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**LINKING PROJECT-BASED MECHANISMS WITH DOMESTIC GREENHOUSE GAS EMISSIONS
TRADING SCHEMES**

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FOREWORD

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Executive Summary

Greenhouse gas (GHG) emissions trading and project-based mechanisms are two possible policy instruments that countries can use to address climate change. As climate change is insensitive to the location of GHG emissions and reductions, these trading-based instruments are particularly attractive in that they allow maximum flexibility in meeting GHG emission commitments, allowing GHG emission reductions to be undertaken wherever/however they may be most cost-effective.

Countries, whether or not Parties to the Kyoto Protocol, have considerable choice in whether and how they engage their private entities in GHG mitigation and whether and how they design and implement domestic emissions trading (DET) schemes. Similarly, they have the choice of whether to implement project-based mechanisms (PBMs) at the domestic level. Project-based mechanisms can provide additional incentives to look for more cost-effective GHG mitigation possibilities, but they are voluntary in nature and only contribute to increasing the supply of credits. Project-based mechanisms thus need to be linked to another instrument, such as an emissions trading scheme, which recognises the project credits towards compliance with a GHG objective.

Linking project-based mechanisms with domestic emissions trading schemes expands coverage (of gases/sources), leads to an increase in compliance options for covered entities, a reduction in compliance costs, and improved market liquidity. However, it can also lead to various challenges in terms of accounting, data, measurement, monitoring issues, and managing overall compliance with a GHG commitment. Implementing PBMs domestically and using their units to offset emissions from sources covered by a DET requires careful consideration to ensure environmental effectiveness, economic efficiency and ease of administration. The objective of this paper is to identify these challenges and to examine options to address them in order to reap the benefits of linking PBMs and DETs. The paper also aims to outline some of the comparisons between emissions trading and project-based mechanisms to facilitate an understanding of some of the issues that arise when the two are linked.

Avoiding double-counting of emissions and emission reductions is a basic principle of flexibility mechanisms. To maintain the integrity – and the value – of emission allowances from emissions trading schemes and emission credits from project-based mechanisms, it is important that one allowance or one credit correspond to one specific unit of emission or emission reductions (e.g. a ton of CO₂ equivalent). Linking project-based mechanisms with domestic emissions trading schemes (defined here as ‘cap-and-trade’) could potentially lead to double-counting of emission reductions if not done properly. The most straight-forward way of avoiding double-counting may be to require that participants in a domestic emissions trading scheme not be allowed to generate project-based credits from activities covered by the trading scheme. But this is not the only way. With appropriate administration and accounting mechanisms, governments can allow project-based activities to be undertaken in sectors covered by an emissions trading scheme – and still avoid double-counting.

Combining domestic trading schemes and project-based mechanisms would typically involve addressing environmental, economic and administrative considerations. Determining appropriate boundaries for project-based activities is important to clearly identify emission reductions that can be attributable to these. Planning with careful monitoring and accounting are key elements of a strategy involving both DETs and PBMs. For example, governments could allow project-based activities to be undertaken in sectors covered by an emissions trading scheme – and avoid double-counting – by determining upfront what portion of a particular sector’s GHG reductions would be met through emissions trading and what portion through project-based activities. The project-based contribution would then need to be subtracted from the total allowances envisioned for that sector. Credits from project-based activities could thus, in theory, be earned up to the level of allowances set-aside for the project-based contribution. One way of avoiding double-

counting may be that eligible project-based activities are those that are undertaken in facilities that do not already receive allowances in the cap-and-trade scheme. However, in the context of a country with an overall emissions target, such as under the Kyoto Protocol, there could be flexibility to add project-based credits to DET allowances, with the sum of these emission units being subtracted from that country's overall allowed emissions (e.g. assigned amounts under the Kyoto Protocol). This may have implications for mitigation efforts in other sectors, but would not lead to double-counting and would not compromise the overall environmental target. There may be legitimate reasons to include PBMs in a sector covered by a DET, for example to attract greater foreign investments. Combining cap-and-trade schemes with project-based mechanisms in the same sector would typically be more complicated to set-up than a single broad emissions trading scheme, as it would require careful design and additional administrative requirements. However, the expected benefits of allowing PBMs in a sector already covered by a DET may be worth it.

Accurately accounting for project-level activities requires good data and confidence in the validity of the baseline and project emissions calculations. Both the calculation of project emissions and the emission baseline involve uncertainties, which need to be taken into consideration when linking PBMs with emission trading schemes. While efforts certainly need to be maintained to improve data quality and consistency, it is not realistic to expect complete accuracy of data and measurements, especially in the short-term. This means, however, that assessments of compliance and project performance will need to take into account uncertainties. Although having 100% certainty is not possible, this does not inhibit the functioning of the GHG accounting system taking into account PBMs. However, it is critical that there be sufficient confidence in the quality of the data and in the processes (e.g. monitoring, verification and reporting) to generate them, and that there be a recognition of their legitimacy.

The way in which emission credits are generated from project-based mechanisms also leads to particular accounting and planning challenges when linking domestic emissions trading schemes and project-based mechanisms. Emission credits from project-based mechanisms are generated *ex-post*, so that governments might wish to keep a check, *ex-ante*, on the potential contribution of project-based mechanisms to meeting GHG commitments. One option to do this is through tracking emission reductions from projects in a separate database and/or through a special notification procedure to the national emissions registry. Setting-up and maintaining such a database and a notification procedure would lead to additional administrative costs, though it may be necessary where a large volume of project-based activities is expected.

The compliance risks associated with project-based mechanisms, in particular when using relative baselines, might need to be taken into account. For example, a relative baseline defined as a given amount of CO₂ per unit of output implies that the amount of emission credits from a project activity would be directly correlated to the project's output levels which may vary over time. Although such compliance risks are expected to be limited in most cases, they may be more significant in certain circumstances, e.g. in countries with a high degree of involvement in the project-based mechanisms that are net sellers of emission units. One possible means of mitigating such risks for a country with an overall GHG commitment hosting project-based mechanisms may be to take into account its mitigation objective in the design of project-based mechanism baselines. For example, a project baseline might need to be developed in terms of "what *should* happen to meet GHG targets" in the host sector/country, rather than "what *would* have happened otherwise" if estimated business-as-usual emissions lead to emissions significantly above the target.

Another way to minimise non-compliance risks associated with possible over-transferring of PBMs credits may be to withhold a portion of allowances/credits for domestic use and restrict the portion of allowances/credits for export, trading these later if they are not needed for domestic obligations. Alternatively, a government may wish to set-aside resources to purchase emission units if there are risks of non-compliance arising from the over/under performance of project-based activities (as it may do to hedge

against the performance risks of any other GHG mitigation policy or measure). Careful monitoring of the emissions market combined with a strategic purchasing strategy would help reduce costs of managing compliance risks. For example, a government could buy units whenever they are below a certain price and sell them if not necessary at the end of a period, instead of waiting until the end of that commitment period to buy necessary units to meet compliance.

Developments in the EU to meet GHG reduction commitments offer a good case study on how some of the theoretical issues associated with linking GHG emissions trading and project-based mechanisms are being dealt with in practice. Under the 2004 EU Linking Directive on project-based mechanisms, JI and CDM credits can be used by private entities for compliance under the EU Emissions Trading Scheme (EU-ETS). Allowing JI and CDM credits into the EU trading scheme is expected to help reduce overall compliance costs under the EU scheme. The paper discusses the rules elaborated under the EU Linking Directive and their implications on the emissions market as well as administrative and accounting requirements.

A key issue in the debate leading up to the recent finalisation of the EU Linking Directive was concern about the implications of allowing JI and CDM credits into the EU-ETS on the amount of greenhouse gas reductions that could be achieved abroad (compared to requiring all reductions to be generated within the EU) and the risks of compromising the practical implementation, within the EU, of the Kyoto Protocol's "supplementarity" principle. The Linking Directive addresses this issue by requiring Member States to decide prior to each trading period on its intended use of ERUs and CERs and the maximum use of JI and CDM credits by each installation covered by the EU-ETS. Member States must also report to the European Commission every two years on the use of credits from JI and CDM activities compared to domestic actions. Subject to whether the EU's "supplementarity" provisions under the Kyoto Protocol and UNFCCC are being met, the Commission shall consider legislative or other proposals to ensure that the use of mechanisms is supplemental to domestic action within the EU.

To avoid double-counting, the Linking Directive includes provisions to allow JI credits (i.e.ERUs) or CDM credits (i.e. CERs) to be issued for reductions or limitations that affect emissions from installations covered by the EU-ETS; however very strict accounting procedures apply:

- ERUs or CERs from any project affecting *directly* emissions of an installation covered under the EU-ETS need to be compensated by the cancellation of an equal number of allowances by the operator of that installation.
- ERUs or CERs from any project affecting *indirectly* the emission level of installations covered under the EU-ETS need to be compensated by the cancellation of an equal amount of allowances from the national registry of the Member State from which the ERUs or CERs originate.

This provision ensures that an EU allowance, a CER, and an ERU each correspond to one Assigned Amount Unit (the basis for national allowed emissions under the Kyoto Protocol) and thus preserves the integrity of each unit.

The Linking Directive demands that baselines for JI or CDM projects implemented in EU Member States comply with the *Acquis Communautaire*. This means that the EU pre-accession process requiring EU accession countries to align their national laws with EU legislation, or the *Acquis Communautaire*, will essentially translate into stricter baselines –and thus a reduction in the volume of credits for potential for JI projects - for some Member States, especially the newest EU Member States, than would be the case without such a requirement. These rules seek to maintain the environmental effectiveness of the EU-ETS, but they may have implications for the JI market (as well as for the demand for other Kyoto units) for all participants, including those from non-EU countries.

1. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol require developed countries to adopt policies and programmes to achieve measurable GHG emission reductions, with the ultimate objective of stabilising GHG concentrations in the atmosphere at safe levels. Domestic greenhouse gas (GHG) emissions trading schemes and project-based mechanisms are two of the possible policy instruments that can be implemented in a government's strategy to meet this goal. These trading-based schemes allow for the buying and selling of emission units which are created when GHG reductions below a given target are achieved.

Linking project-based mechanisms and emission trading schemes typically expands coverage, increases the number of compliance options, lowers compliance costs, and leads to a higher level of market liquidity, compared to a situation where an emission trading scheme is used to the exclusion of project-based mechanisms. However, there are a number of challenges that may arise when linking project-based mechanisms and emissions trading schemes, including double-counting risks, accounting possibilities and managing risks and uncertainties for compliance.

Linking project-based mechanisms and emission trading schemes can occur at a variety of levels. Domestically, countries have considerable freedom in whether and how they engage private entities. This includes flexibility on whether and how they design and implement domestic emission trading (DET) schemes, as well as whether and how they implement domestic project-based mechanisms. Governments can also choose whether a DET can link with domestic project-based mechanisms, and/or with international project-based mechanisms such as the "Kyoto" mechanisms - Joint Implementation (JI) and the Clean Development Mechanism (CDM) – and utilise their associated emission units¹ to meet national targets².

Although there are a number of possible links between emission trading and project-based mechanisms, the focus of this paper is on linking domestic GHG emission trading schemes with: (i) domestic; and, (ii) international (JI and CDM) GHG reduction project activities (see Figure 1). The objective is to examine some of the challenges in linking DETs and project-based mechanisms, as well as some possible solutions to address these challenges. The link between JI / CDM and intergovernmental international emissions trading (i.e. Article 17 of the Kyoto Protocol) is defined by the Kyoto Protocol, and therefore is not covered in this paper.

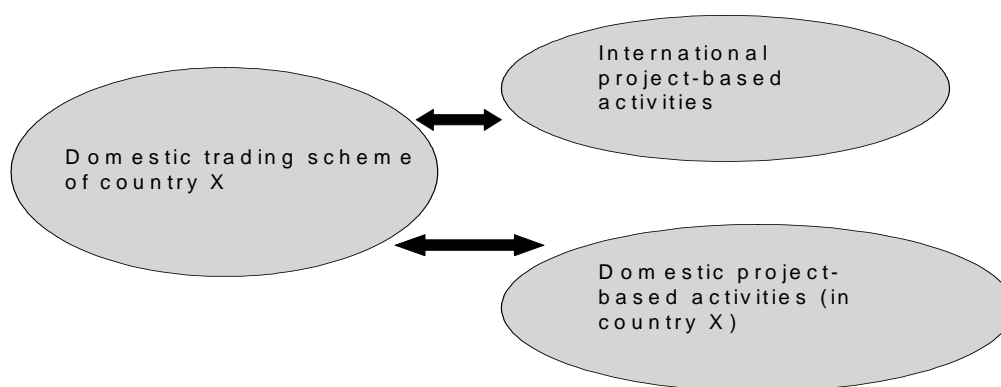
¹ Assigned amount units (AAUs) for emissions trading, emission reduction units (ERUs) for JI projects and certified emission reductions (CERs) for CDM projects.

