

IMPLEMENTING JOINT IMPLEMENTATION:
Developing a Management and Performance System for the Kyoto Protocol's "Clean
Development Mechanism¹

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Report submitted to the United States Environmental Protection Agency, Office of Policy, Planning, and Evaluation, May 1998.

¹ Financial support for this paper was provided by the United States Environmental Protection Agency's Office of Policy, Planning, and Evaluation. This support is gratefully acknowledged. The views expressed in the paper are the authors', and do not necessarily reflect those of the Environmental Protection Agency, or of the authors' institutions. We thank Lisa Carter, Henry Lee, and David Victor for helpful comments on earlier versions.

EXECUTIVE SUMMARY

The Kyoto Protocol's "Clean Development Mechanism" (CDM), established by Article 12, will allow Joint Implementation (JI) of greenhouse-gas abatement or sequestration projects between the Protocol's "Annex B countries" (which have adopted national emission targets) and the "non-Annex B" countries (which have not). Joint Implementation (JI) consists of project-level activity to abate or sequester emissions, undertaken by various decentralized actors including firms and NGOs, following government-defined standards and criteria, for which governments grant credit against abatement obligations. The CDM, the first full implementation of JI, is an important component of the climate regime because it is the only mechanism available to support abatement efforts in the major developing countries.

We focus on the problem of implementing JI systems like the CDM, which depend for their success upon the aggregate success of individual abatement projects. These pose problems of implementation that are fundamentally different from those arising in systems like tradable international emission permits, which place accountability for national emission totals with the state.

Projects may fail for multiple reasons, including intentional nonperformance of obligations by participants; withholding of required cooperation by non-participants; inadvertence, incapacity or uncertainty; bad luck; or any combination of these. Effective response to both unsuccessful and successful projects will usually require judgements of causation. In making these judgements, it is important not to assume that failure always, or even primarily, represents intentional nonperformance.

Consideration of the interests of project participants, and of the theoretical literature on monitoring and enforcement, suggest that the CDM, or any project-centered JI program, should include an integrated, four-phase implementation process, comprising project approval, monitoring, and response, and program evaluation.

To be approved and granted credit, project proposals must first be reviewed and approved (or "certified") for participation in the CDM. Negotiations leading to project certification should establish explicit, agreed definitions of what project developers are committing to do, of what will be monitored and how, and of how project success will be measured. Standards for judging projects should combine *compliance standards* based on observable participant behavior, with *effectiveness standards* based on environmentally relevant project outputs. The CDM Authority may establish separate review and approval processes for high-risk and low-risk projects. They may also use their one-time leverage over project terms to require provisions for monitoring, verification, or response that would be unobtainable later, by making them conditions of approval.

Monitoring should proceed throughout a project's life, and should include both behavioral inputs and environmental outputs relevant to the project's agreed performance criteria. Monitoring and response provisions should be tailored to specific projects, in particular to respond to expected project risk. Monitoring programs should entrain actors with incentives and capabilities to report accurately on project performance. In particular, monitoring should seek to combine "first-party" reporting by project implementors, with "second-party" reporting by the Authority or its agents, and "third-party" reporting by non-parties to a project agreement – e.g.,

local governments, NGOs, or corporations – who have an interest in successful project performance.

When a project fails or threatens to fail, the response should depend on the likely cause, and should seek both to promote this project's return to success and to signal other projects in ways that increase their likelihood of success. In many cases this may mean eschewing sanctions for non-performance, in favor of rewards for successful performance, facilitative measures, information, or normative dialogue.

Finally, the processes of project approval, monitoring, and response should themselves be evaluated systematically in pursuit of high and increasing effectiveness of the entire program over time. Explicit, ongoing system-wide evaluation measures will be the best defense of program effectiveness. The CDM will inevitably face initial obstacles, failures, and growing pains, but developing internal processes of continual improvement can help it become a major contributor to the climate regime.

TABLE OF CONTENTS

<u>1. INTRODUCTION</u>	1
<u>2. THE JI CONTEXT: PARTICIPANTS, INTERESTS, NEGOTIATIONS</u>	2
<u>3. THE ORIGINS OF PROJECT FAILURE</u>	4
<u>4. A JI MANAGEMENT AND PERFORMANCE SYSTEM: REQUIRED FUNCTIONS</u>	6
<u>5. PROJECT REVIEW AND APPROVAL</u>	7
Specify Clear Criteria and Procedures for Evaluating Project Performance.	10
Combine Compliance Standards with Effectiveness Standards.....	10
Negotiate advance acceptance of otherwise unavailable provisions for monitoring and enforcement.	11
<u>6. MONITORING PROJECT IMPLEMENTATION AND PERFORMANCE</u>	12
What to Monitor, and When.....	12
Combine First, Second, and Third-Party Reporting.....	13
Expand Capacity and Authority of Third Parties With Incentives to Report, Not Vice Versa.....	16
Make the Monitoring Program Depend on Anticipated Project Risk.	16
Foster a “facilitative” rather than “adversarial” approach to monitoring.	18
<u>7. RESPONDING TO PROJECT OUTCOMES</u>	19
Fit the Response to the Level and Cause of Project Performance.....	19
Engage Third Parties in Responses, and Enhance Their Capacity.....	21
<u>8. EVALUATING THE SYSTEM</u>	22
Focus on System Performance, Not Just Performance of Individual Projects.	22
Disseminate Lessons Learned From Successes and Failures	23
<u>9. CONCLUSIONS</u>	23
<u>REFERENCES</u>	23

1. INTRODUCTION

After several years of sometimes contentious debate,² the Kyoto Protocol has authorized Joint Implementation (JI) of greenhouse-gas abatement obligations under the "Clean Development Mechanism" (CDM). JI is one of three types of systems that have been proposed to shift abatement effort among nations, by mutual consent, with accompanying flows of finance and technology.³ Two of the three, JI and tradable permits, are market-based systems that seek to reduce aggregate abatement costs by harnessing the incentives of private profit-motivated actors.

Joint Implementation (JI) consists of project-level activity to abate or sequester emissions, undertaken by various decentralized actors including firms and NGOs, following government-defined standards and criteria, for which governments grant credit against abatement obligations.⁴ JI is distinguished from tradable permit systems by its focus of activity and accountability on individual projects, rather than on national emission totals. An important consequence of JI's project-level focus is that JI projects can be undertaken between target and non-target countries, as the Clean Development Mechanism (CDM) allows.

In total, the Protocol sketches four different mechanisms to allow flexibility in meeting abatement obligations. While specified with different levels of detail in the Protocol, all will require further specification before they can become operational. The CDM, established by Article 12, allows JI between countries with national emission targets ("Annex B countries"), and those without. Under the CDM, Annex B countries may receive credit against their targets during the first commitment period, 2008-2012, for abatement they achieve through projects in non-Annex B nations beginning in the year 2000. In addition, Article 4 allows Annex B nations to opt to meet their entire obligation jointly, under a bubble; Article 17 authorizes trading of emissions between Annex B nations; and Article 6 establishes a hybrid system combining some aspects of JI and of tradable permits, which allows Annex B nations to exchange "emission reduction units", which are generated by specific abatement projects but which are implemented through exchanges of national emission targets.

These systems for flexible abatement represent large opportunities, important conceptual novelties, and serious practical problems. They represent large opportunities because, by allowing flexible market-based decisions where and how to abate, they may greatly reduce the cost of attaining a specified global abatement goal. Estimates of the saving potentially available from efficient international allocation of abatement effort are as high as 50 per cent of total cost (see, e.g., (Kuik, Peters, and Schrijver 1994, xii; Metz 1995; Parson and Fisher-Vanden 1997; Weyant, Davidson, Dowlatabadi, Edmonds, Grubb, Parson, Richels, Rotmans, Shukla, Tol,

² Debate continues over the morality of JI, and the balance of political control it implies between developing and industrialized countries. Here we consider questions of implementation and effectiveness, and do not engage these broader debates. See, e.g., (Dubash 1994; Hare and Stevens 1995; Loske and Oberthür 1994; Parson and Fisher-Vanden 1997).

