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practical guidelines for  
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under the UN  
Framework Convention  
on Climate Change**

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A CICERO study to the OECD Environment Directorate

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## TABLE OF CONTENTS:

	Page
<b>Introduction</b>	<b>1</b>
<b>1. The UN Framework Convention on Climate Change</b>	<b>2</b>
<b>2. The concept of joint implementation</b>	<b>4</b>
<b>3. The ambitions of joint implementation</b>	<b>6</b>
<b>4. Agreements under which the mechanism could operate</b>	<b>7</b>
<b>5. Evaluation of projects</b>	<b>9</b>
5.1 Cost-benefit analysis	
5.2 Incremental unit cost	
5.3 Assessment of costs and benefits	
5.4 Different interests of participating countries	
<b>6. Joint implementation and institutional requirements</b>	<b>15</b>
6.1 Bilateral and multilateral systems	
6.2 A simple bilateral system	
6.3 A designated institution as a verification institution for joint implementation projects	
6.4 The designated institution as a market place for joint implementation projects	
6.5 The designated institution as a credits bank for joint implementation projects	
6.6 Determination of credits, uncertainty and control	
6.7 Distribution of credits between investing and receiving nations	
6.8 A designated project management institution under a joint international target	
6.9 Incentives and disincentives	
6.10 National governments and mobilization of private enterprises	
6.11 Comparing the institutional requirements of bilateral multilateral systems	
<b>7. Recommended practical guidelines</b>	<b>21</b>
<b>Literature</b>	<b>23</b>

## INTRODUCTION

In December 1991, the OECD Environment and Development Ministers directed OECD "to initiate work on mechanisms to facilitate joint implementation, in a cost effective manner, of commitments on greenhouse gases." This report has been prepared for the Environment Directorate of the OECD as part of the response to that directive. The report is also intended to comment on ways of making operational the concept of "joint implementation", as embodied in the United Nations Framework Convention on Climate Change (FCCC), signed in Rio de Janeiro in 1992.

Instead of a negotiated agreement on reducing emissions of greenhouse gases (GHGs) where all countries would commit themselves to share the burdens of achieving a global target, we have an agreement where a limited number of countries have committed themselves to strive to return, individually or jointly, to a lower level of anthropogenic emissions of GHGs.

We can assume that the climate effect of any reduction of emissions of GHGs or any growth of carbon sinks is the same, regardless of where it takes place. Because of large differences between countries, inter alia as to their energy sources, systems and degree of technological development, the costs of obtaining a given net emission will vary significantly among countries and between the kinds of measures chosen. Countries which have invested the most in reducing negative environmental effects of GHGs in the past may actually meet the highest marginal costs in the future. That is if rules along the lines of previous international environmental agreements, where all countries were to reduce an equal percentage, i.a. of polluting agents, were to be applied. For this reason, the Convention explicitly stated that policies and measures dealing with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.<sup>1</sup>

The objective of this study is therefore to

*suggest practical guidelines to OECD governments on how to operationalize the concept of "joint implementation" in the context of the UN Framework Convention on Climate Change.*

This study will inter alia consider the option of establishing a multilateral institution where all countries may cooperate towards meeting an international target which may be negotiated at a later stage.

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<sup>1</sup> FCCC, Article 3.3

The report presents the background for the mechanism in Chapter 1, and its main characteristics and ambitions in Chapters 2 and 3. In Chapter 4 different regimes of agreement under which the mechanism could operate are discussed, as in the situation where a negotiated agreement contains an international target to which all participants adhere. A closer description of the elements of the mechanism is given in Chapter 5, with a focus on investment priorities and distribution of costs and benefits. In Chapter 6 different systems for operating the mechanism are discussed, including the required institutional support for these systems. Chapter 7 concludes the report with suggestions for practical guidelines for OECD governments on how to operate the mechanism under the present regime.

## **CHAPTER 1**

### **THE UN FRAMEWORK CONVENTION ON CLIMATE CHANGE**

The choice of negotiating a "framework convention" implied that the Parties wanted to concentrate on the principal issues and leave aside more specific elements for a later stage, either for inclusion in protocols or in other types of agreements to be designed at a later date. This choice also gave the "language" a more general character, often leaving room for interpretations and further discussions as is the case for the concept of joint implementation.

The Convention commits all Parties to "Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs ..." <sup>2</sup> Even if this clause lacks concrete commitments like quantitative targets, time qualifications, priorities, kinds of measures to be taken, etc., it urges Parties to engage in a process. Negligence of entering into such a process will be open and known to other Parties and the world at large through up-coming Conferences of the Parties. This situation represents a clear political push to Parties to participate in ways of meeting the objective of the Convention. The Convention also states the special financial responsibility of developed country Parties and other developed Parties included in annex II of the FCCC to provide assistance to developing country Parties. <sup>3</sup> Depending on the perceptions, i.a. of the "value" of climate projects, and the compatibility of such projects with national development objectives, this should provide an incentive for developing countries to participate.

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<sup>2</sup> FCCC, Article 4.1(b)

<sup>3</sup> FCCC, Article 4.3

Given the general call of all Parties for "the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions"<sup>4</sup>, this report will concentrate on one viable instrument for meeting this call. The FCCC clearly observes the freedom of country Parties to decide on ways and means of how to fulfil their commitments, and states specifically in Article 4.2(a): "*.. these Parties may implement such policies and measures jointly with other Parties..*". The FCCC states further in Article 4.2(d) that: "*..The Conference of the Parties, at its first session, shall also take decisions regarding criteria for joint implementation as indicated in subparagraph (a) above.*"

The FCCC established a financial mechanism for the provision of financial resources on a grant or concessional basis, including the transfer of technology.<sup>5</sup> The Convention entrusted, on an interim basis, the Global Environmental Facility (GEF) of the World Bank, UNDP and UNEP, to mobilize and distribute these funds.<sup>6</sup>

The developed country Parties are the main investors in the GEF. The Facility is i.a. financing the incremental costs of projects reducing GHG emissions or enhancing carbon dioxide sinks. Credits for these actions are however, not returned to the Parties supporting the GEF. The report will later focus on some options of exchanging investments and credits under a multilateral joint implementation system.

