultivation were excluded from a list originally proposed. Such exclusion was based considering critical food security issues in Bolivia.

Adaptation measures identified for the forestry sector were selected on basis of forest types, low cost-efficiency and expected benefits. These adaptation measures consist of research and identification of ecotypes of those forest species that are considered to be tolerant to probable climate change which at the same time would be important sources of economic outputs.

As regards to agriculture and livestock rising sector, adaptation measures are designed to prevent and reduce negative effects suffered by crops that are important sources of economic income in Bolivia. These measures include soil-water management practices, research in agronomy and interactive technology transfer.

It should be noted that the above mentioned mitigation measures to address emissions of GHGs, and adaptation measures to face climate changes in Bolivia, as proposed under the NAP, are necessarily based on international funding assistance and cooperation since Bolivia has no specific financial resources assigned to implement those measures.

**United States Department of State****Bureau of Oceans and International
Environmental and Scientific Affairs****Washington, D.C. 20520**DATE: 9/29/99NUMBER OF PAGES TO FOLLOW (Including Cover Sheet): 9FAX TO: JOE AIDYTELEPHONE: _____ FAX: 395-6870OFFICE: CEAFROM: JEFF MIOTKETELEPHONE: _____ FAX: (202) 647-0191OFFICE: OES/EGC

MESSAGE:

**PROPOSED AGENDA FOR MEETING OF US-MEXICO CONTACT GROUP ON
CLIMATE CHANGE, OCTOBER 5, 1999**

- I. Expectations for COP-5 and opportunities for cooperation**
 - Mexico
 - United States

- II. Ideas for developing country participation in Greenhouse Gas (GHG) reductions**
 - Mexico
 - United States

- III. Elaborating Kyoto Protocol Mechanisms**
 - United States
 - Mexico

- IV. Bilateral cooperation in developing carbon sinks, land-use plans and forestry policy for climate change mitigation**
 - Mexico
 - United States

- V. Co-Benefits of GHG Mitigation**
 - United States
 - Mexico

FCC/OCDE

9-10/3/99

Fernando Tudela
Mexico

Climate Change: Towards Global Participation

EQUITY CRITERIA

No human being / social group / nation / regional economic organization is inherently entitled to use a global externality (such as the capacity of the atmosphere to absorb GHGs without disrupting the climate system) more than others.

- ❖ Present differences are just a "de facto" situation, a recognized starting point
- ❖ In the long run, the most basic equity criterion would require a controlled process of convergence of GHGs emissions per capita.
- ❖ This process -and its timing- must take into account many other criteria. Among others:
 - grandfathering,
 - GHGs emissions / economic output,
 - socio-economic development conditions,
 - technological capacity
- ❖ It is easier to agree upon a temporary, ad-hoc differentiation, than to achieve consensus on specific criteria for this differentiation.

Historical examples:

- how to distribute Marshall Plan funds for post-war economic reconstruction of Europe;
- how to differentiate QELROS at COP3.

Climate Change: Towards Global Participation

REGULATORY EFFICIENCY

❖ At the national level:

The environmental regulation of an industrial sector usually starts with the big industries, those covering a large percentage of the sector's output.

❖ At the multilateral level, considering only energy-related CO₂ emissions:

Six industrialized countries [USA, Russia, Japan, Germany, United Kingdom, Canada] represent 44 % of the world's emissions.

❖ If we add two developing countries [China and India] the percentage reaches 62%.

However, the latter have very low emissions *vis a vis* their population: 2.59 and 0.91 t CO₂ per capita, well below the world's average: 4.02 t CO₂ per capita.

MULTI-TIERED GLOBAL SYSTEM

(Examples)	Total CO ₂ emissions* Mt CO ₂	CO ₂ / capita
I USA	5,324. ⁵²	20.05
	15.5	5.66
II Mexico	342. ¹⁹	3.54
	8.8	6.8
III Vietnam	39. ²³	0.52
	17.7	7.4
IV Tanzania	2. ²¹	0.07
	1	1

*Energy-related CO₂ emissions

-2-

Climate Change: Towards Global Participation

LEGAL INSTRUMENTS

- ❖ A global problem requires a global solution
- ❖ A global system for controlling climate change can only be based on a set of multilateral agreements: ⇨ UNFCCC

- ❖ UNFCCC: Article 3 [PRINCIPLES] . 1:

"The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combatting climate change and the adverse effects thereof".

- ❖ Differentiation:

- Amount of effort;
- Timing

- ❖ Commonality:

- All countries (Parties to the UNFCCC) are concerned and should do their best –in accordance with their responsibility / capability- to mitigate climate change.
- No country can claim that *it can do nothing*.

- ❖ UNFCCC: A fragile instrument, reflecting a very delicate balance.

- ❖ The Kyoto Protocol: An even more fragile instrument. It will not enter into force if developed countries are not willing to "take the lead".

- ❖ Current binary differentiation: Developed / developing, or Annex I / Non-Annex I, will eventually have to give way to a three / four tiered differentiation.

Climate Change: Towards Global Participation

INCENTIVES / DISINCENTIVES

- ❖ Currently, there are no specific incentives for Non- Annex I Parties to take on quantitative targets. Most flexibility mechanisms are restricted to Annex I.
- ❖ Annex I commitments [especially, UNFCCC Art. 4.2 (a) and (b)] are tailored according to the capabilities of industrialized countries. The mechanism established by Art. 4.2.(g) is insufficient.
- ❖ A *stick and carrot* policy for inducing "voluntary commitments" among Non- Annex I Parties might be dangerous:

STICKS	CARROTS
➤ Could be illegal, contrary to existing multilateral agreements ➤ Could break down confidence, trustfulness, good will	➤ May induce acceptance of "hot air" in exchange for legal commitments ➤ May lead to commitments that limit required growth in developing countries

Climate Change: Towards Global Participation

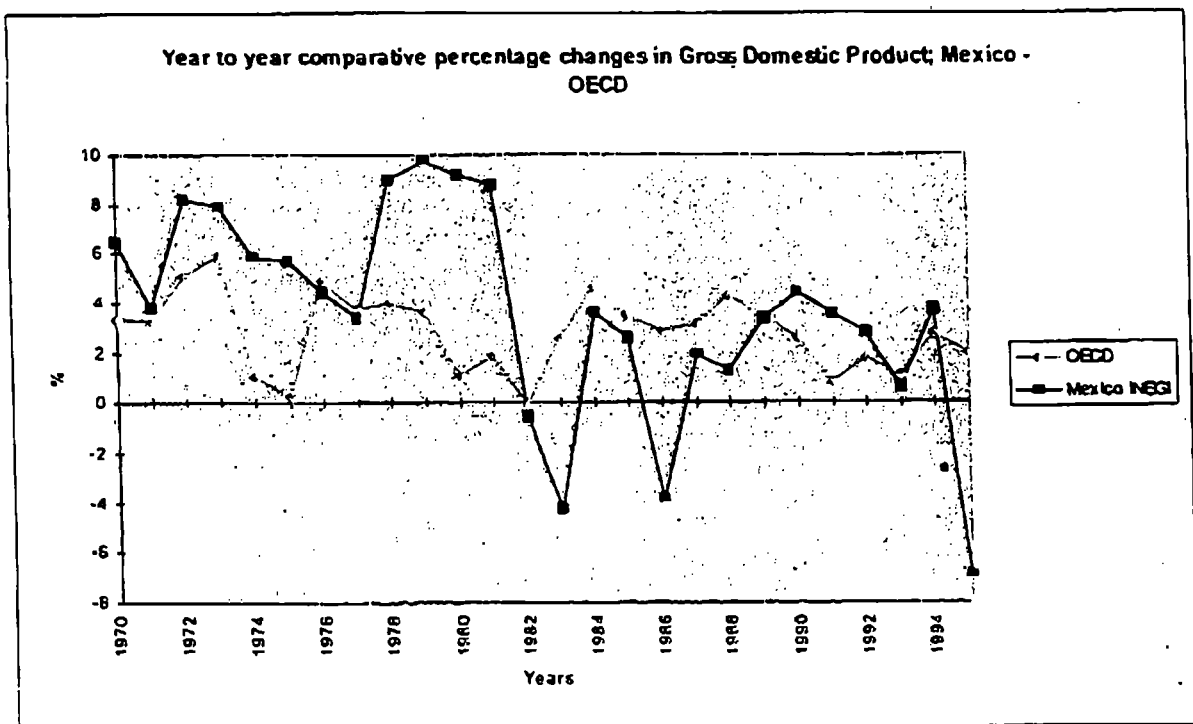
FUTURE EXPANSION OF COMMITMENTS: A PROCESS

In the context of Non-Annex I Parties, taking on targets should be the final stage of a process that might include the following:

❖ **Assessment of initial results of Annex I efforts.**

An expansion in the commitment regime can only be based on equity. Industrialized countries have, historically, been the principal contributors to the problem; it is only fair to expect them to take the lead to solve it.

❖ **In many cases: Some stabilization of economic development, leading to greater predictability of energy requirements.**



Sources:

Mexico: INEGI. Sistema de Cuentas Nacionales de México.

OECD: OECD Environmental Data, Compendia 1997 and 1987.

Climate Change: Towards Global Participation

FUTURE EXPANSION OF COMMITMENTS: A PROCESS (II)

- ❖ **Alternatively: exploration of different types of targets, such as:**
 - **GHGs emissions per unit of economic output (PPP), instead of absolute emissions**
- ❖ **Reinforcement of capacities, assessment of methodologies through utilization of CDM**
- ❖ **First and Second National Communications: The drawing up of two consecutive National Inventories of GHGs, showing real trends in emissions**
- ❖ **Strengthening the technical capacity to draw realistic baselines for GHGs emissions, thus avoiding both "hot air" and unnecessary restrictions to growth**
- ❖ **Strengthening the institutional capacity to deal in a coordinated way with the main sectors contributing to climate change mitigation**
- ❖ **Adoption and preliminary assessment of climate- related policies and measures**
- ❖ **"Dry run" adoption of targets prior to formally binding commitments**

Proposed Participants

State OES/E Delegation Head Brooks Yeager

Mexico EST Counselor Larry Kerr

State/OES/EGC Jeff Miotke

CEQ Joe Aldy

EPA Assistant to the Administrator for Climate Change Bill White

EPA Mexico Policy Analyst Francisco Donez

AID Mexico Climate Program Officer Frank Sudroga

AID Forests Heather Huppy



09859

Santafé de Bogotá D.C.,

10 JUN. 1999

Mr.

Joseph Aldy

Council of Economic Advisers

Executive Office of the President

Old Executive Office Building

Washington, D.C. 20502

USA

Dear Mr. Aldy:

On behalf of the Colombian government we want to thank you for having taken the time from your busy schedule to meet with us and discuss climate change issues, including the possibility of Colombia adopting a greenhouse gas emissions growth target. In particular, our discussions of the US and the Colombia perspective over both setting an emission target and CDM projects, as well as the documentation that was provided to us, will be extremely helpful in any future endeavors that we might undertake regarding climate change.

We also want to make sure that we keep the momentum and materialize the next steps that were agreed upon at the meeting. To summarize, the next steps included:

1. Joint study of options for Colombia like green coal.
2. Joint team to design a joint work program for COP6 for the areas that are of common concern both for the US and Colombia.
3. Exchange modeling knowledge (energy and forestry) and look into the possibility of integrated modeling (US-Colombia).
4. Workshops to study different alternatives on ways emission targets could be managed (i.e. indexed targets).
5. Identification and promotion in the US of a Colombian clean energy project portfolio.

