



COM/ENV/EPOC/IEA/SLT(2000)6

OECD ENVIRONMENT DIRECTORATE
AND
INTERNATIONAL ENERGY AGENCY

**AN ASSESSMENT OF LIABILITY RULES
FOR INTERNATIONAL GHG EMISSIONS TRADING**

INFORMATION PAPER



FOREWORD

The Annex I Expert Group oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy makers and other decision-makers. In a collaborative effort, authors work with the Annex I Expert Group to develop these papers. As such, the papers do not represent the views of the IEA nor the OECD, nor are they intended to prejudge the views of countries participating in the Annex I Expert Group.

The Annex I Parties or countries referred to in this document refer to those listed in Annex I to the UNFCCC (as amended at the 3rd Conference of the Parties in December 1997): Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and United States of America. Where this document refers to “countries” or “governments” it is also intended to include “regional economic organisations”, if appropriate.

ACKNOWLEDGEMENTS

This paper was prepared by Richard Baron of the IEA Secretariat in October 1999. The author would like to thank those who provided comments and ideas on an earlier draft of this paper: Martina Bosi, Jonathan Pershing (IEA), Jan Corfee-Morlot, Jane Ellis (OECD), as well as Christian Albrecht, Anne Arquit-Niederberger, Peter Alsop, Stuart Calman, José Romero and other Annex I Expert Group delegates who commented in their personal capacity. Additional material and comments were provided by Erik Haites, Fiona Mullins, David Victor, and Jake Werksman. The ideas expressed in this paper are those of the author and do not represent positions or conclusions of the Annex I Expert Group, the IEA or the OECD, or their Member countries. The author is responsible for any errors or omissions.

The paper is being released as an IEA Information Paper to share information relevant to the discussions under the UNFCCC.

Questions and comments should be sent to:

Richard Baron
Administrator
Energy & Environment Division
International Energy Agency
9 Rue de la Fédération
75739 Paris Cédex 15, FRANCE
Fax: 33 1 40 57 67 39
Email: richard.baron@iea.org

OECD and IEA information papers for the Annex I Expert Group on the UNFCCC can be downloaded from the following site: <http://www.oecd.org/env/cc>.

See also <http://www.iea.org>

Glossary

Article 3 commitments: Emission objectives under the Kyoto Protocol. These quantitative commitments are listed in Annex B of the Protocol.

Adjusted assigned amount: a Party's assigned amount, plus any acquisition and minus any transfers of AAUs that this Party has realised for a given commitment period. At the end of the commitment period, the Party's emissions should be less than or equal to its adjusted assigned amount.

Assigned amount: emission objectives defined by the Kyoto Protocol for the commitment period 2008-2012.

CDM: Clean development mechanism. The CDM enables reductions generated in non-Annex I Parties to be used by Annex I Parties for the purpose of meeting their emission objectives under Article 3.

CERs: Certified emission reductions. Tradeable emission reductions generated by CDM projects undertaken in developing countries, to be certified in order to be transferable.

Emission units: assigned amount units (AAUs). Unit of international emission trading.

ERUs: Emission reduction units. Tradeable emission reductions generated by joint implementation projects.

GHG: greenhouse gases. Six gases targeted for reductions by the Kyoto Protocol.

IET: (international emissions trading) international greenhouse gas emissions trading among Parties with commitments listed in Annex B of the Kyoto Protocol.

Issuer, issuing Party: Party which allows a transfer of parts of its assigned amount to another Party.

JJ: joint implementation. Mechanism established by the Kyoto Protocol allowing transfers of project-based emission reductions units among Parties with emission objectives under the Protocol.

Kyoto Protocol: Protocol under the UNFCCC which sets legally-binding greenhouse gas emission objectives for a number of Parties, and establishes international emissions trading.

Liability rules: Rules established to allocate responsibility in case a Party which has transferred parts of its assigned amount is found in non-compliance.

- **Buyer beware, buyer liability:** The buyer may not use all of the emission reductions acquired through trading if the issuing Party (seller) does not meet its emission objective.
- **Buyer + insurance:** Trading takes place under buyer beware; buyers must be insured when the acquire AAUs first issued by a Party.
- **Issuer beware, issuer liability:** The issuer of assigned amount units is entirely responsible for its transfers; buyers are assured that AAUs issued on the market are valid.

- **Issuer + tons in escrow:** Trading takes place under issuer beware. For each trade, a percentage of the total traded must be set aside, to cover the risk of default by the issuer. The tons set-aside could be certified emission reduction units from projects under the Clean Development Mechanism.
- **Issuer + annual retirement:** Trading takes place under issuer beware. At the end of every year, a Party must set aside an incremental quantity of AAUs either to cover its cumulative emissions, or a percentage of its assigned amount.
- **Issuer + permanent reserve:** Trading takes place under issuer beware. Parties must hold a share of their assigned amounts in a reserve, equal to five times the emission level of the Party's last inventory, and are only allowed to trade the remainder.
- **Issuer + annual surplus trading (post verification):** Parties are allowed to transfer AAUs every year, corresponding to reductions under their assigned amount for that year. Parties must announce the annual allocation of their assigned amounts to the UNFCCC Secretariat before 2008.
- **Shared liability:** In case of non-compliance by an issuing Party, the burden is shared among buyers and issuers, based on an agreed percentage.
- **Traffic light option:** As a default, Parties trade under issuer liability. In case a non-compliance problem is identified, transfers would go on under buyer beware. All trades may be stopped if the problem is not addressed.

“Overselling”: Situation where a Party does not hold enough AAUs to cover its emissions at the end of the commitment period and has issued and transferred AAUs. The Party has therefore “sold” more AAUs than it was entitled to.

UNFCCC: United Nations Framework Convention on Climate Change.

AAUs: assigned amount units. Traded units under international emissions trading.

TABLE OF CONTENTS

GLOSSARY	3
1. EXECUTIVE SUMMARY	7
2. LIABILITY RULES IN THE CONTEXT OF THE KYOTO PROTOCOL	10
2.1 OBJECTIVE OF THE PAPER	10
2.2 WHY DEVELOP LIABILITY RULES.....	10
2.3 OVERVIEW OF VARIOUS LIABILITY RULES	12
2.3.1 <i>Main Options: Issuer and Buyer Beware</i>	12
2.3.2 <i>Combinations</i>	13
2.3.3 <i>“Issuer +” and “Buyer +”</i>	13
2.4 LIABILITY UNDER ARTICLES 4, 6 AND 12.....	14
2.5 HOW TO MINIMISE THE RISK OF “OVER-SELLING”	15
2.5.1 <i>Eligibility criteria</i>	15
2.5.2 <i>Article 8: Expert Reviews</i>	16
2.5.3 <i>Sanctions for “overselling” of AAUs</i>	17
2.6 FRAMEWORK FOR THE ASSESSMENT OF LIABILITY OPTIONS	17
2.6.1 <i>Environmental Effectiveness</i>	18
2.6.2 <i>Cost for Participants</i>	18
2.6.3 <i>Market Confidence</i>	18
2.6.4 <i>Legal Entities</i>	19
2.6.5 <i>Institutional Requirements and Feasibility</i>	19
3. DESCRIPTION AND ASSESSMENT OF LIABILITY RULES UNDER INTERNATIONAL EMISSIONS TRADING	21
3.1 “ISSUER BEWARE”	21
3.2 “BUYER BEWARE”.....	22
3.3 HYBRID BUYER/ISSUER LIABILITY	24
3.3.1 <i>Shared Buyer / Issuer Liability</i>	24
3.3.2 <i>Hybrid Buyer/Issuer Liability: The Traffic Light System</i>	26
3.4 OTHER OPTIONS: “ISSUER +” AND “BUYER +”	29
3.4.1 <i>“Issuer + Tons in Escrow”</i>	29
3.4.2 <i>Issuer Liability with a Reserve</i>	30
3.4.3 <i>“Buyer + Insurance”</i>	34
3.5 ASSESSMENT SUMMARY	35
4. CONCLUSIONS & FUTURE WORK	38
5. APPENDICES.....	39
5.1 APPENDIX 1 -- DOMINO EFFECT UNDER BUYER LIABILITY.....	39
5.2 APPENDIX 2 -- ILLUSTRATION: ISSUER BEWARE + ANNUAL RETIREMENT.....	40
5.3 APPENDIX 3 -- ILLUSTRATION: ISSUER BEWARE + PERMANENT RESERVE.....	41
5.4 APPENDIX 4 -- BUYER BEWARE AND FUTURES CONTRACTS	41
6. REFERENCES	43

LIST OF TABLES

TABLE 1: A SIMPLE ILLUSTRATION OF NON-COMPLIANCE BY THE ISSUER OF AAUs	21
TABLE 2: NUMERICAL ILLUSTRATION OF “BUYER BEWARE”	22
TABLE 3: ILLUSTRATION OF SHARED BUYER / ISSUER LIABILITY.....	25
TABLE 4: ILLUSTRATION OF DOUBLE LIABILITY.....	25
TABLE 5: ILLUSTRATION OF THE TRAFFIC LIGHT OPTION: TRADING UNDER GREEN AND YELLOW LIGHT	27
TABLE 6: SUMMARY OF LIABILITY OPTIONS	37
TABLE 7: ILLUSTRATION OF POSSIBLE DOMINO EFFECT UNDER BUYER LIABILITY.....	39
TABLE 8: ILLUSTRATION OF ANNUAL RETIREMENT OPTION.....	40
TABLE 9: ILLUSTRATION OF THE PERMANENT RESERVE	41

1. Executive Summary

Context and objective of the paper

The Kyoto Protocol allows Parties with emission commitments to use international greenhouse gas emissions trading (IET) to fulfil these commitments. Emissions trading is a tool that could help reduce the overall cost of compliance by pursuing emission reductions where they are the cheapest. The Conference of the Parties *shall define the relevant principles, modalities, rules and guidelines for emissions trading in particular for verification, reporting, and accountability for emissions trading* (Article 17 of the Kyoto Protocol).

The issue of liability addressed in this paper can be summarised by the following question: Can the buyer of assigned amount units (AAUs) use them for the purpose of its compliance if the Party which issued them turns out to be in non-compliance, i.e. if it “oversold” AAUs? This paper does not address the broader question of whether liability rules are the best means of mitigating the risk of “overselling” and non-compliance.

Without additional rules the Protocol implies that the responsibility of keeping emissions at or below a Party’s adjusted assigned amount rests entirely with the Party. Accordingly, a Party which turns out to be in non-compliance at the end of the period and had transferred AAUs that it needed for its own commitment would be held responsible: the buyer of AAUs could use these for its own compliance in all cases.¹ Yet, this is open for debate: the Conference of the Parties at its Fourth session specifically includes liability and matters relating to accountability as elements of the so-called Buenos Aires plan of action.

Liability rules are being considered in order to:

- define clearly where the responsibility lies for a Party which is out of compliance at the end of the commitment period and has happened to transfer AAUs during the period; and in doing so,
- encourage Parties not to mis-use IET, i.e. not to sell AAUs that are not surplus to what they ultimately need to cover their emissions. Misuse of trading may bring it in disrepute and take away an important tool for cost-effective reductions in the future.

This paper asks: what are possible rules to determine where the responsibility lies when a Party “oversold” AAUs to another Party? How could these rules affect the behaviour of participants to an emission trading system (e.g. encourage compliance)? What are the pros and cons of each rule to allocate liability and its ramifications for other elements of the Protocol?

¹ This applies overall, except for a clause under Article 6.4 on joint implementation projects, whereby credits transferred after an implementation issue has been raised may not be used for compliance.

Coverage and approach

The paper provides a technical assessment of the following liability rules for IET:

- issuer liability;
- buyer liability;
- hybrid systems: shared liability and the “traffic light” option;
- issuer liability + tons in escrow;
- issuer liability combined with different reserves (annual retirement, permanent reserve, and annual surplus trading)
- buyer + insurance.

