

## Considering the options: climate targets for all countries<sup>☆</sup>

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### Abstract

This paper assesses five options for targets that could be taken by all countries to meet the ultimate objective of the climate change convention: fixed, binding targets; dynamic targets; non-binding targets; sectoral targets; policies and measures. Each is evaluated according to criteria of environmental effectiveness, cost-effectiveness, contribution to economic growth and sustainable development, and equity. While fixed, binding targets continue to be viable for industrialised countries, they do not seem suitable for many developing countries in the near future. Dynamic targets could alleviate developing countries' concerns about constraining their development as well as broader concerns about possible introduction of "hot air" in a world trading regime; they could also be considered for some or all industrialised countries. Non-binding targets could be politically appealing to developing countries, alleviate fears about development and/or hot air, but might only allow conditional participation in emissions trading by developing countries. Sectoral targets could offer a pragmatic first step — although their cost-effectiveness might be questioned. Finally, targets based on commitments to implement specific policies and measures might drive mitigation action and be part of negotiated packages including financial and technological co-operation. All these options may coexist in the future. © OECD/IEA 2001. Published by Elsevier Science Ltd. All rights reserved.

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### 1. Introduction

Achieving the ultimate objective of the convention will eventually require limiting emissions of all greenhouse gases at a global level well below that set by the current Kyoto protocol. In so doing, it seems desirable to preserve some of the elements of the current agreement — elements that provide for flexibility in meeting targets, and reduce costs. However, while cost effectiveness issues may be critical, it will also be imperative that matters of equity be addressed: most developing countries have indicated that their

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priorities lie with continued economic growth, and that they have a “right” to increase emissions to meet development needs. Any future agreement that does not acknowledge — and seek to formally address — this concern is unlikely to meet with political success in an international forum.

In this paper, we propose and describe a series of options for next steps, focusing on broader engagement of developing countries. To do so, we develop a framework for assessing next steps over the medium and longer term to meet the ultimate objective of the convention, and evaluate each of these options according to this framework. The options evaluated are the following:

1. “fixed binding targets” (in which new countries assume emission targets based on absolute national emissions; targets are enumerated in a manner identical to that used by Annex-I/B countries);
2. “dynamic targets” (in which the targets are expressed relative to actual economic growth rather than as absolute emission levels);
3. “non-binding targets” (targets in which there are no binding consequences if emissions goals are not reached);
4. “sectoral targets” (targets that apply to a sector only rather than to national totals; such targets could be fixed or dynamic and binding or non-binding); and
5. “policies and measures” (in which commitments are in the form of specific agreed actions to reduce emissions rather than in the form of agreed emissions reductions; under such agreements, the actual level of emissions would be left unspecified).

## **2. Framework for assessment**

We consider the following four criteria (and the linkages between them) to be the most critical in evaluating future emission reduction options. They are as follows:

- environmental effectiveness;
- cost-effectiveness;
- contribution to economic growth and sustainable development; and
- equity.

### *2.1. Environmental effectiveness*

Determining environmental effectiveness is fundamentally a question of the magnitude of global GHG emissions reductions. A number of factors may affect the environmental effectiveness of a policy; perhaps the most important is in the way options may influence target levels (and thus, ultimately, emissions reductions). Elements of an approach that promote cost-effectiveness (e.g. through emissions trading) may allow more stringent targets to be adopted — increasing environmental benefits. Conversely, global environmental effectiveness may be diminished if the targets allow for introducing large amount of so-called “hot air” in the trading system.

Another aspect of environmental effectiveness relates to “leakage” (in which reductions in one country might be offset by increases in other countries, e.g. through the relocation of industrial activities). The leakage concern may be partially offset by a global agreement. The options may also differ with respect to the environmental certainty they can provide. Thus, one structure might prescribe precisely the value of total global emissions, while another might define emissions as a function of another variable (e.g. GDP), while a third may prescribe policy actions, but not emissions levels. In choosing between options, it is

critical to weigh the relative merits of short-term emission certainty against the incentives for long-term action.

## 2.2. *Cost-effectiveness*

A cost-effectiveness criterion evaluates the magnitude of global and national costs for emissions limitation and reduction. Under a more cost-effective regime, deeper GHG emission reductions may be obtained from identical expenditures (in both present and future commitment periods). In this context, it is important to distinguish between national costs (for both developed and developing countries) and global costs (i.e. for the entire agreement). In as much as individual parties must ratify any agreement, national cost consideration will be critical; in as much as total aggregate costs will affect the extent of global reductions, total costs are also critical. It should be noted, however, that there might be a trade-off between technology development and short run cost-effectiveness: the lower the cost of an option, the lower its immediate technology development incentives may be.

Developing country participation could lower the aggregate cost of achieving the objective of the Convention. However, using the Kyoto mechanisms, additional benefits could be generated as well — for example, in the building of new infrastructure and more efficient power generating facilities. Thus, while it has been suggested that this might allow the industrialised countries to pick “low-hanging fruits” (and might deprive the developing countries of such low-cost emission reductions if they subsequently face emissions limits), early action can have significant and long-term local and global benefits (providing more economic and environmentally sound infrastructure and technology development).

