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**What might be minimum requirements for making the mechanism of joint implementation under the Climate Convention credible and operational?**

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**What Might be Minimum Requirements for  
Making the Mechanism of Joint  
Implementation under the Climate  
Convention Credible and Operational <sup>1</sup>**

by

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## **1. INTRODUCTION**

Joint implementation (JI) is a mechanism under the UN Framework Convention on Climate Change (FCCC). The criteria of the mechanism are yet to be decided upon, but discussions in the International Negotiating Committee (INC) and in other fora have shown large differences of opinions on how to make this mechanism operational.

Many complicated issues related to the JI mechanism are under consideration. Many of these issues will probably be difficult to regulate into a strict set of rules and criteria. From our experience with demonstration projects in Poland and Mexico and the number of papers, seminars and meetings on this theme, we believe that it is necessary to establish a few important criteria and leave other elements to the discretion of the countries, Parties to the FCCC, who on a voluntary basis choose to perform JI projects.

Such an approach would give the Conference of the Parties to the Convention (CoP) an opportunity to learn from experience with the mechanism and to adjust criteria as they see fit at a later stage.

This paper should be regarded as a basis for a discussion, which may be a step in the search of a minimum set of criteria to be decided upon by the CoP at their first meeting in March 1995.

## **2. BACKGROUND**

The concentration in the atmosphere of the two most important greenhouse gases (GHGs), carbon dioxide and methane, are increasing. The climate effect of long lived GHGs is the same, regardless of the geographical location of the emissions. 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.

The FCCC has explicitly stated that policies and measures to deal with climate change should be cost-effective to ensure global benefits at the lowest possible cost. The Convention has, inter alia, identified the mechanism of joint implementation as one way to meet this criterium.

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." It is our interpretation that the FCCC has no restrictions for any Parties to the Convention to participate in Joint Implementation arrangements.

The idea of joint implementation is to separate national commitments to reduce GHG emissions from national 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.

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 host country. The climate effect of the project should, in order to be credited under the FCCC, be open to verification by 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.

Such a mechanism might increase the willingness of industrialized countries to increase their commitments to reduce emissions of GHGs. One interesting option presented by Metz (1993) is to establish two accounting systems, one for domestic and one for international emission reductions, which may evolve into a *dual commitment* approach. JI projects would maintain the same global climate effect and normally give additional benefits for the host country.

### **3. ISSUES THAT NEED TO BE DECIDED UPON BY THE COP OF THE FCCC**

The scope of this discussion paper is limited to presenting some important issues that we consider relevant as part of a minimum set of criteria for the JI mechanism, which must be decided upon by the CoP of the FCCC. Consequently we do not claim that the issues we present comprise a complete listing of relevant and/or important issues under a minimum requirement JI scheme. For some of the issues we propose recommendations, whereas further analysis and discussions are needed for other issues. The following issues are discussed:

- What GHGs should be included, and how should the reporting format be?
- What JI project categories are applicable?
- Baseline definition
- Emission leakages
- Time horizon for JI projects
- Distribution of net benefits between investor and host
- "No regrets" options
- Additionality

- Allocation of risk
- Reporting and verification

#### **4. WHICH GHGS SHOULD BE COVERED BY THE MECHANISM**

The FCCC states in Article 3.3 that policies and measures to deal with climate change should cover all relevant sources, sinks and reservoirs. Thus all GHGs except those covered by the Montreal Protocol should be covered under the JI mechanism.

The International Negotiating Committee (INC) has discussed the issue of how to calculate the contribution of different gases to climate change, taking into consideration the concept of GWP. It is agreed that all GHG emissions and removals by sinks should be included in national inventories, with due indication of the range of uncertainty within which results should be assessed. This issue will be further considered by the Committee at its 9. session in February 1994.