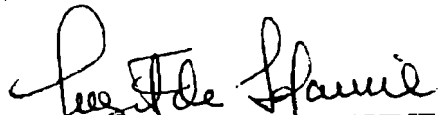
If we missed a next step or misinterpreted one of the next steps please let us know so that we can rectify it as soon as possible. Additionally, it is important to decide on the dates for accomplishing the next steps.

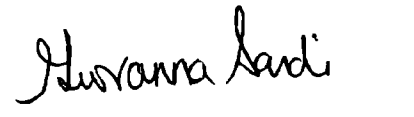


09359

We look forward to meeting with you in the near future.

Sincerely,


LUISA FERNANDA LAFAURIE
Vice-Minister of Mines


GIOVANNA SARDI
Senior Advisor to the Minister



Mikiko <mikiko@nies.go.jp>
08/24/99 09:32:37 PM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP

cc:

Subject: Re: AIM model results for China

Dear Mr. Joe Aldy

Followings are the data you requested.

2010 China BAU/reference emissions

1.126 GtC

2010 carbon price under Kyoto Protocol with global trading

38US\$(year 1992) /ton Carbon

2010 China emissions under Kyoto Protocol with global trading

1.094 GtC

2010 China GDP measure under Kyoto Protocol with global trading

GDP BaU 1199.51 Billion US\$ (year 1992)

Global Trading 1194.86 Billion US\$ (year 1992)

Sincerely yours,
Mikiko Kainuma

> Mikiko Kainuma,

>

> We are pulling together research on the economic effects of emissions

> abatement for China for some of our climate change work. I noticed in your

> recent Energy Journal article an analysis you undertook that includes

> China: global trading. We would very much appreciate any summary data you

> could provide on this scenario, especially by the end of this week given

> the tight deadline we are operating under. Specifically, the data we would

> like for the China module in your model include:

>

> 2010 China BAU/reference emissions

> 2010 carbon price under Kyoto Protocol with global trading

> 2010 China emissions under Kyoto Protocol with global trading

> 2010 China GDP measure under Kyoto Protocol with global trading

>

> Thank you for any assistance you can provide on this matter.

>

> Joe Aldy

> Council of Economic Advisers

> Old Executive Office Building, Room 319

> Washington, DC 20502

> 202-395-1455

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> joseph_e._aldy@cea.eop.gov
>
>
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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:
$$800 \text{ MW} (8760 \text{ Hr/Yr}) (0.90) = 6.3 \text{ million MWh}$$
$$\text{Annual carbon emissions: } 417 \text{ lbs} \times 6.3 \text{ million MWh} = 2627 \text{ million lbs or } 1.1941 \text{ million metric tons of carbon (MMT) per year}$$
- **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.

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.” 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 SCPC 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: $5.6 \text{ million MWh} \times 417 \text{ lbs} = 2335.2 \text{ million lbs or } 1.06 \text{ MMT}$
Saved emissions for year Y are:
 $[(504 \text{ lbs/MWh}) - (417 \text{ lbs/MWh})] \times 5.6 \text{ million MWh} = 487.2 \text{ million lbs or } .22 \text{ MMT}$

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):

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?

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:
 $(660 \text{ lbs/MWh}) - (417 \text{ lbs/MWh}) \times 6.3 \text{ million MWh} = 1531 \text{ million lbs or .70 MMT}$
or 700,000 CERs

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

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

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

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

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

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages ▶ 2

To: <u>JOE ALDY</u>	From: <u>STEPHANIE</u>
Dept./Agency	Phone #
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NSN 7540-01 317 7368 5089 101 GENERAL SERVICES ADMINISTRATION

HITE HOUSE**Office of the Vice President****For Immediate Release
Friday, April 9, 1999****Contact:
(202) 456-7035****VICE PRESIDENT GORE AND PREMIER ZHU RONGJI ANNOUNCE
ENVIRONMENTAL AGREEMENTS AT U.S.-CHINA POLICY FORUM ON
ENVIRONMENT AND DEVELOPMENT**

*U.S.-Chinese Environmental Cooperation Highlighted with Agreements on Emissions Trading,
U.S. Exports of Environmental Technology, and U.S. Investment in China's Energy Sector*

Washington, DC -- Vice President Al Gore and Chinese Premier Zhu Rongji today at the close of the Second Session of the U.S.-China Policy Forum on Environment and Development announced a series of agreements that will help open Chinese markets to U.S. environmental technology, expand U.S. investment in the Chinese energy sector, and take several steps toward reducing greenhouse gas emissions in China.

"As we count down the time to the 21st century in days, not years, more and more of our challenges are threats all nations face together, and no nation can solve on its own," Vice President Gore said. "Nothing illustrates this better than the environment."

"To meet the global environmental challenge, we must all act together. Today's agreements between the United States and China are a step in the right direction."

In an agreement that will accelerate the export of U.S. environmental technology to China, the U.S. Export-Import Bank, the Department of Energy, the China Development Bank, and China's State Development Planning Commission have signed A Memorandum of Understanding on a \$100 Million Clean Energy Program. By funding the sale of U.S. environmental technology to China, this program will accelerate the deployment of clean U.S. technologies in the area of energy efficiency, renewable energy, and pollution reduction.

In an agreement that will move China closer to a system of emissions trading, the EPA and China's State Environmental Protection Administration signed a Statement of Intent on development of a Sulfur Dioxide (SO₂) Emissions Trading Feasibility Study. The agreement calls for developing a study to test the effectiveness of emissions trading in China as a market-based approach to reducing greenhouse gas emissions. This approach which uses market mechanisms to create financial rewards for reducing pollution has been successful in cutting pollution at low cost in the United States.

In an agreement that paves the way for the first-ever foreign investment in an on-shore natural gas pipeline in China, Enron Corporation signed a Memorandum of Understanding on a

-- more --

Natural Gas Pipeline Project with China National Petroleum Corporation for the joint development of a natural gas pipeline in south central China. This pipeline would represent an important piece of China's natural gas infrastructure and help offer a cleaner alternative to fossil fuels.

The pipeline agreement came out of U.S.-China discussions on natural gas policy at the Oil and Gas Industry Forum, held under the auspices of the Energy and Environment Cooperation Initiative (EECI). The EECI is an outgrowth of the U.S.-China Forum and was established in 1997 by former Secretary of Energy Federico Pena and State Planning Commission Vice Chairman Zeng Peiyan to focus U.S.-China cooperation at the intersection of energy and environmental science, technology, and trade.

The U.S. and Chinese delegations also concluded agreements involving energy efficiency, air quality management, cleaner air and cleaner energy technology, and the impact of pollution on children's health.

The U.S.-China Policy Forum on Environment and Development was founded by Vice President Gore and then-Premier Li Peng in March 1997 to expand cooperation and intensify dialogue between the U.S. and China on issues related to sustainable development, particularly protection of the global environment. The Forum is divided into four working groups -- co-chaired by representatives from various agencies -- which act as coordinating mechanisms for activities taking place under the Forum, as well as those outside its structure.

The Energy Policy Working Group discusses issues of energy generation, and major energy-using activities in the industrial, transportation, building, and utility sectors; 2) the *Environmental Policy Working Group* consults and coordinates on multilateral and bilateral environmental issues, such as climate change, forestry, pollution prevention and control, waste management, and health impact of pollution; 3) *Science for Sustainable Development* studies the application of science and technology to understand and foster sustainable development; and 4) *Commercial Cooperation* promotes trade in energy, environment, agriculture, and other aspects of sustainable development.

Working groups schedule their own meetings and projects throughout the year. The full Forum gathers in plenary session when the two countries deem necessary to report to the Vice President and Premier on the progress of projects and to discuss further cooperation.

For additional information on U.S.-China Policy Forum activities please contact:

Commercial Cooperation --- Padraic Sweeney, Department of Commerce, 202/482-0135

Energy Policy Working Group --- Jane Brady, Department of Energy, 202/586-5000

Environmental Policy Working Group --- Brendan O'Neil, EPA, 202/260-0680

Science for Sustainable Development --- Susan Ruffo, White House, OSTP, 202/456-6105

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CHINA AND THE ENVIRONMENT (3/13 draft)

We have an extensive, active program of environmental engagement with China that has allowed us to address our concerns and influence China's behavior on responding to global threats. It also has let us undertake cooperative projects aimed at the local problems that contribute to those global threats. In the process, we have been able to promote U.S. environmental technologies. Outcomes of the last two sessions of the U.S.-China Forum on Environment and Development (April 1999 and January 2000) include:

- China has begun to examine market mechanisms, including domestic emissions trading, as tools to reduce sulfur dioxide emissions. An emissions cap and trade program could result in cost-effective reductions of sulfur dioxide and increased demand for sulfur scrubbing technologies, other pollution control equipment, and more efficient coal combustion equipment.
- The U.S. and China agreed on a \$100 million Clean Energy Program under which the U.S. Ex-Im Bank will provide financing for U.S. environmental exports to China. The program will focus on facilitating the deployment of clean U.S. technologies in the areas of energy efficiency, renewable energy, and pollution reduction.
- The U.S. and China held a second meeting of the Oil and Gas Industry Forum in Houston, TX (July 1999), where they explored access to information, markets, acreage, and parity for foreign companies. The two countries are working on a joint study of natural gas utilization in China to assess the potential for expanding natural gas production to take advantage of its environmental and health benefits.
- The U.S. and China have begun implementing the new Housing Cooperation Initiative called for by President Clinton in July 1998 to increase cooperation on the use of environmentally-friendly, energy-efficient housing materials and design.
- The U.S. and China agreed to cooperate on an Urban Air Quality Monitoring Program, using U.S. equipment and technical assistance from the Environmental Protection Agency and California Air Resources Board.
- The U.S. and China have an extensive program of energy efficiency and renewable energy cooperation, including completion of a feasibility study for energy efficient buildings, installation of solar home systems, energy efficiency and renewable energy market assessments, and training and outreach programs.

Our engagement with China on the environment is critical because China will play a key role in either solving or exacerbating the global environmental challenges that affect the U.S. The more China is integrated into the international system and the more robust our engagement, the better our chances of influencing Chinese behavior in a way that helps protect the health and safety of Americans, Chinese, and everyone on the planet.

- With over 1.2 billion people, one of the fastest growing economies in the world, and energy and other resource demands that will increase rapidly over the next 40 years, China is an important player in global environmental issues.

- After the U.S., China is the world's largest energy consumer and largest emitter of greenhouse gases that contribute to global climate change. China is also the largest developing country chemical exporter and the world's largest producer of ozone-depleting substances. China's participation in global solutions is critical to preventing climate change, controlling the production and transport of toxic chemicals and pesticides, and repairing the ozone layer.
- China has acceded to a number of important international environmental treaties and has met its explicit obligations under these agreements. In the case of the Montreal Protocol, China is ahead of schedule on phasing out various ozone depleting substances. While the Chinese government has not matched all our expectations for implementing the spirit of other agreements, it consistently has made good faith efforts to abide by -- not flout -- the obligations it has undertaken. These agreements -- which have resulted in the strengthening of China's environmental protection institutions and increased contact with the international community -- provide our best leverage for holding the Chinese to their commitments and inducing them to improve further.

China's entry into the WTO creates a better climate for environmental protection and opportunities for cleaner economic development.

- Economists predict that China's economy will grow faster if it joins the WTO. A wealthier China will be able to commit more resources to environmental protection.
- The agreement with China on WTO accession includes provisions that have the potential to facilitate cleaner economic development by promoting the export of environmentally-friendly goods and services to China and improving the environmental performance of economic activity in China.

-- Cleaner energy generation. Liberalization of the energy sector would reduce trade barriers to a wide variety of energy generation and transmission technologies. Since western power technology is 25% more efficient than current Chinese technology, expanding the use of these more efficient energy technologies will allow China to generate more electricity with lower levels of carbon dioxide, sulfur dioxide, and nitrogen dioxide emissions.