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<sup>4</sup> FCCC, Preamble

<sup>5</sup> FCCC, Article 11

<sup>6</sup> FCCC, Article 21.3

## CHAPTER 2

### THE CONCEPT OF JOINT IMPLEMENTATION

The idea of joint implementation is to separate the *commitment* of each country Party with regard to limitation of net GHG emissions from the *implementation* of measures. This implies that a country with high marginal abatement costs may look to another country Party where the same reductions can be obtained at a lower cost. Most abatement measures will also have other effects that are economically and environmentally positive, and thus form a basis for mutual interest.

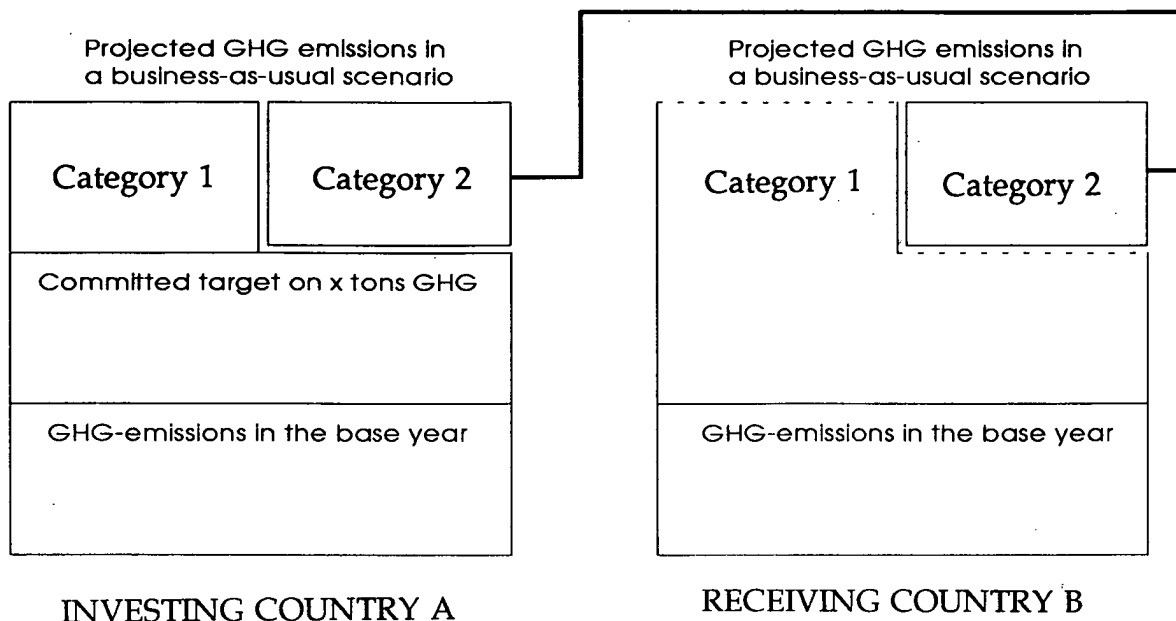
The basis for the creation of a mechanism for joint implementation may be summarized in three fundamental concepts: national commitments, global effects, and cost effectiveness.

- *National commitments* implies that the country Parties identified in Annex I of the Convention are to communicate to the Conference of the Parties their measures and policies to meet their commitments, including measures on emissions and sinks, to reduce emissions of GHGs on a national basis, or together with other Parties, in accordance with article 4.2 (a) and (b) of the Convention.
- *Global effects* means that efforts to mitigate climate change by limiting anthropogenic emissions of GHGs and protecting and enhancing GHG sinks and reservoirs will be appraised on a global basis, regardless of the geographical location of the abatement effort.
- *Cost-effectiveness* means that the country Parties may choose which particular sources and sinks of GHGs they find most appropriate for their own response policies. It also implies that they may choose to implement their commitments nationally or in another country, in agreement with this other country Party.

The least ambitious system for joint implementation is an agreement between two countries. The investing country would, through an agreed sharing of costs and benefits, finance a project giving a reduction of GHGs and/or increase of carbon sinks in the receiving country. The climate effect of the project should, in order to be credited under the FCCC, be open to verification, and possible non-approval by the a commission or an institution designated by the Conference of the Parties. As other environmental and/or developmental effects often will be a part of the projects, these will also form a basis for negotiations between the two Parties. The Parties might, according to their bilateral agreement, share credits received through the project related to their present and/or future commitments. In this simplest case, there is a need for legitimization of the mechanism, but not for any direct financial involvement by other Parties or institutions.

Such a mechanism might ease the economic burden of country Parties which have committed themselves to reduce emissions of GHGs. It would maintain the same global climate effect and normally give additional benefits for the receiving country: This simple model is shown in figure 1 below.

**Fig.1 A joint implementation project between an investing country and a receiving country**



The nature of measures to reduce net GHG emissions in country A and B may be divided in two broad categories for each country:

Investing country:

- Category A1: the portfolio of measures where the total sum of national benefits favor national implementation.
- Category A2: the portfolio of measures where the total sum of national benefits is negative if the measure is to be implemented nationally.

Receiving country:

- Category B1: the portfolio of measures where the total sum of national benefits favor national implementation and are eligible for national funding or development assistance financing.
- Category B2: the portfolio of measures where the total sum of national benefits does not favor national implementation and thus depends on outside resources.

Within categories A2 and B2 we find the potential for establishing joint implementation schemes.