³ The third system consists of Administrative Financial Mechanisms (AFMs) such as the Global Environment Facility and the Montreal Protocol Multilateral Fund. For discussion and comparison of the three systems, see (Parson and Fisher-Vanden 1997).

⁴ While early policy debate used the term JI more broadly to denote any mechanism for flexible abatement, our usage is consistent with most of the recent literature, and with the provisions of the Kyoto Protocol. See, e.g., Mintzer, 1994; Watt and Sathaye, 1994; and Wexler et al, 1994.

Cline, and Fankhauser 1996)). They represent important novelties because of the strength of linkages they introduce between the international climate regime and the conduct of sub-national actors. They represent practical problems because of the complex challenges of implementation, which differ in details among the alternative flexibility systems but are serious for all.

We focus on the problem of implementing systems of JI, such as the CDM, that depend upon the success of individual abatement projects. While all flexibility systems pose serious implementation challenges, those – such as tradable permits or bubbles – that depend on national responsibility for national emission targets pose challenges that are more familiar and more tractable than those of JI, in which the attainment of low-cost international abatement goals and the integrity of the international credit system depend on the performance of the non-state actors who finance, implement, and oversee JI projects. Even the system of Article 6, widely called "Annex B JI", implements project credits through changes in national emission targets, hence making the host country bear the risk of project failure and so posing less acute problems of accountability than those posed by the pure JI of the CDM.

Despite its challenges the CDM is important, because it is the only mechanism available to include efforts in major developing countries, which have not accepted national targets, in global abatement. Including these abatement opportunities may be necessary to attain global abatement goals at reasonable total cost, or even to make stringent global abatement possible. Still, the same decentralized decision-making that makes JI – like other market-based policy instruments – more efficient than command-and-control regulation brings increased risks of nonperformance or project failure (Mitchell 1994). Discussions of JI have recognized this risk, and have called for efforts to make JI projects "verifiable and enforceable" (e.g., (Trexler 1995, 235)); but making them so will depend on details of implementation and system design that have been little discussed.

We seek to begin this discussion, proposing a series of guidelines for the implementation of JI. While we refer to the CDM throughout, which is our immediate concern, our discussion applies to any JI system that depends on project-level accountability. It is, for example, of some relevance to the problem host-country officials will face under the "Annex B JI" of Article 6 in the Kyoto Protocol, and is also of potential relevance to joint implementation systems that might be considered under other environmental regimes.

Sections 2 and 3 outline a set of basic premises regarding the actors involved in JI projects and their interests, and the various possible causes of project failure. Section 4 outlines the four broad functions that a credible and effective system of implementation must perform: project review and approval, monitoring, response to project outcomes, and system evaluation. The remaining sections elaborate on each of these functions in turn, and present a series of recommendations for discharging them.

2. THE JI CONTEXT: PARTICIPANTS, INTERESTS, NEGOTIATIONS

A JI system must balance several goals. It seeks to encourage widespread participation in the regime, including activity in countries that have not adopted national targets; to abate or sequester emissions effectively and at low cost; to ensure accountability; and to encourage innovation in the technology, structure, and management of projects.

The pilot phase, established at the 1995 Berlin meeting,⁵ has provided some preliminary experience relevant to JI. During the pilot phase, approximately a dozen national programs have been established to promote, review, and record projects, and approximately 100 projects have been undertaken. Pilot-phase projects have been regionally concentrated, with most in Central America, Eastern Europe and the former Soviet Union; sectorally, they have included energy efficiency, renewable energy, fuel switching, reduction of natural-gas leakage, and forestry and land use. A few pilot-phase projects are large, but most are small. Pilot-phase projects have been difficult to fund from private sources (Parson and Fisher-Vanden 1997).

The availability of abatement credit will not change the technical and sectoral character of project opportunities available. CDM projects will likely look familiar: retrofits of energy equipment to increase energy efficiency or switch to lower-carbon fuel; new energy developments based on low or non-carbon sources; recapture of emissions; or sustainable forestry or land-use. The availability of credit under the CDM will, however, both substantially increase the scale of JI activity and drastically change the actors involved and the interests they seek to advance, and hence the character of opportunities and risks faced by individual projects and by the system.⁶

Credits will motivate large numbers of private, profit-motivated actors to develop projects. To facilitate their involvement, there will likely emerge various market institutions for exchanging, pooling, insuring credits, as well as specialists performing various functions of project development and oversight, and making markets. Since a central goal of credits is to entrain actors motivated by private gain, these actors' interests will likely outweigh those who participate out of environmental concern. The actors, interests, projects, and hence the types of problems and opportunities, will be starkly different from the small pilot phase.

Four types of actors may be involved in project development, approval and implementation, each with distinct patterns of interests: investors, investor and host-country governments, and implementers. One or several investors who provide financing will typically be motivated by some combination of anticipated financial return from the project, and the value of credits. Investors may seek to use credits directly, if they are subject to an abatement obligation they expect they can meet more cheaply through the project than through their own operations; or may plan to re-sell the credits profitably to some other actor under an avoidable regulatory obligation (Parson and Fisher-Vanden 1997; Pearce 1995, 15). For these credits to be valuable to their holder, they must grant release from a costly abatement obligation in the holder's home country.⁷

While governments will be unlikely to continue funding or managing JI projects directly as some have in the pilot phase, the terms of Kyoto specify that governments of both investor and site countries will remain involved in project approval. By supporting domestic investors in JI

⁵ The pilot phase allowed exploratory projects between Annex 1 and non-Annex 1 countries, but excluded the granting of credit. To distinguish it from credited JI, the pilot phase was called "Activities Implemented Jointly".

⁶ (Anderson 1995; Chayes 1997, 5; Dudek and Tietenberg 1992, 3; Hagem 1996, 432-433; Heller 1996, 337; Parson and Fisher-Vanden 1997).

⁷ In addition to financial returns and the value of credits, investors may derive benefits from a project in public relations or various strategic factors related to gaining information, relationships, or market access. These interests have likely been more salient in the pilot phase than they will be under a larger-scale credited system (Parson and Fisher-Vanden 1997).

projects, investor-country governments can meet their FCCC emission targets at reduced cost, promote international trade and investment, and demonstrate global good citizenship. The incentive that credits provide to investor-country governments and to investors depend on different aspects of their use; investors are motivated by credits against domestic regulatory obligations, investor-country governments by credits against national obligations in the international regime. By supporting domestic implementation of JI projects, perhaps with direct involvement, host-country governments can receive valuable finance and technology; improve their environmental reputation, increase foreign trade and investment, and secure auxiliary environmental, economic, employment, and infrastructural benefits to the local community.⁸

While in some cases investors or governments may participate directly in project implementation, it is more likely that separate parties will implement projects. Implementors may include local or international firms or NGOs, host-country government bodies, or others. The implementor may be engaged by the other parties and participate at their pleasure, or may have some independent standing in project negotiations based on local knowledge or legitimacy, control over project sites, or unique specialized knowledge. Depending on who the implementor is, their interests are likely to reflect some combination of financial gain and local project impacts. Professional implementers will participate primarily to advance commercial interests, through contractual arrangements combining fixed payments with shares of project financial returns or credits. Government or NGO implementers may share in the project's financial returns and credits, but may also be interested in local project impacts.

Characteristics of JI projects will be negotiated by the participating actors. The international regime may impose criteria for projects being certified as JI, such as the criteria of voluntary participation, measurable long-term benefit, and additionality provided by the Kyoto Protocol. But the international JI Authority is unlikely to be directly involved in each project negotiation, particularly if projects are numerous, but will delegate its authority to national bodies, likely with some provision for review. The government participants in each project negotiation will consequently be responsible for ensuring that proposed project meets the internationally defined criteria. But diversity of projects and their conditions are likely to make it impossible for international criteria to specify exactly what each project will look like. Rather, parties negotiating the characteristics of each project will have substantial discretion over its design and implementation.