Important factors are, however, how well the impact of these gases are scientifically understood and quantified, and how easy the emissions are to identify, estimate and monitor. On this basis, we will suggest the following GHGs to be included:

- carbon dioxide (CO<sub>2</sub>)
- methane (CH<sub>4</sub>)
- nitrous oxide (N<sub>2</sub>O)
- tetrafluoromethane (CF<sub>4</sub>)
- hexafluoroethane (C<sub>2</sub>F<sub>6</sub>)
- sulphur hexafluoride (SF<sub>6</sub>)
- hydrofluorocarbons (HFC).

For methane the indirect effects on climate through chemical interactions in the atmosphere can be of the same magnitude as the direct effect on climate, see Houghton et al. (1992). Thus we would suggest that both the direct and indirect effects on climate should be counted.

Research is ongoing regarding the indirect effects of the short lived gases nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO) and non-methane hydrocarbons (NMHC). The uncertainty is, however, still too large to suggest that these gases should be included. They should be considered as our knowledge increases.

The emission reductions resulting from a JI activity should be given both individually for each GHG in mass units according to the reporting format given by the OECD/IPCC, as well as expressed in common units according to their Global Warming Potential (GWP), see Houghton et al. (1992). Although being a rough index, it will allow the major emissions to be recognized and valued. Updated values given by the IPCC should be used by all Parties.

## 5. JOINT IMPLEMENTATION PROJECT CATEGORIES

The most important scheme for reducing GHGs emissions is to reduce combustion of fossil fuels associated with production and consumption of goods and services. The principal ways of reducing fossil fuel combustion are: i) fuel switching, ii) energy efficiency improvements, iii) changing the economic structure, and iv) output reduction. Category iii) refers to changes in the production (and consumption) structure from more GHGs intensive to less GHGs intensive activities, whereas category iv) refers to the relation between the level of production in an economy and the release of GHGs. In relation to JI projects, which are likely to have a limited scope, category iii) and iv) are less relevant. Another category is v) sink enhancement, where net anthropogenic release of carbon dioxide is reduced through carbon fixation in biomass. Thus the interesting JI project categories can be listed as in Table 1.

**TABLE 1 JOINT IMPLEMENTATION CATEGORIES**

JI Project categories	Sub-categories	Examples	Estimation method
i) Fuel switching	Develop renewables. DSM <sup>1)</sup> . Energy supply sector.	Substitute gas for coal in a thermal power plant	Employ saved fossil fuels and emission coefficients
ii) Energy efficiency improvements	DSM. Energy supply sector.	Replace traditional light bulbs with high-efficiency CFLs <sup>2)</sup>	Employ saved fossil fuels and emission coefficients
v) Carbon sinks enhancement	Reforestation. Changes in management practices.	Reforestate degraded grasslands	Calculate carbon fixation in biomass

<sup>1)</sup> Demand Side Management.

<sup>2)</sup> Compact Fluorescent Lamps, see Selrod and Skjelvik (1993).

For categories i) and ii) the emission abatement effect can be estimated from the reduced combustion of fossil fuels. Employing the relevant emission coefficients for each fuel type and greenhouse gas (e.g. coal, oil and gas) the total reduction in emissions can be estimated.

For category v) the increase in the relevant type of biomass, which depends on tree species and local ecological conditions, must be calculated. Total carbon fixation can then be found from the carbon content of the specific biomass type.

There may be some problems involved in calculating emission abatement from all project categories, but the view has been raised that there are potentially larger control and verification problems related to the baseline definition of JI projects in category v). Furthermore, there could be particular problems involved in assessing the alternative value of e.g. forest areas if the long-term use of the areas are restrained by JI sink enhancement projects keeping the forest intact. Still, JI projects to develop sinks should be considered since sink enhancement is specifically mentioned in the FCCC, since such project may be more cost-effective than other projects, and since the potential for sink enhancement seems to be large, and particularly in major developing countries that are important to include in global abatement efforts.

