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IMPLICATIONS OF THE KYOTO PROTOCOL FOR RENEWABLE ENERGY PROJECTS IN DEVELOPING COUNTRIES : INITIAL CONSIDERATIONS

prepared by

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INTRODUCTION

The Kyoto Protocol signed in December 1997 creates, for the first time, specific obligations on developed countries to substantially reduce their emissions of greenhouse gases (GHGs) and/or to protect and enhance GHG sinks and reservoirs. Flexibility measures were adopted, allowing credit for one country's emission reduction obligations for actions taken in another country. An international emissions trading regime is also foreseen.

These developments should help create a favorable environment for new renewable energy projects in developing countries. The purpose of this paper is to provide a brief overview of the relevant issues.

Section I (Overview) is meant to provide background concerning the complex institutional relationships created by the Kyoto Protocol and related instruments, focussing on those provisions that affect energy projects in developing countries. It includes a discussion of the work plan to resolve implementation issues left vague in the Kyoto Protocol, focussing primarily on the Clean Development Mechanism (CDM).

Section II addresses more specifically the Clean Development Mechanism, and in particular the issues that will affect the number and value of credits generated by a renewable energy project in a developing country.

Section III provides background concerning the relationship between the Kyoto Protocol and domestic emission trading regimes, and briefly describes the various Canadian processes and institutions concerned with Kyoto implementation.

Finally, Section IV draws preliminary conclusions and suggests additional steps that could be taken to estimate the value of credits to be generated by a renewable energy project in a developing country and to maximize their value, both before and after commitment to the project.

I. OVERVIEW

A. Framework Convention on Climate Change

In June 1992 at the Earth Summit in Rio de Janeiro, Canada signed the Framework Convention on Climate Change (FCCC). The Convention was ratified by more than 100 countries, including Canada, and came into force on March 21, 1994.

The Framework Convention in effect divides signatories into three categories, which can be described as developed countries, developing countries and countries that are in the process of transition to a market economy ("transition" countries, or "economies in transition" (EITs) in UN-speak). Developed and transition countries (described together in the Convention as "Annex I" countries) undertake to limit their GHG emissions to levels to be decided subsequently.

The parties to the Convention meet periodically in the Conference of the Parties (COP), which is empowered to adopt Protocols and to amend the Convention. A secretariat is also established.

B. Kyoto Protocol

In December 1997, ministers and other high-level officials from 160 countries met in Kyoto, Japan, for the Third Conference of Parties (COP3) to the United Nations Framework Convention on Climate Change, and agreed to the Kyoto Protocol. Under this legally binding Protocol, industrialized countries must reduce their collective emissions of greenhouse gases by 5.2% by the period 2008 to 2012. The Protocol has been signed by 84 countries.

The Kyoto Protocol will come into force when at least 55 of the 84 signatories have ratified it, including countries accounting for at least 55% of the total CO_2 emissions for 1990 for the developed and transitional countries. (To date, only 12 small island nations have ratified the Protocol, accounting for a fraction of 1% of the target emissions.) Until such time as it comes into force, its evolution is in the hands of the COP to the Framework Convention.

Once the Protocol comes into force, its supreme decision-making body will be "the Conference of the Parties serving as the meeting of the Parties to this Protocol" (COP/MOP). Only COP/MOP can formally adopt criteria and methodologies, authorize accreditation bodies ("operational entities"), and otherwise make binding commitments under the Protocol.

The key provisions of the Kyoto Protocol are described in the following sections.

1. Emission reductions obligations (art. 3)

The Kyoto Protocol divides signatories into the same three categories as did the Framework Convention. Under Article 3, both developed and transition countries must ensure that their GHG emissions in the commitment period 2008-2012 are not greater than a certain percentage (given in Annex B to the Protocol) of the base year. They must also make demonstrable progress toward these commitments by 2005.

For developed countries, the base year is 1990. (Canada's commitment is to reduce emissions to 94% of their 1990 levels.) For transition countries, it may be fixed at a later date. Developing countries have no emission reduction obligations, though they may take on voluntary targets.

2. International emissions trading (art. 17)

Developed and transition countries may participate in emissions trading to meet their obligations under art. 3, in accordance with principles, modalities, rules and guidelines to be defined later.[1] However, any such trading must be "supplemental" to domestic actions to reduce emissions. The precise meaning of "supplemental", i.e. the degree to which international emissions trading (IET) can be used to meet domestic obligations, is the subject of ongoing negotations.

Since developing countries have no obligations to reduce, they cannot participate directly in IET under the Kyoto Protocol. The issue of whether or not the adoption of voluntary targets allows developing countries to participate in emissions trading is under discussion at COP.