These options are either based on issuer liability, buyer liability, or a combination of both. In short, issuer liability puts responsibility on the Party which has transferred parts of its assigned amount. Any AAUs issued on the market are therefore valid for use by the acquiring Parties; this would create a homogenous commodity. Issuer liability requires governments to monitor the validity of any transferred AAU, as they are responsible for ensuring that their emissions are less than or equal to their adjusted assigned amount at the end of the period. Issuer liability is likely to depend on the strength of the non-compliance regime that is agreed under Article 18 of the Kyoto Protocol and domestic enforcement mechanisms to encourage compliance.

Buyer liability, in case the issuer is in non-compliance, would result in the cancellation or devaluation of trades. Potential buyers would therefore be careful to acquire primarily from Parties which are most likely to meet their emission objectives. Different prices would emerge for AAUs, depending on the Party which issued them. A relatively high price would be paid for AAUs sold by Parties which appear to be able to comply with their emission objectives. Buyer liability, or buyer beware, puts pressure on governments to monitor the validity of the acquired AAUs: they would be held responsible for non-compliance if the emissions of the issuing Party exceed its adjusted assigned amount and the AAUs could not be fully used for compliance.

As the Protocol currently stands, Parties are responsible for ensuring that their emissions do not exceed their adjusted assigned amount at the end of the period, irrespective of whether they have participated in trading.

The different liability rules are assessed with the following criteria:

- environmental effectiveness;
- cost for participants;
- market confidence;
- institutional requirements and feasibility;
- participation of legal entities.

The liability rules identified in this paper are not ranked as this would involve making political judgements on the relative importance of these criteria.

Other elements governing the design of liability rules

The paper also points to the fact that other elements of the Protocol need to be taken into account when designing liability rules for international emission trading. These include:

- Eligibility criteria for participation (as buyer or seller) to international trading, which may reduce the risk of Parties engaging in transfers that turn out to be invalid at the end of the period. Compliance with Articles 5 and 7, and the establishment of a national registry to track trades (domestic and international) have been proposed by a majority of Annex I Parties as possible eligibility criteria.
- The review of transfers and acquisitions during Article 8 expert reviews. These reviews offer the possibility *to identify any potential problems in, and factors influencing, the fulfilment of commitments*. This could include potential problems caused by IET.
- Sanctions, if any, for failing to meet the eligibility requirements or rules for IET, or for trading AAUs that were not surplus. This issue could be discussed under the item on compliance-related issues of emission trading in the Buenos Aires Plan of Action;
- Decisions on a compliance regime under Article 18.
- Domestic legal requirements on entities for Parties which choose to make entities domestically responsible for their emissions. Such obligations have the potential to be significantly more stringent and enforceable than those that can be agreed internationally.

How these elements are tackled can reduce the risk of trades in AAUs that the issuing Party needed to cover its emissions. As liability rules are also being discussed to address this risk, their design will necessarily be affected by potential decisions on those elements.

2. Liability Rules in the Context of the Kyoto Protocol

2.1 Objective of the Paper

This paper lays out options for defining national responsibility for non-compliance with emissions targets when a non-complying Party has transferred AAUs. This is referred to as “liability” for non-compliance under international GHG emissions trading. Liability rules are in fact a way to define who would bear the risk if a Party has a shortfall at the end of the budget period and has transferred AAUs; they do not refer to “liability” in its legal sense.

The paper is structured as follows: Section 2.2 explains why liability rules are being considered; Section 2.3 offers a brief overview of the different liability rules covered in the paper; Section 2.4 presents how the risk of “overselling” is handled under other flexibility Articles of the Protocol; Section 2.5 considers other options to minimise the risk of “overselling” and Section 2.6 describes the criteria used for the assessment of liability rules. Section 3 provides an assessment of each rule in detail. Section 4 offers preliminary conclusions.

The paper is intended to stimulate discussion of liability under IET, and to do so in the context of other rules for IET. It provides an assessment of different options based on several criteria, without aiming to identify best options.

A full analysis of the effects of liability rules on overall trading activity and market stability would involve an assessment of what unfettered trading would be, and is beyond the scope of this paper. However, it is a potentially important element of the evaluation of liability rules. Also, a full assessment of the effect of liability rules on market stability and liquidity would require the development of alternative emission scenarios, which was not possible for this paper.

2.2 Why Develop Liability Rules

There are several examples of environmental goals implemented through “cap-and-trade” mechanisms, e.g. the SO₂ allowance trading program in the United States, fisheries in New-Zealand. Participants to these trading systems are often very decentralised. However, most of these domestic systems rely on a strict legal framework, financial penalties, and appropriate monitoring of emissions and trades. Establishing an international emissions trading system under the Kyoto Protocol will be different because:

- experience shows that the strong compliance elements of domestic systems are difficult to reproduce *internationally*;²
- obtaining national information on emissions and removal of greenhouse gases covered by the Kyoto Protocol is more difficult and time-consuming at the national level than plant-level. This is due to the large possible number of different GHG sources and sinks. The national inventory defines compliance by Parties with Article 3 commitments, and indicates what they would need to acquire from, or be able to transfer to, other Parties through the international GHG emission trading system.

Non-compliance with Article 3 commitments can be caused by many factors, e.g. lack of appropriate domestic mitigation action, mistakes in emission inventories. With respect to IET,

² Werksman (1998).

every traded AAU allows the buying Party to increase its emissions beyond its initial assigned amount set out in the Kyoto Protocol. If selling Parties had emitted more than their adjusted assigned amount, then IET could lead to Annex I Parties failing to meet their collective commitment, either unintentionally or through deliberate action by some Parties. Of course, Annex I Parties could also fail to meet their commitment in the absence of trading if individual Parties' emissions exceed their targets.

IET could lead to, or worsen, non-compliance for two sets of reasons:

- data-related: i.e., emission projections for the commitment period could be inadequate, and inventory data not timely, whereas it ultimately determines whether a Party, in aggregate, need to acquire units or has units available to transfer;
- financially-related: i.e., trading may create perverse incentives to over-sell AAUs for financial reasons.

Let us look at these problems in turn.

It is generally understood that IET will take place during the whole of the first commitment period and not only at the end, when inventory data would be available for the whole period. Trading over the whole period would enable full cost-minimisation through a liquid market. In fact, emission trading could start even prior to the start of the first commitment period, based on forward or futures transactions.³ However, Parties cannot predict their emission levels with full certainty for the commitment period: they would not exactly know how much they need to acquire from or can sell to the market.⁴

A second issue relates to the timing of GHG inventory data: a Party believing it is on track to over-comply with its commitment may transfer too many AAUs. But it could only be found to be in non-compliance once it has submitted its final inventory and the review of compliance with Article 3 has taken place, probably in 2014.⁵ Parties may want to take some steps themselves to manage the risks associated with data uncertainty and inventory time-lags. For instance, it has been suggested that trading could take place on the basis of the annual surplus in Parties' emissions, precisely to avoid trading non-surplus AAUs.⁶ This and similar options are discussed further under "issuer + reserve" below.

Third, selling AAUs is a potentially large source of revenue. There could be a financial incentive to sell assigned amount units which could put a Party in non-compliance. This is an important issue, especially if no financial penalty or other strong non-compliance measure is applied to discourage Parties from exceeding their targets. Making domestic entities responsible for their emissions and implementing domestic enforcement frameworks could minimise this risk and enhance the international compliance process.

³ Mullins (1998).

⁴ This problem can become particularly serious at the end of the commitment period, when Parties which are not in a position to comply without acquiring assigned amounts will want to buy, while issuers would not necessarily know how much they can sell. A short trading period for adjustment after the end of the commitment period and once 2012 inventories are completed is sometimes advanced as a possible solution to this problem. Improving short-range projections of emission inventories could also help Parties minimise the problem of incomplete inventory information, as would reducing the delay between the year in which emissions occur and the reporting of the inventory for that year.

⁵ Corfee-Morlot (1998).

⁶ Switzerland, submission for the 10th sessions of the Subsidiary Bodies of the UNFCCC (1999).

No *liability* rule can completely eliminate the risk of a Party “over-selling”, although it could encourage buyers and sellers to minimise it. The definition of responsibility for transfers by a Party in non-compliance is therefore an integral part of whatever system is to be set up to address non-compliance under the Protocol.

Because of the above risks, participants to IET should know in advance where the responsibility lays whenever a Party has sold AAUs that turn out not to be surplus to its assigned amount. The responsibility for such “overselling” could fall on the issuer of assigned amounts (AAUs), the buyer, or both. The issuer is the Party which decides to issue AAUs and to transfer them to another Party. The buyer is the Party which acquires these AAUs. For tracking purposes, AAUs would bear the issuing Party’s name, and other necessary information.

Parties have identified liability as one element of their work on the Kyoto mechanisms under the Buenos Aires Plan of Action. At present, the Protocol assumes that the issuer is responsible for the transfer of parts of its assigned amount, as whatever is transferred is automatically added to the buyer’s assigned amount, and subtracted from the issuer’s (Art. 3.10 and 3.11). The default rule is therefore “issuer beware”, or issuer liability. But the Protocol remains silent on what would happen if the transferring Party is in non-compliance at the end of the commitment period.

The next section gives an overview of some of the options that have been advanced to address liability under IET.

2.3 Overview of Various Liability Rules

This section summarises the various liability rules discussed in Section 3. This paper presents a complete set of elements that could be combined into other liability rules: issuer responsibility or buyer responsibility; hybrid systems, combining buyer and issuer liability; additional mechanisms to simple liability rules; and several types of reserves to minimise the risk of “overselling”.

2.3.1 Main Options: Issuer and Buyer Beware

The rule defined as “issuer beware” is when the issuer (seller) is responsible for its transfers of AAUs if it is in non-compliance later on. This is similar to the responsibility falling on the producer of a manufactured good if the delivered good does not correspond to its description in the contract between the buyer and the producer. It is the seller’s responsibility to replace the good or to face whatever legal action is contained in the contract in case of default.

Under the “buyer beware” rule, the buyer is not sure about the ultimate value of its acquisition, not unlike a buyer of stocks or currencies, which will face a financial loss if the value of the acquired stocks decreases in the future, or if the currency is devalued. Under buyer beware, the buyer would not be able to fully use acquired AAUs for compliance if the issuing Party has not met its emission objective.

“Issuer Beware”

- The issuer of AAUs is entirely liable for transferred AAUs in case of non-compliance with its Article 3 commitment.
- Buyers are assured that all AAUs issued on the market can be used to comply with their Article 3 commitments.

“Buyer Beware”

- The ability to use acquired AAUs for compliance depends on compliance by the issuing Party.
- In case of non-compliance by the issuing Party at the end of the commitment period, some or all of the transfers of its AAUs are invalidated to put the issuing Party back into compliance.
- The market determines the price of AAUs based on the issuing Party’s situation towards compliance. It encourages issuing Parties to demonstrate compliance early.

2.3.2 Combinations**“Shared Liability”**

- In case of non-compliance by the issuer, the burden is shared between the buyer and the issuer, based on an agreed percentage.

“Double Liability: Issuer and Buyer”

- In case of non-compliance, the issuer is responsible for not holding enough AAUs to match its emissions (issuer beware)
- In addition, a portion of the transfers AAUs from the defaulting Party are also invalidated, as under buyer beware.
- Double liability augments artificially the quantity of AAUs that buyers and sellers “owe” to the system.

“Traffic Light Option”

- As a default, Parties trade under issuer liability (green light). The default could change if non-compliance problems are identified.
- Buyer liability applies to a Party if a non-compliance problem is identified (yellow light).
- A red light (Party prohibited from transferring AAUs) is turned on if the non-compliance problem is not addressed.
- This option requires definitions of indicators and procedures to trigger yellow / red lights, and possibly more frequent expert reviews for Parties with a non-compliance problem.

2.3.3 “Issuer +” and “Buyer +”**“Issuer + Tons in Escrow”**

- For each trade, a percentage of the total traded must be set aside, to cover the risk of default by the issuer.
- If the issuer has oversold, the set-aside tons are used to offset the surplus.
- Ideally, the set-aside tons must be certified emission reduction units.