3. THE ORIGINS OF PROJECT FAILURE

Roughly speaking, JI projects succeed for each of their participants to the extent they deliver the benefits that actor sought to gain from the project. They succeed as JI, to the extent that they accomplish their planned greenhouse gas abatement or sequestration. While initial project negotiations seek to define project characteristics and participants' rights and duties, they can not specify every detail or contingency, or avoid uncertainties in subsequent project performance. Projects depend for their success on the performance of various actors, perhaps over an extended period of time, under conditions of uncertainty.

⁸ Of course, implementor-country governments will resist JI projects that create negative environmental or economic externalities, divert scarce resource from other productive uses or foreclose potential future development opportunities (Gupta 1996; Shukla 1996).

The time horizon over which project success is determined, the degree and kind of initial uncertainty, and the extent of reliance on faithful and competent performance of duties by various actors will all vary from project to project. For example, a project may depend on performance primarily by one actor or by many, with greater or lesser dependence of success on cooperation by actors not included in initial project approval negotiations. A project's success may be mostly fixed by the characteristics of an initial investment, or depend on continuing performance over years or decades. A project may apply mature technology in a familiar context, or novel technology or technology applied in unfamiliar setting.

Three broad factors can cause projects to fail. First, projects may fail due to intentional nonperformance of duties by project participants. Unlike the pilot phase, few participants in a credited JI system such as the CDM will have a direct interest in abatement. Rather, the credit system, with its associated rights and duties, is intended to link abatement to their primary economic and political interests. Because this linkage is inevitably imperfect, actors' self-interested conduct will sometimes diverge from the goal of efficient abatement. For example, in a reforestation project implementers might plant less land than promised or plant it badly; investors might fail to provide promised finance, training, or other resources.

Second, projects may fail from non-cooperation of outsiders. Project success may depend on cooperation or resources from actors who were not involved in project negotiations, perhaps various host-country government bodies. Clearly, key actors needed for project success should be involved in the negotiations; but it is not possible to anticipate everyone whose help may be needed. To the extent that outside cooperation reasonably expected by participants is not available, a project may fail to attain its projected abatement despite good-faith efforts by its participants.

Either of these situations may arise due to lack of capacity in host countries. Many instances of environmental treaty noncompliance have arisen from unanticipated incapacity of states – particularly but not exclusively developing states – to fulfill commitments (Chayes and Chayes 1995; Jacobson and Brown Weiss 1995). Careful planning may reveal the most potentially serious weaknesses in host's resources, infrastructure or knowledge base, although demanding certainty about future resources would surely exclude too many worthwhile projects. Engaging many developing states will bring short-term political and long-term environmental benefits, counter-balancing some short-term risk of projects under-performing expectations.

Third, projects may fail due to various uncertainties that cannot be characterized as nonperformance of project duties, or of reasonably anticipated cooperation, by anybody. Prominent examples would include required inputs higher than anticipated (and higher than the relevant actor is able or willing to provide); scientific or technical uncertainties about the relationship between inputs and emission effects; or random events. A reforestation project may fail because difficult site conditions require more time or resources to replant than participants predicted; because of errors in the predicted rate of growth or carbon uptake of the species planted; or because of a forest fire or drought (Metz 1995, 170). Projects that are innovative in their technology, organization, or application may in particular pose elevated risks of project failure (Mintzer 1994, 44).

In sum, JI project success depends on project participants' competently and faithfully discharging their duties, and on the cooperation of some nonparticipants -- both of which reflect

these actors' interests, resources, and capacities; and also depends on uncertainties in projecting project effects and on random events that are outside any actors' control. Consequently, when a project fails, it may be due to intentional nonperformance of obligations; inadvertence, incapacity or ignorance; imperfect knowledge; bad luck; or any combination of these. Particular failures may be caused by multiple contributing and interacting factors: an implementor may find ways to scrimp on the quality of planting that violate the spirit of the agreement but do not explicitly comprise nonperformance; unforeseen problems may be resolvable if participants or outsiders are willing to work a little harder, but they do not do so; etc. As we argue below, effective response to unsuccessful – and successful – projects will usually require judgements of causation. These may be difficult, but it is important not to assume that failure always, or even primarily, represents intentional nonperformance.

4. A JI MANAGEMENT AND PERFORMANCE SYSTEM: REQUIRED FUNCTIONS

While JI seeks to encourage decentralized identification and implementation of projects, maintaining accountability in a JI system with credit requires some centralized system of control and oversight. This system should seek to advance the goals of the JI system as a whole, promoting project and program effectiveness, supporting the integrity of the credit system, and promoting progressive improvement in system effectiveness over time, while keeping the additional costs imposed by the system small. The jobs this system must do can be usefully separated into four separate functions, which we discuss sequentially in the sections to follow: approval, monitoring, response, and program evaluation. While these functions are conceptually separable, we do not mean to imply that they must follow each other sequentially.

Approval: defining criteria and conditions for approving projects as eligible for JI credits, and applying them to particular project applications (Kerr 1997).

Monitoring: coordinating the observation and reporting, by participants and others, necessary to assess whether participants have implemented the project as agreed and whether the project has produced the expected emissions results.

Response: coordinating responses to both successful and failed projects to alter the incentives, opportunities, and perceptions of participants so as to make successes more and failures less likely (Selrod and Torvanger 1994, 9).

Program Evaluation: assessing the aggregate accomplishments of the JI program, to identify conditions associated with more and less successful projects and adjust the program to improve aggregate performance over time.

While Article 12 of the Kyoto Protocol establishes some criteria for the CDM and states that it will be governed by an executive board, the extent of institutional capacity that will be established under the Protocol to carry out these functions is not yet clear. The Conference of the Parties may delegate these four jobs to an existing body (e.g., the Convention's Subsidiary Body on Implementation), a newly established international authority, or alternatively to national or independent bodies. For ease of exposition, we refer to the hypothetical body responsible for

these jobs, whether existing or newly established, as the "Authority". For particular jobs, the Authority may create sub-bodies or assign responsibility to them.

This system should seek to recognize, diagnose, and respond appropriately to both project success and failure, to increase the likelihood of success and decrease that of failure. This requires that it recognize and respond appropriately to different kinds and causes of project failure. One of its jobs is to identify and respond to failures caused by intentional nonperformance, to ensure that those responsible for effective project implementation have adequate incentives to carry it out. But it must discriminate among failures, not assuming either that all failures are intentional nonperformance, or that the appropriate response to failure (even if caused by intentional nonperformance) is always the threat or imposition of deterrent sanctions.

Much present research on compliance, monitoring, verification and enforcement does make both these assumptions, explicitly or implicitly. We seek to avoid them. Consequently, we stress that by "monitoring", we mean gathering information to reveal successful as well as unsuccessful project performance; and by "response", we mean any management efforts to increase prospects for project effectiveness. We reserve the term "enforcement" for responses to nonperformance based on the use or threat of coercion or punitive sanctions.

In the remainder of the paper we sketch a set of guidelines for effective discharge of each of these four functions in a JI system.

5. PROJECT REVIEW AND APPROVAL

To be approved as JI and be granted credit, project proposals must be reviewed and approved (or "certified") for participation in the JI program. Projects might be brought forward singly or in bundles of multiple projects with similar characteristics and participation. This review might be undertaken by the international JI Authority, or by national authorities or others acting as its agents, who will decide whether to recognize a project as JI, and with what terms or conditions. This power to grant or withhold JI certification, and thus access to credits, will give the Authority considerable leverage over project design at the outset.

The Authority may use this power to exclude some types of projects or participants categorically. Indeed, it may be required to do so, if the FCCC parties negotiate general JI criteria that exclude specific classes of projects of participants. But these criteria negotiated by the Parties cannot and should not anticipate every detail of project proposals brought forward, so the Authority will inevitably retain substantial discretion in its approval decision and in the application of its leverage. In addition to using this one-time leverage to advance other program goals, the Authority should ensure that projects are designed to include adequate provisions for monitoring, response, and evaluation. Designing these functions into projects at the start can make them easier, cheaper, and more effective, and so increase the likelihood of project success. Variations of project design may substantially vary the ability to monitor and respond to project performance. These aspects of project design should be explicit objects of negotiation in the approval decision, not regarded as fixed. In the absence of other compelling reasons for approval, the Authority should reject projects unable or unwilling to include such provisions.