² It is useful to note that this national decision may, or may not, coincide with the Government's own overall strategy to meet its GHG commitment. For example, a Government could very well decide to cover part of its sources with a DET and not allow covered entities to use Kyoto units (i.e. force them to meet their target entirely through domestic reductions), while it engages in the Kyoto mechanisms as a buyer/seller of Kyoto units to meet the country's national GHG commitment (e.g. to buy Kyoto units to cover emissions increases in sectors not covered by its DET).

The paper is written in the context of:

- countries adhering to the Kyoto Protocol³ and elaborating their strategies to meet their GHG emission commitments, including through the use of the emissions trading and project-based mechanisms. For example, the European Union (EU) will be commencing a GHG Emissions Trading Scheme in January 2005, and recently, the Council of ministers and the European Parliament agreed on a text for an EU Linking Directive allowing the use of JI and CDM emission units in the EU Emission Trading Scheme (EU-ETS).
- all countries (and/or regions within countries) with GHG emission obligations that may choose to use domestic emissions trading and project-based mechanisms to meet their GHG commitments.

Figure 1: Interaction between Domestic Emissions Trading Schemes and Project-based Mechanisms



Note: Arrows represent key interactions addressed in this paper.

The paper includes the following elements:

- (1) an overview of the different flexibility mechanisms (i.e. GHG emissions trading and PBMs), including a brief description and comparisons between the mechanisms (Section 3);
- (2) an exploration of the issues that emerge when project-based mechanisms link with domestic emissions trading schemes, as well as possible solutions to address some of the challenges raised (Section 4);

³ This paper presumes that the Protocol will enter into force. The Kyoto Protocol's entry-into-force requires (i) the ratification by at least 55 Parties to the UNFCCC; and (ii) the ratification of Annex I Parties which account in total for at least 55% of the total Annex I CO₂ emissions in 1990. However, issues addressed in this paper would remain relevant without the entry-into-force of the Kyoto Protocol, with countries implementing domestic GHG trading schemes and project-based mechanisms to meet their GHG targets.

(3) a case study examining the EU-ETS and the EU Linking Directive on project-based mechanisms, in particular on how the EU is addressing in a practical context relevant linking issues (Section 5);

(4) a concluding section that summarises possible challenges and solutions when linking project-based mechanisms with domestic emission trading schemes.

2. Emissions trading and project-based mechanisms – overview of fundamentals

Over the past decade and more, emissions trading and project-based mechanisms have received increased attention as economically efficient and effective means of implementing environmental policy objectives. For example, as early as 1990, the US Clean Air Act Amendments contained provisions for using a cap-and-trade program to control sulphur dioxide (SO₂) emissions that cause acid rain. This US SO₂ cap-and-trade program – the largest and most successful practical experience with emissions trading to date - started in 1995. This positive experience contributed to policy-makers considering trading-based instruments as part of the solution to address other environmental problems. In 1997, the international community adopted the Kyoto Protocol which includes provisions for international GHG trading and two project-based mechanisms (i.e. Joint Implementation and the Clean Development Mechanism). In addition to the emergence of some domestic GHG emissions trading schemes in the late 1990s, the EU recently agreed to implement an EU-wide GHG Emissions Trading Scheme at the installation level that will commence in 2005.

Trading-based mechanisms allow overall emission reduction targets to be met at lower costs than would be the case using entirely internal⁴ means, as they provide an opportunity to take advantage of differences in marginal abatement costs across emission sources. Trading-based mechanisms should theoretically reduce the overall cost of complying with an emissions constraint by providing covered sources the flexibility to meet their individual cap through direct investment in the market or the purchase of emission *allowances* or *credits*. Those with the possibility to reduce emissions below their individual caps at lower marginal cost than the market price may also sell allowances or credits. As a result of differences in marginal abatement costs and the possibility to *trade* allowances or credits – providing an incentive to reduce emissions where it is least costly to do so - a monetary value is given to GHG emissions.

At the domestic level, the main difference between emissions trading schemes (or cap-and-trade schemes⁵) and project-based mechanisms arises from the way in which they can generate emission units. Emission trading schemes involve the allocation of initial emissions allowances to each source covered, as part of an overall cap on emissions. Firms/entities have the responsibility of the management of this new asset⁶, and each source must hold adequate allowances to cover their actual emissions at the end of each regulatory period⁷. On the other hand, project-based mechanisms can only generate credits once they achieve emission reductions below an agreed baseline or, for sinks projects, removals above a baseline. The

⁴ That is, internal to each country's or installation's own operations.

⁵ The focus of this paper is on domestic emissions trading defined as a "cap-and-trade" scheme for private entities (see section 3.1). There are, however, other possible means of engaging private entities in emissions trading.

⁶ For example IEA analysis of the EU Emissions Trading Directive (IEA/SLT(2003)3) calculates that at €20/tCO₂, the emissions allowances allocated to European industry would amount to an asset of about €30 billion per annum, assuming broad industry coverage.

⁷ Note also that sink enhancement activities might be covered in an allocation-based trading system, although this would require particular design features (e.g. deciding how they can offset entities' emissions or give claim for additional allowances).

baseline may be a regulatory limit that is standardised across similar projects⁸, or it may be developed for individual projects (or project types) based on estimates of emission levels in the absence of the project⁹.

2.1 Emissions trading schemes

Under a domestic emissions trading scheme, covered entities are typically regulated at the national level (or sub-national level if a scheme covers only part of a country), and an upper limit (cap) is put on the total level of national emissions. This cap ensures that whatever target has been set (e.g. for GHG emissions) is achieved. In essence, as long as covered sources comply, the overall environmental effectiveness of such a scheme is very high. Entities are allocated emission allowances or permits¹⁰ that in total equal the level of the cap. Entities can sell allowances for emission reductions so long as the entity is in compliance at the end of a commitment period- that is, it can surrender allowances that correspond with its emissions level. In other words, entities can sell and purchase allowances to meet their cap - hence the terminology “cap-and-trade”.

Governments that have overall national emissions cap under an international agreement and have the option to participate in an international emissions trading schemes (such as under the Kyoto Protocol) may also engage their private entities directly into the international emissions trading scheme without designing a “cap-and-trade” scheme. In theory, Governments could impose an obligation upon entities to cover their emissions with eligible international units (e.g. AAUs, CERs and ERUs under the Kyoto Protocol), without going through the processes of deciding on the entity-level cap¹¹. The focus of this paper, however, is on domestic emissions trading as typically defined by “cap-and-trade” schemes.

In a well-designed domestic emissions trading scheme, entities that are efficient in reducing their emissions below their allowance level can sell their “excess” allowances to those entities for whom reducing emissions is more costly, creating sufficient incentive for the buying and selling of emissions allowances. Trade is conducted at the entity level and the more traders, the larger and more efficient the market. In addition, the more buyers and sellers, the more options for compliance, the more liquid the market and the greater the opportunity for the equalisation of abatement costs. In fact, the broader the emissions trading market, the better are the prospects for a smooth and efficient functioning market and the lower the risks of market power. However, given that the price of emission units is determined by the market, the total compliance costs are uncertain and difficult to predict in advance with a high level of confidence.

Concerns raised over cap-and-trade schemes have included the possibility that they can allow for the trade in surplus emissions (or “hot air”) when a country’s GHG emission reduction target is set higher than BAU

⁸ As in early US lead regulations for gasoline products.

⁹ As per the Kyoto Protocol’s Joint Implementation and Clean Development Mechanism.

¹⁰ Allocation is done through either auctioning, grandfathering or updating (for more discussion see e.g. Harrison and Radov 2002, Crampton and Kerr 2002).

¹¹ As discussed above, domestic emissions trading schemes can be standalone schemes or can interact with the international market. For example, New Zealand’s Negotiated Greenhouse Agreement (NGA) programme requires emitters to meet negotiated emissions intensity targets. It is a domestic regulatory regime that interfaces with an international trading system, as it provides for the potential of over-compliance to be rewarded with New Zealand’s assigned amount units – the currency for international emissions trading under the Kyoto Protocol. Although production/emission levels are not capped and no allowances are allocated *ex-ante*, the NGA programme could broadly be defined as an emissions trading scheme in the sense that domestic emitters can trade under and over achievements *ex post*, as well as purchase emission units on the international market.

emissions. However, trade in surplus emissions can arguably be attributed more to the inadequacy of the overall emissions target and its allocation between entities than on the trading scheme itself.

Countries have a great degree of latitude in their design of individual domestic GHG emission trading schemes. Even for the countries covered by the Kyoto Protocol's international emissions trading provisions, there are no provisions as to whether and how countries should design domestic emissions trading schemes. Emissions trading under a domestic scheme can generate a specific kind of emission unit that may, or may not, be recognised under another domestic trading scheme. These domestic trading units may, or may not, be fungible with "Kyoto" units generated by the Kyoto flexibility mechanisms (international emissions trading, JI and CDM).

2.2 Project-based mechanisms

With project-based mechanisms (PBMs), entities or projects earn tradable emission credits if they reduce emissions below an agreed baseline, usually an estimation of a business-as-usual (BAU) scenario. Once the better-than-the-baseline performance has been verified and certified, emission credits corresponding to this performance will be issued and can be traded. Participation in project-based mechanisms is typically voluntary and results in increasing the range of possible cost-effective GHG mitigation options.

The success of project-based mechanisms – measured in terms of the volume of project-based activities and the credits they generate – largely depends on clear rules (both technical and methodological) and administrative processes that ensure emission credits are awarded to projects in a fair, consistent and transparent manner (Karthä et. al. 2002). A downside to their widespread use, however, is the relatively high transaction costs for project developers associated with the generation of credits. These transaction costs typically involve the costs associated with obtaining the certified emissions credits, including the costs generated by the baseline development, and the costs incurred for project validation, monitoring and registration.

One of the key challenges in awarding emission credits for project-based activities is the determination of the baseline scenario and associated emissions (OECD/IEA 2000). In fact, project-based emission credits are generated only according to an agreed emission baseline, which can be constructed either as an absolute (e.g. t CO₂) or a rate-based (e.g. t CO₂/MWh) emission level. The level at which the baseline is ultimately set will determine the stringency of the project-based mechanism (i.e. how difficult it is for projects to reduce GHG emissions below the baseline). The baseline is thus a critical element of PBMs, as it determines the potential volume of credits that could be expected from project-based activities and is a key factor in the economic assessment of such GHG mitigation activities.

Project-based mechanisms can be implemented internationally, as well as in a domestic context in countries that have an overall GHG commitment. The Kyoto Protocol foresees the use of project-based mechanisms in the form of Joint Implementation and Clean Development Mechanisms. An example of project-based mechanisms in a domestic context is the domestic offsets scheme considered under Canada's proposed domestic emissions trading scheme (for more detail see Section 4).

As with emissions trading, project-based mechanisms provide public and private entities with the potential to increase the economic efficiency of meeting their emission targets (as opposed to a situation without such flexibility, e.g. "command-and-control" policies). They do so by enabling more choice in least-cost emission reduction options, leading to an equalisation of entities' marginal cost of abatement. At the same time, PBMs can stimulate the development and diffusion of lower GHG-emitting technologies, especially in cases where the emissions credits are generated via new GHG-mitigation technologies implemented in

countries/regions/sectors where there are otherwise no incentives to implement projects with such technologies.

Project-based mechanisms also offer incentives to look for – and to undertake - mitigation activities not covered by a domestic emission trading scheme or other policy instruments. Project-based mechanisms are voluntary and only contribute to increasing the supply of credits. An incentive to undertake project-based activities thus only exists if there is a demand for the emission credits they generate, i.e. it is possible to use the emission credits¹². In fact, a key difference between PBMs and emission trading schemes is that the latter generate both a demand and supply for emission units¹³, whereas project-based schemes generate only a supply of credits. Project-based mechanisms (or domestic offsets) thus need to be combined with another instrument. They could be implemented at the domestic level in situations where governments regulate emissions through instruments other than emission caps, e.g. through performance standards or voluntary agreements, and in addition allow entities covered by the instruments to count emission credits from projects towards meeting their voluntary agreement, for example, or offsetting a tax. For example, credit trading was used in the earliest emissions trading program in the United States, where the baseline for credits was provided by traditional technology-based standards and where credit trading presumed the existence of a demand set by previously determined set of regulatory standards (Tietenberg 2001).

2.3 Comparisons of emissions trading and project-based mechanisms

Prior to examining issues relating to linking project-based mechanisms with domestic emissions trading schemes, it is useful to firstly examine key similarities and differences between the two systems using the following considerations/criteria:

- environmental effectiveness;
- economic efficiency;
- institutional requirements;
- breadth of coverage of sources and sinks.

This discussion provides for a greater understanding of emissions trading and project-based mechanisms, which is useful background for some of the issues raised in Section 4.

- **Environmental effectiveness**

Environmental effectiveness is a key criterion when considering the implementation of policy tools to meet GHG commitments. Policy analysts rank emissions trading schemes quite high on an environmental effectiveness scale. The emissions cap ensures that the GHG target is met, as long as there are the necessary institutions in place to enforce that covered entities surrender the required amount of allowances to cover their emissions and that the overall emissions cap is met. However, the cap-and-trade scheme can only be judged in terms of meeting a given target, and not on the environmental stringency of the target itself. The purpose of a cap-and-trade scheme is to meet an overarching emissions cap, whatever it may be.

