Networked Carbon Markets

Key Elements of the Mitigation Value Assessment Process

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This Discussion Paper was prepared by the author for the World Bank Group's Networked Carbon Markets (NCM) initiative. It describes the rationale, objectives and key elements of the NCM initiative.

It is expected that the proposed concepts and components outlined in this Paper will evolve based on discussions with stakeholders, further technical work, and negotiations under the United Nations Framework Convention on Climate Change. As such, this Paper is 'live' and will continue to be updated to capture the evolution of the NCM initiative.

Table of Contents

1. Introduction	1
2. Review of the subject matter – a quick reminder of the heterogeneous pricing mechanisms	2
3. Background framework concepts	3
4. Glossary of Key Definitions	9
5. Key roles and available tools.....	14
6. Guidance and regulatory supervision of mitigation value assessments	20
7. Relationship between mitigation value and compliance value, settlement platform; and ITUs and the Index	24
8. Recommendations for Next Step.....	29
Glossary of acronyms	32
ANNEXURE “A”	34
ANNEXURE “B”	37
ANNEXURE “C”	42
ANNEXURE “D”	47

1. Introduction

[1] The Networked Carbon Markets (NCM) initiative of the World Bank Group aims to enable comparison of different carbon pricing systems and trade across different carbon assets with efficiency, transparency and integrity. It is founded on the assumptions that, firstly, the linking of diverse and heterogeneous carbon markets is desirable; secondly, that governments and market participants need information about the schemes with which they enter transactions and the carbon assets they acquire through those transactions; and thirdly, that governments should retain the sovereignty to act on the information about those other schemes and assets as they see fit. An NCM system seeks to provide the information necessary to enable comparability of carbon pricing systems and fungibility of assets. In doing so, it seeks to reduce regulatory risks and delays, address market barriers, catalyze large-scale private investment and achieve the benefits of a single carbon market. The services and institutions developed through the NCM initiative might be introduced in a phased manner, initially facilitating linking of markets within countries and then bilaterally, before being extended to markets on a regional basis – perhaps through carbon clubs – and in the long term helping markets to link on a global basis.

[2] A key element of the NCM concept is a risk-based approach to assessing climate change mitigation value across heterogeneous carbon asset classes. The idea is that mitigation efforts by jurisdictions have a mitigation value, which will translate into the rate of exchange, or the price, or the ratio, at which a carbon asset generated by the trading scheme in that jurisdiction, will be exchanged or purchased.

[3] In preparing this paper, informal discussions have occurred and feedback has been obtained from a series of partners also working on various elements of Networked Carbon Markets concept or who have expressed interest in it. In particular, account has been taken of the concepts and ideas set out by Andrei Marcu in the paper ‘NCM and the Post-2020 Global Climate Change Regime’, the relevant sections of which are copied in Annexure “A”. Others include: Jennifer Austin, consultant on NCM; Clayton Munnings, consultant on NCM; CMIA (Adrian Rimmer, Fenella Aouane); EEX/Eurex (Manuel Möller, Steffen Löbner); London Stock Exchange Group, FTSE

Group (Kevin Bourne, Gordon Morrison) and Mike Wilkins of S&P. Account has been taken also of papers by: IISD/New Climate Institute (Frédéric Gagnon-Lebrun, Seton Stiebert) ‘Scorecard to Assess Carbon Integrity Risks’; Grantham Research Institute on Climate Change and the Environment (Luca Taschini and Corina Comendant): ‘A Comparative Assessment of Design Options for an International Carbon Asset Reserve’; Climate Transparency Initiative: ‘A Guide to Climate Performance Assessments for the G20’.

[4] This paper builds on the findings of an earlier unpublished discussion paper titled ‘Designing a Model for Networked Carbon Markets’,¹ with its objective being to describe key elements of the mitigation value assessment process. The outcome of this paper will inform a model for the Networked Carbon Markets concept, to be prepared at a later date.