Monitoring and response provisions can and should be tailored to specific projects, in

particular to respond to expected project risk. As projects proliferate, and increasing experience is gained with particular project types, it may be reasonable for the Authority to establish separate low-scrutiny and high-scrutiny approval processes.

Low-scrutiny approval would be appropriate for types of projects with enough experience already in hand, and many similar proposals coming forward. For these, there could be standardized, pre-approved performance criteria, monitoring provisions, and response strategies. Alternative forms of "boilerplate" text, procedures, and requirements could be developed to fit the specific needs of several common project types. Such standardization could reduce the administrative costs of approval; incorporate experience with specific project types to meet the Authority's monitoring and evaluation needs at low cost to project participants; and increase the comparability of results between projects of the same type.

High-scrutiny approval would be reserved for novel, complex, or risky projects, or those for which no standard project type provided an adequate fit. It would entail developing project-specific performance criteria, monitoring provisions, and response strategies. Project proponents could petition, or the JI Authority could decide, to employ high-scrutiny approval for any particular project. The standardized project categories for which low-scrutiny approval was used would be expected to grow and change over time, with increasing experience.

Initial project review is also the occasion to define a project's baseline (the hypothetical level of emissions without the project, from which project contributions will be measured), the quantity of credits that might be granted for the project, and the terms on which it will be granted. Setting a defensible baseline that is resistant to manipulation poses grave difficulties, which may bias JI projects toward certain sectors (Parson and Fisher-Vanden 1997). This problem is largely separable from the problems of monitoring and responding to project performance, and we do not address it here.

Defining the credit to be granted, and the terms on which it will be granted, will be one crucial dimension of the initial project negotiations. Since project performance cannot be guaranteed in advance, credit to be awarded should not be guaranteed in advance, either. But in the context of defining expected project outcomes, the approval process should include discussion of expected levels of abatement to be achieved by the project under various outcomes, and so identify potential levels of credit to be earned by the project. Credits to be granted should be tied to project performance measures, to establish a clear and mutually agreed basis for aligning incentives and sharing risk. Project participants might be held responsible for all forms of project risk, or only some.

Projects may be pooled, to reduce the burden on the CDM authority. Such administrative pooling may be particularly appropriate if large numbers of projects are being proposed that are similar in the technology they employ, the sites, or the participants. Projects would be pooled for their entire life cycle: pooling would involve collective approval, a monitoring plan that includes some random sampling over projects in the pool, and a collective response based on the aggregate performance level of projects in the pool. If the response to project under-performance is the revocation or de-rating of credits, all credits associated with a pooled set of projects should be treated equivalently. (i.e., if 10% of the projects in a pool achieve no abatement, then all credits generated by the pool would be de-rated by 10%). Among other benefits, such sharing of non-performance risk would give project implementers incentives to monitor and assist each

other. Since the purposes of such pooling are to reduce administrative burden and provide incentives for mutual monitoring and assistance, pooled projects should be as similar as possible. This contrasts with investors' interest in pooling projects to manage their risk, which supports pooling of diverse projects whose risks are less likely to be correlated. With administrative project pooling, investors could achieve such diversification by purchasing shares of the credits generated by multiple, dissimilar project pools.

Specify Clear Criteria and Procedures for Evaluating Project Performance.

Negotiations leading to project approval should establish explicit, agreed definitions of what project developers are committing to do, of what will be monitored and how, and of how project success will be measured (Sachariew 1991, 37). Such advance specification of definitions and procedures can help participants develop common expectations about project performance, monitoring procedures, and responses. Reducing the ambiguity of obligations can reduce the risk of conflicting interpretations or misunderstandings regarding what is expected, and hence of some risks of project failure (Dudek and Tietenberg 1992, 19; Klaasen 1996, 287). In addition, explicit advance discussions of monitoring and response provisions may allow participants to identify creative approaches that provide useful performance information at low cost.

Combine Compliance Standards with Effectiveness Standards.

Standards for judging projects may be *compliance standards*, based on observable participant behavior, *effectiveness standards* based on environmentally relevant project outputs, or some combination. Projects fail due to various factors, which participants can anticipate and control only to varying degrees. Consequently, the choice of standards for which participants will be held accountable determines both the incentives they face, and the project risks for which they will be held responsible.

At one extreme, projects might be held only to a single clear effectiveness standard, such as emissions actually abated. This approach would grant participants maximum flexibility to attain required environmental performance at minimum cost. Combined with substantial penalties for nonperformance, this approach would also maximize participants' incentive to avoid project failure, even when due to threats or other actors' choices over which they have little control. Project participants bear all risk for project failure, however caused.

But exclusive reliance on an effectiveness standard may weaken the credibility of threatened sanctions, and the attractiveness of participation. Exclusive reliance on such a standard implies that the response to project failure is determined only by the degree of failure, not by its cause. Consequently, only very limited or ambiguous behavioral requirements are likely to be negotiated at the project approval stage. Absent such explicit discussion, project participants may argue that failure was primarily caused by uncontrollable factors, not their own behavior, so they should not be held responsible -- despite having initially accepted such liability. Since sanctions will also be costly to the Authority or those responsible for imposing the sanctions, they may be receptive to such arguments. These claims will at a minimum require costly and time-consuming political resolutions. To the extent that avoidable failures are not sanctioned, these renegotiations will allow project participants to avoid responsibility and weaken the credibility of the system; to the extent that unavoidable failures are sanctioned, participants are saddled with large and uncontrollable risks, reducing their incentive to participate in JI.

In contrast, a pure compliance standard would make participants responsible only for performing actions and defending against eventualities specified at project approval (Kerr 1997, 2). Such a standard would specify behavioral requirements that are believed to be well correlated with project effectiveness, and which address the sources of project risk most strongly under

participants' control. Giving participants clear behavioral expectations would reduce the ambiguity of retrospective determinations of sanctions, and hence participants' opportunities to shift blame for project failure. Moreover, by shifting the least controllable risks away from project participants, this approach would also increase incentives to participate. The major weaknesses of this approach follow from the impossibility of fully specifying in advance precisely how participants should act to maximize project effectiveness. By pre-specifying required behavior and decoupling participant incentives from project effectiveness, this approach limits both their flexibility and their incentives to respond to new knowledge and to local or changing conditions, to advance project effectiveness at lowest cost.

The virtues and problems of the two approaches suggest that exclusive use of either is ill-advised. An appropriate balance will likely favor behavioral standards, with some performance standards. Above all, there should be clarity regarding the sources of project failure for which participants will be responsible, and the likely responses to each type of project failure. From the participants' perspective, risks of project failure due to factors outside their control should not be exacerbated by uncertainty over how the Authority will respond to such failures. The Authority cannot specify all contingencies, but it should seek to identify the most likely types and sources of project failure and clarify a range of likely responses. Responses to nonperformance of specified actions largely within participants' control should differ from responses to unpredictable hazards largely outside their control. To the extent feasible, treatment of failure and success should be symmetrical: just as their liability, and expectation of sanction will be less for failures due to factors less under their control (but they may still be required to make best efforts to remedy), so their rewards for project success or over-success should be less for those due to factors less under their control.

Negotiate advance acceptance of otherwise unavailable provisions for monitoring and enforcement.

Project participants have little interest in meeting the Authority's needs for monitoring and response provisions. Responsible implementers will monitor their own performance, but externally imposed controls merely raise their costs. Implementors who seek to avoid their responsibilities have an obvious interest in avoiding external scrutiny.