“Issuer + Annual Retirement”

- At the end of every year, a Party must set aside an incremental quantity of AAUs either to cover its cumulative emissions, or a percentage of its annual assigned amount.⁷ This would guarantee that Parties hold enough AAUs to cover their past emission level.
- It is allowed to trade the remaining of its assigned amount under issuer beware.
- Non-compliance with the reserve will prohibit the Party from selling AAUs until the reserve has been restored.

⁷ The Protocol does not define annual assigned amounts. What is meant here is one fifth of a Party’s assigned amount, supposed to represent on average its annual emissions over the commitment period.

“Issuer + Permanent Reserve”

- A limit is imposed on transfers by Parties:
 1. Each Party must hold permanently a reserve expressed as a share of its total assigned amount. It is allowed to transfer the rest.
 2. The reserve is based on the Party’s last inventory: it is equal to five times the emission level of the last inventory.
- A Party without enough AAUs in reserve would not be allowed to transfer AAUs.

“Annual Surplus Trading (post verification)”

- Parties wishing to trade must define an allocation of their assigned amount for every year of the commitment period.
- The UNFCCC Secretariat would issue certified tradeable AAUs to Parties whose cumulative assigned amount allocation from 2008 through the given year is above its cumulative emissions for the same period.
- All certified AAUs are valid for compliance by buying Parties, regardless of whether the seller is in compliance at the end of the commitment period or not.

“Buyer + Insurance”

- Buyers acquire AAUs under buyer beware.
- Buyers must be insured when they acquire AAUs first issued by a Party. The insurance aims to cover the buyer in case of non-compliance by the issuer.
- Issuers have an incentive to demonstrate compliance to lower the insurance premium applied to their AAUs, and maximise revenues from the sale.

2.4 Liability under Articles 4, 6 and 12

Before turning to liability for IET, it is useful to study how liability is addressed for the transfer mechanisms under the Kyoto Protocol. The Kyoto Protocol introduces 3 other mechanisms for international co-operation towards compliance with Article 3 commitments:

- Article 4, by which several Parties can share and re-allocate the sum of their assigned amounts. This “bubble” can be seen as a form of international trading *ex ante*; it does not offer any flexibility once agreed;
- Article 6 on project-based emission reduction units for joint implementation among Annex I Parties or their legal entities;
- Article 12 on a clean development mechanism, which introduces crediting of emission reductions achieved in non-Annex I Parties, through sustainable development projects.

Article 4 specifies that in case Parties which have agreed to jointly fulfil their commitments do not meet their common objective each Party will be held responsible against its new assigned amount under Article 4. For instance, if Party 1 has agreed to reduce its assigned amount by 20 MtC under Article 4, for the benefit of Party 2, it will be held responsible against this new assigned amount in case the collective emission goal is not met. Party 1, the “issuer” of these 20 MtC is therefore responsible for its reduced assigned amount once it has transferred AAUs to another Party. In addition, Article 4.6 also sets a collective responsibility for Parties which have engaged in such an agreement together with a regional economic integration organisation.

Article 6 on joint implementation projects within Annex I does not directly address liability, beyond the language of Article 3 (3.10 and 3.11). In fact, Article 3 makes no distinction between AAUs acquired under emission trading and ERUs acquired under joint implementation, as far as their contribution to the emission goals is concerned. However,

Article 6.4 a buyer may not use acquired ERUs if a compliance problem is identified under JI, suggesting a form of buyer liability.⁸

Article 12 does not address the responsibility of each party if a project is found not to have delivered the expected reductions. It is not explicitly stated that certified emission reductions (CERs) would only be credited once certified. However, most commentators are stressing the need for certification after emission reductions have occurred. The purpose of certification, presumably, is to guarantee that reductions are real and surplus from the project baseline, and therefore good for crediting by the (Party of the) buyer against its emissions. Under that assumption, all CERs would be valid for compliance: liability is a non-issue. If reductions can be certified *before* they have been achieved, and re-assessed *ex-post*, then there is a possibility that CERs used for compliance would turn out not to be valid (i.e., the reductions envisaged when the CERUs were issued did not come to fruition). Contractual clauses may define each party's responsibility in such a situation. However, since non-Annex I Parties do not have emission commitments under the Kyoto Protocol and would therefore not be subject to non-compliance measures under Article 18 in case of non-compliance with Article 3. This discussion may therefore have little bearing on liability for IET and joint implementation, given the (emerging) preference for *ex-post* certification.

In brief, there is no unique approach to liability in the other Kyoto mechanisms:

- In the case of bubble agreements under Article 4, issuing Parties are liable for the transfers of their AAUs in case of non-compliance by the bubble. In addition, if one Party fails to meet its commitment without putting the bubble in non-compliance, the bubble implicitly shares the burden of having to offset the Party's surplus emissions.
- Article 6 introduces a form of (temporary) buyer liability, until a compliance problem with Article 6, if identified, is resolved. The effectiveness of this clause is very much dependent on the type of liability regime adopted under IET.

2.5 How to Minimise the Risk of “Over-selling”

Other elements of the Kyoto Protocol and IET need to be considered alongside the liability issue, as they could reduce the risk of “overselling”. These include criteria for participation to IET (eligibility), and domestic requirements for participation; the regime to handle non-compliance with Article 3 commitments under Article 18, possibly including sanctions for “overselling”. How the Protocol will handle these questions will determine how much should be asked from liability rules.

2.5.1 Eligibility criteria

Eligibility criteria for participation to IET mentioned by different Annex I Parties include:

- compliance with Articles 5 and 7 of the Kyoto Protocol (and Article 12 of the Convention);
- a national registry, accounting and tracking AAUs held or traded by the Party and/or its legal entities;
- the adoption and ratification of a compliance regime under Article 18;
- compliance with the rules of the emission trading system.

⁸ Note that this rule may not be effective: if the emissions trading regime were to operate under “issuer beware”, a host country could transfer AAUs corresponding to the ERUs amount that the buyer refuses to acquire under “buyer beware” as a result of Article 6.4.

Eligibility criteria could help minimise the risk of “overselling” in a number of ways. They could deny the right to participate in the system (and to issue AAUs) to Parties which do not have a proper monitoring system or do not adequately report their GHG emissions and the necessary supplementary information under Articles 5 and 7. The expert review process could be used to determine whether Annex I Parties are in compliance with these eligibility criteria.⁹

Whenever a Party has devolved parts of its assigned amount to domestic entities, a national registry would enable the Party to track trades by these entities. However, a reconciliation between the devolved amount and actual emissions would be necessary: entities would have to “retire” AAUs back to the Party for domestic compliance, i.e., to match their emission level. Until a reconciliation has taken place, it is not possible for the Party to gauge entities’ compliance and the quantity of AAUs available for overall Party compliance. Governments may choose to conduct this domestic reconciliation on an annual basis. This would give a Party more information as to whether it was, in aggregate, on track to meet its target, and help avoid transferring AAUs if it was not.¹⁰

Parties which decide to devolve parts of assigned amounts to legal entities could also be required to establish a domestic enforcement procedure (e.g. penalties) to ensure compliance by these entities. Indeed, strong enforcement is more easily implemented, and likely to be more effective, at the domestic than international level.

Another important element of eligibility criteria, potentially linked to national registries, is the supplementary information that Parties need to provide annually under Article 7 “for the purposes of ensuring compliance with Article 3 ...” (Article 7.1). This information is likely to include international transfers of AAUs to and from the Party through IET, joint implementation and the acquisition of CERs from the CDM. It may therefore be possible, to a limited extent, to make a preliminary assessment of progress towards compliance as inventories and net trading data are reported during the commitment period.¹¹ This information, if it revealed potential non-compliance of a Party, may put some moral pressure not to buy from the Party.

2.5.2 Article 8: Expert Reviews

The Kyoto Protocol allows for expert reviews of information provided to ensure compliance with emission targets. Such review gives an opportunity to identify possible problems in the implementation of Article 3 commitments, including the possibility of “overselling”. It could also be used to check whether Annex I Parties meet the eligibility criteria for participation to emission trading¹².

If the expert review were to show that a Party’s emission levels are much higher than its assigned amount and that it had transferred AAUs, the COP/MOP may take some action to minimise the risk of further “overselling” by that Party. At present, the Protocol does not

⁹ Corfee-Morlot (1998).

¹⁰ A Party may have devolved a portion of its assigned amount to legal entities and have a domestic monitoring and compliance system in place to assure that they meet their target. It still may not comply if emissions from other sources outside the domestic trading system are not appropriately managed and covered by assigned amount held by the Party. The Party as a whole may have transferred AAUs through its entities and not be in compliance, in spite of a stringent domestic emission trading requirements, if policies and measures in the non-trading sectors are not effective in managing emissions.

¹¹ However, this would not be the case for those Parties with large and unpredictable annual fluctuations in emissions.

¹² Corfee-Morlot (1998).

speak to that issue, but some reaction by Parties could be expected in such circumstances. For instance, some Parties have suggested that any AAUs transferred after an implementation question has been raised could be invalidated if the issuing Party is found in non-compliance later on.

Expert reviews could therefore be used in a number of ways to limit the risk of “overselling” at the end of the budget period. A few of the options for liability rules described below would probably rely on Article 8 reviews for their implementation.

2.5.3 Sanctions for “overselling” of AAUs

Under the rules governing international emission trading, Parties may consider specific sanctions to discourage “overselling”. A Party could be suspended from trading (e.g. the right to transfer¹³, or the right to transfer *and* acquire¹⁴) in a subsequent commitment period.

The major problem with sanctions for invalid trading is their political acceptability. Is there indeed any particular justification for sanctions applying only to non-complying Parties which have transferred AAUs, as opposed to all Parties which do not meet their emission targets? One can argue that a Party out of compliance by an amount that is less than what it has transferred would have met its emission objective if it had not traded. In addition the acquiring Party would not have been able to increase its emissions; it may have difficulties to meet its next period’s objectives as a result. This would argue in favour of sanctions linked to “overselling”. Other non-compliance measures would be addressed under Article 18 of the Kyoto Protocol.

Another contentious question is whether trading has caused non-compliance, or if it was caused by policies and measures in the non-trading sectors that turn out less effective than expected. Would sanctions for overselling be judged applicable in such cases, or would other non-compliance measures under Article 18 be more appropriate?

The purpose of this paper is not to discuss the whole set of rules for international GHG emission trading, but simply those that would allocate the risk among buyers and sellers. Nevertheless, the possibility of sanctions for “overselling” or non-compliance with trading rules could also encourage Parties to comply, both through prudent management of their emissions and through the use of trading.

2.6 Framework for the Assessment of Liability Options

We assess possible liability rules for international GHG emissions trading from five different angles:

- environmental effectiveness;
- cost to participants;
- market confidence;
- institutional requirements and feasibility; and
- participation by legal entities.

¹³ FCCC/SB/1998/MISC.1/Add.1/Rev.1

¹⁴ FCCC/SB/1998/MISC.1/Add.1/Rev.1 & FCCC/SB/1998/MISC.1/Add.3

2.6.1 Environmental Effectiveness

International GHG trades could lead to an increase in overall emissions by Annex I Parties if a Party's emissions after the trade are above the Party's adjusted assigned amount. Such "overselling" may occur as the result of:

- deliberate intent to make a financial profit;
- lack of proper domestic monitoring of sources, including those authorised to trade on the international market;
- a "honest" mistake in GHG inventories;
- incorrect projections of future emission levels during the commitment period;
- "force majeure", such as extreme weather, etc.

How could liability rules prevent or reduce the likelihood of overselling of AAUs?

2.6.2 Cost for Participants

Emissions trading is meant to improve the economic efficiency of actions to meet a given environmental objective. In order to deliver its full economic efficiency, transactions costs for emission trading must be kept to a minimum. The question is whether or not liability rules add significantly to the cost of trades and deter participants from conducting certain trades as a result. If liability rules create an unnecessary barrier to trading, and add to the cost of a transaction, it would represent a loss in economic efficiency. The rules could increase both the aggregate costs of compliance and the costs for individual participants.