However, agreements of this kind between countries with and without established targets, will need to define clear baselines in the developing countries from which to measure the reductions of GHG emissions, see elaboration in Chapter 5. There are several alternatives to bilateral agreements. Group of countries might decide to cooperate or one may wish to establish a multilateral institution for exchanging joint implementation projects. Such an institution might be the Global Environmental Facility (GEF) or another institution designated by the Conference of the Parties. An elaboration of such schemes is given in Chapter 6. Different alternatives might also be working side by side.



### CHAPTER 3 THE AMBITIONS OF JOINT IMPLEMENTATION

The ultimate objective of the Convention is the "... stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."<sup>7</sup>

For the observant reader, there may be some important contradictions in this carefully negotiated objective. As the Convention is trying to serve several purposes, so will also its mechanisms.

Given a set of commitments to reduce emissions, the mechanism of joint implementation will:

- establish a market for investments;
- allow for a search of cost-effective projects across national borders;
- stimulate development of efficient and clean energy technology;
- provide additional financial resources to receiving country Parties;
- encourage transfer of environment-friendly technology;
- provide local, positive environmental and developmental side-effects;
- give incentives to improve the management of carbon dioxide sinks;
- promote equity, both intergenerational and in accordance with the negotiated common but differentiated responsibilities of Parties;
- provide an instrument which may mobilize private capital; and
- support the precautionary principle.

For the developed country Parties and other country Parties to keep and/or increase their commitments to reduce GHGs, they will need a flexible and cost-effective way of meeting these commitments. Also, the developing country Parties, many of which are crucial to the state of our future climate, need to have visible and attractive incentives to participate.

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<sup>7</sup> FCCC, Article 2

## CHAPTER 4

### AGREEMENTS UNDER WHICH THE MECHANISM COULD OPERATE

One may think of two main scenarios under a global regime of joint implementation outlined above. One is the *national commitment scenario*, where the participants choose their own targets. The total, global effect on the emissions of GHGs within this scenario depends on the willingness of the Parties to accept unilateral efforts. This may be considered a "weak" regime, in the sense that every nation knows that its own contribution to global emissions will be relatively small and in some cases negligible. The rationality for participating is the belief that commitments made by one country will encourage other countries to follow, and thus they act as a "locomotive". For this system to have a significant global effect, it is important that the participants have confidence that commitments made by other Parties are followed up, and that the regime is effective enough to assure this.

A second alternative is negotiating a global target to which all participants adhere, a *common target scenario*. While the total effect on emissions may be regarded as certain, the effect of a single project aiming at reductions of emissions is uncertain. This implies uncertainty about the total costs of fulfilling the negotiated target. At present, a common target involving all the countries in the world is rather unrealistic. There are many issues to be negotiated before such a target can be agreed upon, of which the most difficult is how the responsibility for reducing the emissions of GHGs should be divided between rich and poor countries.

A common target for a group of countries, such as the EC countries or the OECD countries, may be closer at hand. In this case, the group of countries may be regarded as one of the Parties under the Convention. Thus, we are still faced with a situation similar to the national commitment scenario. Because the problem of burden sharing among the countries which constitutes the group must be solved, however, there is also similarities with the common target scenario.

The principle of allocation of burdens among the countries should be related to the present economic and environmental performance of each country. The issue is therefore closely related to the problem of the establishment of a baseline, which defines the state to which the targets are compared. In order to avoid a wide range of possible interpretations of the baseline, the principle should be based on relatively simple criteria. On the other hand, it is necessary that all the participants regard the principle as being fair, so that specific economic, environmental and social conditions by all the participating nations are taken into account.

The principle of allocation of burdens may focus either on the allocation of *reductions of emissions* or on the allocation of *emission levels*. The advantage of allocating reductions is that attention will be given to the eventual cost of restructuring the economy. Consider as an example two countries with a different economic structure and a different consumption pattern. Despite these differences, their level of welfare may be the same in a given year. But if the negotiated

principle of burden sharing implies that one of them is "forced" to approach the consumption pattern of the other, it will clearly result in a loss of welfare for this country. Thus, one may argue that to account for this loss, one should focus on the allocation of reductions.

By focusing entirely on the allocation of reductions, however, the initial situation does not matter. This is unfair to countries with a relatively low level of emissions before the agreement was negotiated. Applying this principle, they will be given no advantages from past actions of reducing emissions of GHGs. To obtain a full credit for these actions, they may argue that the burden should be allocated according to the level of emissions.

Joint implementation reduces some of the "unfairness" caused by the different points of departure in different countries, as it contributes to equalizing the marginal cost of reducing emissions among the participants. Provided that action is to be taken, no one suffers because they have reached a relatively low level of emissions. The question of burden sharing, however, involves the problem of when and for whom is action necessary.

To reach an agreement on burden sharing, both the costs of restructuring the economy and past actions must be taken into account. One may, however, argue that in the long run it seems fair to distribute the burden according to the level of emissions. It must, however, be assured that those countries which have a long way to go are given enough time to adapt to a new economic structure. Furthermore, finding a principle is only one step towards an agreement on the allocation of burdens. Equally important is finding criteria that reflect the principle adequately, i.e. what level of emissions is to be expressed in the national targets? To avoid the "punishment" of countries with an economic structure that is strongly determined by the international distribution of production, it is reasonable to connect the measure to the consumption pattern in each country. One suggestion is to measure direct and indirect emissions of GHG from national consumption by application of national input-output inventories.

## CHAPTER 5

### EVALUATION OF PROJECTS

To the investing Parties, joint implementation requires information on conceivable ways of reducing emissions in other countries, and an estimate of the benefits and costs of doing so. Ideally, the number of negotiated joint implementation agreements would depend on supply and demand for projects. If an investor finds it worthwhile to invest in a project and the receiving Party accepts after reaching agreement on the size of the investment and eventually the sharing of credits, the main interest under the FCCC would be the assessment of credits for the project, although the objective of supporting the process towards sustainable development is also laid down in the Convention. To this point, the evaluation of projects is largely a matter for the participants to carry out. However, there are arguments indicating that a designated institution ought to play a more active part when evaluating projects. The institution may be a source of information about available projects to all participants, and thus contribute to increased cost efficiency and reduced risks. In order to perform these tasks, the institution would have to provide information on costs and credits on each project.