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[1] Unlike analogous places in other articles, art. 17 makes reference to the COP, not the COP/MOP. This could imply that these rules can be defined prior to the coming into force of the Protocol. On the other hand, see footnote 4.

While art. 17 does not make any reference to private-sector participation, many commentators assume that this is implicit.[2] However, for emissions credits granted in the context of a domestic emissions trading regime to be applicable against the international obligations of a Party to the Protocol would imply a considerable degree of coherence between national regimes, and their recognition by the Protocol itself. The interface bewteen domestic emissions trading regimes and the Kyoto Protocol is thus unclear, and will probably remain so for some time to come. See section below on implementation issues.

3. Joint implementation (art. 6)

a. Background

Joint implementation (JI) refers to credits against one country's emission reduction obligations resulting from actions undertaken in another country. It differs from international emissions trading (IET) in that, whereas IET involves lump transfers of emission reduction obligations, JI refers to specific projects or investments treated on an individual basis. Another way to look at it is that JI refers to the *creation* of emission reduction units (ERUs), while IET refers to their exchange between countries.

JI has been the subject of intense debate in the context of the Framework Convention. At the first Conference of the Parties (COP1) in 1995, a pilot project was launched, known as "Activities Implemented Jointly" (AIJ). The AIJ pilot project was to last until 2000, and it was not to lead to the actual creation of ERUs. Projects could involve countries of all three categories.

With the adoption of the Kyoto Protocol at COP3, the AIJ pilot project was discontinued, to be replaced by two mechanisms, JI and the Clean Development Mechanism.

b. JI Provisions of the Kyoto Protocol

Under the Kyoto Protocol, JI can only take place among Annex I countries, i.e. developed and transition countries.

JI leads to the creation of "emission reduction units" (ERUs). As for IET, ERUs can only be "supplemental" to domestic action in meeting the commitments under art. 3. In addition, any JI project must:

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[2] E.g. Josef Janssen, "(Self)-Enforcement of Joint Implementation and Clean Development Mechanism Contracts," January 1999, 21 pp.

- have governmental approval of both Parties, and
- provide reduction in emissions (or enhancement of GHG sinks) *additional* to any that would otherwise occur.

Specific guidelines for verification and reporting are currently under discussion and will eventually be adopted by COP/MOP, once the Protocol has come into force.

4. Clean Development Mechanism (art. 12)

Whereas JI is limited to emission reduction or sink enhancement actions involving developed and transition countries, the Clean Development Mechanism (CDM) is specifically meant to allow credits resulting from such actions in *developing* countries to be applied to the art. 3 commitments of developed and transition countries.

In addition to contributing to the objectives of the Framework Convention and to assist Annex I countries in meeting their emission reduction commitments, the CDM also has an explicit objective to achieve sustainable development in the host countries.

In order to produce credits that can be used by an Annex I country against its commitments, emission reductions from CDM projects must be certified by "operational entities" designated by COP/MOP, resulting in tradable "certified emission reductions" (CERs). To be certified, CDM projects require:

- governmental approval of both Parties,
- "real, measurable and long-term benefits" related to the mitigation of climate change, and
- reductions in emissions that are additional to any that would occur in the absence of the certified project activity.

It has not yet been determined whether or not carbon sequestration projects ("sink protection and enhancement actions") will be accepted under the CDM or, if they are, whether or not there will be mechanisms put in place to prevent them from "flooding the market".

Unlike the ERUs resulting from JI and traded in IET, there is no requirement that CERs be "supplemental to domestic actions" for meeting emission reduction obligations. Thus, while the percentage of ERUs that can be used for an Annex I country will be capped at a not-yet-determined level, no such limit applies to CERs.

The modalities and procedures for auditing and verification of projects are to be established by COP/MOP. In addition, there will be a CDM executive board.

Unlike all the other mechanisms established under the Kyoto Protocol, CDM explicitly allows for the "banking" of credits from 2000 onward. That is, unlike ERUs, CERs earned from 2000 to 2007 can be applied against an Annex I country's obligations for the period 2008-2012.

5. Enforcement (art. 18)

The consequences of non-compliance for the countries that have positive obligations under the Kyoto Protocol will be determined by COP/MOP.

C. Work plan for implementation of the Kyoto Protocol

The Kyoto Protocol is a very general text, and a great number of issues essential to its full implementation therefore remain unresolved, especially with respect to the JI and CDM mechanisms.