-- Cleaner production. China's entry into the WTO will facilitate increased foreign investment. In their overseas operations, most U.S. and many other international firms adhere to world-class environmental standards that exceed current Chinese standards. Chinese enterprises receiving investment from abroad will likely use cleaner production techniques than currently employed. These developments will help raise the bar for domestic environmental standards.

-- Increased exports to China of environmental technology. Liberalization of trade will also increase access to environmental technologies. These environmental technologies will allow China to significantly reduce air pollutant emissions that currently exceed WHO-recommended levels and cause significant harm to both the local population and the environment.

-- Cleaner transportation. Liberalization in the automotive sector will result in greater market penetration by foreign-made vehicles. Since current domestic-made vehicles consume nearly 40% more fuel than comparable import vehicles, increased market share by imports could significantly slow the growth in transportation carbon dioxide emissions. With per capita vehicle ownership projected to nearly triple by 2010, the transportation sector is a fast-growing market with substantial opportunities for improvements in fuel economy.

-- Increased access to Chinese market for environmental services. China agreed to grant much greater access to its market for a variety of environmental services, including sewage treatment, solid waste disposal, noise abatement, and nature and landscape protection services. China also agreed to provide access for environmental consultation services and to allow joint ventures to provide such services.

Drafted:OVP:TOSius:EAP/CM:JDFritz
O:CM:Econ:PNTR:enviropaper

Clearances:

EAP:SLShirk
EAP/CM:SASchlaikjer ok
EAP/CM:RGoldberg ok
OVP:TOSius
OSTP:PAnastas
G:Npurvis ok
OES/PCI:WEDilday ok
DOE:DDwyer ok
EPA:MBailey ok
NOAA:SWare-Harris ok
CEQ:IBowles
USTR:IJones
DOC:DLane
EXIM:VCavaillier
NSC:JRKeith
NEC:TPunke
NEC:MLee

-- DRAFT --
Discussion Paper on
China Strategy
(5/6/99)

This paper suggests medium and near term goals for our climate change relationship with China but does not attempt to define or quantify meaningful participation.

Medium Term

- Bilateral:
 - Continue bilateral "co-benefits" efforts, particularly EPA's work on sulfur trading in China, that will create a domestic "experience pool" and foster acceptance of market-based approaches internationally
 - Consider launching a significant, new bilateral effort, based on our experience assessing potential climate impacts in the United States, to assess potential impacts in China
 - Based on work of task team on financing (see below), consider new USG or USG/private sector initiatives in key areas (e.g., industrial boilers)
- Multilateral:
 - Encourage other members of the G-77 (AOSIS, Africa, Latin America) to find their own voices
 - Intensify our bilateral relationships with other key developing countries (e.g., India)
 - Improve awareness of others' bilateral efforts with China and consider opportunities to coordinate with other Annex I countries (e.g., initiate a discussion of "approaches to China" in the Umbrella Group, consider discussing with EU (either with key Member States or with the Presidency/Commission))

Near Term

- Bilateral:
 - Hold a second "High-Level" Policy Dialogue in July
 - Establish an interagency task force on financing to:
 - ~ determine why Europe and Japan can offer concessional interest rates

- how far we can go to match them
- consider approaches that could help "level the playing field" (e.g., agreement within the G-8 on "rules of the road")
- Assess where U.S. assistance could be most effectively targeted (is new power plant construction the key issue, or is it industrial boilers?) and consider how better to support U.S. firms with relevant technology/expertise
- Multilateral:
 - Win acceptance of holding COP-6 in the Spring of 2001
 - Work out reasonable "principles" regarding the Kyoto flexibility mechanisms (good), or gain agreement to move forward with technical issues, deferring contentious "policy" issues to the future (better)
 - Determine when China plans to submit its initial national communication under the UNFCCC and signal the importance we attach to this in bilateral discussions
 - Win China's acquiescence in allowing developing countries, on a voluntary basis, to invite expert teams to their capitals as part of the "consideration process" for developing country national communications

EPA - results from Forum

nat gas

energy-efficient technology

voluntary

buildings

coal-bed methane

AQM + PM

Still working w/ Chinese on forestry
CDM

Sandalow

more on econ modeling - resources better spent there than impacts
UNDP + WRI Promoting Development by Limiting GHGs - chp on China
review CDM paper? - issues of commonality (EPA)
Writers program - bring Chinese to US
E+I?

* Indexed targets strategy

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DEPARTMENT FOR OES/GLOBAL CHANGE

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TEXT:

TAGS: ENRG, SENV, SOCI, PREL, NTDB, CH
COMBINE: COMPLETE

SUBJECT: PRC PLANNERS' NEW ENERGY STRATEGY: OIL NOT COAL

REF: 99 BEIJING 0719

1. SUMMARY: A MARCH 1999 STUDY PRODUCED BY A RESEARCH INSTITUTE AFFILIATED WITH THE PRC STATE DEVELOPMENT PLANNING COMMISSION (SDPC) CALLS FOR A SHARP BREAK WITH CHINA'S SELF-SUFFICIENT, COAL-DEPENDENT ENERGY POSTURE OF THE PAST FIVE DECADES. THE SDPC INSTITUTE ECONOMISTS FRANKLY ARGUE THAT CHINA MUST OVER THE NEXT FIFTY YEARS HALVE ITS DEPENDENCE ON COAL WHILE SHARPLY BOOSTING NATURAL GAS PRODUCTION AND OIL AND LNG IMPORTS. THIS NEW STRATEGY WILL ENABLE CHINA TO MEET EVENTUAL CLIMATE CHANGE TREATY COMMITMENTS, WRITE THE PRC GOVERNMENT PLANNING AGENCY INSTITUTE ECONOMISTS. "MEDIUM AND LONG TERM ENERGY STRATEGIES FOR CHINA" ARGUES THAT ALTHOUGH INCREASED INVESTMENT IN CLEAN COAL IS IMPORTANT, CHINA'S NEED TO BOOST ENERGY EFFICIENCY, CURB POLLUTION, AND TO MEET EVENTUAL CLIMATE CHANGE TREATY OBLIGATIONS CANNOT BE ACCOMPLISHED WITH AN ENERGY STRUCTURE THAT IS 75 PERCENT COAL DEPENDENT. IN SOME RESPECTS PRC ENERGY POLICY HAS ALREADY TAKEN ON BOARD THE AUTHORS' RECOMMENDATIONS. INCREASED ENERGY IMPORTS HAVE BEEN A FACT OF LIFE SINCE THE EARLY 1990S. END SUMMARY.

2. "MEDIUM AND LONG TERM ENERGY STRATEGIES FOR CHINA" (ZHONGGUO ZHONG CHANG QI NENGYUAN ZHANLUE) EDITED BY ZHOU FENGQI AND ZHOU DADI WAS PUBLISHED BY THE CHINA PLANNING PUBLISHING HOUSE (ZHONGGUO JIHUA CHUBANSHE) IN FEBRUARY 1999. (THE ENGLISH TITLE GIVEN TO THE BOOK IS "STUDIES ON LONG TERM ENERGY DEVELOPMENT STRATEGIES OF CHINA").

3. THE ENERGY RESEARCH INSTITUTE OF THE PRC STATE DEVELOPMENT PLANNING COMMISSION'S SDPC MACROECONOMIC RESEARCH INSTITUTE WROTE THIS VOLUME. THIRTY PAGES OF THE 106 PAGE OVERVIEW IS DEVOTED TO GLOBAL WARMING, ANALYSIS OF THE POSITIONS OF FOREIGN COUNTRIES AND CHINA'S STRATEGY. MORE SPECIALIZED TOPICS EXAMINED IN THIS 370 PAGE VOLUME INCLUDE ENERGY EFFICIENCY, ELECTRIC POWER DEVELOPMENT, ALTERNATIVE ENERGY SOURCES AND ENERGY SUPPLY STRATEGY, NUCLEAR POWER DEVELOPMENT STRATEGY, AND FINALLY WORLD AND CHINESE OIL AND NATURAL GAS RESOURCES.

THE AUTHORS STATE THAT GROWING CHINESE EXPORTS WILL BE ABLE TO PAY FOR EVEN VERY LARGE-SCALE OIL AND NATURAL GAS IMPORTS. TRADE RELATIONS WITH OIL PRODUCERS, ESPECIALLY THE CENTRAL ASIAN COUNTRIES, SHOULD BE STRENGTHENED TO ASSURE CHINA OF LONG TERM RELIABLE ENERGY SUPPLIES, SUGGEST THE AUTHORS.

POST COMMENT ON SDPC ENERGY RESEARCH INSTITUTE STUDY

4. THE STATE DEVELOPMENT PLANNING COMMISSION (SDPC) APPROVES AND DETERMINES MAJOR INFRASTRUCTURE INVESTMENTS IN CHINA AND THEREFORE HAS TREMENDOUS INFLUENCE ON WHETHER NEW POWER PLANTS ARE FIRED BY COAL, NATURAL GAS, OIL OR NUCLEAR FUEL. ITS REPORTS DO RECEIVE WIDE DISSEMINATION WITHIN THE COMMISSION AND WITHIN THE STATE COUNCIL.

MACROECONOMIST RECOMMENDATIONS BUT NO POLICY SHIFT

5. THIS REPORT, HOWEVER, DOES NOT REPRESENT A MAJOR POLICY SHIFT FOR THE SDPC. THE REPORT WAS PREPARED AS PART OF A SERIES OF THINK PIECES ON HOW CHINA'S ECONOMY MIGHT LOOK IN THE 21ST CENTURY. THERE ARE OTHER, CONFLICTING, OPINIONS ON CHINA'S FUTURE ENERGY STRUCTURE AND SERIOUS CONCERNS AT HIGH LEVELS IN THE CHINESE GOVERNMENT ABOUT INCREASING DEPENDENCE UPON IMPORTS, PARTICULARLY IN STRATEGIC COMMODITIES LIKE OIL AND LPG. THE PUBLICATION OF THIS REPORT, AND ITS UNIQUE PERSPECTIVE ON CHINA'S FUTURE ENERGY MIX, IS A SIGN THAT PARTS OF THE CHINESE GOVERNMENT ARE COGNIZANT OF CLIMATE CHANGE CONCERNS AND ARE CONSIDERING WAYS TO ADDRESS THEM. IT SHOULD NOT, HOWEVER, LEAD READERS TO EXPECT A SEA CHANGE IN EITHER CHINA'S CLIMATE CHANGE NEGOTIATING POSITIONS OR IN ITS ENERGY POLICIES IN THE NEAR TERM.

GLOBAL, ENVIRONMENTAL OUTLOOK MAKES REPORT INTRIGUING

6. WHAT MAKES THIS STUDY STAND OUT IS THE INTERNATIONAL (AND ENVIRONMENTAL) REASONING AND ITS OVERLY AMBITIOUS 2050 GOALS. THAT THE SDPC WOULD PUBLISH SUCH A STUDY IS CERTAINLY ENCOURAGING. PEOPLE IN CHINA WILL BREATHE EASIER AND GENERATE ENERGY MORE EFFICIENTLY IF THESE ECONOMISTS' RECOMMENDATIONS BECOME POLICY.