In this section we will discuss problems related to the assessment of the benefits and costs as a background for questions of more practical character. To begin with, we will assume rather ideal conditions, i.e. *all* benefits and costs related to any effort can be assessed in monetary terms, and there is consensus on the method to be used. We proceed by discussing the problems of assessments of costs, benefits and effects of the efforts, and the importance of possible conflicts of interest between the Parties.

#### 5.1 Cost-benefit analysis

The purpose of a cost-benefit analysis is to compare all costs of an effort with all its benefits in order to find out whether or not the net benefit (total benefits minus total costs) is positive, to be able to compare and rank two or more alternatives. Ideally both costs and benefits should be interpreted as widely as possible. Economic as well as non-economic issues, such as the impact on environmental qualities, effects on the income distribution, social consequences etc. should be included. The timing and the uncertainty of the effects should also be accounted for. Obviously, it is impossible to meet all of these requests, and the estimates of costs and benefits must therefore be evaluated against the background of the assumptions underlying the analysis. As a point of departure, however, it is convenient to disregard all of these difficulties and concentrate on the principles. We start by assuming that it is possible to assess the full impact of an effort, and to express these impacts in monetary terms.

Although cost-benefit analyses can be executed for any effort aimed at reducing emissions of GHGs, we will confine ourselves to discuss investments in specific projects<sup>8</sup>. The investors' main interest is the expected effect on the emissions, how much they will be credited, and how much they have to invest. Furthermore, they are interested in comparing available projects in order to find the least costly alternative. Thus, the cost per unit reduction of emission of alternative projects is of main importance for the evaluation of projects included in the joint implementation system. This can be termed the incremental unit cost with respect to reductions of the emissions of GHG. Presumably, the investing Party will choose the project with the lowest incremental unit cost provided that their willingness to pay for credits exceeds this cost.

## 5.2 Incremental unit cost

If the only benefit from all the projects in question is the reduction of emissions of GHGs, comparisons would be concentrated on differences in the costs of the projects. Only exceptionally can the incremental unit cost be isolated to a cost component which exclusively aims at reducing emissions. Typical examples are "end of pipe" investments such as filters or other clean-up facilities installed after the establishment of a factory. In such cases, the assessment of the incremental cost is principally uncomplicated. Investments of this kind are, however, rare. In several countries, attempts have been made to establish statistical inventories on "investments in environmental capital". In most cases it turns out to be very difficult to distinguish between investments in environmental capital and investments in new technology. One is therefore often left with the alternative of making comparisons between the actual investment and the most preferred alternative, provided no environmental costs were accepted.

Normally, a comparison of alternatives will be needed to assess the incremental unit cost of projects within a regime of joint implementation. We may talk of the basic alternative as the project that is preferred initially by the receiving country, and the potential funded alternative as the project that will replace the basic project if the funding by investing countries is sufficiently high. *The basic alternative will exhibit lower costs and higher emissions of GHG than the potential funded project.* Included in the costs of the different alternatives are direct investments in real capital and operating costs. In addition, the investments in infrastructure, investments in human capital such as education, local environmental effects and social effects should be detected for *all* alternatives.

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<sup>8</sup> I.a. investments in some sort of facility, contrary to financial support in exchange of other efforts in the receiving country (fuel taxation, for instance). The assumption is made not only because it facilitates the following discussion, but also because a system of joint implementation may lose some of its potential effectiveness if credits are given for other investments than real capital.

A simple, numeric example is provided in the box. If the only difference in benefits from two projects is the emissions of GHG, the incremental unit cost is equal to the difference between the total cost per unit of emission of GHG of the most preferred alternative and the corresponding unit cost of the project which has a potential of being funded. To what extent investments in infrastructure, education etc. are included in the incremental unit cost depends on to what extent the size of these items differs from the basic alternative.

For most comparisons of basic projects and projects with a potential of being funded one will also face differences in benefits. The incremental unit cost will then include these differences as well. Generally, *the incremental unit cost is the difference in net benefits (total national benefits minus total national costs per unit of emission reductions of GHG) between a project and the basic alternative.* The net benefit is usually termed the shadow price of a project.

The incremental unit cost is therefore the difference in the shadow prices between the projects. (See box)

#### **Inclusion of infrastructure**

A big road is included in the costs of a potential funded project. The project gives a reduction of 10,000 tons of CO<sub>2</sub>. The incremental unit cost of this road is the total cost of the road, 1 mill. USD, minus the roads needed to establish the basic alternative, 100,000 USD divided by the reduction in CO<sub>2</sub>, i.e. 90 USD/ton. If the big road is also included in the basic alternative, the incremental unit cost is zero.

If the big road enables the public to shorten their time of traveling, an additional benefit of the funded project must be included. The benefits of this effect is estimated to 500,000 USD, while the public benefit of the narrow road in the basis alternative is only 10,000 USD. The incremental unit cost of the alternative is then reduced from 90 USD/ton to  $(1 - 0.1 - (0.5 - 0.01))\text{mill.} / 0.1 \text{ mill.} = 41 \text{ USD/ton.}$

### **5.3 Assessment of costs and benefits**

Up to now, we have assumed that there exist a proper method for making estimates of all costs and benefits from the projects. Clearly, many of the issues mentioned in the previous section cannot be assessed without rudimentary assumptions. Thus, the result from a cost-benefit analysis, and thereby the estimate of the incremental unit cost, can only be regarded as one source of information among others.