A work plan was decided on at COP4, held in Buenos Aires in November 1998, which charged the two subsidiary bodies[3] to address a large number of issues related in particular to arts. 6, 12 and 17 of the Protocol, in order to allow decisions to be taken at COP6, expected to be held at the end of 2000 or the beginning of 2001. Such decisions would constitute formal recommendations to COP/MOP for adoption at its first sessions, following ratification by a sufficient number of Parties.[4] However, the subsidiary bodies were unable to reach any conclusions on these issues at their work session in Bonn last June, deferring all decisions to their next meeting, which will be held concurrently with COP5 in Bonn at the end of October 1999. It is therefore quite possible that these issues will not all be resolved at COP6.

The following is an abbreviated list of the elements of this work plan relating specifically to the Clean Develoment Mechanism.

General
Supplementarity
Capacity building
Compliance
Dependence of the ambitious environmental targets of the Kyoto Protocol upon availability of mechanisms

[3] The Subsidiary Body for Implementation (SBI) and the Subsidiary Body for Scientific and Technological Advice (SBSTA).

[4] Decision 7/CP.4, *Report of the Conference of the Parties on its Fourth Sessions, Held at Buenos Aires from 2 to 15 November 1998. Addendum. Part Two : Action Taken by the Conference of the Parties at its Fourth Session,* pp. 22-31. The inclusion of the modalities pursuant to art. 17 in this decision suggests, contrary to the implication noted in footnote 1, above, that art. 17 is read as referring to COP/MOP as well.

Basic
Purpose of CDM projects
Compatibility with sustainable development priorities/strategies
Criteria for project eligibility
Supplementarity to domestic actions for achieving compliance with reduction commitments under Article 3 (concrete ceiling defined in quantitative and qualitative terms on equitable criteria)

Methodological and technical
"Part of" Annex I commitments
Additionality criteria in project funding
Should there be any distinction between public/private funding?
Criteria for certification
Criteria for project baseline
Systems for independent auditing and verification of project activities
Implication of Article 12.10 ["banking" of CERs]
Environmental additionality and baselines
Criteria for sustainable development
Tracking of CERs
Fungibility among mechanisms
Inclusion of sinks projects [carbon sequestration]

Process
Acquisition and transfer of CERs
Approval by involved Parties of sustainable development
Approval by involved Parties of project
Certification of project activities and reductions
Reporting
Auditing and verification
Credit (starting from 2000) for qualifying projects begun before CDM rules become effective

Institutional
Authority and guidance of the Conference of the Parties
Functions of, relationship among and operational procedures of the COP, COP/MOP, the executive board and operational entities
Operational entities – identification/designation/accreditation; monitoring and auditing

II. CLEAN DEVELOPMENT MECHANISM ISSUES

In the following sections, we will briefly survey the unresolved implementation issues that will most directly impact the application of the Clean Development Mechanism to a renewable energy facility in a developing country. In particular, we will address issues that may affect the project's eligibility, the number of credits it would generate, and their value.

A. Obtaining credits

Before a renewable energy project in a developing country can profit from the Clean Development Mechanism, it must first be recognized as an eligible project. Furthermore, the number of certified emission reduction credits it will ultimately generate depends on a number of factors. These two elements are discussed below.

1. Project acceptability

As noted earlier, in order for a project to generate CERs under the Clean Development Mechanism, it will require formal recognition by an "operational entity" (certifying body) recognized by the CDM executive board. Among the more problematic elements of the criteria to be applied are that the project must be "additional" to any that would otherwise occur, and that it contribute to achieving sustainable development.

a. Additionality

According to Art. 12, CERs can only be earned by projects which create emissions reductions that are "addition to any that would occur in the absence of the certified project activity." The determination of what is "additional" poses significant theoretical and practical difficulties.

There are a number of different aspects to this concept of additionality. One which apparently is *not* implied by the Kyoto Protocol is "project additionality", i.e. the requirement that the project itself would not have occurred in the absence of the CDM mechanism:

> Although the Kyoto Protocol could have specified that credit should only be given for projects which are not profitable, or not worth doing for other reasons, this would defeat the purpose of the clean development mechanism. It would no longer serve the function of achieving emission reducitons that are worth doing for reasons unrelated to climate change.[5]

So what is the meaning of "additionality" under the Kyoto Protocol? This is one of the key questions to be addressed under the work plan mentioned earlier. In the meantime, the Pembina Institute has proposed an interesting taxonomy of the notion of additionality, breaking it into five sub-elements:[6]

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[5] Chris Rolfe, *Kyoto Protocol to the United Nations Framework Convention on Climate Change : A Guide to the Protocol and Analysis of its Effectiveness,* West Coast Environmental Law Association, Jan. 21, 1998, pp. 4-5.

[6] *Selling Clean Air,* West Coast Environmental Law Workshop Proceedings, p. 29.

emissions additionality: the project results in real emissions reductions, in relation to a specific baseline (see below).

regulatory additionality: the activity is not required by any law or regulation.

technical additionality: the project exceeds technical and managements norms (good practice) in the relevant sector.

financial additionality: does the project pass regular investment criteria?

overcoming non-financial barriers to investment: does the project overcome some political or institutional barrier which stops profitable projects from being undertaken?