The Authority can use its one-time leverage over project terms to require provisions for monitoring, verification, or response that would be unobtainable later, by making them conditions of approval.⁹ Examples might include monitoring arrangements that participants find intrusive, or requirements to post performance bonds, to be forfeited under specified nonperformance conditions but returned with interest upon successful project completion.¹⁰ Advance explicit negotiation of such provisions will make them more likely to be accepted, more likely to work, and more likely to be perceived as legitimate by project participants.

⁹ For example, the US pilot-phase program, USIJI, already requires that projects provide monitoring and verification plans, accept third-party verification of reductions, and provide annual performance reports (Dixon 1997, 141-143).

¹⁰ The difficulty is to set a bond requirement large enough that the threat of forfeiture is an adequate deterrent to non-performance, but not so large that its posting (or the risk of erroneous forfeiture) does not deter meritorious project proposals.

6. MONITORING PROJECT IMPLEMENTATION AND PERFORMANCE

We have argued above that project approval should include agreement on a monitoring plan. Many authors have stressed the importance of project monitoring in making the JI system transparent, and its claimed contributions credible (Arts, Peters, Schrijver and van Sluijs 1994, 53; Center for Clean Air Policy 1997; Tietenberg and Victor 1994, 44; Wexler, Mintzer, Miller, and Eoff 1995). But what should the monitoring plans comprise, to attain this desired transparency and credibility?

Monitoring must serve multiple purposes if it is to support improvement in the effectiveness of the JI system over time.¹¹ Part of its job is what is typically stressed: helping to compare project emissions to those initially projected (Dixon 1997, 138-142; FCCC/CP/1997/2 1997, Art. 7(3); Metz 1994, 29-30; Wexler, Mintzer, Miller and Eoff 1995, 126-127). But in addition, when feasible, monitoring should help to diagnose why projects fall short of expectations when they do, by seeking information relevant to significant sources of project risk. Monitoring should also help to identify and diagnose projects that succeed, particularly those that significantly exceed expectations.

An appropriate monitoring system will balance various agents' ability and willingness to collect reliable information with the regime's ability to use it to advance its purposes, i.e., a balance between the supply and demand sides. An appropriately designed system may use a combination of information gathered and reported by project participants themselves, by the Authority or its agents, and by outside actors -- first-party, second-party, and third-party monitoring. The differing capacities and incentives of each of these classes of observers will make the information provided by each most useful for different purposes. For example, first-party reports from JI participants may be of little value in identifying specific project failures, but may help with system-wide learning of what factors are associated with project success.

What to Monitor, and When

The type and quantity of data gathered by a monitoring plan should reflect its contribution to the compliance and effectiveness standards in force, and the cost and availability of the data. What is useful to observe, when, and with what precision, will depend on specific characteristics of the project and participants, and the standards to be applied.

In some cases, monitoring must begin before the project, to establish a baseline from which to estimate subsequent project-related effects. This might involve measuring emissions from an old power plant to be retrofitted, pre-project patterns of electrical generation, or the current cover and regeneration rate on a plot proposed for reforestation or change in management.

Monitoring should vary over time to follow behaviors that are crucial for project success, to provide interim feedback, and to respond to early concerns about project failure. For some projects an early large discrete behavior such as an initial investment may be crucial to project success, so close early monitoring may substitute for costly subsequent continuous monitoring of behavior.

¹¹ For an extended discussion of the role of transparency in international regimes and the processes for promoting it, see (Mitchell 1998).

For other projects, success may depend on continuing performance over many years. For these, successful project evaluation may depend on information collected throughout the project's life, such as operation and management efforts, or emission rates, which may not be available at completion. In addition, evaluation of such projects should not wait until completion, but should include interim behavioral standards. Interim evaluation will both allow early recognition and response to risks of project failure (Michaelowa 1995a, 105), and establish repeated interactions between participants and the Authority, enhancing incentives for cooperation (Axelrod 1984). When a project is suspected of falling short of required performance, monitoring can be increased, to resolve ambiguities about whether a failure occurred and why, and increase the Authority's ability to respond.

In cases of intentional nonperformance interim evaluations will occur when deviations from agreed behavior are smaller than if evaluation waits for project completion, so required deterrent sanctions will be smaller and hence more credible. In addition, interim reviews of effectiveness may allow new knowledge of better or cheaper ways to meet project goals to be incorporated into renegotiation of compliance standards, in time to improve project performance or reduce costs.

During crucial periods of project implementation, to the extent feasible, monitoring should gather information about what happened and why – data relevant to assessing actors' behavior, intentions, and capacities – as well as project outcomes, since these may be necessary to making assessments of compliance and effectiveness, and deciding appropriate responses. The potential utilization of data must be considered as well as its availability. Even the low cost of collecting readily available data is wasted if the data are useless for project evaluation, while high-cost data that is precisely relevant to project evaluation may be worth the effort. Proxy data that is closely enough correlated with effectiveness standards may be preferred to direct measurement of environmental performance, if the difference in cost is large enough: for example, observing fossil-fuel inputs to an energy project may be preferred to direct monitoring of emissions. Experience under both environmental and human rights treaties suggests that monitoring programs often gather simultaneously too much and too little data: too much of no relevance to the performance criteria in force; and too little that helps explain why the desired behaviors and outcomes are or are not occurring (Arts, Peters, Schrijver and van Sluijs 1994, 61).

Combine First, Second, and Third-Party Reporting

Effective project monitoring will require that the actors observing and reporting information have both the incentive and the capacity to do so frequently, completely, and accurately. Since the Authority will likely have constrained resources to conduct monitoring itself, it must in many cases delegate monitoring and reporting responsibilities to other actors. But few other actors will have both the required incentives and capacity. Consequently, for the JI monitoring system to provide sufficiently accurate, credible, and useful information, it must carefully combine reporting by first parties, second parties, and third parties. "First-party reporting" involves implementers reporting on their own behavior, its causes, and its impacts. Second-party reporting is that conducted by the body responsible for the effectiveness and integrity of the system -- the Authority or its agents. Third-party reporting involves non-parties to a project agreement -- e.g., local governments, NGOs, or corporations -- reporting on

implementor behavior or project results.¹²

First-party reporting is commonly used in international environmental regimes where the implementers are states, and has important advantages whether the implementers are states or sub-state actors. Except in unusual circumstances, first parties always have the access and authority to provide the required information, and can do so at lower cost than outsiders. First parties may also be able to provide details about internal causes or intended consequences of behavior that no outsider could observe. While even first parties may have limits on their monitoring capacity, particularly in complex or highly sub-divided organizations or those without adequate internal accounting and information systems, their effective capacity to observe and report is usually greater than that of either second or third parties. Finally, extensive use of first-party monitoring may present advantages associated with avoiding any semblance of encroaching on host-country sovereignty, and with assuming participant trustworthiness, potentially a self-fulfilling prophecy.

The common concern with first-party reporting is that implementers may lack sufficient incentive to report completely and accurately, particularly when they have not met the relevant requirements (Klaasen 1996, 297; Roland and Haugland 1995, 364). While this concern may be serious, first parties' incentives to report will also depend on the perceived consequences of reporting, and on their broad level of support for the goals of the JI system. Table 2 summarizes the dependence of first-party reporting incentives on their performance in the specific instance in question, and on their broad support for JI goals. A party may broadly support the JI system either because of intrinsic concern for abatement or, more likely, because of an extended commitment to participating in multiple projects and hence an interest in the broad success and perceived integrity of the system.

Table 2: Incentives for First-Party Reporting

	Support JI Goals	Indifferent or Opposed to JI Goals
Met JI Requirements	Committed Conformer	Coincidental Conformer
Failed to Meet JI Requirements	Good Faith Nonconformer	Intentional Violator

Those who support the regime's goals and have met its requirements in a particular instance are of course likely to self-report fully and accurately, to support the regime, publicize their own success, and encourage others to do likewise. Regime supporters who have not met its requirements in a particular instance are also likely report honestly, unless the penalties they face from revealing their failure are severe enough to over-ride their broader commitment to the integrity of the regime. Participants who lack broad support for the regime may still meet its requirements in a particular case, through pursuing their own interests or by accident, and will likely self-report accurately to claim credit. Intentional violators would prefer to report falsely or not at all to avoid censure or punitive response, unless the regime provides adequate incentives to

¹² This terminology is novel. First-party reporting corresponds to what is normally called "reporting" in the compliance literature, while second and third-party reporting are two subsets of what is normally called "verification" (Graham 1995, 180; Klaasen 1996, 296).

do otherwise (Krasner 1991; Stein 1983, 129-130).