Environmental effects are difficult to value, but in recent years, new methods have been developed, especially methods to be used in cost benefit analysis (contingent claim valuation). In this section we will comment on different approaches for the assessment of non-economic effects of projects, after drawing attention to two crucial assumptions underlying any cost benefit analysis, the time perspective and the treatment of uncertainty. One may say that there is reasonable consensus about

how to take these issues into account, not because the current methods are perfect, but rather because there is no better alternative.

*The timing of costs and benefits.* The usual way to take account for the different timing of costs and benefits of projects is to discount them by a constant rate. There is no consensus about the choice of a proper rate, but the principle seems to be widely accepted. There are, however, some problems with this rationale. Included in costs and benefits are, ideally, the environmental effects of each project. To discount these effects by the rate of interest means, in addition, that the environment is regarded as tradeable over time. Strictly speaking, the rationale for discounting means that we may consider selling a "piece of the environment" today and be able to buy the same piece, plus some more next year. It is important to bear in mind that analyzing the interchange of environmental and economic issues from this point of view does not allow for straightforward interpretations of how future environmental and economic issues are to be weighted together.

When all future and past efforts and effects are transformed into present values we can compare costs and benefits that accrue at different points of time in order to evaluate the whole project. Then, the time profile of "credits" can also be determined as the difference in emissions between the potential funded alternative and the basis alternative in a given future year. Basically, the investor takes advantage of this credit as long as the facilities established by the investments last. If there are plans for future actions connected to the potential projects, such as aid for a renewal of the facilities, or assistance to future maintenance, one may in principle include effects of these efforts in order to calculate the credits for all future years. Some help in assessing the credits may be found in "norms" used for other purposes, for instance in the guidelines for assessment of depreciation of capital equipment in the UN Standard of National Accounts.

*Uncertainty.* A particular problem in all kinds of cost-benefit analyses is how to treat uncertainty. The problem does not lessen when environmental issues are included. Uncertainty about efforts to mitigate climate change, for instance, is often related to ambiguity: We don't know the climate effects from an increase in the emissions of GHG. Therefore, we are not able to attach a probability to a given outcome (an increase in the sea level of two meters by year 2100, for instance) which is necessary if we want to take uncertainty into account by standard methods. In addition, there is also uncertainty about the effects on emissions by measures taken to mitigate climate change.

To what extent these problems affect the analysis of the projects depend partly on how binding the commitments will be interpreted by the Conference of the Parties. Assuming that the commitments are strictly binding, uncertainty about the environmental effect of a project is a question of the uncertainty of the costs of reducing a given size of emissions. Parties that invest in projects that fail to give the anticipated reduction of GHG, will then have to finance new projects in order to obtain their committed target. Their evaluation of uncertainty will be similar to that of considering uncertain economic returns on the projects.

*Top-down and bottom-up approaches.* One way to assess costs and benefits is to apply observed market values on the items included in the analysis. For items without directly observable prices, such as environmental items, one may estimate the price, for instance, equal to the abatement cost of a change in environmental variables. When focusing on one single project, we assume that the socio-economic environment is unaffected; the project does not affect variables at the macro level. This approach is often referred to as a bottom-up approach: On the basis of detailed knowledge on the micro level ("bottom"), the social effect of the project is found by simple aggregation ("up"), thus providing a background for social evaluation of the project. The advantage of the bottom-up approach is that it is founded on relatively firm knowledge of the projects in question. For small projects rather accurate assessments of the effects may be provided.

On the other hand, if the projects under evaluation are significant in terms of national economic figures in the receiving country Party, one should include the simultaneous economic effects on the whole economy. In such cases, a top down approach is needed. The choice of alternatives may be decisive for the utilization of the resources of the economy, and thereby affect relative prices as well. In a long term perspective, the objective of the FCCC is to obtain a significant global reduction in the emissions of GHG, and the main obstacle for reaching this goal is the macroeconomic effects. An indication of the macroeconomic effects of a policy under joint implementation is also of great interest to the Parties for basic reasons: Will such a system give the developed countries an opportunity to "buy" themselves out of their own commitments? If joint implementation results in an increased rate of growth for developed countries, while the economic effects to the developing countries are more dubious, one may expect skepticism to the system in the latter countries.

For the evaluation of projects, therefore, both bottom-up and top-down approaches to cost-benefit analysis should be applied, and as far as possible be integrated.

#### **5.4 Different interests of participating countries**

The incremental unit cost expresses the minimum amount of funding per unit of emission of GHG required for the receiving country to choose a project with less emissions than their basic alternative. The size of the incremental cost depends on the preferences to the Parties involved. However, the investor counts the reductions in the emissions of GHG as the benefit from alternative projects only, while the receiver will have many other items on its list of benefits, such as the economics of the projects, impact on social variables and local environmental effects. Thus, the same country may prefer different projects if it is in the position of a investing Party than when it is in the position of a receiving Party. A typical example is a project which reduces the emissions of GHG, by reducing the input of energy. Energy savings will affect combustion of local pollution components such as SO<sub>2</sub> and NO<sub>x</sub> as well. The benefit of this project is therefore higher if the country is a receiving Party than if it is as investing Party, for which only the effect on the emissions of GHG counts. Consequently, investing Parties may prefer "expensive" projects at home before they consider financing projects abroad.



The aim of a regime of joint implementation is to make the receiving country alter their initial decision; therefore, what counts for the assessment of the incremental cost of a project are the preferences in the receiving country. Ideally, one should ask the receiving country for a list of priority of alternative projects and an indication of the funding they would require in order to choose a particular alternative to all the others.

An investing country might, however, suspect a receiving country to exaggerate the need for funding, and thus undermine the potential of cost effectiveness in the regime of joint implementation. If the receiving Party considers the extra cost of reducing the emissions of GHG as an expense likely to be funded by a developing country Party, it will have no incentive to claim self interest in reducing these emissions. Since emissions of GHG often are closely related to emissions with local nuisances, the receiving Party may neglect their own preferences in order to enhance the potential of external funding.