ALREADY SOME SIGNS OF MOVING AWAY FROM COAL

7. IN SOME RESPECTS, CHINA HAS ALREADY BEGUN TO MOVE TOWARDS A LESS COAL-DEPENDENT FUTURE. COAL OVERPRODUCTION HAS LED TO CALLS FROM THE CENTRAL GOVERNMENT MINISTRIES TO CLOSE SMALL MINES AND REDUCE PRODUCTION, WHICH FELL 12 PERCENT IN 1999. CHINA IS ALREADY BUILDING OR CONSIDERING TWO LARGE NATURAL GAS

UNCLASSIFIED

PIPELINES, FROM SICHUAN TO WUHAN AND FROM QINGHAI TO LANZHOU, TO CUT POLLUTION AND BOOST EFFICIENCY. THUS, ALTHOUGH THEIR TARGET NUMBERS MAY NEVER BE MET, THE AUTHORS HAVE HIGHLIGHTED THE DIRECTION OF CHINESE ENERGY POLICY. IN THE DECEMBER 1999 ISSUE OF CHINA ENERGY RESOURCES (ZHONGGUO NENGYUAN) P. 6 ZHOU FENGQI OF THE SDPC ENERGY RESEARCH INSTITUTE STATES FLATLY THAT "CHINA WILL MOVE AWAY FROM AN ENERGY STRUCTURE IN WHICH COAL PREDOMINATES, BUT THIS WILL TAKE SEVERAL DECADES."

A SOCIAL CONSTRAINT - UNEMPLOYMENT - ON ENERGY POLICY?

8. THE SDPC REPORT PROPOSES SHARPLY LIMITING THE GROWTH OF COAL PRODUCTION (WHICH COMES ALMOST EXCLUSIVELY FROM STATE MINES) BUT NOT REDUCING PRODUCTION IN ABSOLUTE TERMS. THIS PROPOSAL MAY HAVE SEVERE SOCIAL CONSEQUENCES FOR EMPLOYMENT THAT WOULD AROUSE CONSIDERABLE OPPOSITION. CHINESE STATE COAL MINES ARE OVERSTAFFED -- ONE REPORT STATES THAT CHINESE COAL INDUSTRY MANPOWER EFFICIENCY IS JUST 7.5 PERCENT OF THAT OF THE U.S. COAL INDUSTRY. ONE OBVIOUS SOLUTION WOULD BE TO LAY OFF MILLIONS OF COAL MINERS. AS FIFTEEN MILLION NEW PEOPLE JOIN THE CHINESE WORK FORCE EACH YEAR, AS PRODUCTION EFFICIENCY CLIMBS, AND AS THE CHINESE ECONOMY SHIFTS TOWARDS MORE CAPITAL INTENSIVE PRODUCTS, THE PROSPECT OF CUTTING PROJECTED DEMANDS FOR COAL AND FOR COAL HAS SOCIAL CONSEQUENCES WHICH MUST ALSO BE CONSIDERED BY CHINESE LEADERS.

9. THE CAPITAL STEEL CORPORATION OF BEIJING IS A GOOD EXAMPLE OF SOUND ENVIRONMENTAL POLICY CONFLICTING WITH THE SOCIAL STABILITY NEEDS OF THE GOVERNMENT. THIS URBAN STEEL PLANT ACCOUNTS FOR PERHAPS ONE-THIRD OF BEIJING'S AIR POLLUTION. THE MAIN OBSTACLE TO CLOSING DOWN THE PLANT (THE BEST SOLUTION ALTHOUGH LARGE SUMS ARE BEING INVESTED IN POLLUTION CONTROL FOR THE PLANT NOW) IS NOT A SHORTAGE OF STEEL BUT THE SOCIAL COST OF THROWING TENS OF THOUSANDS OF WORKERS OUT OF WORK. AN OTHERWISE GOOD POLICY MIGHT FAIL TO BE ADOPTED IF CHINA'S LEADERS FEAR THAT ITS IMPLEMENTATION MIGHT LEAD TO STILL MORE UNEMPLOYMENT AMONG URBAN WORKERS AND SOCIAL INSTABILITY.

REFERENCES ON U.S. - CHINA ENERGY EFFICIENCY COOPERATION

-- "COOPERATION IN THE ENERGY FUTURES OF CHINA AND THE UNITED STATES", A DECEMBER 1999 JOINT REPORT BY THE CHINESE ACADEMY OF SCIENCES, CHINESE ACADEMY OF ENGINEERING AND THE U.S. NATIONAL RESEARCH COUNCIL REPORT IS AVAILABLE ON THE WEB AT
[HTTP://WWW.NAP.EDU/CATALOG/9736.HTML](http://www.nap.edu/catalog/9736.html)

-- CHINA ENERGY PAGE OF THE PACIFIC NORTHWEST NATIONAL LABORATORY AT [HTTP://WWW.PNL.GOV/CHINA](http://www.pnl.gov/china)

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THE PRC STATE DEVELOPMENT PLANNING COMMISSION ENERGY RESEARCH INSTITUTE REPORT IS SUMMARIZED BELOW.

THE QUESTION: WHAT ENERGY POLICY AND STRUCTURE WILL ENABLE CHINA TO BECOME DEVELOPED, REDUCE POLLUTION AND AVOID GLOBAL WARMING?

THE SDPC MACROECONOMIC RESEARCH INSTITUTE ENERGY RESEARCH GROUP CONFRONTED THE QUESTION WHICH TO SUMMARIZE IS "WHAT ENERGY STRUCTURE AND POLICY WILL ENABLE CHINA TO ACHIEVE ITS GOAL OF BECOMING A MIDDLE-RANKING DEVELOPED COUNTRY IN 2050? CAN CHINA FIND A DIFFERENT DEVELOPMENT PATH THAN THE DEVELOPED COUNTRIES OF TODAY AND ACHIEVE ITS GOAL WITH AN AVERAGE CONSUMPTION OF GOODS AND SERVICES AT ABOUT THE LEVEL OF THE DEVELOPED COUNTRIES OF THE 1980S AND 1990S? WITH CHINA'S LARGE POPULATION, PER CAPITA ENERGY CONSUMPTION WILL STILL BE QUITE LOW. CAN CHINA ACHIEVE ITS GOAL WITH A RELATIVELY LOW PER CAPITA ENERGY CONSUMPTION?

MUCH HOPE IS PLACED ON ENERGY EFFICIENCY BUT IS THAT REALISTIC? IF ONE ONLY LOOKS AT CHINA'S RESOURCES, IT IS HARD TO SEE HOW CHINA CAN EVER ESCAPE ITS DEPENDENCE UPON COAL. BUT IF WE LOOK MORE BROADLY AT THE GLOBAL INTEGRATION OF THE PRODUCTION AND USE OF ENERGY RESOURCES, THIS IS NOT NECESSARILY SO." (PP. 7-8)
GLOBAL WARMING THREATENS ALL HUMANITY. CHINA WILL HAVE AN EVERY BIGGER ROLE IN THE GLOBAL WARMING PICTURE.

ASSUMPTIONS 2050: 1.5 BILLION PEOPLE, 80 PERCENT URBAN

THE SDPC STUDY IS BASED ON A SET OF ASSUMPTIONS (PP. 7 - 8) HERE ARE SOME OF THEM:

- CHINA'S POPULATION WILL BE BETWEEN 1.45 AND 1.58 BILLION PEOPLE.
- CHINESE URBANIZATION WILL PROGRESS FROM 32 - 38 PERCENT IN 2000, TO 41 - 50 PERCENT IN 2020 TO 65 - 80 PERCENT IN 2050.
- THE PRIMARY SECTOR WILL BE 13 PERCENT OF GDP IN 2020 AND 7 PERCENT IN 2050; THE SECONDARY SECTOR WILL BE 43 PERCENT IN 2020 AND 38 PERCENT IN 2050; AND THE TERTIARY SECTOR WILL BE 42 PERCENT IN 2020 AND 54 PERCENT IN 2050.

THE ANSWER: SWITCH FROM COAL TO OIL, NATURAL GAS, BOOST EFFICIENCY, SHARPLY INCREASE ENERGY IMPORTS

THE SDPC ECONOMISTS ARGUE THAT CHINA MUST MOVE AWAY FROM ITS CURRENT POLICY OF RELYING ON THE MASSIVE COAL RESERVES THAT CURRENTLY SUPPLY 75 PERCENT OF CHINA'S ENERGY NEEDS AND MOVE TOWARDS HIGHER ENERGY EFFICIENCY,

OIL, NATURAL GAS, AND SHARPLY INCREASED IMPORTS OF OIL AND GAS. CLEAN COAL TECHNOLOGY IS ESSENTIAL -- YET IN 1995 ONLY 16 PERCENT OF CHINA'S COAL WAS WASHED. (P. 36) DESULPHURIZATION IS IMPORTANT YET VERY EXPENSIVE. A NEW IMPORTED DESULPHURIZATION EQUIPMENT AT A SICHUAN POWER PLANT COST USD 36 MILLION SO DURING THE NINTH FIVE YEAR PLAN ONLY ONE QUARTER OF THE PLANNED INCREASED CAPACITY WILL INVOLVE DESULPHURIZATION EQUIPMENT. (P. 38) REDUCING POLLUTION FROM COAL-POWERED PLANTS IS ESSENTIAL YET IT IS TOO EXPENSIVE TO BE ADOPTED NATIONWIDE. ONLY BY SWITCHING TO OIL AND NATURAL GAS AND RELYING ON FOREIGN SUPPLIES CAN CHINA BY 2050 ACHIEVE THE 55 - 60 PERCENT ENERGY EFFICIENCY THAT IT NEEDS TO JOIN THE RANKS OF THE DEVELOPED COUNTRIES.

CHINA WOULD PAY A HIGH PRICE FOR SELF-SUFFICIENCY

IF CHINA INSISTS ON A CLOSED SYSTEM AND REJECTS THE IMPORT OPTION, IT WILL PAY A HEAVY PRICE (PP. 32- 43). CHINA'S NATURAL GAS PRODUCTION IS ONLY TEN PERCENT OF ITS OIL PRODUCTION -- IT MUST INCREASE TO THE DEVELOPED COUNTRY LEVEL OF 1:1 OIL: NATURAL GAS RATIO SO THAT CHINA CAN MAKE FULL USE OF ITS NATURAL GAS RESOURCES. (NOTE: CURRENTLY GAS MAKES UP ONLY 2 PERCENT OF CHINA'S ENERGY USE. END NOTE) THE UNITED STATES AND EUROPE RELY ON VAST PIPELINE SYSTEMS THAT CAN CARRY OIL OR NATURAL GAS IN ALL DIRECTIONS. CHINA SHOULD TOO. (PP. 44 - 52) RURAL CHINA MUST MOVE AWAY FROM ITS 70 PERCENT DEPENDENCE ON BIOMASS ENERGY SOURCES AND MOVE TOWARD ELECTRICITY TO PREVENT EVEN WORSE POLLUTION AND ENVIRONMENTAL DEGRADATION.