The quality of first-party reporting by those who have failed to meet JI requirements will depend on their expectations of regime response, both to the presence or absence of reporting itself and to the substantive content of reports. In general, a response system based on punishing nonperformance will tend to decrease first-party reporting, while one based on facilitation or rewarding successful performance will increase it, tending also to reveal otherwise unobserved failures. If general reporting rates are low, intentional violators may simply fail to report without attracting attention; if reporting rates are high, their two best options may be to report honestly, or to submit false reports, as the Soviet Union did for many years of whale catch statistics (Yablokov 1994). The probability of honest first-party reporting can be increased by subjecting reports to independent back-up certification, by intergovernmental bodies or independent auditors whose right of access is guaranteed in initial project negotiations (Arts, Peters, Schrijver and van Sluijs 1994, 62; FCCC/SBSTA/1997/INF.3 1997, 2), or through a policy of imposing smaller penalties for nonperformance that is initially revealed by first-party reporting.

While careful design of monitoring and response systems can give many actors sufficient incentive for extensive, regular, and honest reporting, fully reliable first-party reporting cannot be assured so the regime must also employ second and third-party monitoring. Second-party monitors, the Authority or agents in its direct employ, will usually have the incentive and the formal authority to report accurately, though resource and capacity constraints are likely to be severe enough that this must be reserved for back-up certification or other situations where the risk of avoidable project failure and the gains from direct Authority intervention are very high.

The regime can also gain substantial benefits from information on participant behavior and project results gathered and reported by third parties, who are neither project participants nor directly accountable to the Authority (Dixon 1997, 141-142; Goldberg and Stillwell 1997, 7; Mintzer 1994, 49; Wexler, Mintzer, Miller and Eoff 1995, 128). Local communities, governments, NGOs, corporations, universities, auditing firms, or international organizations all might be engaged in providing relevant information.

Both the incentives and the capacities of these third parties can vary. We contend that third parties incentives to report faithfully will depend on two characteristics. As for first-party reporting, those who support broad regime goals will be more likely to report reliably than regime opponents. In addition, third parties may perceive themselves as benefiting from successful project implementation (or harmed from non-compliance). Parties with either or both of these interests may be willing to monitor and report on project implementation, as summarized in Table 3. "Regime-minded victims" support the regime in general and perceive themselves to benefit from successful project implementation. They will have a strong interest in vigilantly monitoring project performance, and may even be liable to portray ambiguous behavior as a violation. "Opportunistic victims" share the same specific interest in faithful project implementation, even though they do not support broad regime goals, perhaps because attainment of abatement goals is correlated with specific local environmental, economic, or political benefits effects of a project. They will share an interest in reporting project performance, except when specific external project benefits and greenhouse gas abatement come into conflict. Project investors will also have incentives to monitor implementation failures that undermine their economic benefits, independent of any commitment to the regime's abatement goals. In an apt example from another environmental regime, oil-tanker captains and shipping associations

regularly report government failures to provide pollution reception facilities, despite their general opposition to shipping pollution regulations (MEPC 1990). Governments, corporations, NGOs, and others that support abatement but are not directly harmed by failed projects are a third group with incentives to monitor and report noncompliant behavior (Climate Network Europe 1997, v; Dudek and Tietenberg 1992, 32; Greene 1993, 168-9; Handl 1992, 18-19; Subak 1997).

Table 3: Incentives for Third-Party Reporting

	Support JI Goals	Indifferent or Opposed to JI Goals
Perceive No Benefit from Successful Project Performance	Regime-Minded Good Citizen	Consistent Nonreporter
Perceive Benefit from Successful Project Performance	Regime-Minded Victim	Opportunistic Victim

Expand Capacity and Authority of Third Parties With Incentives to Report, Not Vice Versa

Well-chosen third parties may have appropriate incentives to monitor project performance faithfully, but may lack requisite financial or technical capacity, rights of access, or legal authority. The JI Authority may considerably expand the useful information available to it at little cost, by identifying such third parties and expanding their capacity or authority. The JI Authority can help build capacity by securing third-party access as a condition of project approval (Dudek and Tietenberg 1992, 21); by defining monitoring needs as clearly as possible and making reporting logistics simple; by providing simple monitoring and reporting templates, perhaps in the form of several nested approaches of increasing complexity and sophistication, as have been developed for national emission inventories (Intergovernmental Panel on Climate Change 1996); or by providing training and facilitating learning between parties.

Some of this expansion of authority will require the regular presence of outsiders in organizations. Governments will have to accept foreign inspectors as a regular part of JI participation, just as corporations and NGOs involved in project implementation will have to accept the regular presence of outsiders in their organizations.

In some instances, non-governmental third parties may have more freedom of action than either governments or the Authority. For example, NGOs may have greater ability to collect and export information, an advantage that the Commission on Sustainable Development has sought to exploit.

Make the Monitoring Program Depend on Anticipated Project Risk.

Monitoring is costly, so should only be done to the level that carries commensurate benefits in evaluating or encouraging project performance.¹³ In aggregate, the optimal intensity of

¹³ Even in the pilot phase, the SBSTA noted, "The precision required in determining environmental benefits from activities implemented jointly should be commensurate with the scale and complexity of the activity" (FCCC/SBSTA/1997/INF.3 1997, 3).

monitoring for a particular project will depend on its level and type of risk, which can be roughly decomposed into risk factors associated with the project and with its participants. Project-specific risk, which derives from a project's innovativeness, the reliability of technologies and processes employed, etc., can be estimated from past performance of similar projects. Participant-specific risk, which derives from the participant's interests in project success, their capacity and expertise, etc., can be estimated from past performance of the same or similar participants.¹⁴ With increasing experience, the Authority should be able to improve its estimates of both sources of risk.

Table 1 shows a simple monitoring scheme that seeks to promote credibility and control costs by treating these two sources of risk separately. The scheme imposes higher scrutiny on higher-risk projects whatever the source of the risk, while favoring risky projects over risky participants through the allocation of monitoring costs. Projects low on both sources of risk would have limited monitoring, with the low costs of monitoring borne by project participants. Projects high on one source of risk, either the project or the participants, would be subjected to rigorous monitoring, but who bears the monitoring costs would depend on the source of the risk. Reliable participants would be encouraged by undertake high-risk and innovative projects by subsidizing the monitoring cost, perhaps through the Convention's Financial Mechanism. Unreliable participants undertaking commonplace or low-risk projects would be expected to bear the costs of more stringent monitoring, to ensure that their performance claims are met. Projects high on both dimensions of risk, project and participants, would be deemed to involve excessive risk of failure, and would be rejected.

Table 1: A Risk-Based Monitoring Strategy

	Low Risk (Reliable) Participants	High Risk (Unreliable) Participants
Low Risk (Commonplace) Projects	Minimal monitoring, borne by participants	Extensive monitoring, borne by participants
High Risk (Innovative) Projects	Extensive monitoring, borne by national or international authorities	Reject Project

The meaning of the stringency of monitoring would depend on the particular project type, but could include the frequency of inspections, the probability of inspection in a random-sampling scheme, the level of access to project operations and accounting required, the number of characteristics observed, or some combination (Selrod and Torvanger 1994, 9).

While discriminating according to participant risk may appear invidious and politically difficult, many writers on JI and the Convention itself have endorsed such discrimination, based on such characteristics as participation in related commitments or demonstrated compliance with other obligations of the regime. See, e.g., (FCCC/CP/1997/2 1997, Art. 7(3)) (Metz 1994, 31)

¹⁴ We do not explicitly include interaction effects, such as participant skills and experience that are specific to particular project types. These can be accommodated within the 2X2 approach we propose, by first assessing participant risk and then project risk given these particular participants.