Cost effectiveness criteria may include a number of sub-elements. One of the most important is “co-benefits”. These are the benefits to other policy areas from climate change mitigation, and the benefits to climate change mitigation of other, unrelated policy actions.

## 2.3. *Contribution to economic growth and sustainable development*

The UN framework convention on climate change states that the parties “should co-operate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all parties, particularly developing country parties, thus, enabling them better to address the problems of climate change”.

It is clear that economic growth and sustainable development issues are critical concerns of all countries — but, in particular, of developing countries. Their main concern in accepting quantitative emission limitation or reduction objectives has been that these may constrain their economic growth — and they have insisted that this concern be fully taken into account when considering next steps. In considering sustainable development, some account must be taken of differing national circumstances. Industrial mixes, energy uses, geography, level of development and national institutions and culture are all critical factors in developing an acceptable policy. An effective approach must accommodate a wide range of such circumstances.

Climate change mitigation may bring ancillary benefits of a diverse nature. Capital inflows may accrue to developing countries from mitigation actions — through the development of renewable energy industries, clean technology production, and the selling of certified emission reductions under the clean development mechanism.

## 2.4. Equity

The UN framework convention on climate change is explicit on the issue of equity, stating: “The parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common, but differentiated responsibilities and respective capabilities (...).”

There are many approaches to equity — and each may generate very different outcomes. Proposals focus variously on short-term as well as long-term distribution of abatement costs and/or emissions rights, historic versus future “responsibility” and capacity for mitigation as a factor in determining action. Notwithstanding these differences, an essential point at the core of any next step is the importance of giving full consideration to the need and willingness of all countries to participate in climate change mitigation strategies that do not impede their economic development or prevent them from making substantial progress towards eradicating poverty.

## 2.5. Interlinkages

The criteria listed above are very much interlinked. For example, an approach that reduces the cost of acting (e.g. cost-effectiveness) may not yield the desired near term environmental benefits (i.e. environmental effectiveness). Thus, expanding the current protocol structure (with its fixed binding targets) may appear to be the most environmentally effective alternative. However, developing countries have rejected this approach on the grounds of equity, and without their engagement, it is clearly less cost-effective or environmentally effective. If developing countries were to take on such targets, the need to fully encompass developing country equity and sustainable development concerns could yield a target with a very limited (if any) environmental benefit.

## 3. Options for future targets

This section describes and analyses five options:

1. fixed, binding targets;
2. dynamic targets;
3. non-binding targets;
4. sectoral targets; and
5. policies and measures.

Each option is then assessed according to the criteria listed in the previous section.

### 3.1. Fixed, binding targets

#### 3.1.1. Description of the option

This option might best be defined as the incorporation of developing countries into Annex-I/Annex-B. It has most commonly been referred to as “voluntary commitments” during the negotiating process. As such, it also implies a full access to the global trading regime. To date, almost no non-Annex-I parties have embraced this alternative: only Kazakhstan has indicated its intent to pursue this alternative.

*3.1.1.1. Parameters.* Parameters that might be considered in this option include country ranking, timing, thresholds, and stringency of commitments; each is discussed below. These parameters might be developed individually, or in the framework of burden-sharing of a specified global emission or concentration target. It should be noted that these kinds of parameters might also apply to other options as well.

*3.1.1.2. Ranking.* The Convention basically recognises two groups of countries as far as commitments are concerned: Annex-I with limitation or reduction commitments, and non-Annex-I — with no such commitments. However, there is a continuum in countries' situations, and a different grouping (or groupings) of countries might have been constituted. For example, Claussen and McNeilly (1998) take three criteria — standard of living, historical responsibility and opportunity — to rank countries in three groups. The first group “must act now”, the second group “should act now, but differently”, while the third group “could act now”. While their first group includes some non-Annex-I countries it does not include all Annex-I countries.

*3.1.1.3. Timing.* Although, it is conceivable that a common calendar could be agreed for the for adoption of fixed, binding targets by all non-Annex-I countries, as with the Montreal protocol, the idea of thresholds, and therefore, staggered entry into force of commitments, might be more appealing. Thresholds could rest upon criteria such as OECD membership, per capita GDP, per capita GHG emissions (current or cumulative), carbon intensity, costs of reducing emissions, or others (see UNFCCC, 1996).

*3.1.1.4. Stringency.* Procedures have been suggested for negotiating legally binding absolute targets for non-Annex-I countries. It is usually recognised that targets would be “growth targets” (Hargrave and Helme, 1997): a developing country commitment would likely be set at some level above the country's current emission level. This is already the case of some Annex-I countries in the Kyoto protocol, and some others through the European joint-fulfilment agreement, even though their emissions are, on aggregate, capped at 5.2% below their 1990 levels. Many of these procedures use the same set of parameters as for timing to compute targets (see, e.g. Jacoby et al., 1999).