Common sense suggests that, if a project fails to meet the first three tests (that is, if it leads to no real emissions reductions or is required by law, regulation, or good-practice norms), it should not be considered "additional".

Adopting *financial additionality* as an independent criterion would create the same contradiction as "project additionality", mentioned above.[7] However, if combined with the fifth criterion, this problem is overcome. **Thus, projects which are profitable and would have happened anyway are *not* additional; those which have overcome significant political or institutional barriers *are* additional.**

According to this reasoning, it would be important for a promoter seeking CDM certification to be able to demonstrate that it had overcome significant institutional obstacles, and that the expectation of obtaining CERs contributed to its motivation to do so.

b. Sustainable development criteria

The purpose of the CDM is not only to assist Annex I countries to meet their emissions targets, but also to assist developing countries in achieving sustainable development (Art. 12, par. 2). The meaning of this term has yet to be fleshed out by the COP, and the way that it does so may lead to specific criteria for the certification of CDM projects.

Among others, the criteria may include the method or extent of technology transfer, specific performance or design standards for transferred technology, and the existence

[7] Another sense of "financial additionality" that almost certainly *will* be retained is that any government funds that go to support CDM projects must be "additional" to existing development assistance.

and nature of agreements for sharing project benefits (CERs and financial returns).[8] Sustainable development criteria may also require that a project be shown not to cause significant other environmental problems and that it provide direct benefits to local communities.[9]

It should also be noted that, under par. 3(a) of art. 12, the host country must "benefit" from CDM projects.

2. Number of credits

Once a project is recognized as eligible under the CDM, it must be determined how any CERs it generates. This is a complicated issue precisely because only those reductions which are "additional" to what would have occurred otherwise can earn CERs. Thus, calculation of CERs depends not only on the project itself, but on a rigorous assessment of the baseline against which it is to be measured. The fact that both project proponent and the host country have an interest in maximizing the number of CERs (and thus in maximizing the expected emissions under baseline conditions) means that methodological considerations, validation and monitoring are essential to a credible system.

a. Baseline methodologies

To assess emissions reductions in developed countries and probably in economies in transition, top-down baselines based on aggregated data and modelling are appropriate at the national, sectoral or regional level. However, development and validation of such top-down baselines requires very substantial resources, and it is thus highly unlikely that they will be developed by countries hosting CDM projects.

For CDM projects, there seems to be little alternative to a project-specific baseline. Given the incentive to exaggerate, **independent validation** of the project baseline will be essential to credibility.

For a renewable energy generation project, it seems clear that the baseline should be displaced generation on the country's grid. However, the baseline must take into account expected evolution over the life of the project. Projected evolution of demand, of the technologies and fuel types to be used to meet that demand and of their average and

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[8] Michael Toman and Marina Cazorla, "The Clean Development Mechanism: A Primer", Resources for the Future, Sept. 29, 1998.

[9] Center for International Environmental Law, "Designing a Legal and Institutional Framework for the Clean Development Mechanism," *Linkages*, Vol. 4, No. 4, 26 October 1998.

marginal costs will thus have a direct impact on the number of CERs a project will generate.[10]

b. Monitoring, validation and certification

For the reasons discussed earlier, monitoring, validation and certification are essential to the credibility of a CDM project, and thus to the CERs it generates. Ultimately, these criteria will be set by the certifying bodies ("operational entities") that will be designated by COP/MOP, once the Protocol enters into force.

In the meantime, it is up to the promoter to take all steps possible to ensure the credibility of the project and of the CERs it will generate. The use of established auditing and certification companies may be helpful. Existing procedures such the IPCC guidelines for measurement and assessment, Work Bank policies and guidelines for environmental impact assessment, ISO 9001 and 14001 may also be relevant. [11]

c. Leakage

Leakage is the phenomenon whereby reduction of emissions by one project leads to parallel increases elsewhere. Thus, replacing an oil-fired boiler with an electric one avoids all the emissions from the boiler, but creates additional emissions from electricity generation. For many projects, identifying and accounting for leakages is extremely complex. Fortunately, this is not particularly problematic for renewable energy generation.

d. Banking and retroactive certification

The Kyoto Protocol allows "banking" of CERs from 2000 on for the CDM, but it is virtually impossible that the institutional steps necessary for their formal issuance will be completed by next year. Given the uncertainties of ratification and coming into force of the Protocol, as well as the myriad technical details still not decided, it could in fact be several years before the mechanism is operational.