¹² Although earlier programs such as Activities Implemented Jointly (AIJ) were voluntary, the incentive to develop projects under the AIJ program was largely focused on gaining experience in relation to project-based mechanisms.

¹³ This is not to say that the implementation of an emissions trading scheme necessarily occurs in isolation. For example, a commitment to meet a GHG target, such as the Kyoto target, is often the stimulus to consider implementing domestic emission trading schemes.

In the case of emissions trading schemes with relative targets, the environmental effectiveness will depend on scale effects – i.e. how large economic growth is. For example, cap-and-trade schemes based on *relative* caps might be less effective in reaching an *absolute* environment target than cap-and-trade schemes based on *absolute* caps, as relative caps would allow covered entities to increase emissions if their output increases¹⁴. But if economic activity decreases, then entities would be allowed to emit fewer emissions and in such circumstance, relative caps may reduce emissions below an overall *absolute* target.

Project-based mechanisms ensure that a project's GHG are kept below the baseline level, however stringent it may be. Entities participating in such schemes can only generate credits if their activity performs better (i.e. lower emissions) than the baseline. The PBMs, alone, cannot ensure meeting an overall GHG objective, as participation in those mechanisms is voluntary and will depend on the other possible mitigation options and on the demand for the units they generate. The overall environmental effectiveness of PBMs would thus typically be lower than a mandatory cap-and-trade scheme, although it is possible that an individual project earning credits might contribute more to GHG emission reductions than some individual facilities covered by a cap-and-trade scheme. For example, some may perceive credits generated from specific projects as being more visible and may prefer to purchase these credits rather than others even though they have the same impact towards meeting compliance. The international oversight and scrutiny of emission credits generated by CDM projects may be perceived to lead to greater environmental performance certainty. Moreover, the World Wildlife Fund (WWF), an environmental non-governmental organization, has developed a "Gold Standard: Quality Standards for CDM and JI" aiming to be an independent best practice benchmark for CDM and JI project-based activities meeting certain environmental and social criteria. It is still early to assess whether such official and independent scrutiny of project-based credits could lead to a sustained price premium in the market – compared to other eligible emission units -, and if so how much it could be.

Economic efficiency, administrative and transaction costs

Trading-based mechanisms seek to increase the economic efficiency of meeting environmental objectives compared to command-and-control environmental policy instruments. Both cap-and-trade schemes and project-based mechanisms are based on allowing various economic actors to decide their own GHG mitigation strategy, according to their individual economic and market situation, instead of the government, which does not necessarily have access to the best information on each actor's marginal abatement costs.

Administrative costs refer to the government costs associated with implementing trading-based mechanisms to meet GHG commitments; while transaction costs are associated with the costs of transacting emission units generated by the mechanisms. There are different views on the relative administrative costs – for a government – in implementing either domestic emissions trading or project-based schemes, with no clear conclusion on which mechanism is more administratively expensive to set-up. But in terms of transaction costs for entities, there is general agreement that they are greater for project-based mechanisms. Indeed, the implementation of project-based mechanisms and the way in which they generate emission credits translates into higher transaction costs associated with validating and certifying GHG reductions from project-based activities.

¹⁴ Note that a domestic cap-and-trade scheme based on relative caps implemented in the context of a country with an absolute emissions target would not compromise that country's compliance if the government is committed to meeting the overall GHG target and compensates for any shortfall.

While there are upfront costs in establishing emissions trading schemes, there is no need for an approved project before a trading transaction can take place. In a project-based scheme, this part of the process can require significant resources. In particular, the information requirements and preparation time for a project-based activity tend to be higher than those of emissions trading (i.e. cost-effectiveness is typically higher with allowance trading than with credit trading). However, transaction costs associated with project-based mechanisms can be reduced if more detailed guidance is given up-front (e.g. a baseline is pre-defined) and increased experience and guidance development should work to further reduce those costs.

Project-based mechanisms would typically require that each project activity be approved by a national (and international, as in the case of the CDM) authority before trading of credits can take place. Compared to cap-and-trade schemes, this feature enables national authorities to have a greater control on the type of emission reductions being undertaken and the quantity of emission credits allocated to each project activity. However, it could also lead to greater administrative costs and institutional requirements for national/regional authorities, compared to cap-and-trade schemes, depending on how many project-based activities are implemented, as administration costs of a PBM scheme increase with the number of projects ultimately submitted for approval. In addition, the results of such a comparison would also depend on the design of the scheme and its coverage.

Administrative costs under domestic cap-and-trade schemes largely relate to the time, resources and political backing needed to set the overall emissions cap and then making the initial allocation of allowances. Setting the cap and then the allocation among covered entities can be very time-consuming and complicated as many important considerations (e.g. impact on competitiveness) typically need to be taken into account. But these two steps (i.e. the cap and the allocation) are necessary for trading to take place.

Institutional requirements

For emissions trading schemes, governments are required to develop plans for allocating allowances to covered sources and sinks, and establish registries to account for emissions from sources and record transactions. Registries are commonly electronic, leading to both hardware and software costs. Ongoing work is involved in monitoring emissions from entities and auditing reports submitted by entities to prove compliance against their cap. On the ground inspections may also be required in the auditing process.

Whereas governments (national or regional) are involved in setting overall emission targets under a domestic emissions trading scheme, it is individual firms that are likely to be the main actors involved in setting baselines for domestic project-based activities where there are no *a priori* baselines (and they would then make their case to have their project reductions validated and then be issued corresponding credits). However, in all cases, governments would be required to approve the project-based activities and recognise the resulting emission reductions. Some governments may be able to develop up-front, clear guidelines for their domestic industry on assessing appropriate baselines for project-based activities implemented within their jurisdiction (which would reduce transaction costs for private entities), while this may not be possible for others.

Breadth and coverage of sources

In theory, there are no restrictions to the breadth of coverage that could be achieved by both types of schemes. In practice, however, not all emission sources are as easily measured or estimated with accuracy, making their inclusion more complicated in mandatory cap-and-trade schemes. This is not to say that these sectors cannot be included in a cap-and-trade scheme, but that confidence in a reliable and effective monitoring, reporting and verification systems will be required and may be more difficult to establish.

In addition, cap-and-trade generally appears to be a very suitable instrument for large stationary sources but difficult to apply to mobile and small sources. The practical implementation of a cap-and-trade scheme which requires an up-front allocation of allowances to all covered facilities is made easier when the covered entities are sufficiently large and not too variable and diffuse in the economy. For example, although the transportation sector is responsible for a large – and growing – proportion of OECD countries' GHG emissions, it is not included in any of the GHG emission cap-and-trade schemes currently being envisioned. The power generation sector is often considered as a good candidate for cap-and-trade schemes, but it is also well suited for project-based mechanisms (see, for example, Kartha et. al., 2002 and OECD/IEA 2000).

By comparison, project-based mechanisms can be just as easily applied to small sources as to large sources, and to sinks. For example, the transport and waste sectors might be more suited to project-based mechanisms, as is being considered under the Canadian domestic offsets¹⁵ program as part of its proposed domestic emissions trading scheme for Large Final Emitters (Government of Canada 2003). However, developing and validating emission baselines may be more challenging for some types of projects (e.g. forestry projects) than others such as power generation projects (OECD/IEA 2000). For example, sink-type projects, whether in the forestry or agriculture sectors, are typically not considered suitable for cap-and-trade systems, while their contribution to reducing net GHG emissions could still be encouraged through project-based mechanisms. In fact, Canada is also considering the inclusion of sinks activities from the agriculture and forestry sectors¹⁶ in its domestic offsets program.

3. Project-based mechanisms and domestic emissions trading schemes – Linking issues

This section of the paper examines specific issues relating to linking project-based mechanisms (PBMs) and domestic emissions trading schemes (DETs). It first discusses the use of international project-based mechanisms as part of a country's compliance strategy and then focuses on the implementation of domestic project-based mechanisms. The benefits of linking schemes relate to a greater number of compliance options and thus lower overall compliance costs. The types of issues that may arise from the linking PBMs and DETs are explored, including double-counting risks, accounting possibilities and managing risks and uncertainties for compliance.

3.1 International Project-Based Mechanisms

There are two options generally available to governments in utilising emission units from international project-based mechanisms. Firstly, a government can make direct purchases of international emission units (such as CERs and ERUs) to assist it in meeting its GHG obligations. Secondly, a government can choose to recognise emission units from international project-based mechanisms as part of its domestic emissions trading scheme. Entities can then purchase emission units from international PBMs to meet their emission caps under the DET. In this situation, international project-based mechanisms provide options, in

¹⁵ Large Final Emitters covered under the proposed Canadian domestic emissions trading scheme can use emission reductions from domestic project offsets to assist them in meeting their emission reduction requirements under the trading scheme. All Kyoto units are also eligible.

¹⁶ However, under the Kyoto Protocol, sink enhancement activities would generate Removal Units (RMUs) which – unlike the other Kyoto units (i.e. AAUs, ERUs, and CERs) – are of a temporary nature. Accounting for RMUs thus requires a longer-term strategy to replace them when they expire.

addition to domestic actions, to meet GHG targets most cost-effectively. The key issue for these purchases is the *recognition* by governments of the validity of the project-based credits earned from projects undertaken abroad.

Several Annex I governments have already started to purchase, or plan to purchase, CERs and ERUs for their compliance. Table 1 highlights the various means that are being taken to make those purchases, e.g. directly or indirectly through government tenders and/or investments in carbon funds.

Table 1: Overview of Selected Initiatives to Purchase CERs/ERUs

Country/Fund	Scheme/System and Description/Type of linkage
Austria	<ul style="list-style-type: none"> • JI and CDM tender programs - aim at spending Euro 1m in 2003, rising to Euro 11 m in 2004, Euro 24m in 2005 and Euro 36m in 2006 on JI and CDM projects.
Asia Carbon Fund	<ul style="list-style-type: none"> • The Fund has a target market capitalisation of US\$120m and a target emissions reduction of 200,000 CO₂e in Phase 1 annually for 21 years, based on a portfolio of small-scale, medium-scale and large-scale renewable energy and energy efficiency CDM projects in the Asian continent.
Canada	<ul style="list-style-type: none"> • Government of Canada considering purchase of a minimum of 10 MtCO₂eq* of Kyoto units, with priority to be given to units from CDM/JI projects.
Denmark	<ul style="list-style-type: none"> • Government initiative to invest in JI and CDM. – Reserve for JI projects: Euro 17.5m.
Finland	<ul style="list-style-type: none"> • Government of Finland pilot JI/CDM program. Current budget Euro 10m. • Focus in 2003 on small scale CDM projects - planned purchases of CERs from small-scale CDM projects approx. 500,000 tCO₂eq.
Italy	<ul style="list-style-type: none"> • Seeking 10.2 MtCO₂eq from JI and CDM activities.
Japan Carbon Fund	<ul style="list-style-type: none"> • Japan Bank for International Cooperation (JBIC) and the Development Bank of Japan (DBJ) planning to invest Euro 45.8m.
Spain	<ul style="list-style-type: none"> • Spanish Carbon Fund – focus on CDM and JI projects.
Sweden	<ul style="list-style-type: none"> • Swedish International Climate Investment Programme (SCLIP). Current budget Euro 15m. Focus on JI and CDM.
Testing Ground Facility (TGF) in the Baltic Sea region	<ul style="list-style-type: none"> • Regional JI fund in the Baltic Sea region. Funded by the governments of Denmark, Finland, Iceland, Norway and Sweden. Current budget Euro 10m.
The Netherlands	<ul style="list-style-type: none"> • The government is planning to meet around 50% of its Kyoto target through JI and CDM (around 25 MtCO₂eq*): • Number of different tracks to purchase ERUs and CERs, including Procurement Tenders: CERUPT (Certified Emission Reduction Unit Purchasing Tender) and ERUPT (Emission Reduction Unit Purchasing Tender); Multilateral international financial institutions and regional development banks: the International Finance Corporation (IFC), the International Bank for Reconstruction and Development (IBRD) and <i>Corporacion Andina de Fomento</i> (CAF) for CDM and European Bank for Reconstruction and Development (EBRD) for JI; private financial institutions (e.g. Rabobank); bilateral purchase agreements with host countries: in discussion; participation in carbon funds: the PCF for JI and CDM and CDCF for small scale CDM projects in least developed countries.
World Bank	<ul style="list-style-type: none"> • Prototype Carbon Fund (PCF) established in July 1999 Credits generated by the PCF can be used in national trading systems that allow for the use of credits generated by the Kyoto Protocol's JI and CDM. • PCF Participants: 6 countries (i.e. Canada, Finland, Japan, The Netherlands, Norway, and Sweden) and 17 companies. • Community Development Carbon Fund (CDCF) aimed at small-scale projects in least developed countries. • BioCarbon Fund launched in November 2002, aimed at demonstrating projects that sequester carbon.

* Figures represent Governments' purchasing plans; they do not include possible purchases of credits from private entities
Sources: IETA's Trading Schemes Database (<http://www.pointcarbon.com/schemes.php>); Hasselknippe (2003), Ellerman et. al., (2003), Government of Canada, Government of the Netherlands, JIQ (2003a, b).