*3.1.1.5. Burden sharing.* An important subset of proposals tries to draw countries' commitments from a global objective for emissions, concentrations or even climate change, largely in an effort to promote equity. This is notably the case of the Brazilian proposal and of proposals drawn from it (Brazil, 1997; Berk and den Elzen, 1998), and of the framework for “contraction and convergence” advocated by the Global Commons Institute (1998). Other analyses try to look at a plausible compromise between baseline emission profile and baseline population profile to share a global emissions path considered compatible with the ultimate objective of the Convention (e.g. Bartsch and Müller, 2000). Finally, another subset of proposals focuses the equity discussion on different distributions of the abatement costs (e.g. ABARE, 1995; Lecocq et al., 1999).

### *3.1.2. Assessment of the option*

Assuming full compliance, this option seems to provide the highest possible level of environmental certainty, as well as good protection against leakage. It gives countries full flexibility to reach their targets using whatever policies and measures are appropriate to their national circumstances, potentially maximising cost-effectiveness. By broadening the market for emissions trading, in particular, to countries, where the marginal cost of emission reductions is lower than in industrialised countries, this option would

be able to improve the cost-effectiveness of global action, as well as provide revenue streams to offset some of the mitigation costs in developing countries. Other potential benefits could include technology transfers and various ancillary benefits. Finally, there could be considerable differentiation of targets amongst countries in order to accommodate equity concerns.

However, it may be that the only way to address developing countries' concerns about this option is to fix the targets at such a high level that it would not have a real effect on emissions (i.e. the most probable environmental outcome from developing country commitments would be a "BAU target"). In addition, setting a "lax" target could also allow the introduction of large amounts of hot air into the international trading regime.

For example, let us suppose that a developing country expects its GDP will grow at 10% each year. Such an affirmation will be difficult to contest, for even if it appears hardly feasible, it also appears very much desirable. The GHG target then would be derived from these projected economic growth and related emissions level. Should this country realise an 8% average yearly economic growth during this 15 years, the difference in GDP amounts at the end of the period will be very large — and if actual emissions were closely linked to the GDP growth, the amount of surplus allowances at the end of the commitment period would be roughly equal to current emissions of that country.

Moreover, developing countries have rejected this approach over concerns that setting targets could lead to economic growth constraints. Clearly, this concern could be exacerbated if more stringent targets were set to more fully ensure environmental integrity. It is likely to be extremely difficult to manage this inherent contradiction in an equitable manner.

### 3.2. *Dynamic targets*

#### 3.2.1. *Description of the option*

In this option, developing country emissions would not be capped in absolute terms. Instead, emissions would be allowed to rise above current levels, but countries would limit their level as a function of some pre-agreed variable. Numerous variables could be envisioned (e.g. population, exports, etc.), although economic growth represents a variable of primary focus for developing country planners. Using this approach, objectives would be computed according to economic growth (as measured ex-post) and the commitment would be expressed in terms of GHG-intensity. One country has already offered a commitment of this form is Argentina.

Although, conceivably an agreement establishing a uniform methodology for setting dynamic targets, it is more likely that the final decision would rest upon a negotiating process of a political nature. Each country will present specific features (e.g. national circumstances or political constraints), that could not be addressed in a single formula or framework. However, an agreement on some basic principles could guide the negotiation of individual dynamic targets.

A number of approaches could be followed in setting the stringency of dynamic targets. It might be possible to set targets so they represented some deviation from business-as-usual — for example, the magnitude of the deviation could represent reductions that could be achieved through "no regret" options. For most developing countries the assigned amount should increase, but at a lower rate than the GDP itself. However, different stages of development and the variety of countries' national situations would require different adjustments to the general principle of indexing assigned amounts.

Argentina provides an interesting example of such a dynamic target (Argentine Republic, 1999). Argentina's target is based on emissions/square root of GDP index, implying a positive relationship

not only between allowed emissions and GDP, but also between the level of effort and the GDP. This criterion was chosen to help account for the large agriculture and livestock sector — from which emissions are relatively independent of the growth rate of the general economy. For developing countries already at a higher stage of development and showing a declining curve of energy intensity, the level of effort might increase with the GDP and the “autonomous energy efficiency improvement” should be taken into account in target setting. Such a target would reflect the fact that higher economic growth would provide more low-cost opportunities for emission reductions, accelerate the formation or replacement of fixed capital, and justify tightening of the targets as GDP increases.

A number of factors would benefit from additional analyses: for example, whether GDP is counted according to power-purchase parities or exchange rates; whether, if the targets cannot be expressed in GHG-intensity, energy intensity may provide a proxy; how energy intensity is counted (e.g. whether it includes non-commercial energies). Deriving values for these variables is not, however, a certain science; dynamic targets would not remove all uncertainties on future emission patterns. The potentials of no-regret measures, the autonomous rate of energy efficiency improvement, the rate of decarbonisation (if any) of energy production and use, will remain uncertain and sometimes even controversial. Thus, considerable scope for negotiation remains.

While analysts have suggested that emissions trading would be an important incentive for developing countries to consider taking targets, it has also been suggested that the uncertainty of actual assigned amounts under a dynamic target approach could make trading difficult (Baumert et al., 1999). Assuming the calculated link between economic growth and emissions holds, this is not likely to be a problem; the uncertainties on both will essentially compensate. In fact, the uncertainty regarding the available or required units of assigned amounts (the difference between the assigned amount and actual emissions), would likely be reduced, not increased, by dynamic targets in comparison to fixed targets.