It is quite possible that the COP/MOP will eventually allow retroactive certification for CDM projects which have already been developed. While there can be no certainty on

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[10] Axel Michaelowa, "Baseline methodologies for the CDM and JI", presentation at the Seminar on Climate Change Business Opportunities, St. Gallen, March 23, 1999.

[11] Alex Michaelowa, "Monitoring, verification and certificatin of project-based emission reduction," presentation at the Seminar on Climate Change Business Opportunities, St. Gallen, March 23, 1999.

this point, a COP decision to this effect would provide a certain degree of confidence. This issue should be addressed at COP6 in 2000 or 2001.

A project that will be operational before the Kyoto Protocol comes into force and before the CDM process becomes fully operational will of course need to seek retroactive certification. The more thoroughly the project can address the credibility issues raised in this section, the better its chances for retroactive certification.

B. Value of credits

Once a project has been recognized under the CDM and has begun to earn CERs, what will those CERs be worth? The answer depends in part on the evolution of the international market for CERs and related emission reduction credits. Furthermore, due to the uncertainties of the entire process, their value may also depend in part on certain characteristics of the underlying project itself.

Many different estimates have been made of future market value of emissions reductions, and their comparison and assessment is outside the scope of this preliminary report. We will thus limit our comments to qualitative factors related to the project itself.

1. Retroactive certification

As noted earlier, the CDM is the only one of the flexibility mechanisms under the Kyoto Protocol that allows for "banking" of credits prior to the 2008-2012 commitment period. That is, CERs earned between 2000 and 2008 can be used by countries to contribute to meeting the emissions reductions to which they are committed for the period 2008-2012. Because of this feature, the implementation issues mentioned above are far more critical for the CDM than for many other elements of the Protocol.

As noted earlier, the fact that the Protocol will probably not enter into force and the CDM not be fully defined before 2000 raises the possibility of retroactive certification. It goes without saying that the need for retroactive certification creates additional complications and uncertainties concerning the value of emissions reductions from CDM-type projects.

2. Verifiability of GHG reduction (CER quality)

Even if the Protocol were to enter into force in the very near future and if the CDM mechanism were to be fully worked out, the bankable nature of CERs creates uncertainty that can potentially affect their value, even if the CERs are duly issued by duly certified "operational entities". Since their value in the coming years derives from their future use by Annex I signatories to meet their emission reduction commitments later on, the possibility that CERs might eventually be found to be invalid will almost certainly lead to a certain discounting of their market value. To the extent that CERs from a particular

project are seen to be less credible than others, they would see further erosion of their market value.

This problem is particularly acute because, as mentioned earlier, the incentive for both the promoter and the host country is to exaggerate the emission reductions resulting from a CDM project and hence the number of CERs it generates.[12] Thus, a CER buyer would need to take into account the possibility that his credits may be challenged or even disqualified before they can be used.

For these reasons, CER "quality" will directly affect their market value. Quality is essentially a measure of the rigour with which the certification process (including assessment of number of credits) has been addressed, on the one hand, and the quality of the underlying project, on the other. Thus, for example, CERs from a project whose baseline has been assessed by an credible, independent firm would be seen to be of higher quality, and thus of higher value, than those assessed in-house.

A feasibility study for the World Bank's Prototype Carbon Fund developed some very preliminary estimates of market value, illustrating the effect of quality on value of GHG emission reductions. The results reproduced here, *à titre indicatif seulement,* are in US dollars per tonnes of CO_2-equivalent (converted from tonnes of carbon in the original).

	Average project quality ranking (2=low, 5=high)			
	2	**3**	**4**	**5**
Conventional Energy Supply	2,13 $	4,26 $	9,13 $	19,48 $
End-use efficiency/renewable energy	0,91 $	1,83 $	4,26 $	8,83 $
Forestry	0,30 $	0,91 $	1,83 $	3,96 $

As noted earlier, the projects prices vary by a factor ten or more, depending on the project quality ranking. It should be noted that wind energy is probably at the high end of the "end-use efficiency/renewable energy" category, due to its high degree of techological maturity and reliability. Thus, if the certification process is well handled, such a project can expect substantial value for its CERs.

3. Liability in the event of disallowance

Because of the uncertainties mentioned above, determination of liability in the event that CERs are disallowed must be addressed. Under the Kyoto Protocol, liability ultimately rests with the developed country parties. However, it is likely that mechanisms such as contractual guarantees, insurance, etc. will eventually develop. It stands to reason that the better the protections attached to a given CER, the greater its value.

[12] Depending on how operational entities are funded, they may also be affected by a similar incentive.