[5] The following Section 2 acknowledges the subject matter of the NCM initiative, namely the diverse and heterogeneous trading schemes and other carbon pricing mechanisms that are being put in place by jurisdictions around the globe. As this is the subject of another World Bank paper, only a brief reference is included. Section 3 sets out a conceptual framework within which to consider the key elements described in the glossary of terms, addressed in Section 4 and Annexure “C”. This section also looks at different transaction scenarios, introducing the concepts of an international transaction unit and an index.

[6] Section 5 turns attention to the types of institutions that might be suitable to participate in the mitigation value assessment process, providing practical examples, and considering the types of expertise and tools those institutions might leverage. Section 6 considers options for regulatory supervision of the MV assessment process. Section 7 looks in more detail at the relationship between mitigation value and the compliance value that might be attached to carbon assets and, in so doing, considers the role and function of the settlement platform. This section also considers the feasibility and potential benefits of an index. The concluding Section 8 looks at the next steps that might flow from this work

¹ Annexure “B” sets out the findings of the earlier discussion paper titled “Designing a Model for Networked Carbon Markets”, which draw on a high-level examination

of three comparable financial markets, namely the bond/debt market; the foreign exchange market; and physical commodities markets.

2. Review of the subject matter – a quick reminder of the heterogeneous pricing mechanisms

[7] It is important not to lose sight of the reason for, and subject of, the NCM initiative, namely the diverse and heterogeneous trading schemes and other carbon pricing mechanisms that are being put in place by jurisdictions around the globe.

[8] As of 2014, there were approximately forty countries and twenty sub-national jurisdictions putting a price on carbon. Of these, there were about twenty existing, emerging or potential emissions trading schemes at national or sub-national levels globally.² These included in Canada, schemes in Alberta and Québec; in the United States, the California Cap-and-Trade Program and the Regional Greenhouse Gas Initiative amongst nine north-eastern states; planned or existing emission trading schemes, at a national level, in New Zealand, Switzerland, Korea and Kazakhstan; and, at a sub-national level, in seven city-regions of China; in Japan, three regional ETS, as well as various other voluntary crediting or offsetting instruments, with a national ETS under consideration; and a carbon price mechanism in Australia.³ In addition, there were at least a dozen national and sub-national jurisdictions where a carbon tax applied, with others considering the introduction of such instruments.⁴

[9] Equally importantly, these emissions trading schemes differ in many key design aspects, including in areas such as:

- the nature of the asset traded, and base unit of its measurement;
- jurisdictional level of implementation;
- number of compliance entities under the scheme;
- banking and borrowing rights of compliance entities;
- distribution of assets – grandfathering, auctioning;
- lifespan of asset, surrender obligations of compliance entities;
- use of offsets/credits within the scheme, permitted sources of those credits/offsets.

[10] These schemes are the subject of a detailed paper prepared by the World Bank.⁵ Mention is made of them here solely to help keep them in mind while consideration is given to the issues and proposals described in this paper.

² World Bank, 2014, *State and Trends of Carbon Pricing 2014*, Washington, DC: World Bank, chapter 4

³ *ibid*

⁴ Note 2 *supra*, chapter 5

⁵ Reference paper prepared by Mandkhair Bayarsaikhan, NCM Initiative, Carbon and Climate Finance Unit

3. Background framework concepts

[11] Before setting out a proposed glossary of terms that might be applied to the mitigation value assessment process, this section aims to provide a framework within which those terms might be considered. In so doing, the aim is not only to reach some level of consistency of understanding of the concepts and terms, but also to flag some of the areas that will need further investigation.

A. Carbon markets as a creation of policy – compliance drives demand

- The UNFCCC/IPCC position, that is, the generally accepted position of most governments globally, based on scientific research, is that GHG emissions must be reduced to avoid dangerous anthropogenic climate change.
- To achieve these reductions requires fundamental changes in the structure of the way in which economies are organised, away from activities that generate such emissions or in the way those activities are carried out.
- Pricing mechanisms and, in particular, markets, were introduced to facilitate an economically efficient transition to a low carbon emission economy – carbon trading is only a tool for achieving the policy objective of reduced emissions.
- There is no natural market for avoided/reduced/sequestered GHG emissions, that is, no natural demand. Demand is generated by the imposition of obligations on the economic actors responsible for the emissions – these obligations take the form of requirements on emitters to reduce their emissions profile over time.
- Hence demand in the carbon market is primarily compliance driven.