One may refer to this problem as the difficulty of assessing a baseline for the receiving Party. In cases where the potential funded project consists of enhancing the performance of an existing facility, this problem may be of limited importance. Then the "baseline" or reference project is the existing plant. In cases where there is a question of investing in new projects, the problem may be substantial. What is needed is documentation from the receiving Party that the reference project will be carried through if none of the alternatives are funded. In these cases, the institutional facilities connected to the regime of joint implementation, such as the financial mechanism, will have to play an important and difficult part in considering the reliability of the baseline claimed by the receiving Party.

Since joint implementation implies that another project is preferred to the "first best" project for the receiving country, a realization of a funded project will imply intervention into its basic preferences. This intervention means that the effect of a reduced level of emissions of GHG is exaggerated according to the preferences of the receiving country. If the funding of projects is regarded by some groups as a general subsidy, it may seem that other positive effects of the alternatives (the ones not being funded) are subverted. Assume that, for instance, the initial priority over alternative projects is altered in favor of a project with lower human input, and thereby causes a loss of jobs. One consequence may be enhanced unemployment, and/or increasing poverty. This may generate skepticism to the regime, and thereby be a disincentive for the receiving countries to participate.

Cost-benefit analysis constitutes an important instrument for choosing among available joint implementation projects. It is, however, the supply of projects and the willingness to pay for them that determines the final success of the system of joint implementation. The problems touched upon in this section should therefore not be exaggerated. Obtaining good information on costs and benefits may, however, contribute to cost effectiveness. With present available methods, one may argue that estimates of the incremental cost should be evaluated with care, and efforts should be taken to accelerate the development of methods in order to properly include attention to the environment in approaches to economic analysis.

## CHAPTER 6

### JOINT IMPLEMENTATION AND INSTITUTIONAL REQUIREMENTS

#### 6.1 Bilateral and multilateral systems

Under joint implementation cost savings are available through collaboration between nations as long as more GHG emissions can be abated in countries with low costs than in countries with higher costs. Theoretically, the more nations that collaborate the more the cost saving potential could be exploited. The total costs of achieving a GHG emissions abatement target would be minimized if all nations of the world could participate in a joint implementation system where the cheapest abatement projects were realized independent of national borders. Other types of cost-effective systems could be based on GHG emission taxes or tradeable emission allowances with global coverage. At present such systems of global coverage are clearly less realistic.

The FCCC have established both a subsidiary body for implementation<sup>9</sup> and a financial mechanism<sup>10</sup>, where the GEF is entrusted to act in on an interim basis. Both these institutions will have to be involved in an institutionalization of joint implementation schemes under the Convention.

Different options for a system of joint implementation are possible given the present FCCC. A joint implementation project involves at least one receiving and one investing nation. The least ambitious option is a *simple bilateral system* where the two nations agree on an investment project and jointly report to the other Parties of the FCCC. Other options for a joint implementation system require some type of *designated international institution*. In a bilateral system the main task of the institution is *verification* of GHG emissions reduction and credit qualifications. Another option is a multilateral system where the institution is a *market maker*, establishing some type of exchange market for potential joint implementation projects between investing and receiving nations. A more ambitious option is for the institution to set up an international *credits bank*, where nations can invest money in abatement projects in return for credits, and where the bank is responsible for the investment projects in the receiving countries. Finally, under a negotiated international target for GHG emissions abatement, to which all (or a group) of Parties adhere, an international *project management institution* is required. These main options for a joint implementation system are useful even if there may be many variants.

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<sup>9</sup> FCCC, Article 10

<sup>10</sup> FCCC, Article 11

## 6.2 A simple bilateral system

In this case an investing and receiving nation agree on an investment project. Furthermore, they agree on how the project costs and GHG emissions abatement credits should be shared. The project is then jointly reported to the other Parties of the FCCC. In this type of system there is a control and verification problem since both nations have an interest to overstate the GHG emissions abatement effect to earn extra credits. Thus some type of verification mechanism is required. One alternative is to establish an international control commission who's task is to pick out, on a random basis, some joint implementation projects and verify the information given. The commission could have members appointed by the Parties to the FCCC. Through a membership rotation arrangement among the Parties all of them could be represented for some period of time. The secretariat of the international control commission could be placed under the main secretariat of the FCCC.

## 6.3 A designated institution as a verification institution for joint implementation projects

In all systems for joint implementation, including both *bilateral* and *multilateral* systems, a main task of the institution is to scrutinize the projects to verify the information given by the cooperating countries, especially with respect to the effect on emissions of GHGs. Determination of the abatement effect is a prerequisite for deciding on the total credits due from the project in terms of approved GHG emissions reduction. The designated institution can be compared to a multilateral *Clearing-House* mechanism, which was proposed by the Norwegian delegation to the INC (Intergovernmental Negotiating Committee) for the FCCC.

The effect on GHG emissions could be expressed in terms of reduction for each single GHG and the total effect of all GHGs in terms of reduction in carbon dioxide equivalents calculated from their global warming potential. The effect is calculated as a reduction in emissions compared to some baseline (see chapter 5). The relevant cost is the *incremental cost* of investing in a project implying GHG emissions abatement as compared to investing in the best alternative project preferred by the receiving nation if no joint implementation funding was available.

## 6.4 The designated institution as a market place for joint implementation projects

In a multilateral joint implementation system the institution can be a *market maker* for investment projects. A nation can then present investment projects it would like other nations to contribute to with the aim to reduce greenhouse gas emissions. It would then be awarded credits under the provisions laid down by the FCCC. The institution should collect information on relevant projects and establish a register for these. The register should specify the type of project, its origin, costs, and abatement effect on GHG emissions. Also, in this case the institution must verify the project information given, either for all projects or for some of the projects chosen on a random basis. The investing nations can then check the project register and contact the relevant receiving nations. Furthermore, the institution could act

as a project broker for receiving countries that need assistance to identify possible projects<sup>11</sup>.