Questions might also be raised as to how the clean development mechanism (CDM) could operate under such a regime. Unless precluded by an international agreement, in a country with a dynamic target, the CDM would basically act as joint implementation (JI) now does among Annex-I countries: certified emission reductions sold in the CDM framework could be deducted from the country's assigned amount.

### 3.2.2. *Assessment of the option*

This option does not provide the same level of certainty on emissions as fixed, binding targets. However, because of the ability to tie critical variables into targets, the overall stringency of such an agreement might be significantly increased — dramatically improving the overall environmental effectiveness. Furthermore, if global emissions are considered in the context of international trading, a dynamic target, by virtue of higher accuracy, could significantly reduce the granting of “hot air”, improving the environmental benefits when compared to a fixed target system. However, a possible rebound effect (possibly stimulated by emissions trading), as well as questions of the accuracy of the measurement of the economic indicator data, could limit environmental effectiveness.

This approach leaves full flexibility to countries regarding the domestic policies that would be undertaken to meet their commitments. By largely removing the uncertainty related to meeting the target that is associated with the economic growth, this option could alleviate fears of introducing undue constraints on developing countries. In doing so, this option might bring additional countries to the table. Then, through the use of emissions trading, this option would be able to improve the cost-effectiveness of global action and provide a large revenue stream to developing countries through emissions trading. It could probably

do so on a much wider range than the CDM, because it embraces all emission sources and the results of policies and measures in all sectors of an economy.

As with fixed targets, most equity concerns could be dealt with through differentiation of dynamic targets. However, this option may be more robust and perceived as more equitable over time because unexpected recession or higher-than-expected growth will not change the difficulty of reaching the targets.

### 3.3. *Non-binding targets*

#### 3.3.1. *Description of the option*

A number of ideas might be introduced for non-binding targets. For example, the UNFCCC itself represented one form. In this structure, the Annex-I parties agreed to a non-binding, hortatory goal of keeping emissions at or below 1990 levels through the end of the decade. As with the convention, the determination of the level for such non-binding targets would likely be a matter for negotiation.

Perhaps, a more intriguing option for non-binding targets would utilise the benefits of the Kyoto mechanisms; the remainder of this section focuses on this alternative. Under such a non-binding regime, an “emission budget” could be allocated to a developing country, which would then be allowed to sell the surplus if its actual emissions are less than the budget. However, the party would be under no obligation to buy permits or to face non-compliance procedures if its actual emissions are above the budget. Naturally, emissions trading with this option would necessitate that other countries have a binding commitment. (Philibert, 2000).

Negotiating a non-binding agreement of this sort would create a new circumstance: the negotiation would be over the size of potential gains, not of potential losses. However, if the uncertainty relative to the economic growth were large, negotiators would have to balance the risk of creating large amounts of hot air with a weak target against that of leaving the country out of the trading regime.

The non-binding character of this target may make it possible to set the level of the target at a more stringent level than might have been the case with binding, fixed targets — particularly, as it vitiates concerns about economic development. As with the other options, the establishment of the target level may be set with full consideration of the potential for “win–win” or “no-cost” mitigation measures.

Choosing the stringency of the target might be undertaken using the kinds of approaches proposed for options A or B above — in fact, the non-binding target could be of either a fixed or dynamic nature.

In many ways, issues of compatibility with the Kyoto mechanisms are similar for the non-binding target and the fixed and dynamic target options discussed above. However, some critical differences do emerge. Perhaps most important is the potential for non-binding targets to threaten the environmental integrity of the trading system. For example, if a country could sell part of its emission budget while its actual emissions exceed its budget (diminished by the selling), the “value” of permits would become meaningless. In fact, in the extreme case, a country could even sell its entire budget and, thus, inundate the market while keeping its emission level unchanged. As targets under this scenario are by definition non-binding, countries taking this path would not be “out of compliance”. A number of different options may be considered in order to maintain the environmental integrity of a trading system including entities with a non-binding target or “emission budget”.

One possibility is to require that as soon as a country with an emission budget starts to sell allowances it face a real limit on its emissions. Another possibility is to allow countries with emission budgets to trade only after the end of the commitment period that is, after the existence of an actual surplus of allowances has been demonstrated. A third possibility is to require countries to buy back the allowances sold if the



budget is exceeded. If a country has an emission budget of 100 million tonnes and sells 10 million tonnes, and if its emissions then exceed 90 million tonnes, the country should buy back the surplus of up to 10 million tonnes — but not beyond the amount it has sold.