4. Acceptability of carbon sequestration projects

One of the major issued left unresolved in the Kyoto Protocol is whether or not the CDM will certify emissions reductions from sink protection or enhancement (carbon sequestration) in developing countries (i.e. forest protection or reforestation). This will almost certainly be discussed, and hopefully resolved, in the upcoming COPs. As carbon sequestration is quite inexpensive compared to other emission reductions, such as renewable energy generation, its inclusion under the CDM would probably have the effect of driving CER prices lower than they would otherwise have been. However, there is very considerable opposition to the inclusion of such projects in the CDM, making it unlikely that they will be admitted at unlimited levels.

III. RELEVANT CANADIAN PROCESSES AND INSTITUTIONS

In this section, we will address issues related to the implementation of the Kyoto Protocol in Canada. This first subsection will look at theoretical issues concerning the relationship between domestic and international emission trading regimes. Then, we will briefly describe some of the private and governmental bodies in Canada concerned with Kyoto Protocol implementation.

A. Domestic emission trading regimes

1. Relationship with Kyoto commitments

The obligations created under the Kyoto Protocol exist strictly at the governmental level, and thus do not directly affect private sector entities, despite the fact that the vast majority of all GHG emissions are emitted by the private sector.

The Framework Convention explicitly requires that all Annex I countries shall adopt national policies and take corresponding measures to mitigate climate change by limiting GHG emissions and enhancing GHG sinks and reservoirs.[13] While this commitment could in theory be met through command-and-control regulation, in most if not all cases, it will probably occur through a mix of domestic emissions trading regimes, direct regulation and taxation. While voluntary systems are certainly possible, it seems clear that domestic trading systems will eventually have to turn to cap-and-trade systems in order to give rise to the substantial reductions required under the Kyoto Protocol.

It is important to recognize that domestic emission trading regimes are *mechanisms* by which many or most nations will meet the Kyoto obligations, but are not in themselves mandated by the Kyoto Protocol.

[13] Article 4, par. 2(a).

Under art. 3, a Party's emission reduction obligations can be met in part by ERUs resulting from JI with another Annex I country, by ERUs obtained through international emissions trading, or by CERs resulting from the CDM. However, insofar as CERs are owned and traded internationally by individuals and businesses, they do not "belong" to any Party to the Protocol.

The Protocol does not spell out the interface between private sector and governmental ownership and use of ERUs and CERs. Many key decisions have yet to be made, so it would be premature to draw firm conclusions in this regard. However, if Canada eventually adopts a cap-and-trade approach, which seems likely, the system might work as follows:

- individual companies are allotted annual emissions rights starting early in the next decade,
- the allotments are gradually reduced to meet the Kyoto commitment levels in 2008,
- companies must thus either reduce their emissions or purchase emission reduction credits to make up the difference,
- these could be either domestic emission reduction credits, administered by Canada, ERUs obtained through JI projects, or CERs obtained through CDM projects,
- the use of domestic emission reduction credits by Canadian companies will not affect Canada's net emissions, which will be equal to the total allotments issued,[14]
- to the extent that Canadian companies meet their domestic emission reduction obligations through the use of ERUs or CERs, Canada will rely on these international emission credits to meet its Kyoto obligations, as per art. 3.

One implication of such a system is that the market value of an ERU or a CER will depend on the market value of emission reduction credits in the domestic market(s) of the trading countries. Of course, since a private party is free to sell his ERUs or his CERs in whatever country offers the best price, there will be an international market in these credits. In theory, this would lead to a worldwide levelling of the value of domestic emissions credits. However, this levelling may be only partial, since under the Kyoto Protocol the use of ERUs must be "supplemental" to domestic actions.[15]

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[14] Except in the case of early action credits recognized by Canada but not by Kyoto. If the domestic system allows early action credits to be applied to the 2008-2012 period, it will therefore have to "overcomply" for that period, in order to meet its Kyoto obligations.

[15] The use of CERs to meet emission reduction obligations is subject to determination by COP/MOP, but, as noted above, it is not required to be "supplemental to domestic action," as is the case for ERUs.

2. Early Action credits

In order to accomplish significant reductions starting in 2008, it goes without saying that significant efforts will have to be made well before that date. However, under the Kyoto Protocol, only CERs resulting from CDM programs can actually be "carried forward" from prior years.

However, nothing prevents Canada or any other country from allowing companies to carry forward emission reductions in the context of their *domestic* emission reductions program. Indeed, early action is probably essential to achieving the required reductions. However, domestic credits recognized by Canada for pre-2008 emission reductions cannot be applied to Canada's Kyoto obligations for the 2008-2012 period.

B. Relevant Canadian entities

There has been considerable activity within Canada since the signing of the Kyoto Protocol, including the setting up of a number of private and governmental bodies, pilot projects, etc. They are briefly surveyed in this section.