If more than one nation is interested in the same project the institution could provide for a mechanism to choose one of the nations. One idea is to have an *auction* for a project where the potential investing nations can make bids for the project in terms of the amount they are willing to invest. The nation with the highest willingness to pay should be awarded the project, which should increase the efficiency of the system in terms of cost savings compared to the bilateral system. If the investment project is large it may be possible to allow several potential investing nations to cooperate and make a joint bid.

#### **6.5 The designated institution as a credits bank for joint implementation projects**

A more ambitious version of a multilateral system is to establish an international bank for investments in joint implementation projects. Investing nations could make deposits in the bank and receive credits for GHG emissions abatement. The bank evaluates investment projects presented by potential receiving nations, and decides on which projects to participate. Based on the portfolio of investment projects available and their features, with respect to costs and GHG emissions abatement, the bank can calculate the average "interest" on the deposits, namely the amount of credits due for each amount invested. By taking the average over many projects the risk in terms of uncertain emission abatement effect and credits given, is shared among the investing nations.

#### **6.6 Determination of credits, uncertainty and control**

The net GHG emissions abatement effect from a project depends on baseline emissions. There are many problems involved in determining the baseline, see the discussion in chapter 4 and 5. An investment project could save GHG emissions for a number of years, which leads to the question of how the credits should be calculated over the lifetime of the project. In principle, the total credits could be calculated as the sum of annual GHG emissions savings compared to the baseline over the lifetime of the project (or eventually based on some kind of present value). Or they could be calculated as annual credits over the lifetime of the project. An additional question is how the credits to the cooperating nations should be distributed over time. One alternative is to give annual credits according to annual savings over the lifetime of the project. A more flexible alternative is to let the cooperating nations distribute the total credits over the lifetime of the project. This alternative would make the control of emissions abatement effect more difficult since the cooperating nations could employ most of the credits during the first years of the lifetime period, however. An exact control of the abatement effect could then only be carried out after the end of the project lifetime period.

Since there is some uncertainty related to a projects effect on future emissions, the

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<sup>11</sup> FCCC, Article 4.

institution may need to examine the estimated effect after realization of the project. As a part of this verification process the institution could obtain reports from the receiving country describing the project progress and observed GHG emissions. If the GHG emissions reduction effect is less than anticipated, the credits should be reduced accordingly. In case the investing nation has to face this uncertainty alone it would be less willing to invest in joint implementation projects. This effect would be less pronounced if the receiving and investing nations could share the risk. A mechanism for risk sharing could be included in a contract between the investing nation and the receiving nation, supervised by the institution, stating a relation between reduced credits and the amount to be paid by the investing nation. Thus reduced credits could mean reduced payments to the receiving nation. Furthermore, such risk sharing would give the receiving nation a stronger incentive to contribute to an efficient and successful project. Under this type of joint implementation system, given no renegotiation of targets for GHG emissions reduction, the uncertainty with respect to a project's effect on future GHG emissions is transformed to a cost uncertainty.

### **6.7 Distribution of credits between investing and receiving nations**

Regardless of the total size of credits the distribution between the investing nation and the receiving nation must be settled. In a bilateral system this question could be left for negotiation between the two nations. An alternative is for the distribution of costs and credits to be based on a set of rules agreed to by the Parties to FCCC, and supervised by the institution. In a multilateral system there ought to be a set of rules. The simplest 'rule of thumb' is to make the investing nation's credits equal to the total GHG emissions abatement as compared to the baseline. Other sharing rules where the receiving nation are given some share of the credits are possible, and there could be some room for negotiation between the two nations. An alternative is to give the receiving nation some other type of compensation in addition to the payment of the incremental cost, for instance additional transfer of technology, see chapter 3.

### **6.8 A designated project management institution under a joint international target**

A designated project management institution is required to operate joint implementation projects under a joint international target for GHG emissions abatement. A joint international target may be negotiated by all Parties or a group of Parties. In the case that all Parties participate the project management institution is an alternative to the designated institutions discussed above. Some of the tasks of the management institution are common with the tasks of these institutions. In the case that only a group of the Parties participate the management institution is not established under the FCCC, and has no general status. To the other Parties and any designated institution the group of Parties (and their project management institution) could be considered as one Party.

In both cases the institution need to collect information on possible projects based on reports from potential receiving countries, and this information must be verified. Furthermore, the institution may assist in identifying possible projects.

Since all the projects are carried out and managed by the management institution however, the institution need not establish an exchange market for projects. The main task of the management institution is to find and choose the cheapest joint implementation projects regardless of national borders, and implement a sufficient number of projects to satisfy the joint GHG emissions abatement target. Consequently the major question to settle for the Parties is not the distribution of credits, but the distribution of the costs of implementing these investment projects. The principles for cost sharing must be negotiated among the Parties.

### 6.9 Incentives and disincentives

There are positive incentives and disincentives (negative incentives) related to each of the five systems for joint implementation discussed in this chapter. The positive incentives induce nations to participate in joint implementation projects, whereas the disincentives may discourage nations from participating and reduce the efficiency of the joint implementation mechanism. Table 1 presents the main incentives and disincentives for investing and receiving nations.

**Table 1 Incentives and disincentives for investing and receiving nations**

Nation type	Incentives	Disincentives
Investing nation	1) Cost savings. 2) Encourage commitments from other nations.	6) Reduced economic growth. 7) Credits uncertainty.
Receiving nation	3) Transfer of technology and know-how. 4) Foreign currency. 5) Possibility for additional funding.	8) Project info. distortions. 9) Distortion of own preferences. 10) Skepticism to global equity effect.