Transaction costs can be defined as all increments to the price of the acquired commodity. Of most relevance for the assessment of transaction costs related to liability rules are the following:¹⁵

- search costs, if all traded AAUs are not equivalent and some help is required to acquire AAUs of better quality;
- insurance costs, as some rules (buyer + insurance, issuer + escrow) require some form of insurance coverage for the transaction. Maintaining a reserve of AAUs is another form of insurance;
- non-compliance costs, which can be borne either by the buyer or/and by the issuer, depending on the rule. Such cost can either be defined by Article 18 of the Kyoto Protocol, or by a specific clause in the definition of the trading regime; and
- approval costs, if governments wish to apply a stringent control on transfers and acquisitions of AAUs, as Parties, not entities, are responsible for compliance.

This paper specifies below whether costs are borne by buyers and/or sellers, although there is an equivalent loss of economic efficiency (less gains from trading) either way.

2.6.3 Market Confidence

Parties and legal entities, if authorised to trade, will only do so if they have a reasonable degree of certainty about the validity of acquired AAUs for compliance, and if they are confident that the market will be able to provide AAUs when needed.

¹⁵ See OECD (1997), page 38.

The validity of acquired AAUs would depend on the chosen liability rule for international emission trading. Some would guarantee the value of AAUs for Article 3 compliance, but not necessarily their environmental value. Others would increase the certainty of buyers vis-à-vis the environmental value of AAUs through information on the environmental performance of the issuer.

We inquire whether the choice of a particular liability rule would affect participants' confidence in the validity of traded AAUs for compliance.¹⁶ Some liability rules could also undermine market confidence if they restrict access to trading during the commitment period and prevent cost-effective actions from being undertaken.

There is a broader question related to the market of AAUs, which is not fully covered in this paper: Would a given liability rule provide for a more stable market, where participants can form reasonable expectations about supply and demand as well as prices, or is the rule likely to disturb the market? We can give intuitive answers to the question, but these remain tentative as we cannot predict how the GHG emission trading system might develop.¹⁷

2.6.4 Legal Entities

Legal entities may be the main participants to IET, if they are authorised to trade. Their motivation to participate, but also their sensitivity to various trading rules, may be different from those of governments. For instance, a company would know exactly what its marginal cost of reduction is, and would conduct more efficient transactions than a government which does not have access to this information for the country as a whole. On the legal side, the private sector and other entities may be subject to much more stringent non-compliance rules under a domestic regime than those faced by Parties at the international level. It is therefore worthwhile asking how legal entities, as opposed to governments, would be affected by various liability rules.

2.6.5 Institutional Requirements and Feasibility

Liability rules discussed in this paper are based on some monitoring of international transfers of AAUs either before or after they have taken place. In addition to measures under Articles 5, 7 and 8 of the Kyoto Protocol, liability rules could require Parties to establish procedures to:

- assess compliance with certain elements of the rule (e.g. a domestic reserve of AAUs, domestic monitoring or registration of international trades, tons set aside, escrow accounts, insurance contracts, etc.);
- monitor international trades and/or transfers of assigned amounts to prevent illegal trading practices;
- provide information on GHG trades and on the adjusted assigned amount of Parties in a timely manner;
- take action to intervene in the market, such as restricting the right to transfer AAUs under certain circumstances, to be defined in advance.

¹⁶ This is a different question from: do the traded AAUs represent surplus reductions for the Party that issued them? In this section we are only concerned with the value of AAUs with respect to compliance with Article 3.

¹⁷ Would international trading be limited, as Parties have little to transfer, or would it be very active with a high number of intermediaries, hedging tools and speculative activity? Would the emission paths be fairly predictable, or will they create great price uncertainty?...

Some of these review tasks may be undertaken by private entities. In some cases, Parties themselves through COP/MOP may need to provide this institutional framework. The workability and effectiveness of certain liability rules may depend heavily on the availability of timely information on Parties GHG inventories, on the trades resulting in a change in assigned amount, etc.¹⁸ Without such information, certain liability rules may not be feasible. The effectiveness of some rules would also depend on the time it would take for the process to arrive at a decision to intervene in the market and for the intervention to then be carried out. Other liability rules would rely more on non-compliance measures under Article 18 of the Protocol.

The feasibility of the liability rules is discussed from the viewpoint of their specific requirements.

¹⁸ Corfee-Morlot (1998) presents the possible timing of various elements of the monitoring, reporting and review mechanisms under the Kyoto Protocol.

3. Description and Assessment of Liability Rules under International Emissions Trading

3.1 “Issuer Beware”

For the purpose of this paper, we start from a simple situation with one issuer, that is a Party which transfers parts of its assigned amount, and one buyer. The issuer falls into non-compliance because its emissions in the period are higher than its assigned amount as adjusted by Article 3 (including sinks, trading, joint implementation and the clean development mechanism). In this case, the issuer sold 10 AAUs, or units, without having achieved the necessary reductions in the commitment period.

Table 1: A simple illustration of non-compliance by the issuer of AAUs

<u>Issuer (seller)</u>		<u>Buyer</u>	
Assigned amount	100	Assigned amount	150
Sales	<u>- 10</u>	Acquisitions	<u>10</u>
Adjusted assigned amt.	90	Adjusted assigned amt.	160
Emissions	100	Emissions	160
<i>Non-compliance by 10 units</i>		<i>Compliance</i>	

Under **issuer liability**, the issuer is responsible for having sold units that did not correspond to its emissions level at the end of the commitment period. Its adjusted assigned amount (AAA), after transfers, is lower than its actual emission level. The issuer is in non-compliance by 10 units. The buyer has acquired enough AAUs to cover emissions and is therefore in compliance. The question of how to deal with “overselling” would be handled under the broader problem of the issuer’s non-compliance with its Article 3 commitment, under Article 18.

One advantage of putting responsibility for trading on the issuer of AAUs is that buyers need not worry about the validity of the acquired AAUs for the purpose of their own compliance. Under issuer liability, any acquired AAUs could be used for compliance by the buyer. Acquiring AAUs from the market would be risk-free, whatever the compliance situation of the issuer is at the end of the commitment period. Legal entities would acquire AAUs with the assurance that these can be used for compliance with domestic goals.

With more homogenous and risk-free AAUs being traded, the market would be more liquid, and transactions costs would be lower, as buyers need not distinguish among AAUs according to their country of origin when they acquire them.¹⁹ A clear international price signal would emerge for an AAU, and hence indicate the marginal cost of reduction of a CO₂ equivalent unit.

The non-compliance regime decided under Article 18 would play an essential role in an issuer liability trading system: the sanction for non-compliance, e.g. the penalty, must be stronger than the potential gain from having oversold AAUs. Otherwise, there is a direct financial incentive to transfer non-surplus AAUs, knowing that sanctions for such behaviour are mild, and so, ineffective. There is otherwise a bigger risk of some Parties over-selling AAUs, leading to a degradation of the environmental objective of the Kyoto Protocol. This would

¹⁹ Kerr (1998)

lower the price of AAUs, at the expense of other traders and of the whole system, as a number of potentially cost-effective measures would not be undertaken as a result.

On the whole, “issuer beware” would generate low transaction costs, modest monitoring requirements (essentially international transfers of AAUs), but may not succeed in preventing overselling, unless strong sanctions are applied to the issuer under Article 18. There is little precedence for such sanctions in international agreements so far.²⁰

The effectiveness of issuer liability would however be enhanced if, at the level of legal entities, governments introduce domestic non-compliance measures (e.g. penalties) for those entities whose emissions exceed held AAUs. Governments could carry out annual reconciliation of entities’ emissions and their AAUs, thus ensuring that the Party’s emissions are backed by AAUs during the course of the commitment period. Through a registry for international transactions, the government would also be able to monitor international transfers by its legal entities, and may stop excessive transfers.

3.2 “Buyer Beware”

The “buyer beware” or buyer liability rule responds to concerns that putting all the responsibility on the issuer may not be enough to deter trading of non-surplus AAUs. As mentioned above, the financial benefits of selling AAUs could, in these conditions, actually reward non-compliance.²¹

Under buyer beware, AAUs acquired from a Party that ends up out of compliance may not be used to comply with Article 3 commitments. Coming back to our simple numerical example, the issuer is found to be in non-compliance because of trading. Under buyer liability, all units sold would be returned to the issuer, and correspondingly subtracted from the buyer’s assigned amount. The buyer is then in non-compliance at the end of the commitment period, by 10 units.

Table 2: Numerical illustration of “buyer beware”

<u>Issuer</u>		<u>Buyer</u>	
Assigned amount	100	Assigned amount	150
Sales	<u>- 10</u>	Acquisitions	<u>10</u>
Adjusted assigned amt.	90	Adjusted assigned amt.	160
Emissions	100	Emissions	160
<i>Non-compliance by 10 units</i>		<i>Compliance</i>	
<u>With buyer beware</u>			
Adjusted assigned amount	90 + 10	Adjusted assigned amount	160 - 10
Emissions	100	Emissions	160
<i>Compliance restored</i>		<i>Non-compliance by 10 units</i>	

This system encourages the buyer to acquire AAUs from those issuers who are most likely to comply. As a result, AAUs issued by different Parties would be priced differently depending on the market’s appraisal of these Parties’ compliance with Article 3 commitments. This is a key element of the buyer liability rule.

²⁰ Werksman (1998)

²¹ Haites (1998).

Because the buyer beware liability rule would reduce the potential revenues of these non-surplus trades, it would lower the incentive to sell, but also reward those Parties which demonstrate over-compliance and wish to issue AAUs.²² Because issuers have a financial interest in the transaction, they are more likely to see to it that they are highly rated by the market in order to benefit as much as possible from the transaction. There would be a stronger pressure by the market (buyers) to obtain information relevant to Parties' compliance (timely inventories and reporting of international transactions). Legal entities in a position to sell AAUs would also put pressure on the government and other entities of the Party to improve prospects for compliance, so as to maximise the potential gains from trading.

All traded AAUs would need to bear the issuing Party's identification. At the end of the commitment period, the holder of AAUs would lose (some of) the right to use these AAUs if the issuing Party were not to meet its Article 3 commitment.

A buyer beware system requires rules on how to invalidate trades: a Party may have issued and sold a certain quantity of AAUs, but only a portion of this quantity may need to be cancelled to bring it back into compliance. Let us assume an issuing Party which has sold 10 units, 5 of which need to be recovered to bring the Party back into compliance. Three methods have been advanced to cancel trades:²³

- Chronological cancellation, starting with the most recent trades, according to the "last-in first-out" principle. The assumption is that those who bought AAUs early did so at a time where the issuer was still in compliance, and only the last trades triggered non-compliance (here, the trades corresponding to the five last AAUs);
- Pro-rata devaluation: all AAUs issued by the non-complying country are devalued by the percentage necessary to restore compliance of the issuer. A Party which transferred 10 AAUs and is in non-compliance by 5 AAUs would devalue all the AAUs it issued by 50% (5/10).
- Cancellation of all traded AAUs arguing that it is impossible to determine which trades do not correspond to real reductions. In our above example, 10 units would be cancelled while only the transfer of 5 units is causing a problem.

Haites (1998) argues that invalidating trades in reverse chronological order would limit the number of trades affected, encourage early registration of the trades, and therefore increase information on market transactions. It is hard to predict whether participants will rush to trade to avoid devaluation or wait to acquire AAUs from Parties more likely to comply. This would create a large demand for AAUs early in the period, and increase market prices at that moment, as early credits are more valuable for compliance. The pro-rata devaluation avoids this situation. It assumes that all trades are equally invalid. It would somewhat complicate the accounting of assigned amounts at the end of the commitment period if issuers of AAUs were to fail to comply, because all buyers of non-surplus AAUs would have to devalue them. The third option, full cancellation, could seriously undermine the confidence in the market, as all AAUs from a Party would be invalidated, e.g. even if only 5% of them were non-surplus.

Under buyer liability, at least two stages would be involved to assess Parties' compliance: before and after the necessary cancellation of trades from non-complying issuers. A buyer in compliance thanks to the acquired AAUs could be thrown into non-compliance if they are returned to their issuer. A "domino effect" could occur, as compliance of Parties engaged in trading hinges on other Parties' compliance. This is illustrated in Appendix 1.

²² Some Parties may even be excluded *de facto* from the issuers market if no participants believe they will be able to comply with their assigned amounts.

²³ Palmisano (1998).