1. Voluntary Challenge and Registry

The Voluntary Challenge and Registry (VCR) was initially established by NRCan in 1995. In October 1997, it was incorporated as an independent entity (VCR Inc.).

VCR's purpose is to encourage organizations from all sectors of the economy to accept greater accountability for GHG generation, and to serve as a catalyst for meeting Canada's GHG objectives through voluntary action.

VCR maintains a public registry of GHG reduction actions planned and carried out by its registrants. It is thus meant to serve as a means of demonstrating and recording individual contributions to GHG emission reduction.

While confidential treatment of certain information is possible, there is an obvious tension between confidentiality and VCR's primary mandate as a public registry. There is thus little point in registering with VCR unless one intends to make public the essential project information.

VCR invites CDM projects to register, indicating CDM reductions as "offsetting measures." However, the VCR seems to be designed primarily for large corporations which are themselves responsible for significant GHG emissions; it is these companies that are being "incited" to reduce their emissions, perhaps including offsets such as CDM. It is less apparent why promoters of free-standing CDM projects would choose to register, except as part of a communications and public relations strategy.

2. Greenhouse Gas Emissions Trading Pilot (GERT)

The Greenhouse Gas Emissions Trading Pilot (GERT) is an 18-month pilot project designed to test the effectiveness of emission reduction trading for greenhouse gases in the Canadian context. It is designed to:

- provide participants with practical experience in emission reduction trading;
- assess environmental and economic benefits of emission reduction trading;
- test and evaluate the technical, administrative and legal elements of an emission reduction trading system;
- maximize involvement of the private sector by emphasizing the use of business principles to achieve environmental and economic objectives;
- encourage identification and joint investment in GHG emission reduction, avoidance and/or sequestration activities; and
- help build the foundation for a possible future emission reduction trading system.

GERT is both a trading system, in which individuals can post offers to sell or buy emission reduction credits, and a reporting system for bilateral transactions. Of course, no credits actually exist at the present time; what is being sold is the right to whatever actual credits (if any) are eventually recognized as accruing to the underlying project.

At the present time, the GERT web site includes six offers to sell, no offers to buy, and 5 bilateral ("trade-matched") transactions. Of these, one offer to sell and one trade-matched transaction have received GERT approval.

Only a few trades have been consumated under GERT to date, and the volumes are miniscule compared to Canada's Kyoto obligations. However, it is instructive to note the prices being asked for emission reduction rights by GERT participants. Following are the sales prices included in the six offers to sell. (No prices are reported for trade-matched transactions.)

Seller	**$ CDN per tonne CO_2-equivalent**
Downie Timber Ltd.	$10
Pacifica Papers Inc.	$4.50
Compost Management	$6.50
Powerex (B.C. Hydro)	$2 to $5
Mikro-Tek	$5
JNE Consulting	$5.70 (reduced from $14)

3. Pilot Emission Reduction Trading Project (PERT)

The Pilot Emission Reduction Trading Project (PERT) is an Ontario-based multi-stakeholder initiative to explore emission reduction trading as a voluntary mechanism to improve air quality in the Windsor-Québec corridor.

While PERT trading is meant to include GHG emission reductions, that is not its central focus. It is unlikely that there would be any real benefits to registering with PERT at the present time.

4. CDM/JI Office

The Canadian CDM/JI Office was originally set up to facilitate "Actions Implemented Jointly" (AIJ) pilot projects under the Framework Convention, without much success. However, now that this mechanism has been replaced by CDM and JI, the Office is optimistic that it can play an important role in facilitating projects and helping promoters take advantage of the CDM and JI provisions of the Kyoto Protocol.

The office has recently been transferred from Natural Resources Canada to the Department of Foreign Affairs and International Trade. It is still somewhat disorganized; they expect to have a brochure available shortly, and a web site within a month or so.

According to Ted Ferguson, Senior Technical Officer, there is considerable methodological and political uncertainty as to the evolution of the Clean Development Mechanism, but he expressed confidence that at least the methodological issues will be resolved. He strongly urged that Canadian investors considering CDM projects register officially with the CDM/JI Office.

One way the Office can help a CDM promoter is by helping him to establish good official relations with the host government, via the Canadian embassy. This is important, since CDM recognition requires formal acceptance by the host government, which it should be noted gains no direct benefit from CDM recognition and thus has no particular incentive to take any great effort or risk in this regard. The Office promises confidential treatment of all project information.

Furthermore, as noted earlier, establishing a GHG baseline in the host country is essential before CDM credits can be issued. For a renewable energy project, this probably will involve determining the average and marginal GHG emissions associated with utility-generated electricity and forecasting its evolution over time. Ideally, this would be done by the host-country utility, but it may be necessary for the project promoter to take a proactive role, likely at its own expense. Even so, utility and governmental cooperation would be essential.