For the investing nation the main incentive to participate in joint implementation projects is the cost saving potential. Furthermore the nation may hope that by committing itself to invest in emissions abatement projects, other nations will be encouraged to make their own commitments. Thus the global warming could be further reduced and the expenses of doing so be more evenly shared among nations.

On the other hand, the investing nation could fear a possible reduction in economic growth since, at least in the short term, these investments could give a higher yield in other sectors. Finally, the investing nation could dislike the risk taken with respect to credits given for a project, especially if the risk is not shared with other nations, like in the bilateral verification system and the multilateral market maker system.

Many of the receiving countries are likely to be developing countries or countries undergoing the process of transition to a market economy, and they are likely to have older polluting technologies. Thus they could gain from the transfer of better technology and know-how related to this. Furthermore, the countries would receive foreign currency, which may be of extra value to them. If the investing nation or the credits bank pay more than the incremental cost of a project there will be additional funding available for the receiving country.

One disincentive is related to the interests of the receiving nation in reporting too high costs and too low national benefits of a project in order to try to increase the external funding. In a multilateral joint implementation system this disincentive is partially offset by a market for investment projects. If one nation tries to report too high costs it risks the investing nation choosing a cheaper project in another nation. Accepting a joint implementation project implies that another project than the one preferred from the nation's own preferences is chosen. The receiving nation may then be worse off than choosing its own project. The effects of the projects in terms of the number and types of jobs, etc., could be very different for the two projects. This possible disincentive could be lessened by giving the receiving nation extra compensation, for instance by paying more than the incremental cost or through additional technological transfer. Another disincentive to participate may exist if the receiving nation is concerned that joint implementation projects may increase global income distribution differences, making developing countries worse off.

In a long-term perspective a mechanism for joint implementation should give investing countries incentives to develop new technologies and export more efficient technologies to other countries (i.e. giving rise to less emissions).

#### **6.10 National governments and mobilization of private enterprises**

The national government is responsible for the national climate policy and GHG emissions abatement projects in a joint implementation system under the FCCC. The government may itself engage in joint implementation projects in other countries to achieve a GHG emissions abatement target. Joint implementation projects are only one part of a national environmental and climate policy. At the national level there could be a system of environmental taxes, tradeable emission allowances, or direct emission regulation. Under this type of environmental constraint private enterprises should have incentives to reduce their GHG emissions to save taxes or emission allowances (that can be sold). The enterprises may make domestic investments to reduce emissions, or they could invest in joint implementation projects if this is the cheapest option to reduce emissions. What is needed is the possibility to get emission credits from off-setting investments abroad through some international institution. The credits are given to the national government, which adjusts the net emissions of the private enterprise accordingly to save taxes or emission allowances. Thus the national government must provide the credits link between the private enterprise and the international institution.

Another option is for the national government to tie concessions, e.g. for extraction of natural resources, to participation in joint implementation projects. An example

could be to specify, in the concession contract for exploration and production from an oil or gas field, some amount of money to be invested in joint implementation projects abroad which are chosen by the government.

### **6.11 Comparing the institutional requirements of bilateral and multilateral systems**

The requirements of the different systems for joint implementation vary with regard to the amount of information needed and the complexity of the tasks of the designated institution. The least demanding alternative is the simple bilateral system, where the only requirement is the establishment of a control commission who's task is to verify the GHG emissions abatement effect for (some of) the joint implementation projects. A somewhat more demanding alternative is the bilateral verification system, where a designated institution is required to verify the project information supplied by the potential receiving nation. In the market maker system the institution's additional tasks are to prepare a register of available projects and establish and operate a market mechanism, for instance as an auction for each available project. A more demanding option is the credits bank system, where the institution also has to accept deposits, distribute credits, and manage joint implementation projects. Finally, under a joint international target for GHG emissions abatement a project management institution must collect information on possible investment projects, select projects, and implement them. The main question of cost sharing should be left to the participating Parties.

## **CHAPTER 7 RECOMMENDED PRACTICAL GUIDELINES**

From the discussion above we would like to forward the following recommendations for practical guidelines for OECD governments to follow when they consider to apply the concept of joint implementation:

1. Establish a GHG inventory as part of a national study on climate change.
2. Determine necessary reductions in estimated GHG emissions to achieve the national target.
3. Find the unit cost (cost per unit of GHG emissions reduction) of different measures and projects to reduce GHG emissions, net of all national benefits, as part of a national study on climate change. For this purpose different cost-benefits analyses should be carried out. The analyses must be based on the lifetime of each project and a relevant discounting.



4. Specifically consider national environmental policy measures giving private enterprises incentives to reduce their GHG emissions. Private enterprises will consider low-cost projects in other countries to reduce GHG emissions if the national government transfers the emissions abatement credits to the enterprises.
5. Collect information on potential GHG emissions abatement projects in other countries, if possible through a designated international institution (i.a. Global Environmental Facility (GEF)), with respect to unit cost based on required additional funding (i.e. incremental cost).
6. Select the necessary number of projects with lowest incremental unit cost, either domestically or abroad. For projects abroad, contact the relevant nations with the aim to carry out joint implementation projects.
7. Make agreements/contracts with the joint implementation partners on funding (i.e. incremental cost) or other types of compensation, eventually on cost risk sharing (if risk sharing is not available through an international institution), and GHG emissions abatement credit sharing, preferably based on standard contracts.
8. Report the projects, specifically GHG emissions reduction and baseline assumptions, to the Conference of the Parties, or possibly to a designated international institution, with the aim to have the credit qualifications acknowledged.
9. If a "market maker" institution should be operational, each Party can make use of the institution to exchange joint implementation projects.
10. If a "credits bank" institution should be operational, each Party can make deposits in the bank to obtain the necessary amount of credits.

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