Table 2 lists some of the initiatives, either planned or underway, to link project-based mechanisms with domestic GHG emissions trading schemes. The table includes domestic initiatives to include both emission units from international project-based mechanisms (e.g. JI and CDM), and emission units from domestic project-based mechanisms.

Table 2: Selected initiatives to link project-based mechanisms and domestic trading schemes

Trading Scheme/country	Project-Based Linking Features
Canada	<ul style="list-style-type: none"> • Domestic Offset scheme under consideration. • Kyoto units (including from JI and CDM) could be used by entities (i.e. large final emitters) covered in DET.
European Union Emissions Trading Scheme	<ul style="list-style-type: none"> • JI and CDM credits can be used up to a limit (for each installation) set by Member States. Member States must report on how firms' purchases affect national commitments to ensure that the Kyoto mechanisms are used only to supplement domestic action. • Credits from nuclear projects are not eligible. • Credits from land-use projects are not allowed during 2005-2007 phase of EU-ETS. A review of this issue will be undertaken, based on a scientific assessment of uncertainties surrounding sinks, thereby leaving a possibility for sinks credits in the EU-ETS starting in 2008. • Credits from domestic project offsets are not allowed in the 2005-2007 phase of the EU-ETS, but this issue will be reviewed for the second phase starting in 2008. • Credits from hydropower projects proposed by Member States are allowed provided they respect the World Commission on Dams criteria. The EU Commission is also to monitor hydropower CDM projects larger than 500 MW approved by the Executive Board of the CDM for possible negative social or environmental effects with a view of prohibiting use of such credits in EU-ETS.
New Zealand government tender	<ul style="list-style-type: none"> • Projects to Reduce Emissions (PRE) tender round for domestic abatement projects launched 2003. 4 Mt CO₂-e of units to be available to incentivise emission abatement and then be available for sale to international buyers.
Norway	<ul style="list-style-type: none"> • Credits from domestic and international project-based mechanisms accepted in plans for the trading scheme.
Chicago Climate Exchange	<ul style="list-style-type: none"> • Credits are given for US and overseas emission reduction projects.

3.2 Project-based mechanisms and domestic GHG emission trading schemes

This section of the paper examines specific issues relating to linking project-based mechanisms (PBMs) and domestic emissions trading schemes (DETs). The focus here is on projects developed and

implemented to generate credits that can either be traded on the international market or used as offsets in a domestic emissions trading scheme, or as a domestic mechanism for national compliance. Whilst most of the discussion relates to linking emission units from domestic project-based mechanisms to DETs, some of the discussion is also relevant to linking emission units from international project-based mechanisms to DETs (although, as mentioned above, this is mostly an issue of “recognition” by relevant authorities, rather than a technical issue).

3.2.1 Background to domestic project-based mechanisms

Countries can implement project-based mechanisms domestically as a means to contribute to meeting their national GHG commitment. For a variety of reasons (e.g. political preferences or practical issues such as ease of measurement of emission reductions), not all sources of GHG emissions may be covered under a domestic emissions cap-and-trade scheme. For example, there are some projects that may not be incentivised by existing domestic policy and regulatory frameworks, but could be covered by project crediting arrangements¹⁷. An example might be project-based activities leading to non-CO₂ GHG emissions when a domestic emissions trading scheme only covers CO₂ emissions (Sorrell and Smith 2002).

Domestic PBMs could also be interesting policy tools for governments, as domestic projects can increase market liquidity, stimulate domestic innovations and investment that lead to more efficient emission reduction options and could also identify other potential areas for emission reductions that are currently not well known (Government of Canada 2003).

Domestic project-based activities can play a useful transition role in stimulating early greenhouse gas reductions in sectors that may be suitable for emissions trading in the near future, or can be used as offsets in an emissions trading scheme, where credits from projects can be used by trading entities for compliance (Government of Canada 2003). Indeed project-based experience could provide valuable information on the mitigation opportunities and costs in different sectors, as well as generally more data that would be useful in setting-up a broader emissions trading scheme in the future and more clearly identify issues to consider in an eventual broader allocation of allowances.

Sources covered in a domestic emissions trading scheme might decide to rely more or less significantly on project-based mechanisms, both within and outside their country, if such emission reductions are valued equally towards the compliance with their emission commitments and end-up being cheaper than internal emission reductions. Some private entities may also be interested in the greater “visibility” associated with project-based activities (compared to transfers of allocations) if they contribute positively to their socially-responsible corporate image - although this is difficult to quantify.

Clearly, many entities covered by a domestic trading scheme might not wish to rely too long on external (i.e. outside their operations) emission reductions given supply and price uncertainties. Typically, companies would tend to prefer using domestic and/or international project-based mechanisms as a lower-cost transition strategy until it becomes feasible to shift their own internal operations to lower greenhouse gas emitting options, and thereby reduce uncertainties associated with emission units supply and prices. Nonetheless, having the flexibility to meet commitments through cheaper project-based reductions could be particularly useful for entities in some sectors in minimising the economic cost of GHG mitigations. To ensure that linking international and domestic project-based mechanisms with DETs is both effective and efficient, governments will need to ensure that emission reductions are not covered more than once,

¹⁷ If a domestic trading scheme includes voluntary opt-in provisions, this might effectively replace project-based mechanisms, as both would target any lower GHG abatement options outside the trading scheme. However, project-based activities, by definition, would not require allowances; a key difference with “opt-in” installations.

that accounting methods for assessing sub-national emissions are developed, that project level emission reductions are reflected correctly in the national GHG inventory, and that the various compliance risks with projects are carefully managed. The issues of double-counting, accounting, data and measurement, and compliance are now discussed in the sections below.

3.2.2 Double-counting issues

To maintain the integrity – and the value - of emission allowances from emissions trading schemes and emission credits from project-based mechanisms it is important that one allowance or one credit correspond to one specific unit of emission or emission reductions (e.g. a tonne of CO₂ equivalent). For these reasons, ensuring that there is no double-counting of emission reductions is a basic principle of flexibility mechanisms. Avoiding double-counting is also critical for overall compliance towards a national GHG commitment.

One way to implement this basic principle may be to require that participants in a domestic emissions trading scheme not be allowed to generate project-based credits from activities covered by the trading scheme¹⁸. But this does not mean that participants in a domestic trading scheme could not also be involved in project-based activities. For example, participants in a given domestic emissions trading scheme may have sources which are not covered by the scheme, which could be eligible as crediting projects. Sorrell and Smith (2002) noted, in their examination of the UK trading scheme, the possibility that retail chains may want to propose project-based activities associated with transport – a sector not covered by the UK trading scheme.

To avoid double-counting, determining appropriate boundaries for project-based activities is important. This requires clearly identifying emission reductions that can be attributable to these activities and set the limits regarding reductions that could be claimed by participants in project-based schemes. The issue of boundaries is critical to clarify the emissions (direct and/or indirect) for which a particular project-based activity is responsible. Issues of ownership, control, significance will need to be considered, as well as the relative ease of calculation/estimation and accounting.

The boundaries for project-based activities should strike a balance between comprehensiveness, impacts on which a project has control and ease of calculation/implementation. Both Begg et. al. (2002) and Sorrell and Smith (2002) have discussed the issue of project boundaries in relation to accounting for emission reductions from projects in the event that a domestic projects scheme may be developed in the UK. The issue here is the extent to which a project could be considered to be separable from the rest of the system in which it operates. For example, switching from coal to gas at a small industrial site may have a minimal influence on the rest of the energy system, but in other cases, a project will have broader influences throughout the energy system. This is particularly the case in the electricity sector. For example, an efficient lighting program within the domestic sector will impact upon emissions throughout the electricity sector, as would a large scale wind farm or CHP installation. In these cases, Sorrell and Smith (2002) recommend that an estimation of the project baseline requires an assessment of the impacts on the whole system, perhaps through the use of a system model. But such a requirement would likely increase the transaction costs associated with project-based mechanisms and might also be difficult to verify, as modelling results will be highly dependent on the assumptions. Begg et. al., (2002) consider 4 possible

¹⁸ It should be noted that in a scheme where emissions from entities are not specifically capped, but where the emissions must be covered by eligible emission units – whether from IET or PBMs-, the risk of double counting is significantly reduced. In such cases, it is more straight-forward to combine project activities with trading or comparable policy measures within the same sector.

options for dealing with project boundaries, including (i) life cycle analysis, (ii) limited life cycle analysis for a specific project type, (iii) impacts one level upstream and downstream in the project boundary¹⁹, and (iv) a developer limited life cycle assessment with control boundaries²⁰. They conclude that either limited life cycle assessment for specific project types or including impacts one level upstream and downstream in the boundary are suitable options, subject to the size of the project.

The issue of project boundaries has also been examined in other contexts. For example, the UNFCCC's Marrakech Accords (UNFCCC 2001) specify that for CDM projects, "The project boundary shall encompass all anthropogenic emissions by sources of GHG emissions under the control of the project participants that are significant and reasonably attributable to the CDM project activity" (FCCC/CP/2001/13/Add.2, Annex G, para 52). The WRI/WBCSD work on the Project Quantification Standard (draft WBCSD/WRI 2003) proposes that a project boundary encompass "all relevant primary and secondary effects that will be taken into account in the project calculation...[and] can include both direct and indirect effects", where primary effects are the specific GHG reducing activities that the project is intended to achieve, and secondary effects are all other GHG emissions changes resulting from the project, including leakage. The Dutch CERU-PT programme guidance is based on the principle of control/influence and specifies that direct on-site emissions must be considered within a project's boundary, including one-step upstream and downstream effects that are influenced by the project. Off-site emissions effects from the generation of electricity and heat that occur on the same grid as the project also need to be taken into account.

Avoiding double-counting typically implies that the greater the coverage of sources covered by a cap-and-trade scheme within a country or region, the more reduced is the scope for project-based activities in that country or region. Sorrell and Smith (2002) in fact recommend that projects that affect emissions from *sources* covered by a cap-and-trade scheme should be ineligible for crediting due to concerns about double-counting of emission reductions. For example, if the power generation sector is covered by an emissions trading scheme, not only would that exclude credits being earned from project-based activities in that sector, but also exclude project-based activities that avoid GHG-emitting power generation, such as energy efficiency projects that reduce electricity demand or renewable energy projects.

It does not necessarily have to be "all or nothing", however. Governments could allow project-based activities to be undertaken in sectors covered by an emissions trading scheme – and still avoid double-counting. One way to do this could be by holding-off part of the allowances (i.e. not allocating all the allowances to covered sources) to leave room for a certain volume of project-based emission credits to be generated in the sector(s) covered by the trading scheme. However, project-based activities would typically be able to be issued credits only if they are undertaken in facilities that do not already receive allowances in the trading scheme²¹ - unless project-based credits were to substitute allowances. Under these conditions, a domestic project-based mechanism could, in principle, co-exist with a domestic cap-and-trade scheme. Once a decision is made on the overall GHG contribution of a given sector and thus the amount of emission allowances to be allocated to that sector, government authorities would also need to make an assessment of the likely (or desired) contribution of project-based activities in that sector. The project-based contribution would then need to be subtracted from the total allowances envisioned for that sector. Credits from project-based activities could thus, in theory, be earned up to the level of allowances

¹⁹ As is used in the Dutch ERUPT scheme.

²⁰ Similar to limited life cycle assessment for project type except that boundaries are not pre-assigned but developed by the project investor.

²¹ For example, an independent renewable energy project might be considered as an eligible project-based activity, but not an energy efficiency measure within an installation already receiving allowances.

set-aside for the project-based contribution. In the context of a country with an overall emissions target, such as under the Kyoto Protocol, there could be flexibility to add project-based credits to DET allowances, with that total being subtracted from that country's overall allowed emissions (e.g. assigned amounts under the Kyoto Protocol). This may have implications for mitigation efforts in other sectors, but would not lead to double-counting and would not compromise the overall environmental target. If emission reductions achieved by project-based activities end-up being greater than the volume of credits/allowances set-aside, then other mitigation measures or emissions purchases would be needed. Conversely, if fewer emission credits are generated than the allowances set-aside, then the "extra" credits or allowances could be made available in the trading market or banked for the future, for example.

Combining cap-and-trade schemes with project-based mechanisms in the same sector is technically possible. Governments considering this possibility would need to assess the advantages and disadvantages of such a policy decision, as well as the design and administrative implications. Issues to consider in the particular context of each country would likely include the economic/political costs and benefits of having part of a sector covered by project-based mechanisms instead of a domestic emissions trading scheme (DET). For example, would project-based mechanisms be more compatible with the objectives of attracting foreign investments in a sector covered by a DET? What kind of baselines, including their level, would be needed to make project-based activities in a sector compatible to efforts required by "capped" facilities to ensure some level-playing field in the sector? Combining a DET and project-based mechanisms in the same sector would likely imply additional administrative requirements compared to only having a DET, but what type and how much? With respect to the latter question, the added administration cost associated with project-based mechanisms – particularly if the baseline guidance is clear and easy to apply (e.g. the baseline for projects is defined as a pre-set standard) – might be manageable, given that the allocation of allowances process for a DET scheme already requires examining the covered sector and its players in detail. Nonetheless, combining a DET and a PBM in the same sector would likely involve more complexities and perhaps efficiency losses compared to a stand-alone DET. The relative importance of these costs and how they affect the decision-making process will largely depend on the overall resources available to manage the flexibility mechanisms within a government²² and the estimated benefits of having a sector covered by both mechanisms. This issue is further discussed in Section 5 in the context of the EU Linking Directive.