One of the sticking points in getting international agreement for the CDM was developing countries' fear that existing development assistance would be diverted to CDM-related projects. For this reason, it is not possible for such projects to be funded by the foreign aid budget. However, the prohibition does not extend to "capacity building" efforts. Thus, it is not inconceivable that the Canadian International Development Agency (CIDA) or similar agencies might be able to offer some kind of support for baseline development work within the host country. This issue is currently being explored by the Center for Clean Air Policy in Washington, D.C., among others.

Another possible value of registering with the CDM/JI Office would be to establish a paper trail to demonstrate the project's "additionality". Demonstrating that the expectation of earning CER credits was one of the driving elements in the business decision to proceed with the project may thus be of some importance when the CDM executive board and its "operational entities" are in place.

IV. CONCLUSIONS AND ACTION PLAN

A. Conclusions

The considerable uncertainty surrounding the Kyoto Protocol necessarily translates into uncertainty in the value of CERs created by virtue of the Clean Development Mechanism. Among the most critical uncertainties, we note the following :

- Ratification of the Kyoto Protocol: if the Protocol is not ratified by 55 countries and by countries representing 55% of 1990 emissions, it will simply not come into force. These threshold numbers create a *de facto* veto for the United States, where ratification by the Senate is by no means certain. Even if the U.S. does ratify, it is far from clear when or if the threshold levels will be reached.

- Implementation: As noted above, a great many critical details have been put off for later negotiation. These include compliance mechanisms (carrots and sticks) as well as operational details for the CDM and the other "flexibility mechanisms" (emissions trading and joint implementation). Even if ratification and implementation proceed, lack of agreement on key details may obstruct the growth of functional domestic trading systems, necessary to give value to CERs.

- CDM certification: Among these key details are the institutional structures necessary for the CDM to operate, including designation of certifying bodies ("operational entities"), auditing and verification protocols, etc.

Assuming that these institutional and political barriers are overcome, there are also numerous project-specific issues on which eventual certification will depend. Of these, the determination of a credible project-specific baseline is without doubt the most

important. Other issues include meeting likely sustainable development criteria, auditing and verification protocols and establishing project liability mechanisms.

Finally, the quality and thus the future value of the resulting CERs will depend on the credibility of the project itself, the methodology and implementation of the baseline determination and the credibility of the auditing and verification procedures used. According to a study done for the World Bank, the value of emission reduction credits may vary by a factor of 10 depending on their "quality" and credibility.[16] Establishing strong relations with the host government and proceeding to establish credible baselines are thus essential to success.

B. Action plan

Potential future actions concerning a renewable energy project in a developing country can be distinguished into those that precede and those that follow commitment to the project.

1. Prior to commitment

In the short term, before committing to the project, it would be useful to look in some detail at the project and the host country's energy context to **develop a rough idea of the number of CERs the project could generate**. Given the many uncertainties mentioned above, the result would be a range of values.

Similarly, it will be useful to **develop a range of projected dollar values per CER**, depending on a number of institutional and political scenarios.

2. Post-commitment

Once the promoter has obtained the rights to the CERs eventually flowing from the project, he can always attempt to sell them quickly. Embryonic markets such as GERT do exist, and it may be worth **evaluating the potential proceeds of a short-term sale,** in Canada or elsewhere, if a buyer could be found.

Assuming that the promoter intends to hold onto the resulting CERs, it is important to make a concerted effort to ensure that the project is recognized by the eventual Clean Development Mechanism authorities, and to maximize the value of the resulting CERs. Even if there is an interest in selling the rights to the CERs in the next few years, efforts to solidify the project's certifiability and to maximize the quality of the resulting CERs will almost certainly augment their value.

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[16] Econergy International Corporation, Carbon Offset Market, Risk & Pricing Analysis : Feasibility Study of the World Bank's Prototype Carbon Fund.

Formal relations with the host country are critical to eventual project recognition. To this end, if a solid relationship has not already been established, it may be worthwhile to **contact the CDM/JI Office of the Canadian Climate Change and Energy Division**, which can facilitate such contacts through the good offices of the Canadian embassy.

It may also prove important to **establish a "paper trail"** demonstrating that participation in the CDM played a real role in the decision to proceed with the project. Official registration with the CDM/JI Office may prove valuable in this regard as well.

Finally, **establishing a credible baseline** for the host country is essential to initiating the process that will eventually lead to CDM certification. Without a baseline, it is impossible to know how many CERs the project will generate. **Beginning work in this direction should be a priority.** Other issues requiring attention are monitoring and verification protocols and questions regarding liability in the event of subsequent disallowance of CERs.