B. Top down model

- The Kyoto Protocol includes an attempt by the signatory Parties – national governments of sovereign states – to put in place such a compliance driven market.
- Parties listed in Annex B made quantified emission limitation and reduction commitments (QELRCs) to reduce their emissions by the stated percentage amounts over a fixed five year period (First Commitment Period 2008-2012), with the intention that there would be subsequent commitment periods.

- Some states and the EU gave further application to the market concept by creating corresponding obligations on domestic economic actors and establishing schemes for trading between these entities (e.g. as in the EUETS).
- While the EUETS has had success in reducing emissions of the entities on which it places compliance obligations, the top down model has failed, inter alia, because:
 - the idea of a top down, compliance-driven model is flawed due to the inability to impose and enforce compliance commitments on sovereign states (in a regulatory command and control sense); and
 - politically and economically, national governments of sovereign states will always act to protect the national self-interest, hence voluntary commitment is not an adequate substitute for the ability to enforce compliance.

C. Bottom up model

- A response to the failure of the top down model has been the growth of individual jurisdictions, both at the sovereign state and sub-national levels, implementing or developing their own carbon pricing systems, including trading mechanisms.
- Differences in the design and other elements of these mechanisms, while reflecting local preferences and circumstances, have resulted in fragmentation and heterogeneity.
- In order to improve the liquidity and depth of these markets, and help them leverage new low carbon financing and investment, ways are being explored to facilitate fungibility of the carbon assets traded in these heterogeneous markets.
- Fungibility of the carbon assets being traded presumes either (i) the carbon assets are all the same, which cannot be the case here unless all the heterogeneous trading schemes are made the same; or (ii) that there is a way of evaluating and comparing the relative values of the diverse carbon assets being traded, e.g., by applying exchange rates or ratios.
- It is proposed to bring about an evaluation and comparison of the various diverse carbon assets by assessing the 'mitigation value' ('MV') of the jurisdiction within which the carbon asset is generated: it is proposed that the MV assessment process will translate into rates of exchange, or ratios,

at which carbon assets can be traded between schemes.

D. What is 'mitigation' and how is a value attached to it?

- Mitigation means stabilising GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, which is the ultimate objective of the UNFCCC (Article 2).
- According to the IPCC, this means keeping average global temperature increase to less than 2° above pre-industrial levels.
- Mitigation can be achieved in two ways: (i) limiting or reducing anthropogenic GHG emissions by sources to the atmosphere, or (ii) preserving or enhancing sinks or reservoirs of GHGs.
- The commitments of Parties under the UNFCCC to mitigate, are qualified in terms of (Article 4.1) "common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances" and in terms of (Article 4.2) "the differences ... in starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances".
- Hence, mitigation relates to the actions (in the context of the UNFCCC, taken by a Party (sovereign state), but in broader terms, taken by any economic actor), to limit or reduce its GHG emissions by sources to the atmosphere or to enhance removals of GHG emissions by sinks from the atmosphere.
- Taking account of the qualifications in UNFCCC Articles 4.1 and 4.2, mentioned above, mitigation actions need to be seen in their proper context.
- Accordingly, in developing technical and analytical foundations for a framework to assess and compare different climate change mitigation efforts (the aim of the NCM initiative), it is important to ensure that framework is able to take account of the different respective circumstances in which the mitigation efforts are made, in ranking those efforts relative to each other.
- While there is no finally accepted definition yet of what mitigation value is, for the purposes of this discussion paper, mitigation value is proposed as a relative measure, as between jurisdictions, of the effectiveness of their emission reduction programs in 'mitigating', which takes account of their respective jurisdictional 'circumstances'. In doing so, the NCM initiative, seeks to take account of the different respective circumstances in which climate mitigation efforts are made, rather than excluding some countries due to domestic choices or inability to meet potentially unattainable standards.
- Not only can jurisdictions have their mitigation efforts ranked relative to each other, but those efforts – the jurisdiction's performance in carrying out mitigation actions – might also be assessed against what that jurisdiction has stated it will achieve in that respect, i.e., its level of ambition.
- The jurisdiction's 'level of ambition' might be compared, also, against a 'view' as to what the level of ambition for that jurisdiction *should* be (taking account of its circumstances) in the context of achieving the ultimate objective of the UNFCCC (that is, keeping average global temperature increase to less than 2° above pre-industrial levels). This 'level of expectation' might be formed by an independent, unbiased, *expert group*. If this approach were followed, how such a group might be constituted and how it might form its views would need to be addressed, however, these issues are beyond the scope of this paper.
- Having, as part of the MV assessment, a level of ambition for a jurisdiction's mitigation actions and that level of ambition being assessed for its adequacy in global terms could tie a jurisdiction's MV back to the ultimate objective of the UNFCCC.
- However, while theoretically any jurisdictional level (i.e., national, provincial, local) can state a level of ambition for its mitigation actions, it is unlikely that all jurisdictions will have done so. Furthermore, it may not be realistic to try to gather all the data necessary to make valid assessments of whether a jurisdiction's level of ambition is adequate, in global terms, for jurisdictions other than at the sovereign level (i.e., for sub-national jurisdictions).
- Nevertheless, in developing an MV assessment process, the relationship between a jurisdiction's MV relative to other jurisdictions, and its MV when compared to (a) its level of ambition and (b) the level of expectation as to its ambition, will need to be explored and determined, as well as the level of