## **6. CALCULATION OF EMISSION ABATEMENT**

The emission abatement effect of JI projects can be evaluated at a local project-by-project level, a sectoral level, a national level, or at a global level. The higher the aggregation level the more comprehensive and complicated the calculation will be. On the other hand the risk of overestimating the abatement effect is greater at the less aggregated levels due to "leakages", where activities are shifted so that aggregated emission reduction is smaller than apparent reduction from the JI project. Large JI projects are more likely to induce price changes and influence other sectors than smaller projects. For these reasons the emission abatement effect should be evaluated at the highest feasible aggregated level, which can be the national level if the necessary data and tools (such as macroeconomic models) exist. In many cases, however, the only practical option is to calculate the abatement effect on a project-by-project basis, or possibly at the sectoral level.

### **6.1 Emission reference level (baseline)**

The emission abatement effect of JI projects must be compared to some reference level or *baseline*. Since there may be particular problems related to defining a baseline, one should decide on what principles to apply for choosing among possible definitions. The following definitions of baseline are possible (see for instance EPA and DOE (1993)): i) historical reference line (constant emission level based on earlier observations), ii) projected reference line (rising reference line based on extrapolation of emissions or modeling), iii) projected unit production reference line (rising reference line adjusted for production growth in the period), and iv) project-by-project reference line (calculate emissions reductions on a project-by-project basis and add the reductions to current emissions to generate the reference line). A mix of these alternatives is conceivable. Advantages and disadvantages related to the definitions are given in Table 2.

**TABLE 2 POSSIBLE BASELINE DEFINITIONS**

Definition of reference line (baseline)	Advantages	Disadvantages
i) Historical	Relatively simple to establish	Countries with growing emissions less likely to follow suit
ii) Projected	Incentives also for countries with growing emissions	Credibility problems (plausibility of reference case)
iii) Projected unit production	Incentives also for countries with growing emissions. Better performance indicator than projected baseline.	Credibility problems (plausibility of reference case). Depends on production definition; problems with quality changes.
iv) Project-by-project	Calculation of interaction with other projects and sectors not required	Credibility problems (plausibility of reference case). Potential leakage problems.

For countries with an underlying increase in emissions over time the growth rate of emissions can be positive even if several measures to reduce emissions are realized, including JI projects. In this situation the emission in some future year could be higher than today, but lower than the case without any JI projects in the same future year. Such a situation of a relative decrease in emissions but an absolute growth in emissions compared to today can be realistic for developing countries, where an allowance for future growth of emissions is given.

According to the FCCC JI projects can take place between any of the Parties, but an issue has been raised whether such projects should be undertaken in countries with no national emission target (i.e. developing countries). The main argument for a restrictive view is that there is no guarantee that JI projects undertaken in countries without emission targets will reduce global emissions. An argument for considering JI projects in all countries is that the emission abatement effect can be calculated on a project-by-project basis, where for instance a gas-fired thermal power plant is substituted for a coal-fired plant, thus making a realistic calculation of emissions reduction possible.



## **6.2 Potential leakages**

Leakages can be divided into two main categories (see e.g. EPA and DOE (1993)): i) activity shifting (including outsourcing and life-cycle emissions shifting), and ii) market leakage. An example of category i) leakage is to replace steel with aluminum in some production process, and not counting the emissions related to aluminum production. An example of category ii) leakage is a lower coal price due to reduced demand in enterprises/sectors where JI projects take place, which leads to higher demand for coal and higher emissions in other sectors. Thus induced price changes and market reactions may partially offset the initial emission reduction. The possibility for such leakages is an argument for making emission abatement calculations at the highest aggregated level possible, either sectoral level or national level. One option at a less aggregated level is to use a comprehensive life-cycle analysis of products to include impacts of emission reducing activities through the production process.