3.2.3 Accounting issues

As noted earlier, the creation of project-based credits typically requires their "certification". Once certified, project-based credits can become part of a common currency and be traded in a domestic emissions trading scheme. The accounting of project-based emission reductions requires²³, *inter alia*, the definition of the project cycle, the definition of project boundaries, the definition or guidance for baselines, the definition and treatment of leakage, the determination of projects' crediting lifetime, the establishment of project monitoring and verification guidance and procedures, as well as clarification of the certification criteria and the credit issuance process. How these issues are handled has implications on the volume, quality and timing of project-based credits, as well as their transaction costs.

Project credits are generated *ex-post*. However, for planning purposes, a government might wish to keep a check, *ex-ante*, on the potential contribution from project-based mechanisms to meeting GHG commitments. One possibility could be to track emission reductions from domestic projects in a separate

²² Having a better understanding of the implications on administration costs to be considered when exploring possibilities of jointly implementing a domestic trading scheme and a project-based mechanism would necessitate further data and analysis, which could be the subject of future work.

²³ For a more detailed discussion on each of these issues (and others), see Begg et al. (2002).

database, or through a special notification procedure to the national registry, as a suitable check and balance of project emission reductions against the national emission inventory, as suggested by Begg et al (2002). Clearly, establishing and maintaining a separate database for domestic projects increases the administration costs of implementing a domestic project-based scheme. However, it might be worth the cost, particularly if a large volume of project-based activities is expected.

For example, the separate database for offsets under consideration by the Canadian Government, would store information relating to projects and track ownership of offset credits. An offset credit would be given a serial number to allow tracking back to the project that created that credit. To ensure that project-based activities underway are being consistently reported, it is proposed that only project activities that are covered in the national database would be eligible to generate offset credits (Government of Canada 2003). Moreover, if such a project offsets database could be publicly accessed, it would contribute to increasing the information on mitigation options for all players in the domestic trading scheme.

Finally, in the context of project-based activities implemented domestically within countries with overall national GHG targets, there would need to be a link between the allowed emissions under the national GHG target and the credits issued for domestic project-based activities. For instance, in countries that are Parties to the Kyoto Protocol, each domestic project-based credit, once certified, would likely need to be backed-up by an Assigned Amount Unit (AAU). In fact, these projects could then effectively become similar to “track 1” JI projects²⁴ undertaken unilaterally. This means that if international transfers and acquisitions of these credits occur, there would be a corresponding adjustment of AAUs (or ERUs) in GHG registries. This type of “backing” should work to guarantee the compatibility of project-based credits (JI or domestic PBMs) with the issuing country’s emissions commitment under the Kyoto Protocol.

3.2.4 Data and Measurement Issues

Governments considering implementing project-based mechanisms as part of their strategies to meet GHG obligations will want to ensure that emissions and emission reductions at the project-level get reflected in their country’s GHG inventory and contribute to progress towards meeting the GHG target. This can be represented by the following Equation:

$$\text{Equation 1: } \text{target emissions}_t \geq \text{GHG inventories}_t + \text{units sold}_t - \text{units bought}_t$$

In order for a country to have met its GHG target in period “t”, that target emissions level will need to be greater or equal to its GHG inventory emissions at that period, adjusted for purchases and sales of emission units from any trading-based mechanism (see Equation 1). This is consistent with what has been decided under the Kyoto Protocol in terms of assessing compliance.

Accurately accounting for project-level activities requires good data and confidence in the validity of the baseline and project emissions measurements or estimates. Both the calculation of project emissions and the emission baseline involve uncertainties, which need to be recognised and managed.

For example, project emissions are typically estimated based on a number of data/assumptions, including: data on the project’s activity level (e.g. how many tons per MWh were generated by a power plant), the

²⁴ The Marrakech Accords allows an Annex I Party that respects a number of conditions, including having in place a national system for estimating GHG emissions and sink as well as a national registry, to host a JI project, verify its emission reductions and issue the appropriate quantity of ERUs (FCCC/CP/2001/13/Add.2). This is referred to as “track 1 JI”.

type and quantity of input and the type of technology used and appropriate emission coefficients. Accurately accounting for project level activities may be relatively straightforward in the energy sector but is more challenging in other areas. Activity data are generally good for the energy sector but may be poor for other sectors such as waste, agriculture and transport. For example, it is these sectors that are being considered under the proposed Canadian domestic offsets system. In New Zealand, domestic projects in landfill gas, renewable energy, bio-energy and co-generation have already been awarded Kyoto units under the country's programme on Projects to Reduce Emissions²⁵.

Baselines are the basis for the calculation of emission reductions and thus credits generated by project-based activities. Baselines for domestic project-based activities could take various forms, and lead to different results in terms of emission credits. For example, in the case of baselines for domestic project-based activities in the electricity generation sector, it could be decided that the baselines are to reflect the performance of a given technology such as natural gas-fired power plants using combined cycle gas turbines (CCGT). Alternatively, baselines seeking to reflect BAU scenarios from grid-connected projects could be based on estimated grid emissions (e.g. the "combined margin"²⁶ recommended in Kartha et al. 2002). The baseline for the same type of projects could also potentially be based on the performance of a particular plausible alternative (e.g. a coal-fired power plant).

At the international level, the Intergovernmental Panel on Climate Change (IPCC) Guidelines on National Greenhouse Gas Inventories and the Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories were developed to assist countries in producing the best possible estimate of historical annual, national emissions in a consistent, transparent and comparable manner. This guidance is important for project-based mechanisms as well as for project/plant-level inventories and baselines. Methods to calculate fuel used and translate this into GHG emissions by using appropriate emissions factors (e.g. using default emissions factors developed by the IPCC) in cases where site specific data are not available might be the same for project-based mechanisms²⁷ and inventories in some situations.

However, while standard methods exist for the development of national inventories, methods to assess sub-national or entity-level emissions can vary within the same country or among countries. National inventories tend to rely on aggregated data sources whereas project-level data is specific to similar types of projects. While these data should be in theory fully compatible, there are often discrepancies. For instance, data collection by different agencies (e.g. data on large plants collected by the Environment Agency and data on smaller plants collected by local authorities) could be the cause of some inconsistencies and incompatibility between data sets. Nonetheless, IPCC national-level guidance should provide a common basis for guidance on the development of entity-level GHG inventories. Over time, the evolution of guidance for entity-level inventories in different countries would likely benefit from sharing experiences which could lead to some convergence.

The use of different emission coefficients to estimate emissions from a given sector and to estimate emissions for projects within that sector can also contribute to the discrepancies between aggregate and project-level emissions estimates. However, Martinsen (2001) notes that monitoring of emissions (or sequestration) from a given project will provide project-specific knowledge about the source in question as

²⁵ See <http://climatechange.govt.nz/policy-initiatives/projects/index.html>

²⁶ Kartha et al. (2002) recommended a "combined margin" methodology for baselines for grid-connected electricity generating projects. This methodology reflects a project's typical effect on (i) the operation of current or future power plants (i.e. the "operating margin"), and (ii) what and/or when new facilities when be built (i.e. the "build margin").

²⁷ For example, previous OECD/IEA papers on baseline methodologies (e.g. OECD/IEA 2000) relied on IPCC emissions factors for the baseline calculations.

well as general knowledge about the emission factor used. This may provide valuable information for similar projects and national inventories, and be helpful in updating IPCC emissions factors and updating of national inventories. In fact, efforts to use more disaggregated data for the development of national emissions inventories could help bridge the differences between emissions estimated at the national level and those estimated at the project level.

The recognition of credits generated by domestic project-based mechanisms is highly dependant on the reliability of the measurement/estimation of projects' emission reductions. While efforts are needed to improve data quality and consistency, it is probably not realistic to expect complete accuracy of data and estimates, especially in the short-term. Even if having 100% certainty is not possible, this does not inhibit the functioning of the GHG accounting system. However, it is critical that there be sufficient confidence in the quality of these estimates and in the processes (e.g. monitoring, verification and reporting) to generate them, and that there be a recognition of their legitimacy. Clear and transparent monitoring, verification and reporting (MVR) processes will thus be critical for the recognition of the project-based units, but once there is this recognition of units – even if there is uncertainty in the (MVR) processes – there can be linking between domestic PBMs and domestic trading schemes that is compatible with overall GHG objectives. (See Section 4.2.5 below for further discussion of the management of compliance risks that could be generated from project-based activities).

3.2.5 Compliance issues

From a government perspective, it will be critical to ensure that project-based reductions undertaken domestically (e.g. hosting JI or domestic projects) actually contribute to meeting the country's GHG target. Otherwise, there is a risk that the issuance of credits essentially becomes like printing bank notes without the corresponding economic activity to back it up. This "inflation" of a country's credits could lead to a reduction of their market price, and thus lessen the economic signal to undertake genuine GHG reductions. A lower price generated by "inflated" PBM credits would be expected to have an impact on the compliance strategies pursued by entities covered by a DET. As mentioned earlier, the implications of such a scenario could also include the government being required to find ways to compensate for project-based credits that do not translate into measurable progress towards GHG reduction goals, either through additional domestic GHG reductions or via the purchase of emission units elsewhere within or outside the domestic system.

It is possible to combine domestic emissions trading schemes and domestic project-mechanisms to meet GHG obligations, by applying them to different sectors - or to the same sector with appropriate scheme designs and administration provisions (see section 4.2.2). International project-based mechanisms might also be undertaken domestically, as is the case of several Annex I countries (mostly from Eastern Europe) planning to host JI project activities under the Kyoto Protocol. An important issue in such circumstances is the management of compliance risk related to the country's greenhouse gas emissions balance.

As discussed above, the IPCC Guidelines do not provide guidance on estimating baselines, such as those seeking to represent "what would have happened otherwise", which is the role of the baseline in the Kyoto Protocol project-based mechanisms. There are good reasons to examine closely the link between project-based GHG *reductions* and a country's overall *emissions inventory*, as the inventory should eventually reflect the reductions achieved through domestic project-based mechanisms.

The data and measurement uncertainties mentioned earlier are important considerations for government efforts towards managing compliance with a national GHG obligation. Moreover, compliance issues associated with implementing project-based mechanisms domestically include the risk of PBMs generating, *ex-post*, fewer absolute emission reductions, as well as leading to higher absolute emissions

levels (e.g. in the case of PBMs assessed against rate-based baselines), compared to the *ex-ante* expectation about their GHG mitigation potential (Ellis et al. 2004).

It would be important for governments planning to implement PBMs domestically to have a sense of the possible magnitude of the PBM-related uncertainties and compliance risks, as well as the key factors influencing them. Laurikka (2002) examines the risks associated with these mechanisms, both in terms of (i) the compliance risks associated with rate-based versus absolute baselines, and (ii) the compliance risks associated with uncertain project output levels which affect emission levels.

Project-based activities' GHG performance can be based either on rate-based (e.g. x tCO₂ per unit of output) or absolute baselines (x tCO₂). Using an absolute baseline may not be ideal as it would allow a project to generate extra credits through lower activity levels (e.g. by shutting down). In addition, the features of absolute baselines imply that they do not provide any incentives for a project sponsor to manage his/her project efficiently (i.e. to maximise output). For reasons of accuracy and providing appropriate incentives, project mechanisms might thus preferably rely on rate-based baselines²⁸. Rate-based baselines are generally considered a more accurate instrument for the estimation of emission reductions from project-based activities, in that they do not reward (in the form of emission credits) lower activity levels than what is assumed in the baseline (e.g. OECD/IEA 2000; Laurikka 2002), but they can involve some compliance risks for countries hosting them and that have absolute national GHG targets. While it is difficult to assess with a high degree of certainty the importance of this possible compliance risks, some studies indicate that using rate-based baselines for domestic project-based activities should not significantly increase risks of non-compliance with overall national targets (e.g. Laurikka 2002; see Box 1).

However, in order to account for project-based emission reductions in the context of an overall national absolute target, rate-based performances must be converted into absolute baselines via some mechanism (e.g. it could be that one tonne of CO₂ reduced per unit of output is translated directly into one tonne of emission reduced, but not necessarily). Some exchange mechanism would be needed for this conversion process to take place.

²⁸ Interpretations of the Marrakech Accords also suggest – although not explicitly – a preference for rate-based baselines, as it is stipulated that “a baselines shall be established... in such a way that [credits] cannot be earned for decreases in activity levels outside the project activity or due to *force majeure*”.