jurisdiction at which (a) and (b) should be taken into account.⁶

E. How is mitigation value measured?

- The most common standard unit for measurement of GHG emissions is a metric tonne of CO₂-equivalent gas, pursuant to the conventions adopted under the UNFCCC and IPCC Guidelines.
- While the heterogeneous carbon pricing and trading mechanisms that are springing up in diverse jurisdictions may vary in the basic unit of measurement they provide for, most of the differences (at least between the trading schemes) seem to be between metric tonnes or US short tons, or as to the types of gas emissions, e.g. CO₂ only, or a number of GHGs. As such, there should not be any difficulty in reducing all of these to a common unit of measurement. Similarly, mitigation by schemes based on energy intensity, fuel substitution, or ratios per unit of production (or similar), or other such measures, should (in most cases) also be capable of being reduced to a unit of measurement common to other schemes, e.g., metric tonnes CO₂-equivalent gas.
- However, physical measurement of GHG emissions, reductions, avoidance or removals is impractical at best, and possible for only a limited suite of point sources: for example, the USEPA Acid Rain program, in providing for trading in SO₂ emission allowances, benefitted from continuous monitoring of stack emissions of regulated sources: this sort of approach is simply not possible across the board in the case of broader, economy-wide schemes that provide for GHG emissions and reductions, etc, from diverse sources, more generally.
- Hence both volume of emissions and the extent of their mitigation often will need to be derived as estimates, or indirectly through measurement of proxies. There are well-developed methodologies and a considerable body of data and experience in making such estimations: for example, since 1996, UNFCCC Annex I Parties have been required to submit to the secretariat an annual inventory of their emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol (non-Annex I

Parties also have to submit National Communications); both the IPCC and the UNFCCC have issued guidelines; methodologies have been approved also by the CDM Executive Board; and there is also the GHG Protocol (WRI/WBCSD) and ISO 14064, for GHG accounting and reporting principles and methodologies.⁷