## **6.3 Time horizon of JI projects**

To make JI project cost and benefit calculations, and as a basis for calculating credits over time, the time horizon for JI projects must be determined. A rule of thumb can be to apply the normal life expectancy of the relevant capital or investment object (e.g. a new power plant). However, a shorter time horizon than this might be applicable to account for long-term technological progress, which will reduce the relative abatement effect compared to the baseline. Furthermore, one should avoid that host countries are bound for an unreasonable long period by JI contracts. One option is for the host countries to "lease credits" to the investing country for some specific time period, see Metz (1993). Instead of establishing general rules for JI project time horizons this issue could be left to negotiations between the country Parties.

## **7. COST AND EQUITY ISSUES**

Of the many issues pertaining to cost definitions and distribution of costs and benefits related to JI projects between investing and host countries, we will consider the four important issues of: i) distribution of net benefit between investing and host countries, ii) "no regrets" options, iii) additionality in terms of financial obligations and level of national abatement efforts, and iv) allocation of risk between investing and host countries.

### **7.1 Distribution of net benefit between investing and host countries**

A country investing in a JI project in a host country must cover the *incremental cost*, which can be defined as the difference in net benefits (total national benefits minus total national costs) between the JI project and the basic alternative for the host country. Aside from the global benefits, i.e. slowing global warming, the host country will be equally well off accepting the JI project as rejecting it if the incremental cost are exactly covered. There will, however, often be local and national environmental benefits and various spin-offs in terms of technology transfer, etc.,

that are difficult to evaluate and calculate, and thus not added to national benefits in the calculations. Consequently such benefits can make the host country better off accepting the JI project, even if compensation is based on incremental cost. The investing country will be better off realizing the JI project due to the cost savings if the project is allowed to contribute to meet the national emission abatement targets. Another possibility for strengthening the incentives for investing countries is, as mentioned in section 2, the option of creating a dual commitment system. To give host countries strong enough incentives to participate, and since there is a surplus in terms of reduced costs to share, one might consider including some funding to host countries in addition to covering the incremental cost, or sharing the credits between the investing and host countries.

### **7.2 "No regrets" options**

"No regrets" investment options are profitable under normal market conditions, that is without including any global benefits from reduced global warming. The problems of "no regrets" options as potential JI projects are that they will be undertaken anyway, and that accepting such projects will give countries incentives to establish or overstate existing barriers to introducing globally beneficial technologies to attract additional international funding. One argument for accepting "no regrets" JI projects is that they may induce earlier emissions abatement than otherwise possible. What might look like a "no regrets" option might not be profitable due to institutional and other barriers to such investments, that is additional costs which are commonly not included in cost calculations, confer e.g. the ILUMEX project in Mexico reported in Selrod and Skjelvik (1993).

### **7.3 Additionality in terms of financial obligations and level of national abatement efforts**

JI investments should be additional to the financial obligations of Annex 2 countries (developed countries) under the FCCC, and should not replace development assistance through other channels.

To make certain that there is a balance between abatement actions taken within developed countries and elsewhere, the view has been expressed that JI reductions should not be allowed to count against the FCCC obligations of Annex 2 countries (developed countries and countries that are undergoing transition to market economy) to reduce emissions to 1990 levels by year 2000. Such a view can be motivated by equity considerations and the potential danger of slowing down technological innovation in developed countries if national abatement efforts are too small, see Metz (1993). These considerations can also be supported by a *partial crediting* rule, where some restriction is put on the share of JI reductions of total reductions for an investing country, or where the JI credits are shared between the investing and host country. On the other hand, such restrictions will make the abatement cost even higher for high-cost countries, and could lower their ambitions in terms of national abatement target.

#### **7.4 Allocation of risk between investor and host**

For all JI projects there is a risk that the anticipated emission abatement effect is overestimated. If such a project after implementation is evaluated as part of a verification mechanism, emission credits will be reduced accordingly. This can be interpreted as a risk associated with credits or with the incremental unit cost. The question is how this risk should be allocated between the parties. The investing countries' interest in JI projects will be reduced if they have to carry all the risk. One can argue that the host country should share some of the risk (and the credits) to give incentives for implementing the JI project efficiently.