In a country with a non-binding target, the CDM would basically act as JI in Annex-I countries: certified emission reductions sold in the CDM framework would be deducted from the country's assigned amount, as would emission reduction units in the current JI framework. Emissions trading under non-binding targets shows considerable similarities to the CDM. Both are non-binding: if a project under the CDM drives more emissions than the agreed baseline, rather than less, neither the host country nor the investor would have to compensate for this increase. Both are presumably relative to a baseline ("what would have happened otherwise"). This suggests that one could negotiate non-binding targets under the existing negotiated framework for the CDM. The Kyoto protocol makes clear that this mechanism is based on project activities, but the exact meaning of this wording has not been specified as yet. Taking a non-binding target would be very similar to undertaking a countrywide, "unilaterally-funded", CDM project. There would be two advantages in taking the "CDM way" to negotiate non-binding targets. The first is to build on existing provisions on the Kyoto protocol with no need for having it amended. The second is to allow trading under non-binding targets to start immediately after the COP decision.

One possible downside of this approach is that it may make progressively tightening the targets (as developing countries reach some threshold level, e.g. in per capita emissions or GDP level) more difficult, by taking roots in the "baseline" approach of the CDM.

### 3.3.2. *Assessment of the option*

In as much as non-binding targets encourage additional countries to join the agreement — and to take action — this option may offer considerable potential environmental effectiveness advantages. It would probably help reduce the possible amount of hot air by comparison to fixed targets. However, it provides a low certainty on emission reductions (and if the non-binding aim were expressed as a fixed target, also a lower certainty about "hot air").

The option of a non-binding target may seem superior to that of a dynamic target in providing an answer to the risk of leakage or the growth rebound effect. Increases in developing countries' emissions due to leakage will reduce the amount that could be traded. However, this would be true as long as leakage is not sufficient to push emissions above the countries' target and make them ineffective. In other words, non-binding targets might better deal with the leakage problem if it is small, while being less efficient if it is large.

By broadening the market for emissions trading, in particular to countries where the marginal cost of emission reductions is thought to be lower than in industrialised countries, this option may have the potential to improve the cost-effectiveness of the global action. However, this may be limited by the fact that not necessarily all countries taking a non-binding target will participate in emissions trading.

The non-binding character of the option may offer the advantage of a higher certainty that the economic growth will not be constrained — depending on the sub-option chosen to maintain the integrity of the system.

It might also be worth considering the value of establishing a hybrid form — creating a "non-binding dynamic target" to seek to combine the advantages of the two options. Such targets would combine a very low risk on economic growth with higher chances to enter emissions trading (and little risks of hot air).

By providing developing countries, the possibility of some "gain" with no risk of some "loss", this option may be more equitable from a developing country's perspective. However, it is not clear that other

stakeholders would find this outcome “equitable” as well. However, one may argue that this option, as applied to non Annex-I countries, is very similar to the framework of commitments and mechanisms (the CDM) that has been agreed upon at Kyoto.

### 3.4. Sectoral targets

#### 3.4.1. Description of the option

Under this option, quantitative targets could be established in one or several sectors of a country, rather than at a country-level. These targets could have different forms, as is the case for country-level targets. They could be dynamic or fixed, and binding or non-binding. In the non-binding cases (whether dynamic or fixed), establishing these targets would be essentially equivalent to establishing baselines for sector-wide CDM projects.

There may be a number of different reasons to support sectoral targets:

- the uncertainties regarding the monitoring of emissions in some sectors (methane and nitrous oxide from agriculture and livestock, e.g. or CO<sub>2</sub> removal from forestry) make these less certain than for CO<sub>2</sub>, suggesting a more focused approach could be valid. However, such an approach might also limit the incentive to improve monitoring of the sectors with no targets;
- the uncertainties — and potential inability to control emissions — in some sectors (e.g. transport) could lead countries to conclude they did not want these sectors to be part of their commitment regime;
- an interest in distinguishing between the “productive” sectors and sectors more related to consumption. For example, a country may be willing to take on a commitment in its power sector and/or its energy intensive industries, while refusing to broaden this approach to the consumption sectors. Such a decision might be taken for political reasons, or for reasons of social welfare supports; a sectoral approach might be considered as a means to complement the CDM (pertinent to “projects” in the narrow sense) and thus, focus on sectors with numerous and dispersed emission sources for which centralised individual projects may not apply. Policies and measures applied in such sectors could then be rewarded through emissions trading at a sector level. In this context, the parties of the UNFCCC may feel more comfortable in broadening the scope of CDM projects to sector-wide non-binding targets, rather than to countries, at least in a first step.

The analytical work currently undertaken on the definition of multi-project baselines for CDM project activities (see OECD/IEA, 2000) could be of a great help in setting appropriate sectoral targets. Such target levels could apply to a great number of countries in the short term — and it might be expected that sectoral targets (like options 1, 2 and 3 above) may be progressively tightened as countries reach thresholds in their economic development.

If targets were to be binding, they could be dynamic and could be related to the economic output of the sectors. Alternatively, other indicators could be considered for establishing dynamic targets — and might be particularly suited to sectors more closely related to consumption, such as emissions per square meter in the housing and commercial sectors, or emissions per km-travelled and tonnes-km in the transport sectors. The details of setting targets would clearly vary from sector to sector. Thus, to take the example of transport, a dynamic target might be established that required an improvement in the ratio of emissions per km travelled by road, or alternatively, for the travel sector as a whole, thus giving an incentive for mass transit systems as well as for road travel.