Legal entities of a Party may have purchased AAUs which are invalidated under buyer beware.²⁴ The Party would be subject to that devaluation as well, if entities have presented these AAUs for compliance. Governments are therefore likely to apply some control over the acquisition of AAUs by their legal entities, as they carry a potential risk of non-compliance for the Party. Indeed, lessons from the Montreal Protocol show that a ban on imports (in our case, the government controls the quality of acquired AAUs under buyer beware) may be more efficient than a ban on exports (whereby issuing governments must control the validity of what is being transferred).²⁵ National registries for international transactions and reconciliation could be used to that aim.

As the entity could face direct sanctions for non-compliance with its domestic goal, it would seek to minimise such risk. The contract between the legal entity and the issuer could include a clause to mitigate the buyer if the acquired AAUs are cancelled or devalued, a form of insurance clause. They may actually force the issuer to supply the agreed amount regardless of its compliance status. In effect, this would turn the buyer beware system into an issuer beware system, as far as legal entities are concerned. Another option could be for the government to require that legal entities insure themselves, e.g. acquire and set-aside supplementary AAUs for every acquisition, to create a safety cushion.

Under buyer beware, buyers would incur search costs in order to gain certainty about an issuer's compliance with its assigned amount, whereas issuer beware makes such investigation unnecessary.²⁶ During the initial period, there may not be sufficient information of a good quality to assess individual Parties' compliance, and adjust price accordingly.

Buyer beware could be perceived as putting an unfair pressure on buyers (who may not be able to obtain sufficient information on selling Parties), and too little pressure on issuers. In fact, buyer beware removes any risk from issuers for their non-compliance if any AAUs they have "over-sold" are returned to them if they need them for compliance. The only pressure on issuers would be through the low price of their AAUs if their compliance is improbable, but there remains an incentive to "oversell".²⁷ Additional measures may therefore be required to discourage the transfer of non-surplus AAUs under buyer liability. Sanctions for "overselling", and other sanctions for non-compliance under Article 18 may play that role, but are yet to be defined and agreed.

3.3 Hybrid Buyer/Issuer Liability

3.3.1 Shared Buyer / Issuer Liability

Under this option, the buyer and the issuer would share the risk of "overselling" and the resulting excess emissions. Only a share of all invalid transactions would be devalued or cancelled for the buyer, here 20% (2 units out of ten are subtracted from the buyer's assigned amount and added to the issuer's). The low burden put on the buyer reflects the principal

²⁴ Under an issuer liability system, the legal entity acquiring AAUs would not need worry about devaluation as all transferred AAUs would be valid for compliance purposes.

²⁵ Victor (1998).

²⁶ Symmetrically, private actors will more readily engage in the development of information services on Parties' compliance if such services are valued by market participants, as in the case of buyer beware liability.

²⁷ It is only in the next commitment period that issuers of invalid AAUs would be affected, when buyers would be strongly deterred to purchase from an issuer who defaulted in the first commitment period.

responsibility of the issuer, as it has a better knowledge of its emission level and compliance prospects by the time of the trade.

Table 3: Illustration of shared buyer / issuer liability

<u>Issuer</u>		<u>Buyer</u>	
Assigned amount	= 100	Assigned amount	= 150
Sales	= - 10	Acquisitions	= + 10
Adjusted assigned amt.	= 90	Adjusted assigned amt.	= 160
Emissions	= 100	Emissions	= 160
Non-compliance by 10 units		Compliance	
<u>After shared buyer / issuer liability</u>			
Adjusted assigned amount	= 90 + 2	Adjusted assigned amounts	= 160 - 2
Emissions	= 100	Emissions	= 160
Non-compliance by 8 units		Non-compliance by 2 units	

Shared buyer/issuer liability represents a middle ground between buyer and issuer beware options. The buyer would still rate AAUs according to the country's of origin compliance, but its risk would be minimised by the fact that only a portion of "invalid" trades could be cancelled. This would not send as strong a signal to potential buyers as the simple buyer beware system.

A stronger version of the shared liability rule can be envisioned, the so-called double liability rule, whereby the issuer would be liable for *all* of the excess sales while the buyer would still bear some burden for having bought non-surplus units. In the example below, 20% of the acquisitions are cancelled for the buyer.

Table 4: Illustration of double liability

<u>Issuer</u>		<u>Buyer</u>	
Assigned amount	= 100	Assigned amount	= 150
Sales	= - 10	Acquisitions	= + 10
Adjusted assigned amt.	= 90	Adjusted assigned amt.	= 160
Emissions	= 100	Emissions	= 160
Non-compliance by 10 units		Full compliance	
<u>After double buyer / issuer liability is applied:</u>			
Adjusted assigned amt.	= 90	Adjusted assigned amt.	= 160 - 2
Emissions	= 100	Emissions	= 160
Non-compliance by 10 units		Non-compliance by 2 units	

As the example makes clear, the double liability system would more than compensate the non-surplus emissions that are traded. The issuing Party's emissions are above its assigned amounts by 10 units and is fully responsible for trading non-surplus AAUs. On the other hand, the buyer is also held responsible for having engaged in a trade that turns out to be invalid, and is penalised at a rate of 20% of the AAUs it acquired. Indeed, it works as a penalty put on the traders, on top of their shared responsibility for trading non-surplus AAUs.

A rationale for this approach, when compared to the shared liability option, would be to hold the issuer *fully* accountable for oversold AAUs, while still creating an incentive for buyers to assess the issuer's compliance. On the whole, it is equivalent to introducing a penalty for non-compliance through trading, in the form of an addition to the "environmental debt", but a penalty that is exclusively applied to the buyer.

This seems difficult to justify without a similar penalty for non-compliance applied to all Parties, regardless of their trading activity. As the characteristics of this option are otherwise similar to the shared liability rule, it will not be discussed further.

Shared-liability combines the market incentive of the buyer liability system with the straight issuer liability regime. The environmental effectiveness of such a system will depend on two elements:

- the non-compliance rules (for the seller), and
- the share of the "invalid" trades that are under the buyer's responsibility (20%, 50%, ... ?)

As we have explained above, the buyer liability regime brings more of an incentive to the issuer to comply, because of the financial gains generated by the sales of highly-rated AAUs.

Because buyers would be responsible in part for non-compliance and over-selling by the issuer, they would be willing to pay for information on how likely the issuing Party is to comply, adding some transaction cost to the overall system. They would also need to monitor that Party's situation throughout the period (if they have acquired AAUs early) in order to respond in time to a risk of default by the issuer. But the pressure on buyers would be less important than under a pure buyer liability system.

The confidence of market participants in the validity of the acquired AAUs will depend on how much responsibility is put on the buyer in case of non-compliance. If buyers are liable for a small share of the invalid transfers, the validity of traded AAUs will be less dependent on issuers' compliance and there will be more confidence in the market than under a pure buyer beware system.

3.3.2 Hybrid Buyer/Issuer Liability: The Traffic Light System

In the case of Joint Implementation, Article 6.4 of the Kyoto Protocol states that:

"if a question of implementation [...] is identified [...], transfers and acquisitions of emission reduction units may continue to be made after the question has been identified, provided that any such units may not be used by a Party to meet its commitments under Article 3 until any issue of compliance is resolved."

This article introduces the possible suspension of right to use joint implementation emission reduction units (ERUs) for compliance. On that basis, Goldberg et al. (1998) propose a hybrid buyer/issuer liability system based on Parties' progress towards compliance during the commitment period. A "green" light for trading with a Party would indicate that issuer liability applies, and would be the default liability rule for trading.

Based on the annual review of Parties' performance, if a compliance problem is expected for a Party, a "yellow" light could be turned on to inform other Parties that sales may continue, but that the buyer cannot use the acquired AAUs until the issuer's compliance problem is resolved. Trades would then take place under buyer liability. Some Parties would issue AAUs under issuer liability, others would trade under buyer liability. The red light would be turned

on when serious non-compliance is identified, and would indicate that no further sales by the Party are allowed.

To illustrate this system, we need to distinguish two phases within the commitment period: during the first phase, the issuing Party does not present any problem of compliance and is free to trade. Here, the issuer sells 5 units to another Party. A risk of non-compliance by the issuer is identified: from now on, all sales will be made under buyer liability for this issuer, until the non-compliance problem is resolved. Let us assume that the buyer accepts this risk and buys two more units from the issuer during this “yellow-light” phase. At the same time, it implements additional domestic mitigation options to be in line with its adjusted assigned amount of 157 units. If, at the end of the commitment period, the issuer has not resolved its non-compliance problem, the situation would be as follows:

Table 5: **Illustration of the traffic light option: trading under green and yellow light**

<u>First phase</u>			
<u>Issuer</u>		<u>Buyer</u>	
Assigned amount	= 100	Assigned amount	= 150
Sales	= - 5	Acquisitions	= + 5
<u>Second Phase</u>			
Sales	= - 5 - 2*	Acquisitions	= + 5 + 2*
Adjusted assigned amt.	= 93	Adjusted assigned amt.	= 157
<u>Trades under yellow light: buyer beware eventually applies</u>			
Adj. assigned amount	= 93 + 2 = 95	Adj. assigned amount	= 157 - 2 = 155
Emissions	= 100	Emissions	= 157
<i>Non-compliance by 5 units</i>		<i>Non-compliance by 2 units</i>	

Considering the “yellow light” was applied during the second period (transactions with “*”), the sale of 2 units is cancelled so that the assigned amounts must be adjusted downward for the buyer, and upward for the issuer. In the above example, both Parties are in non-compliance. If the “red light” had been switched on, no further trades would have taken place, and the buyer would not have acquired the two additional units that it bought in the above example. On the other hand, the buyer may be more cautious and turn to other Parties (under “green light”) to acquire valid units.

Some have suggested that if the issuer solves the compliance problem in the next budget period, the suspended trades could become fully valid. This would somewhat complicate the review of compliance by the buyer, as its compliance could hinge on some issuer’s returning to compliance at some unknown stage in the future. Another option would be for trades to go on, but on a discounted basis, until the compliance issue is resolved.²⁸

3.3.2.1 What Could Trigger Yellow and Red Lights?

The main question raised by the traffic light option is the nature of the compliance problem that would trigger the yellow or red lights²⁹. A relatively easy and quick rule would have to be applied, in order for the system to be operational and effective *during* the commitment period.

²⁸ EDF (1999).

²⁹ Goldberg et al. (1998) do not address this question.

Parties under yellow light would then have sufficient time to make the necessary adjustments to return on track for compliance and restore the green light. Possible criteria to trigger the yellow light could include:

- annual transfers by a Party represent more than a certain percentage of this Party's assigned amounts (not unlike the various reserve options discussed below);
- a Party lacks a transparent system to register its international transfers, or does not report its AAUs transactions;
- a Party has not submitted its GHG inventory for a certain period, or has submitted incomplete inventories, making it impossible for outsiders to assess its compliance status. Or the inventory was not compiled following the inventory requirements / guidelines;
- a Party's actual emissions exceed the total assigned amount it holds for that period.³⁰

Triggering the red light would require certain knowledge, during the commitment period, that a Party will not be able to comply with its Article 3 commitment. Review under Article 8 of the Kyoto Protocol could generate useful information to identify such a problem. But in theory, a Party which sold all of its AAUs could acquire them back from the international market in order to restore compliance and bring its adjusted assigned amount in line with its emissions. It is only through the combined assessments of a Party's needs for AAUs, of the potential supply of AAUs on the international market and of the Party's willingness to pay to be in compliance, that it would be possible to judge whether a Party will or will not comply, and to trigger the red light if not. In all, this would not be a straightforward assessment.

Under a more precautionary approach, a criterion such as the ratio of total AAU transfers to assigned amount could be used to trigger the red light. This may run the risk of stopping valid trades. On the other hand, if a Party intended to transfer AAUs and actually manages to comply, it would automatically bank any extra AAUs for the next commitment period, or could transfer them during a possible "grace period". This would minimise the opportunity cost for the issuer who was unable to sell its extra AAUs while the red light was switched on.