Box 1 – Compliance risks associated with project-based mechanisms: rate-based vs. absolute baselines

Laurikka (2002) argues that the compliance risks due to uncertain output levels with project-based mechanisms with rate-based baselines should not be a major source of concern. He examines the case of an energy supply project and notes that both absolute and relative baselines involve an “output risk” in the case of an energy project with a positive emission intensity. He demonstrates that the uncertainty range related to relative baselines is only greater than that associated with an absolute baseline where the emissions intensity of the project is lower than half the emission intensity assumed in the baseline:

$$\text{GHGintens}_p < 0.5 \text{GHGintens}_b$$

Where:

GHGintens_p is the emissions intensity of the project (e.g. in tCO₂e per GWh); and

GHGintens_b is the emissions intensity of the baseline

This implies, for example, that for projects involving modest improvements in efficiency, the uncertainty range is smaller with relative baselines.

There might still be a perceived risk of non-compliance if there is a significant reliance on project-based mechanisms that use relative baselines in a country’s strategy to meet overall GHG commitments – although the actual risks of non-compliance with a national GHG commitment may be limited if the country’s government adopts measures to hedge against non-compliance risks (see below). Laurikka (2002) seeks to bring these risks into perspective. He examines the compliance risks associated with the use of project-based mechanisms and expresses the *ex-ante* decision-making setting using equation 2.

Equation 2: TARGET = BAU – P&M – Δ MECHANISMS

where:

TARGET is the absolute emissions target (in MtCO₂-e);

BAU represents the “business-as-usual” emission projection (in MtCO₂-e), where no measures are taken to reduce emissions;

P&M are the domestic/internal policies and measures implemented to reduce GHG emissions; and

Δ MECHANISMS (MtCO₂-e) refers to the combined balance of the emission credits purchased and sold and allowances.

The *ex-ante* compliance risk management (i.e. to reach the TARGET) requires careful monitoring and management of all three variables on the right side of Equation 2, including project-based mechanisms. However, it is likely that the absolute deviation of the business-as-usual emissions (BAU) is in many cases likely to be large in the total GHG emission balance, particularly in comparison to the deviation of Δ MECHANISMS. Moreover, for many countries, where BAU is greater than the emissions target

(TARGET), it is likely that the impact of domestic policies and measures (P&M) will be expected to be a significant factor compared to net purchases of emission units (Δ MECHANISMS).

Laurikka²⁹ concludes that the compliance risks associated with project-based mechanisms using relative baselines would be generally the greater:

- the lower the emission intensity of the project compared to the baseline;
- the shorter the compliance period (e.g. a project would be more vulnerable to unforeseen higher-than-estimated economic growth during a single year; whereas in a longer compliance period, project output would tend to even out over the years to the baseline assumption);
- the lower the number of projects with non-correlating activity levels in the portfolio; and
- the higher the volume of projected emission reductions from projects compared to the internal/domestic BAU-emissions.

Notwithstanding that in many cases, the compliance risks associated with project-based mechanisms hosted domestically might be relatively limited, taking into account the countries mitigation objective in the design of project-based mechanism baselines may help manage compliance risk. For example, in the context of hosting JI project activities which are undertaken in countries with emissions targets for the Kyoto Protocol's 2008-2012 commitment period, it might be useful if baselines took into account the timing (and level) of the host country's commitment³⁰, in order not to give away credits that would make domestic compliance more difficult to achieve (UNEP/OECD/IEA, 2001). In some cases, relying on projections, or even historical trends, to develop baselines for domestic project-based activities, might not be fully compatible with some host countries' GHG commitments, especially when host countries' national commitments require significant greenhouse gas reductions. In such cases, there is a risk that project-based activities could be allocated emission reduction credits, but not lead to reduced (or sufficiently reduced) emissions in the host country's national emissions inventory. It might thus be important that the development of baselines take into account the host country's national GHG commitments. For example, a project baseline might need to be developed in terms of "what *should* happen to meet GHG targets" in the host sector/country, rather than "what *would* have happened otherwise" if business-as-usual emissions lead to emissions that are significantly above the target. This could help ensure that project-based activities earn emission credits that do not compromise the country's overall compliance or put an additional mitigation burden on other sectors. Of course this would mean that project-based activities would generate fewer credits than if they were assessed against a baseline representing "what would have happened otherwise", with repercussions on their potential economic attractiveness.

Various other means to manage, *ex-ante*, compliance risks associated with the use of trading-based mechanisms have been identified. For example, the separate database for domestic offsets, as discussed in the previous section, is one such means. Other mechanisms might include imposing restrictions on companies about how much they can each individually trade internationally at any one time (Jones 2003)³¹. Another possible strategy to minimise the risks of non-compliance that could be adopted by governments is withholding a portion of allocations, which it could trade at a later stage if they were not needed

²⁹ Laurikka (2002) examines the particular case of energy projects.

³⁰ For CDM projects, which are undertaken in countries *without* GHG commitments, baselines would not have to take this into account.

³¹ Parties to the Kyoto Protocol will need to comply with the Commitment Period Reserve (CPR), which restricts the selling of AAUs to reduce the risks of non-compliance resulting from over-selling. Haites and Missfeldt (2002) note that some specifications of the CPR could restrict exports of AAUs by participants in domestic emissions trading schemes. It could then also affect the "exportability" of credits earned from project-based activities undertaken domestically.

domestically (Evans 2003). Alternatively a government might decide to set some resources aside for the purchase of emission units, if project-based activities do not exactly deliver the planned reductions; such a strategy could also be useful – and relevant - for all other GHG policies and measures which might deliver uncertain results. In such cases, it might in fact be more efficient to monitor the market closely throughout the commitment period with a clearly defined purchasing strategy in order to avoid the risk of needing to purchase units at the end of the commitment period when unit prices might spike.

4. Case study

This case study seeks to illustrate how a number of theoretical issues discussed in the paper are addressed in the EU emissions trading Directive and the EU Linking Directive covering project-based mechanisms. Relevant issues include:

- Impacts of including JI and CDM on economic efficiency and environmental effectiveness;
- Sectoral coverage;
- Potential for double counting emission reductions;
- Treatment of existing JI projects in EU accession countries.

4.1 Background to the EU Linking Directive

The EU GHG emissions trading scheme (EU-ETS) – covering installations from the electricity and heat; iron and steel; refining, glass and building material; and pulp and paper sectors - will commence in 2005 (with the first phase going from 2005 to 2007, and the second one corresponding to the Kyoto commitment period of 2008-2012) and has been designed primarily with the objective of achieving domestic emission reductions for EU Member States in meeting their commitments under the Kyoto Protocol. When the EU trading scheme was initially proposed in October 2001, there was no discussion for provisions to include JI and CDM credits. At that time, the Marrakech Accords, which clarified many of the rules and modalities for the implementation of JI and CDM, were still under negotiation. However, Article 26 of the final EU emissions trading Directive recognised that it is desirable to allow links between the EU-ETS and JI and CDM. The European Commission established a Working Group under the European Climate Change Programme to examine how flexible mechanisms might be further developed within the EU in the context of climate change policy. A Sub-Group on JI and the CDM was further established in 2001 to facilitate the implementation of project-based mechanisms and explore possible links with the EU emission trading system.

A number of reasons have been identified to justify pursuing the linking of JI and CDM to the EU emissions trading scheme (ECCP 2002, Wemaere 2003, EC 2003a, Runge-Metzger 2003). For instance, linking project-based mechanisms and domestic emissions trading:

- increases compliance options for entities, reduces overall compliance costs, and improves liquidity of the emissions trading market within the EU;
- contributes to the sustainable development objectives of host countries, and promotes the transfer of environmentally sound technologies to third countries;

- drives environmental policy integration in EU external policies and contributes to the EU Strategy on Sustainable Development;
- fosters international cooperation on common policies and a multilateral approach to climate change.³²

Such linking could also be positive for the EU's climate change negotiations with non-EU Annex I countries and developing countries. By accepting credits from project-based activities undertaken in other countries, governments from these countries may consider the EU Linking Directive as a positive signal by the EU towards recognising, in a practical sense, the value of projects undertaken in non-EU countries and encouraging them.

On 23 July 2003 the Commission released a draft proposal for consideration by Member States and the European Parliament amending the EU emissions trading Directive to include project-based mechanisms - with some restrictions (EC 2003a). On April 20 2004, the European Parliament agreed on a text, modifying the Commission's original draft proposal, and adopted the Linking Directive. Once the Parliament's text is translated into all official EU languages, the Council is expected to formally approve the Directive. The Directive sets out the rules for purchases of emission credits from JI and CDM projects (ERUs and CERs respectively) by entities covered by the EU-ETS.

The Linking Directive stipulates that Member States may allow entities covered by the EU-ETS to use CERs and ERUs. This would take place through the issuance and immediate surrender of allowances by a Member State in exchange for the same number of CERs and ERUs held by an entity in its account in the national registry. The Directive stipulates that CERs can be used in the EU emissions trading scheme from 2005, and ERUs can be used from 2008. The use of CERs in the EU-ETS is independent of the entry-into-force of the Kyoto Protocol.

4.2 Impacts on economic efficiency and environmental effectiveness

The Linking Directive allows entities to purchase emission units from the Kyoto project-based activities instead of solely relying on the scheme's internal allowances to meet their commitments. The CERs and ERUs are worth one EU-ETS allowance. As project-based activities are expected to offer more cost-effective mitigation options for trading entities, this arrangement should lead to greater economic efficiency, i.e. the environmental target would be met at lower overall cost³³. As mentioned earlier, project-based mechanisms offer greater compliance options - but they do not create a demand for emission credits. Through the Linking Directive, the EU is creating a European private sector demand for ERUs and CERs. Emission reductions achieved via JI or CDM would thus replace mitigation within the EU-ETS and compensate for emissions of GHGs from installations covered by the EU-ETS.

Nonetheless, concerns have been raised about the impact on the *internal* environmental effectiveness of the EU trading scheme. Some have argued that as emissions will increase in those sectors already covered by the EU emissions trading scheme, the amount of emission reductions taken domestically in EU Member countries will be reduced, negating an important objective of the scheme. There is a perception of some

³² A secondary aim is to engage sources and sinks not covered by the EU emissions trading Directive; although most JI and all CDM projects will likely take place outside of the EU.

³³ The Commission's proposal for a draft EU Linking Directive notes that prices are expected to drop from €26 to €13 per tonne as a result of linking (EC 2003a).

conflict between meeting the economic efficiency and *internal* environmental effectiveness³⁴ outcomes. This concern reflects an assessment of environmental effectiveness solely based on emission reductions *within* the EU. However, *global* emission reductions would still occur as a result of JI and CDM project activities. In fact, this concern implies a differentiation between the values of emission reduction undertaken within and outside Europe. The Kyoto Protocol and its 2001 Marrakech Accords treats emissions and emission reductions equally, regardless of their location. By design, the integration of different market-based schemes means that resources should be allocated towards the cheapest GHG reductions which can be counted toward an obligation. There is thus a contradiction between (i) supporting the inclusion of Kyoto's project-based mechanisms, which is based on the concept of fungibility between different Kyoto units, and (ii) objecting to some installations being able to increase their emissions and then compensating them with credits earned outside Europe.

The Marrakech Accords do stipulate, however, that the use of the Kyoto mechanisms (i.e. international emissions trading, JI and CDM) "shall be supplemental to domestic action and that domestic action shall constitute a significant element of the effort made..." by each Annex I Party to meet its emission commitment. Each Party is free to decide whether and how this "supplementarity" is to apply to its legal entities.

The Linking Directive transposes "supplementarity" requirements of the Kyoto Protocol and the Marrakech Accords to the use of CERs and ERUs in its EU-ETS. It does so through Article 30 instructing each Member State to publish in its National Allocation Plan - a requirement under the Trading Directive³⁵ - its intended use of ERUs and CERs and the maximum amount that each installation is allowed to use in the EU-ETS. Article 11 (bis) stated that Member States may allow operators to use CERs and ERUs but only "up to a percentage of the allocation to each installation". Member States are also required to report to the Commission every two years on the level of domestic action relative to the use of project-based mechanisms to show that "domestic action actually constitutes a significant element of the efforts undertaken at national level...". The Linking Directive further stipulates that subject to the report by each Member State on the extent of domestic action compared to the use of project-based mechanisms, the Commission can then decide to "make legislative or other proposals" to ensure that the use of mechanisms is supplemental to domestic action within the EU.

While potentially addressing any concerns over the *internal* environmental effectiveness of the EU-ETS and helping meet "supplementarity" requirements, provisions for restricting the amount of project-based credits under the EU ETS, could also limit the potential for economic efficiency of the Linking Directive³⁶. In fact, some have argued that restrictions on project-based units can represent further barriers to trade and that countries should not apply export/import limits on the exchange and transfer of credits (see for example ICC 2003). Non-EU countries that were counting on the EU-ETS to stimulate a demand for their ERUs or CERs could perceive this as a negative signal for GHG-friendly investments in their countries. Moreover, implementing such a restriction could mean higher administration costs of running the EU-ETS.

³⁴ The environmental effectiveness is assessed here only by emission reductions within the EU. Global emission reductions would still occur as a result of JI and CDM project activities.

³⁵ Each Member State must develop a national plan stating the total quantity of allowances that it intends to allocate for each EU-ETS period and how it proposes to allocate them.