In sectors with a higher level of aggregation of sources, the sectoral target approach might still allow the respective entities to participate directly in emissions trading. Alternatively, if the sectoral target is non-binding, reductions in the sector could be considered as a CDM-project in which the certified emission reductions would result from a set of policies and measures (that could even include the establishment of a domestic tradable permit scheme).

In sectors with numerous and dispersed emissions sources, apart from instituting an “upstream” trading regime, it may be difficult to allow individual sources to participate in emissions trading. It is possible that the State would participate in trading on behalf of the sector, and would derive any revenues from it. As with any regime in which domestic emissions are not readily verified, the international community may have less confidence in such a system unless clear national monitoring and verification arrangements are in place.

#### *3.4.2. Assessment of the option*

Inasmuch as sectoral targets might be easier for new countries to accept, they offer the possibility of increased environmental effectiveness over a BAU scenario. In addition, sectoral targets may not entail the risk of bringing large amounts of hot air in the international trading regime, as in many cases, projections of sectoral trends may be more accurate than full national trend analyses. The risk of “hot air” might also be diminished if these targets were non-binding and/or dynamic.

Unlike a national target (in which inter-sectoral leakage is fully accounted), sectoral targets may be open to inter-sectoral leakage — which may not be counted in a target. In addition, unless all countries adopted an identical target, international leakage could still be a problem. A more specific concern could be that of leakage under sectoral dynamic targets. The relative protection against leakage that country-level dynamic targets would offer is essentially based on the fact that leakage would take place for energy-intensive industries that have a higher carbon intensity than the country’s economy as a whole. The increase of economic output of these industries would presumably not be sufficient to make the country-level target ineffective. This may not be true with a sectoral dynamic target, where the pertinent criteria may be the carbon intensity of the sector, not that of the whole country. However, if all countries adopted a sectoral target, this concern could be completely offset.

In face of uncertainties on abatement cost curves, it would probably be less cost-effective to take numerous sectoral targets rather than one single country target. However, if a sectoral target is taken while other sectors are not covered, perhaps as a first step, then this problem would be much less significant. In addition, like other options allowing emissions trading, sectoral targets using flexible mechanisms would bring revenue streams to developing countries and help increase the cost-effectiveness of the international framework for global action, although to a lesser extent than national targets.

Sectoral targets might allow a country to select the area in which it needed financial or technical assistance — and condition its acceptance of a target on the receipt of support to meet needs identified in this sector. Finally, sectoral targets may offer a wide enough scope in their design to satisfy equity concerns, as decisions on which sectors to target, and the range of binding or non-binding, or fixed or dynamic targets within sectors offer substantial national flexibility.

### *3.5. Policies and measures*

#### *3.5.1. Description of the option*

Under this option, future mitigation commitments may be based on agreements to implement specific mitigation actions rather than on quantified emissions limits.

An existing obligation in the UNFCCC commits all Parties (including developing country parties) to undertake policies and measures that help mitigate climate change. Identifying specific policy requirements may be a logical extension from existing commitments. Recent studies have pointed to a large number of relevant policy actions being taken in developing countries (e.g. Goldemberg and Reid, 1998). Many of these policies have been taken for reasons independent of climate change — but, have nonetheless had significant emissions reduction benefits.

The option could take different forms. One alternative could be the adoption of specific policies and measures by many developing countries at the same time, perhaps through the negotiating process within the UN framework on climate change. A rationale for some kind of international co-ordination could be to help resolve concerns about international trade and competitiveness. Another rationale could be to establish a link between these qualitative commitments and the strengthening of further commitments by industrialised countries. It might also be noted that limited implementation of the existing Annex-I commitments could discourage any non-Annex-I action.

Alternatively (or simultaneously), the adoption of such commitments could be linked to a strengthening of the commitments by Annex-II countries regarding the financial mechanism of the convention and/or the financing of technology transfers and capacity building efforts. The recent agreement between India and the USA may provide a harbinger of such a process (see Bowles, 2000).

The “policy and measures” approach does not seem consistent with any formulation of emissions trading. However, as with other approaches, it might be possible to combine policies and measures with the CDM, i.e. the CDM project could be the policy or measure itself. Such an approach could constitute a transition towards a trading regime with flexible and/or non-binding targets. This possibility has been further explored in the previous section.

However, there may also be some disincentives created in such linkages. For example, broad policy actions might eliminate the value of specific CDM projects, and while they might provide greater global environmental benefits, these may be difficult to quantify. However, the net result could be a reduction in international financial flows through the CDM itself. As an example, a country might choose to reduce its energy subsidies — and a CDM project, that might look additional in a country with high energy subsidies may look like a business-as-usual project if these subsidies were removed.

A number of possible areas might be explored for setting policy targets. These could include energy subsidy removal, fiscal reform, carbon taxes, domestic energy consumption limits, research and development and others. A number of these are discussed below.