As in the case of buyer beware, the traffic light option would encourage the development of information on Parties' emission levels and transfers, as all potential sellers would need to convince the system's oversight organisation that they are able to generate extra AAUs for sale. This would generate a better picture of overall supply of AAUs for the international market, and help potential buyers to elaborate their compliance strategy.

3.3.2.2 *Assessment*

In theory, the traffic light option can deter all trades with a Party once a non-compliance situation has been detected, and keep the system tight in environmental terms from that moment. But the environmental effectiveness of this option will very much depend on:

- how early the non-compliance problem is raised, based on what set of indicators / information released by the defaulting Party;
- how quickly the institutions reacts to this problem; and
- what measures are put in place to restore compliance.

There can be a significant time-lag between the identification of the non-compliance problem and the decision to switch the yellow light for transfers from the Party. One option would be

³⁰ As in the "blended accountability system" proposed by EDF (1999).

that the decision be taken by COP/MOP. For instance, a problem may be detected during an expert review under Article 8 in 2010, with a COP/MOP decision by 2011, changing the status of that Party to buyer beware for the last year of the commitment period. In the meantime, transfers from that Party would continue under issuer beware. Under the Protocol, the Secretariat and Parties are asked to bring questions concerning implementation by individual Parties to the attention of COP/MOP.³¹ If such a procedure were to be used to trigger the yellow light, any Party could unsettle another Party's ability to transfer while COP/MOP processes and analyses the question in detail.

Alternatively, COP/MOP may agree *ex-ante* on what would trigger the yellow/red lights, e.g. a quantitative indicator based on Parties' inventories and assigned amounts, and on the procedure to change the status of a Party as soon as the review under Article 8 has delivered its results. The political acceptability of this rule will depend on the stringency of the criterion that triggers a change in the status of transfers.

Because of the necessary simplicity of a quantitative indicator to trigger yellow/red lights, the traffic light option may artificially deter market participants to acquire AAUs from a Party which is only having a temporary problem. The purpose of the five-year commitment period is precisely to allow fluctuations in emissions. Switching the yellow light while a drop in emissions is expected in the next year may restrict the supply of issuer-beware AAUs, and raise prices, at a cost for all participants.

Legal entities may find it difficult to trade under the traffic light option, especially as issuers if their Party's compliance depreciates the value of their assets by turning the yellow/red lights on all AAUs issued by the Party. It may be easier for legal entities to get used to either buyer beware or issuer beware, than to react to possible changes during the commitment period.

3.4 Other options: "Issuer +" and "Buyer +"

3.4.1 "Issuer + Tons in Escrow"

An issuer beware system can be supplemented to provide more certainty on the value of the trades. One way to secure the trade is to put the revenues of the trade, or a portion thereof, in some account where they could be used only upon agreement of both Parties, a so-called escrow account. This system would allow the issuer to cash the transaction at the end of the commitment period, once inventories and assigned amounts are reconciled and the trade has been cleared.³²

The financial dimension of this system, with potentially large amounts of money held in escrow for as many as 5 years, and the back-end arrangements to reimburse buyers and/or acquire AAUs from the market, makes "issuer + escrow" a rather heavy option, both in terms of transaction and opportunity costs. Holding the money in an escrow account would make it impossible for the issuer to invest to reduce its emissions, which may be one of the objectives of transfers.

An alternative would be to set aside tons (AAUs) at every transaction. Under this option, if a Party or legal entity wants to sell 100 AAUs, it must set aside a portion of this total to be able to cover any shortage of AAUs at the end of the budget period. On the other hand, Parties or legal entities may artificially inflate what they wish to trade in order to cover the amount to be

³¹ Corfee-Morlot (1998).

³² Haites (1998).

set aside. For instance, if an entity is required to set aside one ton for every 10 transferred, it could pretend to sell 110 tons when it only has 100 to sell. This would be a way not to incur the opportunity cost of foregone sales. To avoid this problem, one could require Parties / entities to acquire certified emission reductions from other Parties every time they transfer their own AAUs.

The certified nature of these units would reduce the risk that they are invalid when and if they are needed for compliance. If the issuer is in compliance, it can still trade its set-aside units or CERs as banked AAUs in the next commitment period.

From the standpoint of environmental effectiveness, the option of setting asides certified emission reduction units, or reductions from JI projects may have value, as at least some portion of the “environmental debt” would be offset with some certainty.³³ On the other hand, this requirement may create a bottleneck if there are not enough CDM projects to supply the agreed portion of traded AAUs under IET.

A key question under “issuer + escrow” as described here is: which entity would be in charge of holding the set-aside tons, and assuring that the right proportion of set-aside tons to traded AAUs is maintained? If legal entities trade, it would be reasonable for their government to assure, through the domestic registry of international transactions, that certified tons would be set aside by entities for each international transfer. This verification could be done annually. Entities would be free to use the CERs as they see fit once the Party has established compliance with its Article 3 commitments, after 2012.

If a government decides to trade for its own account, some international entity should monitor whether it has acquired the proper amount of certified emission reductions to cover the risk of non-compliance. This could be one of the tasks under Article 8 of the Protocol.

In all, escrow or set-asides would add quite some administrative burden on international emission trading, which may well discourage participation by legal entities in the system.

3.4.2 Issuer Liability with a Reserve

The idea of the reserve is to minimise the risk that an issuer would sell AAUs that do not correspond to surplus emissions. Several kinds of reserves have been proposed:

- annual retirement,
- trading based on the last inventory (inventory-based trading)
- trading limited to annual surplus (annual surplus trading)

These are not liability rules *per se*, but options to supplement issuer liability, as this option alone would otherwise hinge too much on the non-compliance system established in Article 18. For all the following options, issuer beware guarantees high market confidence. The need to keep a reserve would increase participants’ confidence in the environmental validity of traded AAUs.

3.4.2.1 Issuer + Annual Retirement

Under this option, a Party must hold the equivalent of its inventory in assigned amounts (one year worth after the first year, two years worth after the second year, etc.). As GHG

³³ If the seller of the project-based reductions fails to reduce emissions, the problem remains, however.

inventories may take some time to be produced, some percentage of Parties assigned amounts could be agreed (e.g. 80% of 1/5 of the total assigned amount); the reserve could be adjusted once inventories are produced. Failure to keep the reserve to its appropriate level would stop transfers from the Party. The annual retirement option would need to be supplemented by mechanisms to encourage Parties to buy back from the market the quantity required to return the reserve to the appropriate level.

The reserve required by the annual retirement system is fairly low in the first years of the commitment period (on year 1, the Party can still trade about four fifths of all its assigned amount), and increases gradually to reach the level of compliance during the last year, at which time all Parties must hold enough AAUs to cover their emissions. This is illustrated in Appendix 2.

The obligation to hold the reserve will send a signal that transferring too many AAUs too early will mean more active trading towards the end of the budget period, and probably higher prices. Participants may therefore not behave like the Party in our illustration, which sells a lot early and buys back later in the period. Rather, Parties may be inclined to allow transfers that are more in line with their surplus reductions on an annual basis. In that case, the reserve represents no real constraint, and entails little, if any, opportunity cost. But the trading behaviour of Parties is difficult to predict so any conclusion on this is necessarily tentative.

The annual retirement reserve would not in itself prevent a rogue trader from selling several years' worth of AAU in the first year. It is only after the fact that the Party would be found in non-compliance. In a less extreme case, a Party may follow the rule and hold 4 year-worth of AAUs at the end of the fourth year, and still over-sell all of its last-year assigned amount, with a negative effect on the environment. Because the reserve system would be under "issuer beware", buyers would not necessarily refrain from buying these AAUs, even if they are aware of the issuing Party's situation. This rule provides little guarantee that Parties will not over-sell without having to face any sanction until after the end of the commitment period.

A key feature of all issuer beware systems is that they guarantee the validity of issued AAUs for compliance, as the issuer will face alone the consequences of emitting GHG beyond its assigned amount and over-selling. The need to keep a reserve contributes to reassure market participants that acquired AAUs correspond to real reductions, because any failure by a Party to meet the reserve constraint prevents that Party from transferring assigned amounts. But, in the end, making the issuer liable in case of non-compliance is the primary reason why the value of traded AAUs is guaranteed.

This reserve, coupled with issuer liability, would require that Parties engaged in trading have a mechanism to officially retire or set aside AAUs corresponding to their annual inventory. This mechanism could be covered under the eligibility criteria, in particular by the requirement to hold a domestic registry and to reconcile the accounts of legal entities on an annual basis. A Party would be able to retire its annual AAUs more easily if it already had a national registry. Otherwise, the additional information required under Article 7, e.g., on transfers and acquisitions of AAUs is all that would be needed to operate this rule. In order to make this rule effective, COP/MOP would need to agree before the beginning of the commitment period on a quick procedure to implement the decision to stop transfers from a Party which does not comply with the reserve.

Because the reserve may be expressed as a percentage of assigned amounts, progress to maintain reserves could be assessed fairly easily. But an agreement on the share of annual assigned amounts to be held in reserve may trigger a difficult negotiation.

3.4.2.2 *Permanent Reserve*

Parties could agree that each Party should retain a given portion of its total assigned amount to cover probable future emission levels *for whole the commitment period*, as opposed to the cumulative annual amounts in the annual retirement option. Parties would only be able to transfer a total amount equal to their total assigned amount minus this “permanent” reserve.

The reserve would be expressed as a share of the total assigned amount. For instance, until the submission of the first GHG inventory of the commitment period, Parties may be allowed to transfer a maximum of 30% of their *total* assigned amount. The reserve would be equivalent to 70% of the assigned amount (the default reserve percentage). Preferably, the last available inventory (2007 or 2006) could be used to establish the reserve. As inventories would be gathered and trades recorded, it would be possible to assess whether the reserve can be adjusted downwards or if the Party should, on the contrary, stop transferring parts of its assigned amount as the reserve must be increased.

If a Party is in fact in a position to trade AAUs beyond what is imposed by the reserve, the reserve can be seen as a barrier to trade. On the other hand, the earlier this Party produces the information to show that has indeed surplus AAUs, the sooner it can trade this surplus on the market. This incentive to produce information on inventories and trades is indeed a key element of this option. The barrier to trade would only be temporary, and the market would benefit from more information on Parties’ compliance.

Transfers would be monitored on an annual basis: a Party may have transferred a total of 350 within one year, and bought back 300, resulting in a net transfer of 50. As in the case of the annual retirement reserve, this is not a limit imposed on the overall trading activity, but more a tool to keep overall transfers within what would be defined as a safe amount.

The permanent reserve could prevent the rogue trader situation described under the annual retirement reserve, but not completely. Because defaulting Parties would no longer be able to sell AAUs until they have restored their reserve, this would limit the risk of overselling in the rest of the commitment period. As the permanent reserve requirement is more stringent than the annual retirement, this option offers more certainty that Parties will not oversell.

In terms of cost, the permanent reserve is the mirror image of the annual retirement system, it tends to allow transfers of AAUs once reductions have been achieved.³⁴ The higher the percentage of assigned amount can be traded (the lower the emissions of the last inventory), the lower the reserve, and the lower the opportunity cost. If the share of assigned amount that is tradeable before verification is low, the reserve applies a stringent constraint on trades early in the period, with a higher opportunity cost. In the case of an active trader, the cost is higher than with the annual retirement reserve, and the flexibility for compliance allowed originally by the 5-year commitment period may be reduced substantially.³⁵

It is important to note here that because GHG inventories may take one to two years to complete, there could be some lost opportunity for an issuer with decreasing emissions to sell its AAUs in the first budget period, and some economic loss. This would also restrict access

³⁴ In the early years of the system, when emission information is not available, Parties would be allowed to trade an agreed percentage of their total assigned amount, so the system does not preclude Parties from transferring AAUs before they have reported their inventories.

³⁵ This is even more true for a Party with relatively high emissions in the first years, and fairly low emissions afterwards. The 5-year commitment period would allow it to issue AAUs right at the beginning of the period, as the Party anticipates surplus reductions; the reserve would restrain transfers early in the period, or force the Party to buy back AAUs if its first year inventory shows a high emission level.

to potential buyers. This loss would be reduced, however, if a grace period was introduced to allow Parties with a deficit in AAUs to acquire them from the market after the end of the commitment period.