³⁶ Earlier modelling by Criqui and Kitous (2003) using the "Multi-gas" version of the POLES model indicated that allowing JI and CDM credits up to 6% of the total quantity of EU allowances would decrease the price of allowances from around €26/tCO₂e (without linkages) to €14/tCO₂e in 2010. With unrestricted use of CERs and ERUs, the market price of allowances is estimated to be €12/tCO₂e.

However, some (e.g. Jepma 2003) have indicated that the amount of purchases of CERs and ERUs are likely to be relatively low (e.g. below 6% of the EU-ETS allocation level – the limit for CERs and ERUs originally proposed in the Commission's draft). According to analyses in Haites (2004) – based on the Commission's original draft proposal, the Linking Directive could create an estimated industrial market for CERs and ERUs in 2010 of 110 MtCO₂e ± 65 MtCO₂e. This would represent roughly 33 percent of the estimated emissions gap between the EU-15 Kyoto target³⁷.

Other concerns regarding linking JI and CDM with the EU ETS include impacts on domestic incentives for technology innovation. This concern has been noted in the draft proposal by the EC which mentions that despite the fact that the inclusion of project-based units would lead to price reductions, this could result in delaying the development of emission reduction technologies in the energy and industrial sectors in Member countries, another important objective of the EU trading Directive (EC 2003a). However, as mentioned earlier, relying on CDM and JI credits at lower costs might not be a long-term strategy for most companies, but rather a shorter-term strategy to minimise costs associated with stranded assets by keeping GHG-emitting installations for the duration of their economic life and purchasing lower cost emission credits during that time. Moreover, this may be an argument for the inclusion of credits from domestic projects, which are currently not eligible under the EU-ETS.

There may also be some equity and efficiency issues with respect to incentives provided for investments in project-based activities abroad versus similar domestic project investments. For example, the Linking Directive would allow JI projects in the transport sector of an EU country, while firms from that country covered by the EU-ETS cannot gain credits from emission reduction projects at home. According to the Linking Directive, this issue of domestic project credits will be included in the 2006 review of the Directive, thereby leaving the door open for a more consistent treatment of project activities – regardless of the nationality of the investor and the mechanism – in the EU-ETS second phase starting in 2008.

4.3 Sectoral coverage

The Linking Directive includes some restrictions in the type of eligible CDM and JI credits in the EU-ETS. For instance, it does not currently allow for the inclusion of JI and CDM credits from sink activities in the agriculture or forestry sectors. However, this issue will be considered by the Commission in its review of the Directive in 2006, and may result in their inclusion in the 2008-2012 phase of the EU-ETS. Similarly, credits from nuclear activities are not allowed. Hydro projects are also addressed in the Linking Directive, but the provision is aimed at the Member States, rather than entities. In the case of hydroelectric power project activities with a capacity greater than 20 MW, the Directive instructs Member States to approve³⁸ only those projects that adhere to criteria and guidelines issued by the World Commission on Dams in its 2000 Final Report, led by the OECD and by the World Bank. Moreover, the Linking Directive instructs the European Commission to keep track of approved JI and CDM projects involving hydropower plants with a capacity greater than 500 MW that may have negative environmental and social impacts. This is to be done with a view to restricting the use of such credits in the EU-ETS.

Each Party to the Kyoto Protocol can have preferences on the type of Kyoto units it wishes to purchase and which ones it wishes to exclude from its purchasing strategy. The EU has clarified its preferences in its Linking Directive. However, once Kyoto units get traded between different entities and Parties, Kyoto units excluded from the EU-ETS may still affect the EU-ETS *indirectly* through their impact on the overall

³⁷ According to 2003 figures provided by the European Environment Agency, the business-as-usual projections (including existing measures) lead to a gap in 2010 of 329 MtCO₂e compared to the EU-15 Kyoto target.

³⁸ The Kyoto Protocol (Article 12) requires that participation in CDM project activities is to be voluntary and be approved by *each* Party involved.

level of supply accessible to different Parties and legal entities – even without physically entering the emission registry of EU Member States (Blyth and Bosi 2004). For example, with the linking of different domestic trading schemes, a non-EU country or entity could keep their non-eligible units (under the EU-ETS) for their own domestic compliance, and transfer only eligible units to EU installations. Moreover, the provision for ERUs or CERs from hydro power projects may involve additional transaction/administration costs to demonstrate that they meet World Commission on Dams (WCD) criteria. This requirement may have limited effectiveness, as CERs and ERUs from projects not meeting the (WCD) may still be purchased by EU entities and enter the EU-ETS. Indeed, such projects may be approved by non-EU governments and generate ERUs and CERs that could be used by installations covered by the EU-ETS (the Commission would not track credits from projects smaller than 500 MW).

In terms of its coverage of installations in the electricity generation sector, the EU-ETS covers thermal electricity generating installations with rated thermal input greater than 20 MW. This could have implications for the eligibility of two potentially important categories of JI activities in some EU countries (particularly the new EU Member States) that have a link with that sector: (i) electricity generation from renewable energy; and (ii) demand-side management (DSM) projects involving electricity savings for the consumer. As mentioned in sections 3 and 4 above, covering the same sector with both an emissions trading and a project-based scheme requires careful consideration in order to avoid double counting of emission reductions. In fact, the Linking Directive addresses this issue and allows for JI/CDM projects to occur in sectors covered by the EU-ETS only if they respect certain accounting provisions (see section 5.4 below).

4.4 Double-counting

In the lead-up to the EU Linking Directive, a number of concerns were raised relating to activities “opting in” to the EU emissions trading scheme and the potential for double-counting emission reductions. As flagged earlier, double-counting is both undesirable from the economic point of view (it devalues genuine reductions by lowering allowance prices) and the environmental point of view (it reduces environmental effectiveness as it leads to some “paper allowances” – not representing reductions - in the market)³⁹.

The original Commission’s draft proposal simply restricted ERUs or CERs eligible in the EU-ETS to those generated from projects that would not affect directly or indirectly emissions covered from installations covered by the EU-ETS. According to Wemaere (2003), this would have essentially translated into the ineligibility of JI projects – in EU countries - such as fuel switching in a district heating plant and other project activities which could directly or indirectly affect emissions from installations covered by the EU emissions trading scheme. As the Trading Directive states that existing carbon-free sources would not receive any allowances in the initial allocation in the EU-ETS framework, this would have meant that ERUs or CERs could not have been awarded to investments in carbon-free sources for conversion into allowances.

Double-counting could occur because emission credits generated from energy efficiency project activities, for example, would effectively be in addition to the previously-allocated power sector’s emission allowance. Assuming that all allowed emissions from the power sector are allocated to thermal generators, then the energy efficiency project-based credits would indeed involve some double-counting of the sector’s total emissions allocation. At the same time, the project-based activity would also lead to reduced GHG emissions from thermal generation plants and hence decrease their need for abatement action and/or

³⁹ Although overall negative environmental implications of such a scenario may in fact be eliminated in the case of host countries with national commitments that compensate any shortfall from PBMs of DETs by achieving emission reductions elsewhere.

purchase of emission allowances. To avoid double-counting, the Linking Directive stipulates that generally no ERUs or CERs should be issued for emission reductions from installations covered by the EU-ETS, but there are exceptions. The final Linking Directive text (Article 11 *ter*) allows such project-based activities to generate ERUs or CERs while avoiding double-counting if they meet the following accounting provisions:

- ERUs or CERs from any project affecting *directly* emissions of an installation covered under the EU-ETS need to be compensated by the cancellation of an equal number of allowances by the operator of that installation.
- ERUs or CERs from any project affecting *indirectly* the emission level of installations covered under the EU-ETS need to be compensated by the cancellation of an equal amount of allowances from the national registry of the Member State from which the ERUs or CERs originate.

This provision ensures that an EU allowance, a CER, and an ERU each correspond to one Assigned Amount Unit (the basis for national allowed emissions under the Kyoto Protocol). This preserves the integrity of each unit.

This provision should also address critiques previously raised (JIQ 2003b) which argued that the Commission's proposed draft Linking Directive effectively undermined the spirit of the Kyoto Protocol and its Marrakech Accords by limiting access of Parties to the Kyoto Protocol to JI projects in EU Member States. It was also argued that the draft text also compromised Eastern European countries' right to rely on JI to attract GHG-friendly foreign investments in their country and thereby undermine possibilities for the new EU Member States to realise larger GHG reductions which could be possible via JI. The final text of the Linking Directive should thus be a positive step towards addressing the concerns and interests of the various parties seeking to participate in JI projects in Eastern European countries covered by the EU-ETS.

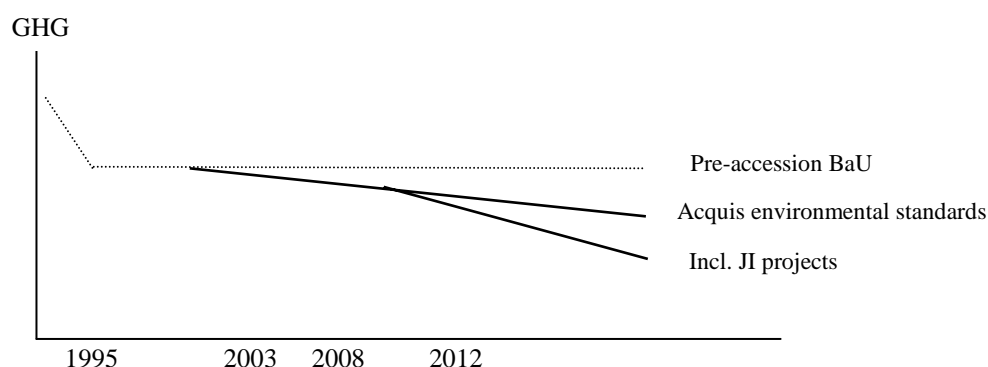
As discussed in Section 4 of this paper, the EU Linking Directive demonstrates that it is possible to implement both emissions trading and project-based mechanisms within the sector and to avoid double counting. However, such co-existence should involve very strict monitoring systems and accounting procedures which may translate into additional administration costs for EU governments. Nevertheless, the benefits from potential foreign investments in JI projects may very well outweigh these costs.

Other incentives for DSM and renewable energy projects may also be generated indirectly by the Directive. For example, incentives could be provided through the expected increases in electricity prices in Europe due to the internalisation of CO₂ allowance costs under the cap-and-trade scheme (Probase 2003).

4.5 Baselines and the *Acquis Communautaire*

The EU pre-accession process requires that candidate countries adjust their legal and institutional framework, and harmonise their national laws with the body of EU legislation (so-called *Acquis Communautaire*) published by the European Commission in the Official Journal of the European Union. The *Acquis Communautaire* include provisions on environmental protection⁴⁰, which aim at ensuring that the level of environmental protection within the candidate country is at the EU level by the time the candidate becomes an EU Member State.

⁴⁰ Mostly energy, air pollution and other environmental regulations with secondary GHG benefits.

Figure 1: Illustration of *Acquis Communautaire* impact on JI potential

The Commission has made it clear in its Linking Directive that the *Acquis* requirements should be fully taken into account in the determination of a project's baseline (Article 11 *ter*). The Commission argues that this is consistent with the Marrakech Accords decision⁴¹ stipulating that baselines for JI projects shall be established taking into account relevant national policies and circumstances. This has implications for each new EU Member State's business-as-usual emissions levels from which JI project baselines would typically be derived, as these will now be lower (to reflect the implementation of the *Acquis*) than if the country had not acceded to the EU (see Figure 1). This in turn lowers the emission reduction potential of JI projects and reduce the scope for credits from JI projects in Central and Eastern Europe (van der Gaast 2002).

A number of JI projects are either already in place or being developed in Central and Eastern European countries that are new Member States of the European Union. In addition, many of these countries have hosted Activities Implemented Jointly (AIJ) pilot phase projects from 1995. Some of these AIJ and/or JI project-based activities have been undertaken by governments of EU-15 member States (e.g. The Netherlands and Sweden).

In the lead-up to the EU Linking Directive, there was considerable discussion around the temporary exemption of ongoing JI project activities in EU accession countries, as well as the potential for using transition periods for JI projects in these countries (Wemaere 2003, Lefevre 2003), typically negotiated between accession countries and the Commission in the overall accession process. For example, Jepma (2003) noted that transition periods negotiated under other (non-GHG) EU Directives for some projects in accession countries have extended out to 10 years.

Other suggestions in the lead up to the final Directive included converting existing JI projects into emissions trading transactions, where two Parties agree on a transfer of EU-ETS allowances, backed by government AAUs, in exchange for an emission reduction investment, which would otherwise be undertaken as a JI project (van der Gaast, 2002). In this respect, fast track ERUs are essentially viewed as packaged AAUs (JIQ 2003a). A proposal by Hungary in January 2004 suggested cancelling an EU allowance in the JI host country's registry for every ERU issued for JI project activities that indirectly reduce the emission level of installations covered by the EU ETS.

⁴¹ Decision 16/CP.7 Guidelines on the implementation of Article 6 (on JI) of the Kyoto Protocol.