(Heller 1996, 340). Participants who demonstrate a record of successful project implementation would be able to work themselves from high-risk to low-risk status.

Foster a "facilitative" rather than "adversarial" approach to monitoring.

As every auditor and government inspector knows, legal right of access to information is no guarantee of real and effective access. The ease and effectiveness of real access will depend significantly on nuances in the approach taken to monitoring, the implied assumptions about implementers' intentions, and the consequent character of the relationship between monitors and project implementers.

Adversarial and *Facilitative* approaches to monitoring define two illustrative extreme cases. An adversarial approach assumes project participants are trying to cheat, assumes that nonperformance is likely to occur and likely to be intentional when it does occur, and that deception or concealment in first-party reporting is widespread. Participants are likely to reciprocate this adversarial approach, seeking to avoid revealing even minor or unintentional problems, particularly if any observed nonperformance is likely to bring sanctions. With such an approach, acquiring useful information can be difficult and costly, if not impossible.

A facilitative approach assumes that participants are trying to implement successful projects, that nonperformance if it occurs is likely to be inadvertent, and that first-party reporting is likely to be largely honest. Participants are likely to reciprocate this approach as well, revealing project problems before they threaten performance, particularly if the response is likely to be useful assistance in bringing a nonperforming project back on track, e.g., through technical or managerial assistance.

To the extent that participant behavior is not determined independently of the conduct of monitoring, both these approaches can set in motion reciprocal behavioral dynamics that make their embedded assumptions self-fulfilling. The facilitative approach encourages the good-faith implementation it assumes, at the cost of being slower to detect the intentional nonperformance or attempted deception that it assumes to be unlikely. The adversarial approach may be quicker to detect intentional cheating, at the cost of making implementers who are ambiguous in their intentions more likely to try it. There are no instances of strongly adversarial approaches in real international environmental regimes, though they are periodically advocated. Strongly facilitative approaches are more common, such as the wetlands convention (Ramsar Convention Bureau 1990).

An appropriately designed monitoring system will combine aspects of the two approaches, with a strong emphasis on the facilitative approach. Such an approach can make participants willing, rather than reluctant, providers of information, most of the time. This approach can be strengthened to the extent that the system provides useful operational and diagnostic information to the implementers. For example, the European maritime regime collects daily inspection reports from individual port authorities. All fourteen members routinely supply these reports, despite the cost of doing so, because the secretariat re-distributes aggregated data that helps port authorities identify suspect ships and so deploy their enforcement resources more effectively.¹⁵

¹⁵ The same data regularly show that these countries are not meeting agreed inspection rates, but they continue to provide the data. See (Mitchell 1994).

Similarly, the JI Authority could process and re-distribute project information so as to facilitate information exchange among projects, help projects improve their operations or solve potential problems before they threaten project success, or help project implementers sustain a positive public image.

The monitoring approach can vary, depending on the history of a particular project or participant. A bias toward a facilitative approach does not preclude shifting to more aggressive inspections and verification if and when intentional nonperformance or deception should become evident.

7. RESPONDING TO PROJECT OUTCOMES

Monitoring seeks to identify the extent, mechanism, and causes of project success or failure. But monitoring can only influence the likelihood of success and failure, whether in the present project or subsequent ones, if some response follows from it (Ikke 1961). An effective response to either a successful or a failed project must target both the participants in this particular project, and a broader audience of current and prospective participants in other projects.

The repertoire of responses must certainly include the threat and, where necessary, the execution of punitive sanctions (Downs, Rocke, and Barsboom 1996), but the near-exclusive reliance on these in current discussions of JI system design is not warranted (See, e.g., (Camber Corporation 1997, 5; Center for Clean Air Policy 1997, 1)). The full range of potential response options includes six types, in three pairs. Punishment for nonperformance and reward for performance comprise one of these pairs, which seek to manipulate the consequences of agents' choices and so strengthen their incentive to implement projects successfully. Alternative forms of response seek to alter actors' set of feasible choices, through providing new opportunities for desired behavior or foreclosing opportunities for undesired behavior; or seek to alter actors' perceptions of the desirability of alternative choices, by providing information or persuading them to support regime goals (Mitchell 1996; Mitchell 1997).

Fit the Response to the Level and Cause of Project Performance

The appropriate response to a project's performance will depend on an assessment of what happened, why, and who was responsible. Project performance must be compared to what was specified at approval, more likely as a graduated assessment of the degree of performance and success, allowing an appropriate and proportionate response, than as a binary determination of success vs. failure or compliance vs. violation.

When a project has fallen short of its anticipated performance, an appropriate response must incorporate multiple objectives, balancing the likelihood of producing desired behavior change, the cost to the regime, and the effect on other projects and participants. Failure may be less frequent than success but will be a greater political concern. The appropriate response will depend on a diagnosis of causes contributing to the failure, and in some cases on an assignment of responsibility, even though such determinations cannot be made with full reliability (Wexler, Mintzer, Miller and Eoff 1995, 127).

Clear advance identification of likely potential failure modes and responses at the project

approval stage, perhaps through assigning liability to either the buyer or seller of credits¹⁶ can assist these determinations, but cannot fully determine responses. In principle, responses should also depend on actors' behaviors and intentions, and their knowledge of how those behaviors would affect project outcomes. The widespread assumption in arms control, trade, and human rights contexts that most violations are intentional seems less plausible in environmental contexts (Mitchell 1993; Young 1991, 183-185), though some instances of intentional state non-compliance with environmental commitments have occurred. Even if the Authority rejects proposed projects that appear to be inadequately resourced, the required resources may be underestimated. Good-faith principals may need the cooperation of others who are not committed to JI goals and whom they cannot control. Projects may fall victim to inadequate maintenance of infrastructure, or changes or instability in host-country government (Loske and Oberthür 1994, 50).

Many writers on JI advocate sanctions against participants when emission goals are not achieved (Center for Clean Air Policy 1997, 8; Dudek and Goffman 1997; King 1997, 66; Michaelowa 1995b, 171). In the JI context, sanctions could be directed against state or non-state participants in failed projects. Plausible sanctions could include publicizing poor performance, restricting participation in future JI, discounting or revoking emission credits, restricting states' participation in Convention business, fines, or trade sanctions (Center for Clean Air Policy 1997, 8-9; Dudek and Goffman 1997; Michaelowa 1995b, 171; Selrod and Torvanger 1994, 9).

Considerable evidence suggests, however, that it is difficult for states to impose sanctions on other states, and that fairly stringent conditions must be met for sanctions to be likely to produce the desired change in behavior (Arts, Peters, Schrijver and van Sluijs 1994, 64-65; Axelrod and Keohane 1986; Hufbauer, Schott, and Elliott 1990; Martin 1992; Schrijver 1995, 139). In some cases, sanctions may even have perverse effects, by eliciting a defiant response from the targeted actor or creating opportunities for third-parties to profit by evading the sanction (Barber 1979; Makkai and Braithwaite 1994). While sanctions must be both credible and potent to be effective (Schelling 1960), threatened international sanctions often lack credibility because of free-rider problems and other obstacles to imposing them, and lack potency because too few states are willing to impose them. A graduated approach to compliance, with flexible responses directed primarily toward non-state project participants may mitigate both these problems.

In some cases, sanctions will be the necessary or most effective response. But when other responses are more likely to promote success, the Authority should resist predictable political pressures to punish through sanctions. For innovative projects with heightened risks of failure the Authority may need to avoid sanctions, lest they deter participation and innovation even more effectively than they deter project failure. When a project is failing due to incapacity, threatening or imposing sanctions is less likely to improve its performance than simply providing the resources that are lacking. Even when nonperformance is clearly intentional, sanctions may not be the only, best, or most credible response (Center for Clean Air Policy 1997, 11-13). With some failures, the best response will seek to get the project back on course. With others, the primary objective of the response will be to send a signal to other projects and increase the likelihood that they will succeed. Alternatively, the objective may be to punish the failure in

¹⁶ These have been described as the "seller liability" and "buyer beware" approaches. The "buyer beware" approach seeks to give buyers of credits incentives to monitor performance of the projects they buy from. See (Center for Clean Air Policy 1997, 8; Embree 1994, 94).

order to express disapproval for the responsible behavior, even if no deterrence is achieved. Finally, the main response goal may be to understand better why the failure occurred. In many real cases, these objectives will intertwine.