THE MOVE TO HIGH EFFICIENCY FUELS: CHINA SHOULD TOO

EVERY DEVELOPED COUNTRY MOVED TO HIGH EFFICIENCY FUELS -- CHINA SHOULD TOO. (P. 54) HIGHER IMPORTS AND GREATER INTEGRATION INTO THE WORLD TRADING SYSTEM WILL PAY FOR OIL WITH HIGHER EXPORTS AND ASSURE CHINA'S ENERGY SECURITY. THE WIDE VARIETY OF OIL USERS AND SUPPLIERS AND CHINA'S VALUE TO OIL EXPORTERS AS A COUNTERWEIGHT TO THE BIG MULTINATIONALS ALSO WORKS IN FAVOR OF CHINA'S ENERGY SECURITY. INCREASE ENERGY COOPERATION WITH EAST ASIAN AND ESPECIALLY NE ASIAN ECONOMIC COOPERATION AND NE ASIA SUPPLY ORGANIZATION FOR JOINT EXPLORATION AND DISPUTE RESOLUTION. (PP. 55 - 64) THE OIL AND GAS RESOURCES OF THE CENTRAL ASIAN COUNTRIES WILL BE ESPECIALLY IMPORTANT FOR CHINA. (P. 60) MOVING AWAY FROM COAL AND TOWARDS LOWER CARBON OR NO-CARBON FUELS SUCH AS OIL, NATURAL GAS, NUCLEAR POWER AND SOLAR POWER WILL ENABLE CHINA TO CARRY OUT COMMITMENTS TO REDUCE EMISSIONS TO MEET GLOBAL WARMING AGREEMENT COMMITMENTS. (PP. 90 - 96)

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ENERGY AND THE ENVIRONMENT: HOW IT AFFECTS CHINA

MANY CHINESE ENVIRONMENTAL PROBLEMS ARE TIED TO ENERGY CONSUMPTION PATTERNS. SO2 FROM COAL COMBUSTION CAUSES ACID RAIN. PETROCARBON FUEL CONSUMPTION CAUSES GLOBAL WARMING. TWO THIRDS OF ALL CHINESE CITIES ALREADY EXCEED RESIDENTIAL AREA SULFUR DIOXIDE AIR POLLUTION STANDARD. THE CENTURY LONG GLOBAL WARMING TREND CAN ALSO BE SEEN IN CHINA, ALTHOUGH THE WARMEST DECADE FOR CHINA WAS NOT THE 1980S BUT THE 1940S. ACCORDING TO ESTIMATES OF THE EFFECT OF GLOBAL WARMING ON CHINA, BY THE YEARS 2013 - 2033, CHINA'S AVERAGE TEMPERATURE WILL INCREASE BY 0.45 DEGREES CELSIUS AND RAINFALL WILL INCREASE BY 3 PERCENT. BY 2033 - 2042, CHINA'S AVERAGE TEMPERATURE WILL CLIMB ANOTHER 0.75 DEGREES AND RAINFALL WILL DECREASE BY 5 PERCENT.

TO CONTROL ACID RAIN, SULFUR DIOXIDE MUST BE CONTROLLED

IN 1995, CHINA ESTABLISHED TWO ACID RAIN CONTROL ZONES THAT INCLUDE 8.4 PERCENT OF CHINA'S LAND TERRITORY. PLANS CALL FOR SO2 EMISSIONS TO BE CONTROLLED TO THEIR YEAR 2000 LEVELS BY 2010. IF THIS IS NOT ACCOMPLISHED BY 2010 THE ACID RAIN ZONE WILL GROW FROM 16.74 MILLION SQUARE KILOMETERS TO 28.97 MILLION SQUARE KILOMETERS BY 2010. IN ORDER TO MEET THIS GOAL BY THE YEAR 2010 CHINA NEEDS TO HOLD SO2 EMISSIONS TO 12.23 MILLION TONS ANNUALLY EITHER BY ADDING SUFFICIENT DESULPHURIZATION EQUIPMENT OR BY REDUCING COAL CONSUMPTION BY 530 MILLION TONS. THIS GOAL IS TO ACHIEVED BY

- 1) INCREASING ENERGY EFFICIENCY
- 2) USE CLEAN COMBUSTION TECHNOLOGY TO REDUCE EMISSIONS
- 3) ACCELERATE SWITCH TO ALTERNATIVE LOW POLLUTION ENERGY SOURCES

BOOST ENERGY EFFICIENCY TO CUT SULFUR DIOXIDE EMISSIONS

COAL CONSUMPTION PER UNIT OF GDP IN THE ACID RAIN CONTROL AREA MUST BE REDUCED FROM 3.35 TONS PER 10,000 RMB OF GDP TODAY TO 2.49 TONS BY 2010. THIS CAN BE DONE WITH A 2.8 PERCENT ANNUAL INCREASE IN ENERGY EFFICIENCY DURING 2000 - 2010. THIS WILL CUT COAL CONSUMPTION BY 250 MILLION TONS -- THE EQUIVALENT OF AN SO2 EMISSIONS CUT OF 5.54 MILLION TONS. THE CONTRIBUTION OF ENERGY EFFICIENCY TO THE SO2 EMISSIONS REDUCTIONS WILL BE 45 PERCENT. (PP. 64 - 70)

GLOBAL WARMING: DIFFERENCES IN EUROPEAN, U.S. APPROACHES

A THIRTY PAGE SECTION (PP. 70 - 107) DISCUSSES GLOBAL WARMING, THE RESULTS OF THE KYOTO PROTOCOL CONFERENCE,

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THE EFFECT THE IMPLEMENTATION OF THE KYOTO COMMITMENTS BY THE DEVELOPED COUNTRIES WILL HAVE ON THE DEVELOPMENT OF GLOBAL WARMING, AND THE INCREASING IMPORTANCE OF DEVELOPING COUNTRY EMISSIONS AS A SOURCE OF GLOBAL WARMING. ACCORDING TO THE REPORT, "THE U.S. HAS ADMITTED THAT IT WILL NOT BE ABLE TO IMPLEMENT ITS 1990 COMMITMENT TO BRING ITS GREENHOUSE GAS EMISSION LEVEL DOWN TO THE 1990 LEVEL.... PRESIDENT CLINTON SAID THAT HE WOULD NOT SUBMIT THE KYOTO AGREEMENT TO THE U.S. SENATE UNLESS THERE IS SOLID PROGRESS ON DEVELOPING COUNTRIES ACCEPTING COMMITMENTS UNDER THE KYOTO AGREEMENT.... THE EUROPEAN UNION HOWEVER, WITH ITS SUPERIOR ENERGY STRUCTURE AND ENVIRONMENTAL PROTECTION TECHNOLOGY HAS TAKEN A MORE POSITIVE ATTITUDE." (PP. 82 - 83)

CHINA WILL BECOME AN EVER MORE PROMINENT POLLUTER

ACCORDING TO THE REPORT, CHINA'S RAPID DEVELOPMENT OF THE PAST TWO DECADES MADE IT THE SECOND LARGEST EMITTER OF SULFUR DIOXIDE (2.849 BILLION TONS) IN 1995. SINCE THE BEGINNING OF THE 1980S, THE RATE OF INCREASE OF U.S. NO2 EMISSIONS HAS BEEN LOW (0.8 PERCENT ANNUALLY) COMPARED WITH A 5 PERCENT ANNUAL NO2 EMISSION RATE FOR CHINA. IF THE UNITED STATES FULFILLS ITS PROMISE OF REDUCING ITS NO2 EMISSIONS BY 20 PERCENT TO THEIR 1990 LEVEL, THEN CHINA WILL EXCEED THE U.S. NO2 EMISSION LEVEL IN 2020 AND AFTER 2025 OR 2030 CHINA WILL NO LONGER BE BELOW THE WORLD PER CAPITA NO2 EMISSION LEVEL.

DEVELOPED PUTTING PRESSURE ON DEVELOPING COUNTRIES

THE U.S. AND OTHER DEVELOPED COUNTRIES ARE PUTTING PRESSURE ON CHINA AND INDIA TO ACCEPT EMISSION REDUCTION COMMITMENTS. SOME DEVELOPED COUNTRIES HAVE SUGGESTED THAT DEVELOPING COUNTRIES TAKE ON EMISSION REDUCTION COMMITMENTS AROUND 2014. THUS BY THE SECOND DECADE OF THE 21ST CENTURY, CHINA WILL STAND OUT EVEN MORE STARKLY AS A HIGH VOLUME EMITTER OF GREENHOUSE GASES AND A FOCUS OF INTERNATIONAL CRITICISM. BY THAT TIME, CHINA'S ENERGY SOURCE DEVELOPMENT WILL BE NOT ONLY UNDER POLITICAL AND DIPLOMATIC PRESSURE TO REDUCE ITS GREENHOUSE GAS EMISSIONS BUT ALSO STRONGLY AFFECT CHINA SOCIO-ECONOMIC DEVELOPMENT AND THE LIVING STANDARD OF ITS PEOPLE. (PP. 86 - 90)

COAL TO OIL SWITCH, ENERGY EFFICIENCY WILL BETTER ENABLE CHINA TO CONTRIBUTE TO REDUCING GREENHOUSE GAS GROWTH

ACCORDING TO THE REPORT (PP. 90 - 96), LIKE OTHER COUNTRIES, THE ENVIRONMENTAL PROBLEMS CHINA WILL FACE IN

A WARMING WORLD WILL BECOME MORE PRONOUNCED. REDUCING SO2 EMISSIONS IS IN CHINA'S OWN LONG-TERM INTEREST. THEREFORE CONTROLLING POPULATION GROWTH, ENERGY CONSERVATION, AND PROTECTING THE ENVIRONMENT MUST BE TOP PRIORITIES. A LONG TERM STRATEGIC OBJECTIVE OF CHINA'S GREENHOUSE GAS EMISSION CONTROLS SHOULD BE TO HOLD DOWN EMISSIONS SO THAT CHINA'S EMISSIONS ARE MUCH LOWER THAN WERE THOSE OF THE DEVELOPED COUNTRIES AT COMPARABLE STAGES OF THEIR DEVELOPMENT. AS CHINA STRIVES TO BECOME A MIDDLE RANKING DEVELOPED COUNTRY, IT WILL ALSO BE ACTIVELY CONTRIBUTING TO THE SLOWING THE GROWTH OF GREENHOUSE GAS EMISSIONS. CHINA'S STRATEGY SHOULD BE:

1. MAKE USE OF THE INTERNATIONAL OIL AND NATURAL GAS MARKET TO CHANGE CHINA'S ENERGY STRUCTURE. CHINA'S PRESENT ENERGY STRUCTURE GIVES IT THE OPPORTUNITY TO MAKE CHANGING THAT STRUCTURE A MEANS OF REDUCING THE GROWTH OF GREENHOUSE GAS EMISSIONS. MOREOVER, AS INTERNATIONAL SOCIETY MOVES TOWARDS GREENHOUSE GAS REDUCTIONS, THERE WILL BE TECHNOLOGY IMPROVEMENTS THAT WILL MAKE ENERGY USE BOTH CLEANER AND MORE EFFICIENT. MOREOVER INTERNATIONAL COOPERATION ON REDUCING THE GROWTH IN GREENHOUSE GAS EMISSIONS WILL INCREASES CHINA'S INFLUENCE AND STATUS IN THE WORLD. CHINA AS A BIG EMITTER OF GREENHOUSE GASES WILL HAVE IMPORTANT ADVANTAGES AS IT ACCEPTS GREENHOUSE GAS EMISSION GROWTH CONSTRAINTS THAT ARE SUITABLE TO ITS LEVEL OF DEVELOPMENT.

2. INCREASE ENERGY EFFICIENCY, CONSERVE ENERGY AND STRIVE TO REDUCE THE GROWTH RATE OF NO2 EMISSIONS. CHINA'S ENERGY EFFICIENCY HAS BEEN INCREASING STEADILY OVER THE PAST TWO DECADES -- ENERGY CONSUMPTION GROWTH HAS BEEN ONLY HALF OF OVERALL ECONOMIC GROWTH. ECONOMIC RESTRUCTURING ACCOUNTS FOR ABOUT TWO-THIRDS OF INCREASED ENERGY EFFICIENCY WHILE IMPROVED TECHNOLOGY ACCOUNTS FOR ABOUT ONE THIRD. ALTHOUGH INTERNATIONAL COMPARISONS ARE DIFFICULT BECAUSE OF EXCHANGE RATES CHINA'S ENERGY INTENSITY RELATIVE TO GDP IN 1995 WAS FOUR TIMES THE WORLD AVERAGE, TWELVE TIMES THAT OF JAPAN AND SEVEN TIMES THAT OF THE UNITED STATES.