*3.5.1.1. Energy subsidy removal.* One example of policies already undertaken in a number of developing countries that has climate-related ancillary benefits is subsidy removal. Work within the IEA and the OECD has examined the implications of subsidy removals in the energy sector and concluded that considerable CO<sub>2</sub> emissions reductions would accrue from such policies (e.g. for a sample of eight developing countries, energy subsidy removal could lead to an average of 15% reductions in CO<sub>2</sub> emissions from business as usual; IEA, 1999). In addition to its emissions benefits, subsidy removal has the added attraction of increasing government revenues — although, such removals are likely to run counter to some specific interest groups and is thus, usually a politically difficult exercise.

Although, a frequent justification for subsidising energy consumption in developing countries is the belief that such instruments ensure better access to energy services (in particular to the poor), they often prove to have adverse effects. For example, indirect subsidies in electricity with prices can deprive

companies of the resources needed to expand the electric grid or invest in producing capacities — which in turn might benefit more people.

Efforts to remove subsidies in energy-intensive industries may benefit from some kind of international agreement, particularly if there is a potential for a price discrepancy to result from such removals vis-à-vis a trading partner. Moreover, one may believe that commitments to reduce energy subsidies in producing internationally traded commodities could by themselves be an answer to some concerns expressed within Annex-I countries.

However, there is an unanswered question as to whether subsidy removal would be made easier with an international agreement promoting such a change. Evidence from the IEA suggests not: although, the member countries have promoted subsidy reform for nearly 25 years, a number of member countries still retain energy subsidies and do not have open markets. It may thus, be unrealistic to expect such a change from the UNFCCC process.

*3.5.1.2. Fiscal reforms and carbon taxes.* Much of the discussion on subsidies also applies to other fiscal measures, e.g. the establishment of carbon taxes. There is no particular reason for developing countries not to consider carbon taxes as some industrialised countries do, especially to the extent that a “double dividend” arising from the reduction of other taxes or charges can be identified.

As with subsidies, the question remains regarding the help an international commitment could bring to such a process. It seems clear that in most domestic circumstances, such a commitment will not necessarily help, unless the agreement were to be adopted at a global level. This is exemplified in the case of carbon-intensive industries, which have largely been exempted in most carbon tax schemes to allay concerns about competitiveness in a world with uneven tax penalties.

*3.5.1.3. Others.* Apart from the fiscal and price measures affecting production in energy-intensive sectors, other measures affecting energy consumption (or other GHGs such as HFCs) may have substantial merit — for example, those in internationally traded goods such as appliances, or cars and trucks. Developing world-wide standards (perhaps in the form of “voluntary agreements” with companies) may be appropriate in some cases, and may be more readily adopted than unilateral commitments from developing countries. Willingness to adopt common approaches may be justified by a desire to avoid trade barriers or distortions.

If qualitative commitments were taken by developing countries (either in common or in isolation) through collective or individual agreements with industrialised countries, then the range of possible policies and measures increases considerably. Such actions could include policies and measures to promote energy efficiency, as well as R&D and information and education policies designed to affect longer-term GHG emissions.

### *3.5.2. Assessment of the option*

Mitigation commitments without targets may not provide the level of emissions certainty that parties desire — and that may be necessary to guarantee sufficient action to control atmospheric concentrations of greenhouse gases. However, it seems likely that policy actions would induce some emission reductions, and as such, provide environmental benefits. In as much as countries might fear emissions trading would be in “hot air”, this approach, by essentially eliminating the trading alternative, might be considered environmentally sound. However, the economic benefits of trading are also precluded and the limited resources will pay for a lesser level of emissions reductions.

It is likely to be extremely difficult to determine the difference between a policy approach and the no-policy, business-as-usual action. This may make it difficult to both negotiate a meaningful agreement, and to evaluate implementation and compliance.

As individual policies that might be taken differ widely, it is hardly possible to make a global assessment of their cost-effectiveness. However, common policies may not apply equally to all countries as national circumstances may dictate their relative effectiveness. It is unlikely, e.g. that national or international agreements on policies and measures would be as efficient as a global target implemented through a global tax.

While some policies and measures may provide multiple benefits, others may entail costs that are not necessarily predictable or even apparent. However, the absence of a quantitative limit on emissions would be perceived as insurance that economic growth is not threatened.

Intra-sectoral debate, as well as disagreements between countries that adopt policies versus countries that refuse to adopt policy agreements may dominate perceptions of equity. With respect to the former, e.g. subsidy removal may be perceived as undermining financial transfers that had been established in name of equity. Justifying it by international agreement may aggravate that perception even if the real effects in terms of equal access to energy might at the end of the day turn out to be positive. Ultimately, the equity issue may be more significantly affected by the stringency of the policy (i.e. by the magnitude of the change required) and by the support (both financial and technical) provided from developed country parties to assist with meeting the commitment than by the form of the option.

#### **4. Discussion**

Fixed, binding targets might still be considered for Annex-I countries and for these countries currently not listed in Annex-I, but that have many characteristics of Annex-I countries (close GDP per capita and/or emissions per capita levels, and perhaps an economic growth that is relatively predictable). Although, there might only be a few such countries (see, e.g. Claussen and McNeilly, 1998), and their aggregate emissions only represent a small part of the global amount, these countries do not currently show much enthusiasm for binding, fixed targets. In the long run however, as countries develop, the option may become more acceptable.