### **8. REPORTING AND VERIFICATION**

All Parties are required to prepare national inventories for sources and sinks of emissions, and to formulate and implement programs containing measures to mitigate climate change.

The developed country Parties (Annex 1 countries) and the developing country Parties have different obligations regarding both the format and the time for communication of their obligations. While the first group of countries should report within 6 months after the entry into force of the Convention, the latter part should report within 3 years. A decision on guidelines for the preparation of communications for Annex 1 countries is expected to be taken at the next INC meeting in February 1994. JI activities should be included in this format, separate from the domestic measures.

Any group of Parties may also, subject to guidelines adopted by the CoP, make a joint communication in fulfillment of their obligations.

For the JI mechanism it is vital to create credibility for how the projects are implemented, and how the effects are calculated and reported upon. Those Parties agreeing to initiate a JI project should therefore, at an early stage jointly inform on their agreement to the CoP. This communication should be open and publicly available.

As projects most often will perform better or worse than expected, a later report should be given on the basis of a completed project where actual emission reductions are established. Actual crediting should only be awarded to "after-the-fact" emission reductions. The reporting should contain a description of the baseline and demonstrate that net emissions are met and maintained over the project period and that emission leakages do not occur. An important requirement to the submission of information is that of *transparency*, meaning that a third party should be able to reconstruct and verify the information given. The information given should in principle be based on mutual trust, but must also be open to verification by a third Party or a separate body designated by the CoP.

JI projects should be required to undergo environmental assessments and evaluations of how the schemes fit in with national development priorities. This information should also be included in the report.

The CoP should designate a special body to establish verification procedures and to review various types of reported joint implementation activities. Verification could, in order not to strain resources, be performed on a random basis or if specifically requested by another Party to the Convention. If reporting is based on minimum requirements and carried out according to well established methodologies, rules and procedures, verification and review processes should not be overly complicated and expensive.

## 9. SUMMARY

Our proposed response to each of the issues discussed in this paper are given in the following. As shown by the list the amount of further analysis and discussion needed varies. One should also keep in mind that the list is not intended to be a complete listing of issues relevant for a Joint Implementation minimum requirements scheme.

**Issue:** What GHGs should be included, and how should the reporting format be?

**Proposal:** Include carbon dioxide, methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulphur hexafluoride, and hydrofluorocarbons. Expressed individually for each GHG in mass units, as well as in common units according to their GWP.

**Issue:** What JI project categories are applicable?

**Proposal:** Fuel switching, energy efficiency improvements, carbon sinks enhancement.

**Issue:** Baseline definition.

**Proposal:** Different options. Further analysis and discussion needed.

**Issue:** Emission leakages.

**Proposal:** JI project calculations should be carried out at the highest aggregated level possible, be it national or sectoral level, and not only at a project-by-project level.

**Issue:** Time horizon for JI projects.

**Proposal:** This could to a large extent be left for negotiations between the country Parties.

**Issue:** Distribution of net benefits between investor and host.

**Proposal:** The surplus in terms of reduced costs should be shared between investor and host. Different options are available, and further analysis and discussion are needed.

**Issue:** "No regrets" options.

**Proposal:** The threshold for accepting "no regrets" options as JI projects should be high.

**Issue:** Additionality.

**Proposal:** JI investments should be additional to the financial obligations of Annex 2 countries, and should not replace development assistance. There should be some balance between national abatement efforts and JI investments, but further analysis and discussion is needed for the available options.

**Issue:** Allocation of risk.

**Proposal:** There are arguments for sharing the risk between the investor and host, but further analysis and discussion is needed on this issue.

**Issue:** Reporting and verification.

**Proposal:** The Parties should at an early stage jointly inform the CoP on their agreement. Crediting should be awarded to "after-the-fact" emission reductions only. Some projects could be chosen on a random basis, or if specifically requested by another Party to the FCCC, and verified by a special body designated by the CoP.

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