3. INCREASE THE USE OF ALTERNATIVE AND RENEWABLE ENERGY SOURCES. ECONOMIC CONSTRAINTS REDUCE THE PRACTICALITY OF THIS OPTION. THE INADEQUATE TECHNOLOGY, THE WEAK MANAGEMENT CAPACITY AND THE LIMITED CAPITAL RESOURCES OF CHINA'S DOMESTIC NUCLEAR POWER INDUSTRY LIMIT THE NUCLEAR POWER OPTION. CHINA HAS ABUNDANT BUT POORLY DISTRIBUTED HYDROPOWER RESOURCES. BY 2010, NUCLEAR POWER, HYDROPOWER, SOLAR POWER, TIDAL POWER, GEOTHERMAL POWER AND BIOMASS WILL HAVE RISEN FROM 5 PERCENT IN 1990 TO 10 PERCENT OF CHINA'S POWER RESOURCES.

SDPC REPORT POLICY RECOMMENDATIONS

(PP. 96 - 107)

PART I

1. IN THE YEAR 2050 CHINA WILL REACH A PER CAPITA OIL CONSUMPTION OF 2 - 2.5 TONS OF OIL AND A TOTAL NATIONAL ENERGY CONSUMPTION OF 3.0 - 3.75 BILLION TONS OF OIL. THIS MEANS THAT CHINA MUST ACHIEVE AN ENERGY EFFICIENCY IN 2050 THAT IS BETWEEN 30 AND 100 PERCENT HIGHER THAN THAT OF DEVELOPED COUNTRIES TODAY.
3. CHINA WILL NEED TO ACHIEVE AN ENERGY EFFICIENCY OF 55 - 60 PERCENT, HIGHER THAN THAT OF THE DEVELOPED COUNTRIES TODAY.
4. ENVIRONMENTAL CONSTRAINTS, THE CLIMATE CHANGE AGREEMENT AND THE NEED FOR VERY HIGH ENERGY EFFICIENCY MEANS THAT THE ABOVE GOALS CANNOT BE ACHIEVED WITH A COAL-BASED ENERGY STRUCTURE.
5. ACCORDING TO PRELIMINARY ESTIMATES, COAL CONSUMPTION CANNOT EXCEED 35 PERCENT OF CHINESE ENERGY CONSUMPTION IN 2050 WITH OIL AND NATURAL GAS ACCOUNTING FOR 40 - 50 PERCENT AND PRIMARY ENERGY SOURCES SUCH AS NUCLEAR, HYDRO, SOLAR AND WIND POWER ACCOUNT FOR 15 - 20 PERCENT. (NOTE: THESE GOALS ARE EXTREMELY AMBITIOUS. END NOTE)

PART II

1. IN ORDER TO MEET THE ABOVE GOALS, CHINA'S PER CAPITA ENERGY CONSUMPTION WILL REACH 1.5 TONS IN 2020 - 2030 AND A TOTAL ENERGY CONSUMPTION OF 2.25 BILLION TONS OF OIL.
2. IN 2020 - 2030 CHINA MUST REACH THE ENERGY EFFICIENCY LEVEL THE DEVELOPED COUNTRIES HAD IN THE 1990S. THAT LEVEL, 45 PERCENT, IS TEN PERCENTAGE POINTS ABOVE CHINA'S PRESENT LEVEL.
3. ENVIRONMENT AND CLIMATE CHANGE WILL BE INCREASINGLY IMPORTANT FACTORS IN CHINA'S ENERGY POLICY.
4. BY 2020 - 2030, CHINA SHOULD REDUCE ITS DEPENDENCE ON COAL FROM THE 74 PERCENT OF TODAY TO 50 - 55 PERCENT.
5. THE PROPORTION OF OIL AND NATURAL GAS IN THE MIX SHOULD RISE FROM 20 PERCENT TO 35 PERCENT AND THE PROPORTION OF PRIMARY SOURCES SHOULD INCREASE TO TEN PERCENT.

PART III

1. THESE ARE VERY CHALLENGING GOALS FOR ENERGY EFFICIENCY AND ENERGY STRUCTURE.
2. ONLY BY CHANGING CHINA'S ENERGY STRUCTURE AND SWITCHING TO LARGE-SCALE IMPORTS OF OIL AND GAS IS ACHIEVING THESE GOALS POSSIBLE.
3. WORLD OIL AND GAS RESOURCES CAN SUPPLY CHINA'S NEEDS.
4. CHINA'S ENERGY POLICY AND STRATEGY MUST SOON CHANGE IN ORDER TO ACHIEVE THESE GOALS.

THE EXPERIENCE OF MARKET ECONOMIES SHOWS THAT IN ORDER TO ACHIEVE THESE GOALS NOT ONLY THE MARKET BUT GOVERNMENT REGULATION IS NECESSARY. NEAR AND MEDIUM RANGE GOALS NEED TO BE ESTABLISHED FOR THE EQUIPMENT

NEEDED. BACKWARD INDUSTRIES MUST BE UPGRADED SYSTEMATICALLY. PREPARATION (BETTER PORTS, ROADS, RAILROADS ETC.) MUST BE MADE TO SHARPLY INCREASE CHINA'S CAPACITY TO IMPORT OIL AND GAS SINCE BY 2050 CHINA WILL IMPORT 700 MILLION TONS OF OIL AND NATURAL GAS -- 25 PERCENT OF ITS ENERGY NEEDS. CHINA SHOULD ACTIVELY PARTICIPATE IN REGIONAL ENERGY GROUPINGS. IMPROVING THE QUALITY OF ITS ENERGY STRUCTURE IS CHINA'S PRIMARY ENERGY POLICY GOAL. BUILDING DOMESTIC NATURAL GAS PIPELINES AND INCREASING THE ROLE OF PRIMARY POWER SOURCES SUCH AS NUCLEAR POWER AND HYDROELECTRIC POWER, AND OF CLEAN COAL TECHNOLOGIES WILL ALSO BE IMPORTANT.

SUMMARIES OF SECTOR REPORTS

THE BALANCE OF THE REPORT IS SUMMARIZED BELOW. IT DISCUSSES:

HOW IS PRC ENERGY EFFICIENCY CALCULATED

HOW CHINA'S ENERGY EFFICIENCY IS CALCULATED USING AN "ENERGY SYSTEM NETWORK CHART". A LARGE CHART IS ATTACHED TO THE ENDPAPERS OF THE BOOK. THIS CHAPTER EXPLAINS STEP BY STEP HOW CHINA'S ENERGY EFFICIENCY FOR 1995 WAS CALCULATED. (PP. 111 - 150)

OPTIMIZING CHINA'S ELECTRIC POWER GENERATION STRUCTURE

"FUTURE OPTIMIZATION OF CHINA'S ELECTRIC POWER GENERATION STRUCTURE" (PP. 151 - 244). CHINESE ELECTRIC POWER GENERATION CAPACITY DOUBLED FROM 1987 AND 1995 TO REACH 200 MILLION KILOWATT-HOURS. THE CHANGES IN THE SOURCE OF POWER GENERATION CAPACITY, LOAD FACTORS, AND CONSUMPTION PATTERNS BETWEEN 1987 AND 1995 ARE EXAMINED. NUCLEAR POWER IS COMPETITIVE WITH COAL-FIRED PLANTS IN REGIONS WITH RELATIVELY HIGH COAL PRICES. (P. 186) COAL IS SHIPPED FROM THE NORTH WHERE IT IS RELATIVELY ABUNDANT TO THE INDUSTRIES OF THE SOUTH.

CHINA DOES NOT YET HAVE EFFECTIVE CONTROL OF SULFUR DIOXIDE EMISSIONS. IN 2000, CHINESE ELECTRIC POWER COMPANIES HAVE SULFUR DIOXIDE SCRUBBERS INSTALLED ON 10 MILLION KILOWATTS OF ELECTRIC POWER GENERATING CAPACITY. EVEN WITH FURTHER ADDITIONS TO 2010, ONLY A SMALL PROPORTION OF CHINESE POWER PLANTS WILL BE SO EQUIPPED. TODAY THE POLICIES, LAWS, CAPITAL AND TECHNICAL SUPPORT THAT WILL BE NEEDED TO SHARPLY REDUCE SO2 EMISSIONS DO NOT EXIST. (P. 208) LARGE COAL BURNING PLANTS CAN ACHIEVE RELATIVELY GOOD EFFICIENCY WITH INEXPENSIVE COAL. IGCC, PFBC AND OTHER ADVANCED TECHNOLOGIES ARE ATTRACTIVE FOR THEIR HIGH ENERGY EFFICIENCY AND ENVIRONMENTAL CHARACTERISTICS YET THEIR ECONOMIC COMPETITIVENESS HAS YET TO BE DEMONSTRATED. (P. 242)

ALTERNATIVE ENERGY SOURCES AND CHINA'S ENERGY STRUCTURE

"ALTERNATIVE ENERGY RESOURCES AND CHINA'S FUTURE ENERGY STRATEGY" (PP. 245 - 321) EXAMINES THE WORLD ENERGY STRUCTURE, CHANGES IN WORLD ENERGY CONSUMPTION PATTERNS, THE SHIFT TOWARDS RENEWABLE ENERGY SOURCES TO REDUCE POLLUTION AND PROMOTE SUSTAINABLE DEVELOPMENT, AND SPECIFIC TECHNOLOGIES SUCH AS FOREIGN EXPERIENCE WITH COAL GASIFICATION. CHINA LAGS FAR BEHIND THE DEVELOPED COUNTRIES IN ITS USE OF COAL GAS. CHINESE SCIENTISTS HAVE BEEN WORKING ON COAL GASIFICATION SINCE THE 1950S BUT EXPERIMENTAL CONVERSION EQUIPMENT ONLY PRODUCES 0.1 TONS OF OIL PER DAY. THIS COMPARES WITH THE 150 - 600 TONS OF OIL PER DAY SCALE ACHIEVED IN GERMANY AND THE UNITED STATES. (P. 271) AN ENERGY STRUCTURE CHART GIVES PROJECTIONS FOR 2000 - 2030 IN FIVE YEAR INTERVALS. IN 2030 COAL IS EXPECTED TO PROVIDE 62 PERCENT, OIL 18 PERCENT, NATURAL GAS 8 PERCENT, HYDROPOWER 9 PERCENT, AND NUCLEAR POWER 3 PERCENT OF CHINA'S ENERGY CONSUMPTION. (P. 296)

CHINA'S NUCLEAR POWER INDUSTRY DEVELOPMENT STRATEGY

"STRATEGY AND DEVELOPMENT OF CHINA'S NUCLEAR POWER INDUSTRY" (PP. 322 - 351) THE HISTORY OF NUCLEAR POWER PLANT DEVELOPMENT WORLDWIDE AND LESSONS THAT CAN BE DRAWN FROM THE EXPERIENCE OF FOREIGN COUNTRIES ARE OUTLINED. OVER THE MEDIUM AND LONG-TERM, NUCLEAR POWER WILL BECOME ONE OF CHINA'S MAIN ENERGY SOURCES. CHINA'S EASTERN AND SOUTHERN CITIES ARE THE MOST SUITABLE PLACES FOR NUCLEAR POWER PLANTS BECAUSE OF THE DIFFICULTY OF TRANSPORTING AN ADEQUATE QUANTITY OF COAL TO CITIES SO FAR FROM THE MAIN COALFIELDS AND ENVIRONMENTAL CONSIDERATIONS. CHINA HAS FAIRLY RICH URANIUM RESOURCES BUT LACKS ADEQUATE URANIUM REACTOR SPENT FUEL REPROCESSING CAPACITY BUT THAT DEFECT IS BEING REMEDIED SO CHINA WILL BE ABLE TO REPROCESS DEPLETED URANIUM FUEL. (P. 333) THE DAYA BAY NUCLEAR POWER PLANT WAS IMPORTED ALTHOUGH CHINESE TOOK PART IN THE CONSTRUCTION AND MANAGEMENT. THE 300,000 KILOWATT QIN SHAN PHASE I PROTOTYPE NUCLEAR PILE TYPE NUCLEAR POWER PLANT WAS DESIGNED BY CHINESE ENGINEERS AND BUILT FROM 95 PERCENT CHINESE MADE EQUIPMENT. QIN SHAN PHASE II WILL BE A WATER PRESSURIZED REACTOR WHICH USING SOME IMPORTED TECHNOLOGY WILL BE 70 PERCENT CHINESE DESIGNED. CHINA NOW HAS THE ENGINEERING KNOWHOW TO DESIGN AND BUILD SMALL TO MEDIUM SIZED WATER PRESSURIZED REACTORS. CHINA ON THE BASIS OF THAT EXPERIENCE WAS ABLE TO EXPORT TO PAKISTAN EQUIPMENT FOR A 300,000 KILOWATT NUCLEAR POWER PLANT. (PP. 344 - 345)