Dynamic targets might be of a great interest for many developing countries, especially the “newly-industrialised”. However, its application to countries in early stages of development and/or with large share of non-commercial energies in their energy balance, and/or with GDP measurement under question, might be problematic. It could also be usefully considered for some industrialised countries, especially those in transition, which lack economic predictability. Dynamic targets for this group could help support the environmental integrity of the protocol. Furthermore, while fixed targets are currently the choice for industrialised countries for the first commitment period, it is not clear that this choice would continue to be optimal. There might be a trade-off here between the environmental certainty provided by fixed targets and the potential for more stringent dynamic targets, which remove concerns associated with uncertain economic growth.

Non-binding targets may have the advantage that they would be relatively less dependent than dynamic targets on the accuracy of measuring GDP and actual growth. The higher certainty that the economic growth will not be constrained might be rather appealing to developing countries, although this option may provide a lower certainty that the target will be effective as well as a lower certainty that emissions trading will happen.

Sectoral targets might be a pragmatic first step towards more comprehensive action. However, there may be a (legitimate) fear that such a limited approach would foster delay, rather than accelerate, comprehensive action. Furthermore, unless a full range of sectors was selected, this approach might engender only a limited environmental impact.

There is no doubt that it will be very useful to exchange views and experiences among countries on policies and measures to abate greenhouse gas emissions. The question remains to identify the policies and measures that could best be implemented through an international commitment — if indeed they exist. It has been suggested that this might be the case for subsidy removal in the energy-intensive industry sector. Many other policies and measures could as well be established in exchange for the strengthening of commitments by industrialised countries. However, it is more probable that policies and measures could be adopted by developing countries in exchange for further financing by industrialised countries of investments, technology transfers and capacity building, at a country level or at a more global level through the negotiating process.

A separate issue may be raised regarding differentiation of stringency or burden-sharing within any given option. Up to now, the differentiation of commitments in the convention and the protocol has followed a few simple lines:

- only Annex-I countries have quantified emission reduction and limitation objectives;
- these binding and fixed commitments are differentiated quantitatively;
- non-Annex-I countries have no quantitative commitments;
- Countries as Annex-II have additional other commitments regarding financing, technology transfer to non-Annex-I countries.

The inclusion of the entire set of options considered in this paper could lead to a more diversified picture for future commitment periods, with the creation of new groups or sub-groups within the negotiated framework. Possible consequences could be the following:

- some Annex-I countries could have dynamic targets rather than fixed targets;
- some non-Annex-I countries could have fixed, binding targets
- other non-Annex-I countries could have non-binding and/or dynamic targets;
- all these commitments would be differentiated quantitatively;
- selected non-Annex-I countries could have sectoral targets and/or commitments on policies and measures;
- some other non-Annex-I countries would still have no target of any kind. Of course, they could host CDM.

Alternatively, the picture could be simpler: a single common choice might be made for all future commitments. Given the reluctance of countries to take on fixed binding commitments and the perception that non-binding or limited policy approaches would be insufficient to meet the environmental goals, perhaps the most robust single approach would be for all countries to have dynamic targets. Of course, as noted in the discussion above, to accommodate the equity and development concerns of countries, there would presumably be considerable differentiation among country targets.

The placement of a country in one or another of these categories, or the movement of a country from one category to another (including that of binding and fixed commitments), when their economies become further developed, could be entirely left to the negotiating process, as could the issue of the stringency of the different targets. Alternatively, the negotiating process could define some rules that would assign

the countries to specific categories as well as help define the targets. In both cases, the existing analysis on the differentiation of commitments, including different burden sharing possibilities, could usefully be taken forward by considering how the options considered here could affect the outcomes of these analysis.

A separate question may also be raised with regard to timing. For second and subsequent commitment periods, commitments of different types and levels could be decided simultaneously for all countries. Clearly there will be costs from taking action. However, the benefits from the action undertaken by all and benefits from the action undertaken by all, the fact that a growing number of countries are taking action is by itself both an incentive and a justification for each country to take deeper commitments. Moreover, by reducing the costs of abatement, the establishment of a world-wide trading regime could encourage industrialised countries to strengthen their commitments in the subsequent periods (relative to the commitments they could take in the absence of this regime). While difficult, it may also be possible for targets for non-Annex-I countries to be adopted in time for the first commitment period.

A different trade-off may exist between the economic objectives of encouraging developing countries to take targets and the environmental benefits. For example, if weak targets for some developing country were adopted, this could substantially reduce the cost of implementing Annex-B commitments, but could reduce the environmental effectiveness of the protocol.

One of the most significant concerns over target setting for developing countries is that of “hot air”. However, if a global cap is agreed, and a “burden-sharing” regime adopted, then allowing “tropical hot air” would no longer be a way to reduce costs; it would rather imply a deeper reduction of the assigned amounts of industrialised countries. Rather than “hot air”, it would be the equivalent of agreed financial transfers. Of course, while recognising that some level of “excess” financial transfers may be needed to gain acceptance, it is unlikely they would constitute a starting point in the negotiations for donor countries.

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