The more or less stringent constraint that it applies on transfers throughout the period could have two opposite effects on participants confidence in the market's ability to deliver AAUs:

- on the one hand, it may artificially restrict the quantity of AAUs for sale in one year, while releasing large quantities afterwards; this could result in wide price variations. Essentially, it takes away *some* of the time-flexibility introduced by the 5-year commitment period.
- on the other hand, all market participants would have a clearer idea about the available quantities of AAUs for the coming year, based on inventories submitted to the UNFCCC, which may help their trading strategy.

In terms of monitoring, this option does not require any information additional to what would be required from Parties under Article 7 of the Kyoto Protocol.

How would legal entities respond to the permanent reserve? First, governments would certainly apply the same principle to their entities, and monitor this through the domestic registry. The government may wish to monitor also futures and forward trades by legal entities, but this may not be possible in practice. Legal entities wishing to enter a futures transaction would probably make it dependent on the issuing Party's ability to trade at the maturity date of the contract.

3.4.2.3 Annual Surplus Trading (post-verification)

This option has been proposed as an alternative to pure buyer liability.³⁶ Parties could only sell AAUs after they have shown these AAUs are in excess of their assigned amount, on an annual basis. As assigned amounts are defined for a five-year period, Parties would notify the UNFCCC Secretariat, before 2008, how it would allocate its assigned amount for each year of the commitment period (a Party can at any time adjust its annual allocation for the remaining years of the commitment period by notifying the Secretariat in advance of the year(s) in question). It is proposed that a restriction would be applied on the range of assigned to any single year ("e.g., +/- 20% of the annual average"). The excess AAUs available for sale in any given year, so-called certified AAUs, would be equal to "the cumulative assigned amount allocation from 2008 through the given year minus cumulative emissions from 2008 through the given year".

By definition, post-verification trading assumes that all issued AAUs are valid, and can be used for compliance by the buying Party, not unlike the regime of issuer liability.

Trade in certified AAUs could only start as soon as a potential issuer (i.e., a Party) has submitted its national inventory to the UNFCCC, after 2008. On the other hand, Parties and their entities could engage in forward trades, anytime before. This system would encourage potential sellers to report inventories in a timely fashion, since AAUs would only be issued after the inventory has been compared with the annual assigned amount.

Annual post-verification trading decouples the trading system from the issue of compliance with Article 3 commitments at the end of the commitment period, while providing some

³⁶ Swiss proposal for a post-verification trading model on an annual basis. FCCC/SB/1999/MISC.3/Add.2/Corr.1

incentives for compliance. Whereas this trading model does not aim to eliminate the risk of “overselling”, as it is defined in this study (see Glossary)³⁷, annual surplus trading would reduce the potential for non-compliance caused by trading, since a Party must maintain annual emissions within certain bounds in order to generate certified AAUs. On the other hand, a Party could transfer certified AAUs in the first three or four years of the commitment period and emit beyond its annual assigned amount in the remaining years, leading to non-compliance. Here again, the risk of non-compliance caused by trading will depend on the effectiveness of the compliance system, and on how well Parties’ policies and measures ensure adequate control of their emission profile towards and during the commitment period.

Similarly, a Party’s ability to transfer AAUs early in the commitment period, e.g. to finance mitigation options that would reduce emissions later, would depend on various factors, including an appropriate choice for the annual allocation of assigned amounts.

With the annual surplus trading regime, legal entities wishing to transfer AAUs would operate under two constraints. First, as for all liability systems, they would need to demonstrate in the framework of their domestic legislation, that their emissions are below their devolved assigned amount on an annual basis. Second they would only be allowed to sell their surplus if the Party also has more than enough AAUs to cover its annual emissions. There could therefore be some control applied to *transfers* by legal entities under this option, but this may be the case under any other trading regime: Parties are likely to control trading by entities to ensure that they (Parties) hold enough AAUs to comply at the end of the commitment period. Of course, complying entities would still be free to trade on the domestic market, if it exists. In addition, they wouldn’t be restricted in selling any ERUs or CERs that they have acquired.

3.4.3 “Buyer + Insurance”

One option proposed to strengthen the buyer liability rule, that is to further assure buyers about the validity of acquired AAUs, is to require buyers to acquire insurance contracts to accompany the traded AAUs.³⁸ Insurance companies would offer contracts to make up for the discounted or returned AAUs if the issuer is not in compliance. The insurance contract would be recorded when AAUs are issued and sold for the first time. Presumably, the insurance would be transferred along with AAUs hereafter.

The insurance premium would rise with the risk of non-compliance by the issuing Party. This would encourage sellers to demonstrate their ability to meet their emission commitment, so as to lower the insurance premium and to increase the revenues from the sales of AAUs.

One major assumption for this system to work is that insurance companies would have access, when needed, to AAUs to offset invalidated trades. Would buyers not have access to that same potential? Also, one can imagine a scenario where, at the end of the budget period, all extra AAUs would have already been sold or used for compliance, so that insurance companies would not be able to acquire any. The alternative would be for insurance companies to enter the market and hold (potentially large) reserves of AAUs as a hedge against the contracts they have issued. In such a case, the acquisition of AAUs by insurance companies could reduce the availability of AAUs for other participants. The price may also

³⁷ The Swiss proposal states that “a post-verification trading model eliminates the risk of “overselling”, because only certified excess AAUs can be traded. The potential for non-compliance caused by trading is also significantly reduced, although there is no guarantee that Parties [which] issued certificates for excess AAUs will be in compliance with their [quantified emission limitation or reduction commitments] at the conclusion of the commitment period”. This is precisely what we define as “overselling” in *this* study.

³⁸ Haites (1998).

increase as the result of higher demand and thus the costs of meeting the target may be higher than without compulsory insurance. One can therefore question whether insurance contracts would work or would not distort the market.^{39 40}

The obligation to acquire an insurance contract when acquiring AAUs from the issuing Party implies an additional transaction cost. But if the insurance contract compensates effectively the default by the issuer, the insurance premium does not represent a cost, as it reduces the non-compliance cost of the buyer. On the other hand, because insurance premiums are not likely to be zero, the obligation of insurance would add a net cost for the buyer every time it buys AAUs from a complying Party.

Buyer beware puts pressure on *governments*, if they are not the buyer of AAUs transferred to their Party, to monitor the validity of the acquired AAUs, as they would be held responsible for non-compliance if the AAUs are devalued or cancelled. Forcing buyers to acquire an insurance contract mitigates such risk for the government.

This rule would require that additional information, i.e., insurance contract information, be recorded along with transaction information in a registry. This could be relatively easy with respect to legal entities who would need to register their international trades in the domestic registry.

This option faces three barriers with respect to feasibility:

- A political agreement on forcing additional cost to all market participants with the inclusion of insurance, whereas certain transfers may not need such risk-hedging mechanism. Insurance is a mechanism that buyers may wish to rely on without being obliged to do so.
- The cost of maintaining a register and monitoring system for all insurance contracts.
- The willingness and ability of insurance companies to deliver AAUs when needed.

3.5 Assessment Summary

Liability rules presented above rely on a number of different elements. The most simple options are limited to an *ex post* assessment of a Party's compliance with its emission objective and a clear rule for allocation of the burden in case of non-compliance. The burden could be based on buyer beware, issuer beware, or shared liability.

More elaborate options require additional procedures and monitoring during the commitment period to try and prevent the risk of trades of AAUs that are ultimately needed for Parties' compliance. Other combinations than those presented in this paper could be imagined, with more or less reliance on new institutions, and on the international market to supply appropriate information and tools to hedge risk.

Our assessment of the liability rules is summarised in the following table. No further synthesis of these results is presented in order to keep the full picture for each option. No ranking of the options is provided, as it would require quantifying the relative importance of the different criteria, which is beyond the scope of this paper.

³⁹ Insurance companies have not expressed strong interest in issuing insurance contracts to cover invalid emission trades (Haïtes personal communication).

⁴⁰ An alternative to the insurance contract is the creation of an *international* reserve of AAUs to protect buyers from issuer default. The current practice of futures trading gives a useful illustration of this point. This is explained in Appendix 4.

It is important to recall that environmental effectiveness is defined in this case in a very narrow sense: the prevention of overselling. Emissions trading is a tool; if properly designed, it could minimise cost and encourage compliance with the Kyoto Protocol emission objectives. Adding significant transaction costs to participate to IET could deter legal entities and governments from undertaking cost-effective mitigation activities, and possibly lead to non-compliance.

No full assessment of the effects of different liability rules on the market is provided here beyond an evaluation of the existence and nature of transaction costs. A more complete evaluation would require formulating assumptions about how trading would develop if it were unimpeded by these rules, using this as a reference point, and then assessing each system against this point. It is difficult to predict at this stage the behaviour of governments and legal entities vis-à-vis international GHG emission trading, e.g.:

- Will all governments allow their entities to trade freely, or apply tight control over international transactions (transfers and acquisitions)?
- Will legal entities be overly risk-averse in their acquisition of AAUs?
- Will the level of GHG emissions in during the commitment period allow for active trading, or leave only a small potential for international transfers?

Table 6: Summary of liability options

	<i>Environmental Effectiveness</i>	<i>Costs</i>	<i>Market Confidence</i>	<i>Participation of legal entities</i>	<i>Comment: requirements and feasibility</i>
Issuer beware	Depends primarily on Article 18 and other trading rules.	Low transaction costs.	All AAUs valid for compliance. Clear market price for AAUs.	Participation would be relatively easy, given registries	Easy implementation; issue of the feasibility of sanctions under Article 18.
Buyer beware	Incentive for issuer to demonstrate probable compliance in order to obtain a higher price.	Buyers must gather (pay for) information on issuer's compliance to price AAUs correctly.	AAUs are priced differently, according to issuing Parties' prospect for compliance. Market uncertainty.	Acquisition of AAUs requires some information gathering.	Pressure on buyers but with reduced risk for issuers could be problematic.
Shared Liability	Less incentive on issuers to demonstrate compliance than under buyer liability.	Same as buyer beware.	Mixed dynamics, between issuer and buyer beware. Market uncertainty.	Same as under buyer beware.	Same feasibility issues as buyer and issuer beware.
Traffic light option	Triggers restrict transfers once a compliance question is raised.	Same as buyer beware, once a compliance problem is identified.	Depends on whether green, yellow or red lights apply. Market uncertainty.	Change in status (issuer to buyer) may hinder entity participation.	Requires definition and agreement on trigger(s) for yellow/red lights and a speedy process for implementation.
Issuer + annual retirement	Some control of the validity of trades.	Some (low) transaction costs on issuer.	All AAUs valid for compliance	Easy participation, if domestic registries.	No requirements in addition to Article 7.
Issuer + permanent reserve	Medium control of the validity of trades.	Opportunity cost (issuer) if unable to conduct valid trades due to the reserve.	All AAUs valid for compliance. Maybe less market access for sellers than under "annual retirement".	Year-to-year variations in the reserve adds uncertainty on trading prospects for entities.	Same as above.
Annual surplus trading (post-verification)	Depends on restrictions on range of annual allocation of assigned amount.	Low transaction cost (automatic certification) Low opportunity cost if inadequate annual allocation.	All AAUs valid for compliance.	No major barrier to participation, if domestic registries.	Requires annual allocation of assigned amount, which can later be adjusted if necessary.
Buyer + insurance	Possibly higher than under buyer beware, if insurance pool fully covers non-compliance.	Insurance cost imposed on buyer which may not be offset if insurance is not effective.	More liquid if insurance companies trade actively, or less if AAUs are locked up as a hedge against issued contracts.	Buyer beware and insurance requirements may make trading overly costly for entities.	Main issue is the availability of AAUs necessary for insurers to be able to cover risk. Low acceptability given the imposed additional cost.