ESTIMATES OF WORLD AND CHINESE OIL AND GAS RESOURCES

"PRELIMINARY ESTIMATES OF OIL AND NATURAL GAS RESOURCES" (PP. 352 - 365) REPORTS THAT WORLD OIL AND GAS SUPPLIES ARE PLENTIFUL AND ENTIRELY ADEQUATE TO SUPPLY RAPIDLY INCREASING CHINESE IMPORTS OVER THE NEXT FIFTY YEARS. CHINA HAS LARGE PETROLEUM RESOURCES BUT EVEN WITH SLOWLY INCREASING PRODUCTION THEY ARE NOT SUFFICIENT TO MEET CHINA'S NEEDS. CHINA HAS THE CAPACITY TO GREATLY INCREASE NATURAL GAS PRODUCTION FROM ABOUT 15 - 30 BILLION CUBIC METERS IN 2000 TO 100 BILLION CUBIC METERS IN 2030. (PP. 358 - 359) THE GLOBALIZATION OF THE WORLD ECONOMY AND MULTIPOLAR TREND IN POLITICAL RELATIONS IS WORKING IN FAVOR OF CHINA'S ACCESS TO INTERNATIONAL MARKETS AND CHINESE ENERGY SECURITY. (PP. 360 - 361)

ENTERING THE INTERNATIONAL OIL MARKET CARRIES WITH IT POLITICAL RISKS OF OIL SUPPLIES GETTING CAUGHT UP IN POLITICAL, ECONOMIC, ETHNIC, RELIGIOUS AND TERRITORIAL DISPUTES. CHINESE OIL COMPANIES ARE UNFAMILIAR WITH THE GEOLOGY OF FOREIGN COUNTRIES, SO OIL EXPLORATION OVERSEAS IS RELATIVELY RISKY FOR THEM. CHINESE COMPANIES DO NOT HAVE THE EXPERIENCE OF THE FOREIGN MULTINATIONALS, SO THEY ARE AT A COMPETITIVE DISADVANTAGE. CHINA SHOULD FOCUS ON OIL AND GAS RESOURCES IN RUSSIA AND CENTRAL ASIA AND SECONDARILY ON THE MIDDLE EAST AND NORTHERN AND NORTHWESTERN AFRICA. SOUTH AMERICA AND ESPECIALLY VENEZUELA IS A POTENTIAL OIL SUPPLIER TO CHINA. (PP. 363 - 364)

END SUMMARY OF THE SPDC ENERGY RESEARCH INSTITUTE REPORT

AUTHORS OF THE STUDY

MAJOR PARTICIPANTS IN THE STUDY INCLUDED ZHOU FENGQI, ZHOU DADI, LIU XIAOLI, GUO YUAN, CHEN SHUTONG, SONG WUCHENG, ZHANG JIANMIN, HU XIULIAN, GAO SHIXIAN, XU HUAQING, JU SHIYUAN, PENG FANGXIANG, AND DAI CHANDE.

MARTIN



United States Department of State

*Bureau of Oceans and International
Environmental and Scientific Affairs*

Washington, D.C. 20520

June 13, 2000

MEMORANDUM

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TO: OVP - Ted Osius
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DOC - Cheryl McQueen
DOC - Helen Burroughs
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A handwritten signature, likely of Bill Dilday, in dark ink.

SUBJECT: Draft Agenda for U.S.-China High Level Dialogue on
Climate Change - FOR YOUR CLEARANCE

Attached for your clearance is the draft agenda we would like to propose to the Chinese for the upcoming High-Level Dialogue on Climate Change, to be led by U/S Frank Loy. The Chinese have accepted July 12-13 for the dialogue to be held in Beijing.

We welcome other agencies to participate on the delegation; however, agencies who wish to participate will need to be prepared to discuss their ongoing technical cooperation projects with China. As we have envisioned it, agencies' programs would be discussed under the bullets: Review of Progress under the Environment and Development Forum; New and Creative Ideas for Cooperation; and The Road Forward. In introducing any new areas of cooperation, we should be prepared with money to follow up in concrete ways.

Please respond with your comments by COB Thursday, June 15th, also indicating your agency's interest in joining the delegation. We hope to share this draft agenda with the Chinese delegation to the climate negotiations in Bonn this week.

Attachment: As stated.

Draft dated June 12, 2000

China-U.S. High-Level Dialogue on Climate Change Beijing, July 12-13, 2000

Agenda

Wednesday, July 12, 2000

Opening Plenary (2-3 hours)

- Brief Opening Statements (China leads/US responds)

Each side would outline their goals for the meeting

- Review of progress under the Environment & Development Forum (China leads/US responds)

Each side would review progress under the forum relating in part to climate change, as well as discuss any outstanding issues

- Goals for COP-6 (US leads/China responds)

Each side will outline their goals for COP-6

BREAK

Negotiator-Level Working Group (4 hours or more as needed)

- Buenos Aires Plan of Action – Negotiator Level Issues (lead alternates from issue to issue, China leads first with US responding first)

This segment would cover many important issues relating to the Buenos Aires Plan of Action that may not require the attention of senior officials.

Evening – To Be Determined

Thursday, July 13, 2000

Resumption of High-Level Plenary (4-6 hours as needed)

- Report from previous day's working group discussions (China leads/US responds)

Each side would present a brief report to the high level participants that would highlight their separate perspectives regarding issues where we agree, where we succeeded in narrowing differences and where further discussion may prove useful.

- Buenos Aires Plan of Action -- High Level Issues (leads alternate from issue to issue; US leads and China responds on first issue)

This segment would cover those aspects of the Buenos Aires Plan of Action that require the engagement of senior officials. It is anticipated that many issues will be discussed in this segment. A joint list of these issues could be developed shortly.

- New and Creative Ideas for Cooperation (US leads/China responds)

Each side would present, consider and discuss any new and creative ideas regarding bilateral, regional and global cooperation on climate change. Each side shall make an effort to develop ideas that, like the CDM, would help promote economic growth and fight climate change.

- The Road Forward (China leads/US responds)

Each side would present their views regarding next steps on climate change bilaterally (under the Forum and High Level Dialogue) and internationally (under the FCCC and its Protocol).

Lunch and Evening – To Be Determined

USAID/ Environmental Policies and Institutions for Central Asia
(EPIC) Program

and

USAID/ Global Training for Development Project

"A Third Way to Participation in the United Nations'
Framework Convention on Climate Change"

Training Seminar

23-24 May 2000
Tashkent, Uzbekistan

DRAFT FINAL REPORT

Seminar Program:
" A Third Path to Participation in the UN Framework Convention on Climate Change"

23-24 May 2000
Tashkent, Uzbekistan

22 May, Monday

Participants arrive from all countries, check in to Shodlik Palace Hotel.
Informal dinner arranged for the US delegation and interested parties at the Taj Restaurant.

23 MAY, TUESDAY

8:30 Registration

9:00 Opening Remarks

- Rafik Saifulin, Director of the Institute of Strategic and Regional Studies under the President of the Republic of Uzbekistan
- Ambassador Mark Hambley, US Chief Negotiator on Climate Change Issues
- Ken McNamara, USAID- Central Asia Region
- Alexander Golub, Independent Expert (a brief commentary on the first meeting of the "Third Way" group at COP-5)

10:00 Coffee Break

10:30 **Session I: Perspectives from Central Asia**

Moderator: Theresa Sabonis-Helf, EPIC Program. Presentations:

- for Kazakhstan: Irina Yeserkepova, Head Researcher KazNIIMOSK
- for Turkmenistan: Yuri Federov, National Coordinator for Questions of Climate Change
- for Tajikistan: Bekmurad Makhmadaliev, Chief of GlavHydromet
- for Kyrgyzstan: Mars Amanaliev, Ministry of Environment
- for Uzbekistan: Viktor Chub, National Focal Point and Tatiyana Ossoskova, GlavHydromet

11:30 Questions and Discussion

13:00 Lunch at "Bakht" Restaurant

14:30 **Session II: Perspectives from the Caucasus and Moldova**

Moderator: Michael Boyd, USAID - Yerevan. Presentations:

- for Georgia: Marina Shvangiradze, National Focal Point

- for Azerbaijan: Mirzakhan Mansimov, Project Manager, Initial National Communication to the UN FCCC
- for Armenia: Aram Gabrielyan, National Focal Point
- for Moldova: Lidia Treschilo, Chief of the GlavHydromet

15:30	Questions and Discussion
16:30	Coffee Break
17:00	Expert Commentary, Joseph Aldy (Adviser, White House Council of Economic Advisers)
17:30	Independent Expert Commentary, Alexander Golub (Harvard Institute for International Development/ EPIC program)
19:30	Banquet at the "Irbis" Restaurant

24 MAY, WEDNESDAY

10:00	Experience from Argentina, Daniel Balzer, US Dept. of State
10:30	Roundtable discussion on the theme of "Next Steps for the Third Way Group"
12:00	Coffee Break
12:30	Concluding Session and interactive development of recommendations for the next steps. Moderator: Alexander Golub
14:00	Lunch at "Golden Rain" Restaurant

Purpose of the Seminar

At the Fifth Conference of the Parties to the UN Framework Convention on Climate Change (UN FCCC), Uzbekistan took a leadership role among transition economies seeking to find a way to reduce greenhouse gas emissions without damaging their prospects for continued growth. Under the leadership of the Uzbek delegation, a group, which calls itself "The Third

Way” formed and agreed to examine the best ways for transition economies to participate in the Framework Convention more fully.

Seven countries signed the memorandum indicating their intent to join the Third Way group – Armenia, Azerbaijan, Georgia, Moldova, Turkmenistan, Tajikistan and Uzbekistan. Two countries – Kazakhstan and Kyrgyzstan - signed as observers, indicating that they wanted to be informed of the “Third Way” as plans develop

The Third Way group is developing a proposal for how transition economies might participate in the so-called flexible mechanisms of the UNFCCC. In exchange for taking on these voluntary commitments, the Third Way states hope to obtain the right to participate in these mechanisms (such as emissions trading, Joint Implementation projects) which are expected to attract investment in the modernization of the energy and other sectors.

The US government is supporting this meeting of the Third Way group, because the US has expressed its desire to find ways to attract «meaningful involvement» on the part of developing countries. This development is one of the most significant in negotiations with developing and transition countries. The Third Way group has been greeted with enthusiasm, and is proposing some strategies for transition economies similar to those being proposed by Argentina for developing countries.