The essence of Hungary's proposal has been adopted in the final version of the EU Linking Directive. Paragraph 4 of Article 11 (*ter*) outlines that "ERUs [and CERs] may only be issued if an equal number of allowances are cancelled from the national registry of the Member State of the ERUs' or CERs' origin."

It is clear that considering the levels of the *Acquis Communautaire* for baseline purposes would lead to lower volumes of ERUs per JI project than if business-as-usual emissions were considered. Some have argued that JI could be a vehicle to help Central and Eastern European countries meet the *Acquis Communautaire* environmental performance levels. However, it is unlikely that the Directive would allow projects to be used to "finance" new EU Member States' efforts to reach the standards from the *Acquis Communautaire* (JIQ 2003a). Japan has made the argument that this provision would be in contradiction with the Marrakech Accords rules whereby baselines for track 1 JI projects are basically the result of bilateral negotiations. With respect to whether a proposed JI project is additional, Japan also argued that insights could be taken from the CDM Executive Board guidance on the treatment of regional environmental regulation in the baseline. In the case of CDM project-based activities, regional environmental regulations do not automatically form the basis of the baseline if project proponents can make a case that a barrier(s) exist(s), inhibiting complying with that regulation.

It is too early to determine what exactly would be the implications of having a CDM-like rule for determining whether or not the *Acquis Communautaire* are effectively the proper basis for a EU-hosted JI project. But if there are insufficient resources in some Central and Eastern European countries to rapidly meet the *Acquis Communautaire*, opening the door to JI projects with a different baseline might help attract some needed – and additional - climate-friendly investments into those countries. The risk is also that some investments that might have gone into Europe in the form of JI projects might not simply turn into a demand for AAUs from Europe, but perhaps be displaced towards other non-EU Annex I countries, although this is difficult to assess and will depend on a series of factors.

The Linking Directive's provision for baselines to reflect obligations under the *Acquis* could affect the demand for JI projects implemented in EU countries, particularly Eastern European countries if the baselines for such projects result in too few credits compared to other possible alternatives. Given that Eastern European countries were originally estimated to be attractive JI host countries, impact, the Linking Directive could potentially reduce the overall scope for JI in the EU trading scheme – although this is difficult to quantify. The implications of these provisions for the emissions market are that they may result in an increase of available AAUs⁴² (from EITs) on the international emissions market (van der Gaast 2002). The impact on the CDM would depend on the international market price, as well as market preferences, although the impact of restricted JI supply should increase the demand for CDM credits. In addition, there could be a resulting increase in the demand for JI projects in non-EU countries (e.g. the Dutch JI wind project in New Zealand) or in Russia and the Ukraine where there is significant potential for energy JI projects⁴³. There could also be increased interest in Green Investment Schemes that link purchases of surplus AAUs to environmentally-friendly/compatible activities (see Blyth and Baron 2003).

⁴² That is, it increases the volume of AAUs that EITs with already lower emissions than their commitment could sell on the international emissions market.

⁴³ Assuming that there is a preference for JI projects over international emissions trading.

5. Conclusions

For practical reasons (e.g. administration and ease of measurement), domestic cap-and-trade schemes tend to include only a partial coverage of a country's GHG emissions. Project-based mechanisms can provide additional incentives to look for more cost-effective GHG mitigation possibilities, but they are voluntary in nature and only contribute to increasing the supply of credits. Project-based mechanisms thus need to be linked to another instrument that recognises the project credits towards compliance with a GHG objective - such as an emissions trading scheme. Linking project-based mechanisms and domestic emissions trading schemes is economically desirable as it typically expands coverage of gases and sources, increases compliance options, increases market liquidity and lowers compliance costs of meeting environmental goals. However, environmental and economic issues and concerns may arise when considering such linking. This paper shows that they can be addressed through the implementation of different accounting and compliance management solutions.

To maintain the integrity – and the value - of emission allowances from emissions trading schemes and emission credits from project-based mechanisms, it is important that one allowance or one credit corresponds to one specific unit of emission or emission reduction (e.g. a ton of CO₂ equivalent). The most straight forward way to avoid double-counting is to simply ensure that sources covered by a domestic emissions trading scheme are not also covered under domestic project-based mechanisms. But this is not the only way. It is possible to cover a given sector's emissions with both domestic emissions trading schemes and project-based schemes; although this requires careful *ex-ante* planning and monitoring, with implications on overall administration costs. For instance, one way of avoiding double-counting may be that eligible project-based activities are those that are undertaken in facilities that do not already receive allowances in the cap-and-trade scheme. A clear understanding and definition of the project boundaries is important. In the case of countries with overall GHG commitments (such as the Kyoto Protocol emissions commitments), there may be more flexibility to implement PBMs in facilities covered by a DET as long as the DET allowances and PBM credits are subtracted from the country's total allowed emissions (e.g. assigned amounts under the Kyoto Protocol), thereby ensuring the environmental integrity of the overall system.

A country with an overall emission commitment hosting project-based mechanisms might also have concerns about the implications of the uncertainty surrounding the projects' performance for compliance. This may be particularly the case when project-based credits are based on a relative baseline (e.g. CO₂ per unit of output), making the GHG performance and credits correlated with output which may vary over time. However, in most cases, the project-based uncertainties are not expected to pose huge compliance risks for countries, especially when not anticipating hosting a large volume of project-based activities. Nonetheless, taking into account a country's overall commitment in the development of project baselines might help reduce compliance risks for the host country.

A number of other solutions can be implemented to address compliance risks associated with the use of market-based mechanisms. Countries with a large reliance on market-based mechanisms, in particular units from project-based mechanisms, may wish to withhold a portion of allowances for domestic use and restrict the export of these allowances, until they are not needed domestically. Alternatively, a government may wish to set-aside resources to purchase emission units if risks of non-compliance are non-negligible. Careful monitoring of the emissions market combined with a strategic purchasing strategy would help reduce costs of managing compliance risks.

In terms of reconciling emission reductions at the project level and inventories at the national level, effective monitoring systems are critical when linking a projects performance with national emissions trading schemes, although data and measurement uncertainties (both at the project and at the national

inventories levels) need to be taken into account in a government's efforts to manage compliance with GHG commitments. Careful monitoring of emissions (or sequestration) from given projects may help update information for other similar projects and refine estimates calculations in national inventories. Implementing a separate projects - or "offsets"- database could be a useful check between inventories at the project and national levels. A special notification procedure to the national emissions registry could also be a useful mechanism. Implications of discrepancies would only be important if the volume of project-based credits is expected to be large relative to total inventory emissions. Nonetheless, at the outset, it will be important that countries with national GHG commitments expecting to host project-based activities develop a domestic plan clarifying the GHG contribution of its different sectors, and thus developing an assessment of the amount of credits that could be allocated to project-based mechanisms implemented domestically.

The EU Emissions Trading Directive, once implemented, will create the world's largest industrial GHG emissions trading scheme. The Linking Directive, which sets the rules for purchases of JI and CDM credits by firms covered by the EU-ETS should result in a decrease in overall compliance costs, as sources covered by the EU-ETS will have access to lower cost options, and support technology transfer to developing countries and countries with economies in transition. This might be particularly important to ensure a smooth transition towards lower-emitting technologies for capital-intensive installations covered by the EU-ETS. It also sends a positive signal to players in the CDM market, as private entities covered by the EU-ETS could, depending on their emissions allocation yet to be determined and their marginal abatement costs, be an important source of demand for emission credits from JI and CDM project-based activities (particularly given that entities covered by the EU-ETS would not be allowed to use AAUs towards their compliance). In fact, estimates indicate that total EU private sector demand for CERs could be in the order of 110 MtCO₂ in 2010 as a result of the Linking Directive. It will mean that installations with higher mitigation costs will have the opportunity to emit at levels higher than the target as these emissions can be compensated abroad through project-based mechanisms. However, the Linking Directive transposes "supplementarity" requirements of the Kyoto Protocol and the Marrakech Accords to the use of CERs and ERUs by each installation covered by the EU-ETS. Each Member State must specify in its National Allocation Plan its intended use of CERs and ERUs and the percentage of the allocation up to which operators can use CERs and ERUs. The Directive gives the Commission the authority to "make legislative or other proposals" to ensure that the use of mechanisms is supplemental to action undertaken within the EU.

While potentially addressing any concerns over the *internal* environmental effectiveness of the EU-ETS, provisions for restricting the amount of project-based credits under the EU ETS, could also limit the potential for economic efficiency of the Linking Directive. Moreover, implementing such a restriction could mean higher administration costs of running the EU-ETS.

The Linking Directive allows JI and CDM projects to be undertaken in sectors covered by the EU-ETS while avoiding double-counting through the following provisions:

- ERUs or CERs from any project affecting *directly* emissions of an installation covered under the EU-ETS need to be compensated by the cancellation of an equal number of allowances by the operator of that installation.
- ERUs or CERs from any project affecting *indirectly* the emission level of installations covered under the EU-ETS need to be compensated by the cancellation of an equal amount of allowances from the national registry of the Member State from which the ERUs or CERs originate.

EU Member States can thus host JI or CDM projects and generate ERUs or CERs that can be used for compliance by entities covered by the EU-ETS. However, emission reductions from domestic

projects/offsets are not yet recognised under the EU-ETS. This issue merits further consideration in order to ensure a consistent treatment of similar projects regardless of investors' origins and mechanism used. Moreover, incentives for domestic projects may lead to the identification of emission reductions possibilities not covered by the EU-ETS and thus help countries meeting their overall GHG commitment.

Provisions for baselines for projects in new EU countries needing to meet environmental standards of the *Acquis Communautaire* could work to keep a tight control on the environmental integrity of the EU-ETS. However, it could also imply reducing the potential for JI projects undertaken in EU countries. It may limit foreign climate-friendly investments in EU countries, including Eastern European countries, if the baselines result in too few credits compared to other alternatives.

The EU Linking Directive should increase compliance options and help reduce the costs of meeting installations' emissions cap under the EU-ETS. It demonstrates that the co-existence of DET and PBM in a same sector is technically possible, but this option involves very strict monitoring systems and accounting procedures. These may translate into additional administration costs for host governments. However, the benefits from potential foreign investments in JI projects undertaken in their countries may very well outweigh these costs.

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7. Glossary

Absolute target – a target expressed as total emissions during a specified period.

Accountable entities – Sources or other economic agents that must surrender allowances to their government to establish compliance with their emission goals under an emissions trading system.

Allowances – tradeable units under emission trading programmes. Under the Kyoto Protocol, the allowances are assigned amount units, emission reduction units (under Joint Implementation) and Certified Emission Reductions (under the Clean Development Mechanism).

AAUs (Assigned Amount Units) – Allowances for the emissions trading system established by the Kyoto Protocol. Correspond to a permit granted to a Party to emit one tonne of CO₂ equivalent in the period between 2008 to 2012.

CERs (Certified Emission Reductions) - Emission units from CDM projects.

Clean Development Mechanism (CDM) – Emission reduction projects between Annex B and non Annex I Parties, i.e. projects are hosted by countries without emission reduction commitments under the Kyoto Protocol.

Commitment Period Reserve – A compliance rule established under the Marrakech Accords to prevent overselling of allowances by Annex B Parties. At any point in time, Parties must keep in their national registry at least either 90% of their assigned amount, or 100% of five times its most recently reviewed inventory, whichever is the lower.

Coverage – The sources or categories of emitters that are included in an emissions trading scheme as well as the gases that are included.

Credits – Allowances related to a project, corresponding to avoided emissions generated by the project.

ERUs (Emission Reduction Units) – Emission units from JI projects.

Flexibility mechanisms – market instruments established under the Marrakech Accords that include emissions trading, joint implementation and the Clean Development Mechanism. Mechanisms earn emission units for reductions in greenhouse gas emissions that can be traded amongst countries to meet emission reduction commitments.

Gateway – a mechanism to prevent inflation of allowances in an emissions trading scheme with an absolute sector, which only allows for the transfer of emissions units from a relative sector to an absolute sector when allowances from the relative sector are greater than or equal to allowances in the absolute sector. Applied in the UK emissions trading scheme but potentially applicable as a mechanism between domestic emission trading schemes with different targets.

Joint Implementation (JI) – Emission reduction projects between industrialised (Annex I) Parties, i.e. projects are hosted by countries with emission reduction commitments under the Kyoto Protocol.

Project-based mechanisms – Flexibility mechanisms defined under the Marrakech Accords that earn emission credits on the reduction of emissions from an agreed baseline (otherwise referred to as credit trading or baseline-and-credit schemes).

Relative target – A target expressed as an emissions rate, such as emissions per unit of output or activity such as GDP or energy savings, or emissions per unit of input.

RMUs (Removal Units) – emission units from sinks projects.

Supplementarity – A provision enshrined in the Kyoto Protocol (Article 6.1) and the Marrakech Accords (Decision 15/CP.7) stipulating that the “use of mechanisms shall be supplemental to domestic action and that domestic action shall thus constitute a significant element of the effort made by each Party included in Annex I to meet its quantified emission limitation and reduction commitments under Article 3, paragraph 1 [of the Kyoto Protocol]”.