Effective response to successful projects, as to failed ones, will require understanding the causes of the success. Various reward responses would be plausible. Awarding (or adjusting) credits based on actual emission reductions or sequestration, or some equivalent retrospective distribution of financial rewards, could serve both to reward performance and over-performance, and to punish under-performance. Expediting project approval and monitoring for implementers with strong performance records on past projects would provide incentives to perform well on initial projects. Granting well-publicized awards to a few exemplary projects would incentives to perform well while promoting the JI program more generally.

Other responses seek to change actors' available choices. For example, the Authority could under some conditions renegotiate the terms of a struggling project to allow new approaches to implementation that preserve project goals but are less burdensome or costly. Alternatively, the Authority could promote technology transfers that would make achieving project goals easier. A multilateral fund could be established to provide resources to projects experiencing unforeseen threats to their success. Conversely, project success may be fostered by foreclosing options that would be inconsistent with project success. For example, a project proposing to replace or retrofit a coal-fired power plant might include a commitment to scrap the old equipment that is being displaced.

A promising but little explored alternative would send expert teams consultants or trainers, perhaps including veterans of successful similar JI project implementation, to trouble-shoot when a project first experiences trouble. The resultant dialog, while assuming good faith and focusing on solving problems, would also have the effect of putting pressure on bad-faith implementers, likely bringing at least marginal changes in behavior. As for monitoring, a facilitative approach to response can avoid alienating participants, and may even increase their commitment to JI goals.

Responses may occur throughout a project's life. Early monitoring allows facilitative intervention before a project fails, when it can be both less costly and more effective. For example, early identification of improper operation or maintenance of a plant can avert risks of excess emissions and shortened plant life through simple retraining or technical assistance. Early emphasis on such facilitative response can increase the likelihood that subsequent problems will be solved constructively, by avoiding the antagonism likely to arise once a full violation has been committed or alleged.

In sum, no single type of response can be effective for all project outcomes. The Authority should have various responses in its repertoire and must attend to details of project outcomes and causes, to determine what response or mix of responses is most appropriate.

Engage Third Parties in Responses, and Enhance Their Capacity

In its ability to respond directly, the JI Authority will face the usual constraints on international bodies in imposing sanctions or raising revenue. Effective response will consequently depend on coordinated actions from the Authority, states, and other actors. As with

monitoring, third parties can contribute to effective responses to the extent that they have the incentive, authority, and capacity to do so. Good design of system response will involve identifying third parties who have incentives to take appropriate response, and increasing their capability and authority as necessary.

For example, requiring high-risk participants to post performance bonds (funds put on deposit, which are returned with interest if performance is adequate but forfeited if it is not) gives the bondholder the ability to impose a sanction on nonperforming project participants. Alternatively, participants could be required to maintain a reserve of excess abatement, to offset projects that fall short of their targets (Center for Clean Air Policy 1997, 8). If such reserves were assigned jointly to groups of similar projects, they could motivate participants in each project to monitor and assist the others.

Since some actors will undertake repeated JI projects, responses can be structured over multiple projects or tailored to past performance. The JI Authority might wish to encourage repeat participation, because it would allow linking credit for newly proposed projects to actual past performance, and because repeat participants will care about their reputations for implementing successful projects (Dudek and Goffman 1997).

Responses involving rewards, technology transfer or training may prove difficult for states to implement because of the general difficulty of maintaining adequate contributions to multilateral funds. Voluntary payments could provide some funds to support responses, but could be augmented by revenue from forfeited performance bonds, fines, and perhaps once the JI program is well enough established, application fees. Non-monetary resources may be as influential and more available. NGOs or successful project veterans might provide training, consultancy, or trouble-shooting pro bono, perhaps via "sponsorship" relationships with particular projects that would also serve to increase participants' commitment to project success.

8. EVALUATING THE SYSTEM

Because JI represents a novel approach to international environmental policy, it is most unlikely that the procedures established for project approval, monitoring, and response will get it right the first time.

An initial objective of JI should be that enough projects succeed for the program to establish the credibility and legitimacy necessary to continue contributing to the greenhouse management process. At the same time, the system's criteria and procedures should encourage innovation, allowing room for variation and the elevated risk of failure that attend innovative projects.

The final task of JI implementation must be regular and critical assessment of the effectiveness of the entire JI program and the factors responsible. Assessment of individual projects is insufficient to guide evaluation of criteria for JI approval, technologies and procedures for monitoring, or novel strategies of response. Rather, these must be evaluated with regard to the success of the overall program, perhaps expressed as average project effectiveness and its trend over time.

Focus on System Performance, Not Just Performance of Individual Projects.

Jl's contribution to FCCC goals will depend on the total abatement accomplished by a large number of projects. The JI Authority should choose and manage a portfolio of projects to maximize this aggregate contribution, recognizing that the best performing aggregate mix of projects is likely to include many innovative and high-risk projects, of which substantial numbers may fall short of expectations or fail completely. Individual project failures need not threaten the overall goals of the system.¹⁷ Through its reporting and outreach, the JI Authority should also encourage others to evaluate the system in terms of aggregate reduction achieved.

Relevant lessons may be drawn from individual projects, or from patterns across multiple projects. It might be observed, for example, that sequestration projects underperform expectations on average, while energy efficiency projects overperform. Identifying the sources of such aggregate variation may prove as useful as noting why a particular project exceeds or falls short of average performance for projects of its type. Drawing useful guidance from such system-wide experience will require a focus on lessons learned rather than placing blame.

Disseminate Lessons Learned From Successes and Failures

In addition to extracting lessons from both successful and unsuccessful projects, the Authority should encourage the incorporation of these lessons in design of subsequent projects and revision of system procedures. This will require ensuring that project assessment, analyses, and lessons derived from past and ongoing projects are made widely available to subsequent project developers. To this end, the Authority should establish and maintain open, continuing lines of communication among project participants, and between participants and the Authority. Multiple channels of information should be supported: e.g., targeted electronic listservers and web pages; journals, newsletters, and other print publications; and conferences or workshops that bring together project participants. Such interchanges are likely to facilitate real program improvements, even if they prove difficult to document.

9. CONCLUSIONS

Consideration of the interests of JI project participants, and of the theoretical literature on monitoring and enforcement, suggest that a JI program should include an integrated, four-phase implementation process.

Project review and approval should design in monitoring and response mechanisms that increase the likelihood of a project being faithfully implemented, including commitments of access for subsequent monitoring and evaluation.

Monitoring should proceed throughout a project's life, and should include both behavioral inputs and environmental outputs relevant to the behavioral and effectiveness criteria by which the project will be evaluated. Monitoring programs should entrain actors with incentives and capabilities to report accurately on project performance.

When a project fails or threatens to fail, the response should depend on the likely cause and should seek both to promote this project's return to success and to signal other projects in ways that increase their likelihood of success. In many cases this may mean eschewing sanctions for

¹⁷ Note that this claim is not true for all issues, but depends on structure. In some issues, e.g., nuclear proliferation, a single failure can thwart regime goals.

non-performance in favor of rewards for successful performance, facilitative measures, information, or normative dialogue.

Finally, the processes of project approval, monitoring, and response should themselves be evaluated systematically in pursuit of high and increasing effectiveness of the entire JI program over time. Explicit, ongoing system-wide evaluation measures will be the best defense of program effectiveness. JI will inevitably face initial obstacles, failures, and growing pains, but developing internal processes of continual improvement can help it become a major contributor to the climate regime.

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