Summary of the Seminar

Materials provided in advance to all participants included a document outlining the principles of the Third Way group and a document which used Uzbekistan as an example of how an emissions target might be estimated for a transition country. Both of these documents were prepared by Alexander Golub, and these provided the basis for discussion of the next steps which needed to be taken.

Representatives from all countries had the opportunity to make presentations and demonstrate the current status of GHG emission management strategy development in their country including:

- Strategy for participation in the UN FCCC;
- Emissions inventory;
- National communication;
- GHG forecast and emission reduction options;
- Most important problems and limitations;
- Reflection of willingness to increase the degree of participation in UN FCCC and support the idea of the Third Way.

Recommendations of the seminar were elaborated based on these presentations and on further discussion.

All the countries which participated supported the broad general idea of taking on an emissions budget based on the four main principles presented at COP-5 in Bonn, when the Third Way group announced its intentions. However, countries placed the strongest emphasis on their interest in cooperating and developing options and joining together to have a stronger voice in the FCCC. There is caution about committing to an emissions budget, and

some reluctance to foreclose other options - especially CDM. Most of the countries concur that substantial research would have to precede selection of a target.

By the conclusion of the seminar, the representatives of each country gave the following assessments of their countries' readiness to commit to a Third Way approach:

- Azerbaijan supports a political announcement at COP-6 regarding formation of this group. They believe that the announcement of this group and its common interest is the first step, and that further research should follow.
- Georgia wants a document with conclusions to put before its government for a decision, but the government has already approved the Third Way in principle.
- Uzbekistan supports the Third Way but is concerned that additional economic analysis is necessary and that US support of this analysis is essential.
- Armenia is ready to initiate the Third Way Group officially. Targets will be a question at a later time.
- Tajikistan supports the Third Way but is not ready to make formal commitments, not ready to sign anything.
- Kyrgyzstan and Kazakhstan consider themselves observers in this process.

Between the COP-5 meeting and this Seminar, most of the countries had the opportunity to secure full government support for the Third Way principles, but not all countries have finished this process. In addition, the participants in the Seminar did not have full authority to finalize the formal creation of the Third Way group and register it under the Framework Convention for Climate Change. It is hoped that this can be achieved at or by the next Third Way meeting (tentatively scheduled for September). It was decided at the Seminar that the GlavHydromet would circulate a draft declaration of the Third Way group, and receive commentary. This Declaration will be finalized at the next Third Way meeting.

All member countries expressed concern of the need for capacity building and technical assistance in developing the infrastructure for GHG management and participation in flexible mechanisms. In every country, the same goals will need to be achieved: 1) an improved emissions inventory (a few countries have not completed even their first inventory, others have found weaknesses in theirs); 2) creation of a GHG emissions reduction project pipeline and registry system; 3) national strategies for GHG management and participation in flexible mechanisms; 4) long-run GHG emission forecast; and 5) elaboration of a non-Annex B emissions target. Goal 2) could be achieved on a regional or all-member basis rather than nationally.

Each of the member countries in the Third Way group are at a different stage of development of their national GHG management systems. It was agreed that the degree of participation in the Third Way group, as well as the time table for presenting a non-Annex B target should differ by country. In terms of immediate priorities, the Caucasus, Uzbekistan and Turkmenistan are ready to concentrate on GHG forecasting, estimation of GHG reduction potential, identification of emissions targets, and identification of no-regret and low-cost options. These countries expressed a desire to participate in the upcoming macroeconomics modeling seminar in Kazakhstan, although no financial source to support their participation has been identified.

Moldova needs to conduct additional analysis and inventory of available data, but will then be at a level similar to the countries above. Kyrgyzstan and Tajikistan have yet to develop their Initial Communication, and require support for that as well as more basic capacity

building and designation of authority from these governments of who is responsible for what aspects of GHG reporting.

All the countries agreed that creation of the Third Way group and announcement of the willingness to take on an emissions target is a separate action from announcing the actual target levels. They wish to announce at COP-6 a declaration of their group and its goals, but do not expect to announce their emissions targets. Selection of emissions targets should be preceded by more comprehensive analysis. Kazakhstan reiterated its role as an observer within the group, as Kazakhstan is committed to continued pursuit of an Annex B emissions target.

Recommendations of the Seminar

(These were adopted as a draft Recommendation of the Seminar. Participants agreed to send any comments or changes to the Glavgidromet in Tashkent within a week. Point 9 was the only change recommended after the meeting.)

1. Each country will confirm a commitment to the General Principles of the "Third Way" Initiative Group.
2. Consider the "Third Way" Concept document as a basis for the Initiative Group activities.
3. Prepare by July 1, 2000 national proposals for in-depth analysis programs, including a projected scope of work, budget and research plans.
4. Present the above mentioned proposals to Glavgidromet of the Republic of Uzbekistan (National Focal Point on Climate Change of the Republic of Uzbekistan).
5. In September – October, 2000 conduct a "Third Way" Group meeting on Development of the United Research Program with further submission to international organizations and donors for program financing.
6. Note that Kazakhstan participates in the Group work as an Observer.
7. Note that Seminar participants from Kyrgyzstan and Tajikistan reported that they would inform their Governments of the results of the Seminar and would recommend full official participation in the Group.
8. Recommend all members of the "Third Way" Initiative Group disseminate in their countries information about objectives of the Group.
9. Note that the "Third Way" Initiative Group is open to participation by additional countries.

Summary of Training Activities

For the first day, the program took the format of formal presentations followed by questions and answers. The second day was organized in more of a roundtable format. The Seminar also provided ample informal opportunities for representatives of different countries to meet and discuss their efforts and shared problems.

Evaluation of Participants

The participants were enthusiastic about the opportunity to take part in this training. They were actively engaged throughout the program. All participants strongly supported the recommendation that the group have one more opportunity to meet prior to the Sixth Conference of the Parties (COP-6). The idea of the one additional meeting is to re-evaluate what they succeed in achieving after this seminar. The additional meeting would enable the participants to ratify and agree on their statement for COP-6, and prepare a strategy for launching the Third Way group at COP-6.

Description of the Group

The group was all relatively high level. From each country, either the highest-ranking representative on Climate Change (those that are designated by the UN as the National Focal Point) or that person's deputy was present. For this reason, the level of understanding of the issues was high, and the participants are empowered to make strong recommendations to their own governments in terms of next steps.

However, across the countries participating in the Third Way group, there is an uneven level of development of climate change policy. Kyrgyzstan, for example, has filed for membership in the UN FCCC only this year (2000), and thus has no designated agency to develop a National Communication. Kazakhstan, by contrast, has been a member for some time, and has filed to join Annex I of the UN FCCC, indicating its willingness to establish a very sophisticated national structure to regulate GHG emissions. This seminar was an opportunity to trade experiences with the relative new-comers, as well as an opportunity to develop a collective strategy for the future.

In this seminar, 10 countries were represented. (The participation of Azerbaijan was supported by the Institute for Strategic and Regional Studies, not by any USAID program.) The seminar was developed before it was known that a US delegation would also participate. The diversity of countries represented was the greatest asset of this program. These countries ordinarily would only have an opportunity to meet as a group during the Conferences of the Parties (COPs). If they meet only once a year in the midst of a larger program such as the COPs, they will never be able to craft a collective strategy, or to learn from each other's national experience in the issue. The addition of the US delegation was a great asset, as it provided the group with some sophisticated technical and political expertise capable of critiquing their approach and goals.

Use of Interpretation

The program used simultaneous interpretation. The interpreters used were Sergey Ossipov and Irina Tsoi. The simultaneous interpretation equipment was from the Presidential Apparatus. The interpreters were well-prepared, and familiar with the terminology. During all the seminar sessions, the interpretation was quite good. The equipment was adequate, and caused no problems during the seminar.

Program Logistics

The most significant logistical difficulty was the arrival in Uzbekistan by two delegates from Kyrgyzstan who did not have appropriate passports. In spite of the fact that one delegate was an employee of the Ministry of Foreign Affairs and the other was an elected official, these two delegates had only Soviet passports, without any official designation of their post-Soviet country of residence. The Uzbek border guards refused to admit them into the country. The GTD representative who was supposed to meet them at the Tashkent airport learned of the difficulty and contacted EPIC and the Institute for Strategic and Regional Studies immediately. The Institute was able (after two hours of discussion and after sending the Director himself to the airport) to secure their admittance into the country. EPIC and GTD then worked with the Kyrgyz embassy to prepare the paperwork necessary for the delegate's smooth departure after the close of the seminar.

The second-most significant logistical difficulty was the loss of power (on the morning of the first day of the seminar) to the region in which the Institute for Strategic and Regional Studies is located. The Institute was able to use its generator to supply power to the seminar up until lunch. After lunch, there was a half-hour delay in the schedule, as the Institute had no power remaining and was working to re-connect to the grid. Local administration had promised that the grid would be running by 14:00, but instead power was restored at 15:00. The program resumed, one-half hour behind schedule.

All other logistics went smoothly in spite of the complex task of coordinating travel from 9 countries, and sharing the cost and logistics among several agencies. USAID paid directly through their national missions for those outside the Central Asia Region (except for Azerbaijan), and EPIC managed the logistical arrangements for these people. The Institute paid for and made arrangements for the participant from Azerbaijan. GTD paid for those traveling within the region and made their arrangements. The US delegation paid for itself. Its logistics were handled cooperatively by the US Embassy, EPIC, and the Institute. There was some duplication of effort, but in every case, participants were met at the airport and transported back to the airport in a timely manner. There was great concern that the US delegation be properly met. In the end, three different cars met the Ambassador when he arrived.

All logistics connected to meals and coffee breaks were very smooth. The quality of the food and service in every case was very high. For the final luncheon, the number of participants was incorrectly estimated - several of the Uzbek participants came to the last session but not to the lunch which followed, and no participants came from the US embassy, although some were anticipated.

Recommendations and Lessons Learned

Recommendations for future action concerning the Third Way Group are as follows:

Near-Term (to COP-6)

- Provide analytical support to GlavGidromet before the next Third Way meeting to ensure that all countries have relevant support materials to get approval from the national Governments to announce participation in the Third Way;
- Provide legal support: review appropriate procedure of registration as a Group etc.

- Provide support for the Third Way Group to meet one time in the Fall prior to COP-6. This will enable participants to prepare a strategy for launching the Third Way group officially at COP-6.
- Locate source of support for participation in the Macroeconomic Modeling Program for representatives from Uzbekistan, Turkmenistan and the Caucasus (if possible, given short time frame).
- Provide support for active countries of the Third Way Group to send one additional representative to COP-6.
- Provide support for a Third Way side meeting at COP-6, and resources for publication of a "Countries of the Third Way Group" pamphlet outlining the Third Way Group declaration and detailing the progress in each country within the UNFCCC.
- Provide limited support to Kyrgyzstan and Tajikistan in 1) making a governmental decision of which agencies are responsible for the inventory and strategy and then 2) providing assistance in developing a proposal for the UN FCCC for assistance in inventories.

Longer-Term (after COP-6)

- Assistance for improvement and review of inventories in all Third Way group countries.
- Assistance for creation of a GHG emissions reduction project pipeline and registry system, preferably common to the Third Way group.
- Assistance with identifying no-regrets and *low-costs* options for GHG abatement
- Assistance with elaborating non-Annex B emission targets.
- Assistance in producing GHG emissions forecasts and estimation of GHG reduction potential.

Lessons Learned regarding Logistics

- Host country should advise of passport and visa requirements. Home country sponsor of each participant should review all documents of participants to ensure compliance.
- Paying participants in advance for travel and per diem was very successful, especially in Uzbekistan where reimbursement issues are very complex due to currency regulations.
- Placing US delegation and all participants in the same hotel was very productive, and made possible a number of informal side meetings.