4. Conclusions & Future Work

Liability rules would define who bears the responsibility for transfers of AAUs by Parties which are not in compliance with their emission objectives at the end of the commitment period. As such, the chosen liability rule may be one of the key elements of the Kyoto Protocol that can minimise the risk of “invalid” transfers under IET. Other elements include:

- The eligibility criteria for participation to international emission trading. The establishment of national registries to monitor and track international trades by legal entities could be one such criterion, in addition to compliance with Articles 5 and 7 of the Protocol.
- Domestic compliance and enforcement mechanisms in Parties which allow their legal entities to participate in IET.
- The possibility of specific measures if a Party fails to comply with the rules for IET, or if it “over-sold” AAUs (e.g. suspension of the right to trade);
- The role of the review under Article 8 with respect to the Kyoto mechanisms, eligibility, and liability rules.

Assessing liability rules beyond the analysis given in this paper is therefore difficult, without an idea of what other measures may be taken on these other possible elements of the Kyoto Protocol.

No single liability rule assessed here can deliver all of the following desirable qualities: a strong guarantee against “overselling”; low transaction costs; market confidence and easy participation by legal entities. In short, putting liability on the issuer will create a homogenous market with low transaction costs, but no guarantee that IET will not be mis-used, absent a strong non-compliance regime. Buyer liability will create incentives for issuers to demonstrate compliance, and generate different ratings for AAUs depending on the issuer, but with reduced risks for the issuer if it is in non-compliance. Each rule would be likely to create very different markets.

The choice of a particular liability rule will also hinge on what kind of a trading system is anticipated by participants (widely open to legal entities with limited government control or a more heavy-handed intervention of governments who remain responsible for compliance with Article 3 commitments). The involvement of legal entities and the potential for entities’ compliance to be effectively assured at the domestic level with appropriate enforcement mechanisms could enhance Parties’ compliance. In the end, of course, compliance will depend on the ability of governments to control all sources and sinks, and not just those allowed to trade.

It may be desirable to extend the study towards the legal aspects of international risk management. Some lessons could be drawn from a review of default clauses in international contracts. This could also give some insights on the possible contractual arrangements between legal entities under an international emission trading regime.

5. Appendices

5.1 Appendix 1 -- Domino Effect under Buyer Liability

Table 7: Illustration of possible domino effect under buyer liability

	Party 1	Party 2	Party 3
assigned amount (AA)	100	150	80
issued AAUs (-)	- 10	- 5	- 0
bought AAUs (+)	0	+ 10 (from Party 1)	+ 5 (from Party 2)
adjusted AA (AAA)	90	155	85
<u>actual emissions</u>	<u>100</u>	<u>155</u>	<u>85</u>
compliance before buyer liability	No emissions > AAA	Yes	Yes
adjusted assigned amount after buyer liability	100 (90 + 10 sold AAUs) 10 units sold to P2	145 (150 - 10 + 5) 10 units from P1 5 units sold to P3	80 (85 - 5) 5 units from P2
Art. 3 compliance after full adjustment for buyer liability	Yes emissions = AAA	No emissions > AAA	No emissions > AAA

Party 1 sold 10 units to Party 2, which lead Party 1 into non-compliance (for the sake of clarity, we suppose that all units sold by Party 1 are not surplus; although the same reasoning applies if only part of the trade is cancelled). This transfer of 10 units is invalidated, at the expense of Party 2. Party 1 has restored compliance, but Party 2 lost 10 units. Party 2 has also sold 5 units to Party 3. Because Party 2 is now in non-compliance, under buyer liability, it recovers the units sold to other Parties, here 5 units sold to Party 3. However, this is not enough to make up for the 10 lost units from Party 1. Party 2 is therefore also in non-compliance. So is Party 3, who acquired 5 units issued by Party 2, and must give them back under buyer liability rules.⁴¹

The likelihood of such a scenario may be low, as Parties will be either buyers or sellers, unless they are faced with dramatic changes in their emission levels in the course of the commitment period. But it cannot be ruled out completely, because legal entities may sell AAUs on the international market at a certain time, while the Party as a whole is a net seller over the commitment period.⁴² Parties and legal entities may also speculate on the value of AAUs, and buy and sell in large quantities throughout the commitment period.

⁴¹ The situation would be similar if Party 2 had not itself *issued* 5 units but, instead, re-sold 5 units from Party 1 to Party 3.

⁴² For instance, a domestic emission trading system where compliance is assessed annually may require domestic sources to acquire AAUs to comply with their annual target over two years out of five, while other sources,

5.2 Appendix 2 -- Illustration: Issuer Beware + Annual Retirement

The following example illustrates how the reserve may constrain a Party's trading activity during the commitment period. For the sake of the illustration, we assume that Parties have agreed to a percentage equal to 80% of the annual assigned amount. The total emissions are only known at the end of the commitment period (see lower left-hand side cell).

Table 8: Illustration of Annual Retirement Option

Party's assigned amount: 500 MtC				
	Reserve in MtC	Net transfers of AAUs that year (- sale, + purchase)	Adjusted A.A. (must be higher than, or equal to, the reserve)	Tradeable AAUs (end of year) = AAA - reserve
2008	80	- 100	500 - 100 = 400	400 - 80 = 320
2009	160	- 10	400 - 10 = 390	390 - 160 = 230
2010	240	- 100	390 - 100 = 290	290 - 240 = 50
2011	320	+ 30 *	290 + 30 = 320	320 - 320 = 0
2012	N/A. cumulative emissions = 440	+ 120 **	320 + 120 = 440	

* 30 AAUs acquired to have sufficient AAUs to meet the reserve constraint (adjusted assigned amount is equal to the reserve)

** 120 AAUs acquired to comply with adjusted assigned amount for the whole period.

In this example, we assume that the Party or its legal entities are heavily engaged in international emission trading. The Party transfers large quantities of AAUs in the first three years, more than it has reduced in the same period. The annual retirement option does not prevent the Party from doing so. It is only in 2011 that the Party must buy back 30 AAUs to maintain its reserve. In 2012, the Party acquires 120 AAUs to comply with its assigned amount. This last transaction is not imposed by the annual retirement reserve: it is necessary for the Party to comply with Article 3 commitments.

If we assume that the behaviour of the Party (and its legal entities) is unconstrained by the reserve in the first three years, the only opportunity cost for the Party is introduced by the obligation to buy back 30 AAUs in 2011. Without the reserve, the Party would be free to transfer more AAUs in 2011, but would need to buy as many more in 2012.

not covered by the domestic system, emit less than anticipated over the period and allow the government to transfer AAUs on the international market.

The result in terms of opportunity cost in our illustration is as follows. If a Party trades heavily, as illustrated above, and if the price of AAUs in 2012 is lower than earlier in the commitment period, there is an opportunity cost to the reserve. Indeed, the Party would have bought all needed AAUs in 2012, and not earlier. If it turns out that the price is higher in 2012, the obligation to buy back AAUs earlier in the period results in a net economic gain for that Party.

5.3 Appendix 3 -- Illustration: Issuer Beware + Permanent Reserve

In the illustration below, the Party is allowed to transfer as much as 30% of its total assigned amount in the first year, or 150 MtC (see column AAUs allowed for transfer), but transfers only 100. During 2009, it submits its inventory which shows its annual emission level to be only 60% of its initial assigned amount divided by five (what we have called annual assigned amount). Its reserve is therefore lowered to 60% of its initial assigned amount, or 300 MtC. As a result, it is allowed a total transfer of AAUs of 200. During the year 2011, its inventory for 2010 is produced, showing emissions of 65% of the annual assigned amount, and the reserve is increased accordingly, to 325. It must buy back 25 units to comply with the reserve.

Table 9: Illustration of the permanent reserve

Assigned amount: 500 MtC			Default reserve percentage: 70%			
	Annual emissions (% of 1/5 AA)	Reserve (use default reserve % until inventory available)	AAUs allowed for transfer	Total transferred (- acquired)	Cumulative emissions	Adjusted assigned amount
2008	60 = 60%	70% * 500 = 350	150	100	60	400
2009	60 = 60%	60% * 500 = 300	200	+ 50 = 150	120	350
2010	65 = 65%	300	200	+ 50 = 200	185	300
2011	70 *	325	175	- 25 = 175	255	325
2012	80 *	N/A.	N/A.	- 10 = 165	335	335

* As Parties are supposed to comply with their adjusted assigned amount in 2012, the reserve rule would have no more use in 2012.

5.4 Appendix 4 -- Buyer Beware and Futures Contracts

A trade under buyer liability bears striking resemblance with a standard futures commodity contract. The buyer acquires AAUs that will only become available (i.e. valid for compliance) sometime in the future, after the inventory of the issuing Party has been reconciled with its adjusted assigned amount.

Definition of a futures contract: a legal agreement between a buyer (seller) and an established exchange or its clearing house in which the buyer (seller) agrees to take (make) delivery of something at a specified price at the end of a designated period of time.

How is seller default handled under a futures contract? A futures contract is a combination of two contracts, where the exchange acts as the buyer to the seller, and as the seller to the buyer. If the seller defaults, the exchange must deliver the product to the buyer, and undertakes legal action against the seller.

The seller can eventually be barred from trading on the exchange. In effect, the exchange plays the role of the insurance company. To be able to do so, it collects fees from traders who want access to its services.

What lessons can we draw from futures contracts to a GHG emission trading system? In futures contract, the exchange makes up for any default on the side of the seller. Under international GHG trading, some entity would be needed to play that role, and to provide the buyer with the necessary AAUs. As an equivalent to the entrance fee of an exchange, this entity would need to collect AAUs from Parties wishing to participate to international GHG emission trading. Like an exchange, it would need to apply certain criteria before it allows Parties to engage in trading, precisely to assure that they can deliver what they promise. It is conceivable that private actors (existing exchanges) would be willing to play that role under a pure “buyer beware” system, against a fee.

We do not discuss the option of an *international* reserve, as it is beyond the scope of this paper, but it may be a useful approach to complement liability rules. Note also that the private sector may offer such a service to guarantee the validity of traded AAUs under a buyer liability regime, provided the market is expected to be liquid enough to deliver the necessary units in case of default, or that participants to the exchange are first checked for compliance.

6. References

- Corfee-Morlot J. (1998): “Monitoring, Reporting and Review of National Performance under the UNFCCC and the Kyoto Protocol”. OECD Information Paper, Paris.
http://www.oecd.org/env/docs/cc/MON_98.pdf
- EDF (1999): On the path forward: Accountability and compliance under the Kyoto Protocol on climate change. Environmental Defense Fund, Washington D.C. March 5.
- Goldberg D., Porter S., LaCasta N., Hillman E. (1998): “Responsibility for Non-Compliance Under the Kyoto Protocol’s Mechanisms for Cooperative Implementation”, Center for International Environmental Law & Euronatura. Washington D.C.
- Haites, E. (1998): “International Emissions Trading and Compliance with Greenhouse Gas Emissions Limitation Commitments” Working Paper for IAE Policy Dialogue: *International Emissions Trading under the Kyoto Protocol: Rules, Procedures and the Participation of Domestic Entities*, 6-7 September 1998. International Academy of the Environment, Geneva.
- Kerr, S (1998): “Enforcing Compliance: the Allocation of Liability in International GHG Emissions Trading and the Clean Development Mechanism”. Resources for the Future Climate Issue Brief #15.
<http://www.rff.org/environment/climate.htm>
- Mullins, F. (1998): *International Emissions Trading under the Kyoto Protocol*. OECD Information Paper, Environment Directorate. Paris, October 1998. <http://www.oecd.org/env/cc/freedocs.htm>
- OECD (1997): *International Greenhouse Gas Emission Trading*. Working Paper 9, Annex I Expert Group on the United Nations Framework Convention on Climate Change. OECD/GD(97)76, Paris.
<http://www.oecd.org/env/docs/cc/gd9776.pdf>
- Palmisano, J. (1998): “Buyer Liability for Greenhouse Gas Trading is Good for the Environment and Good for Emissions Trading”. Enron International, Washington, D.C.
- Victor D.G. (1998): “The Operation and Effectiveness of the Montreal Protocol’s Non-Compliance Procedure”, in Victor D.G. eds (1998): *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice*. MIT Press.
- Werksman J. (1998): “Responding to Non-Compliance under the Climate Change Regime” OECD Information Paper, Paris, October 1998. http://www.oecd.org/env/docs/cc/COM_98.pdf