- A jurisdiction's mitigation effort will be a function of the programs, policies and pledges ('PPPs') that it has in place to limit or reduce its GHG emissions by sources to the atmosphere or to enhance removals of GHG emissions by sinks from the atmosphere.
- To determine the effectiveness of the jurisdiction's PPPs, it will be necessary to make measurements/estimations of the emissions (a) with the PPPs in place; and (b) without them in place (the business-as-usual ("BAU") scenario). There are also other considerations, for instance, how well the PPPs are set up: see the IISD risk categories e.g., program boundaries/leakage; funding to fully implement; enforcement; accounting, monitoring, reporting, etc.⁸
- It is relevant also whether this assessment of a jurisdiction's mitigation effort is being made:
 - ex-ante, that is, forward looking and on a predictive basis as to whether the PPPs will deliver the anticipated results, in which case, it is more an assessment of the robustness of the PPPs in place, and factors such as IISD risk categories e.g., program boundaries/leakage; funding to fully implement; institutional strength; enforcement; accounting, monitoring, reporting, and so on, will be more significant; or
 - ex-post, that is, looking back at the relevant period of emissions, in which case, measurements and proxy-based estimates⁹ should be available and will be more significant; and
 - it is conceivable that over time, assessments of a jurisdiction's MV will change in emphasis to take more account of the ex-post components as the PPPs build a track record.

⁶ NB: if comparing one jurisdiction with another, they need to be assessed in the same way: so if one is a city or province (i.e., sub-national), and the other is a sovereign state (i.e., national), the same criteria must be applied to each in arriving at their respective MVs; cannot look at the level of ambition for the sovereign state, but not for the province, especially if they both operate a trading scheme generating carbon assets they wish to be fungible

⁷ See also, for example, Climate Action Tracker methodology: <http://climateactiontracker.org/>

⁸ IISD/New Climate Institute: 'Carbon Integrity Assessment at the Program Level – Scorecard to Assess Carbon Integrity Risks, Supplementary Note', Frédéric Gagnon-Lebrun, Seton Stiebert, July 2015

⁹ For example, levels of production using a particular process for which % emissions, level of energy use, efficiency are known, types of energy used, efficiency of production and emission factors for that type, etc.

- If a jurisdiction has a number of PPPs in place, each one will need to be evaluated individually for effectiveness then, collectively, they would contribute to the MV of the jurisdiction; so at the jurisdictional level, the MV would be a matter of:
 - mitigation performance of each individual PPP, considered together (that is, the sum of the PPP MVs); and
 - collectively, how do the PPPs fit and work together (do they complement each other? Are there gaps? Overlaps? Inconsistencies? Conflicting elements?); and
 - any other overriding factors – political will of the government, strength of the supervising institution and so on.
- If one of the PPPs that a jurisdiction has in place is a carbon trading mechanism generating carbon assets for trading within the scheme but which, by participating in NCM, might also be traded into schemes in other jurisdictions, then not only will that particular PPP be evaluated, but it will be evaluated in the context of the jurisdiction overall, the resulting MV¹⁰ being translated into an exchange rate, or ratio, for its carbon assets when they are traded between schemes. The form and practicality of a carbon exchange rate is still being explored.
- The extent to which estimates, indirect measurement through proxies, or direct measurement, are applicable, will vary depending on the size and nature of emissions, the PPP and the jurisdiction.
- As noted earlier, consideration of the effectiveness of a jurisdiction's mitigation needs also to take account of its circumstances, which might include factors such as:
 - Level of emissions;
 - Economic structure – energy resources, transport, industry, agriculture, waste management;
 - Geographic profile – size, population, demography, building stock profile;
 - Financial profile;
 - Institutional structures;
 - Political profile.
- Account will also need to be taken of the level of government: is the jurisdiction regional (e.g., EU), national, sub-national, provincial, local – are the emissions and their mitigation particular to the jurisdiction; what degree of independence is there from the next higher level of government (principle of subsidiarity)¹¹ – this may dictate the applicability of any of the factors listed in the preceding point in the case of any particular sub-national jurisdiction; and the operation of internationally binding commitments and principles (e.g. principle of supplementarity)¹².

F. What determines compliance value ('CV') of a carbon asset?

- Under carbon trading schemes, carbon assets ultimately have to be surrendered against compliance obligations imposed on the economic actors who must reduce emissions ('compliance entities'), so those assets have a value for compliance purposes: the compliance value ('CV'). The form and practicability of how CV is taken into account is still under consideration.
- The scheme administrator/regulator will determine the amount of compliance obligation to accept, as having been acquitted against the carbon assets surrendered by a compliance entity. In so doing, they determine (at the time of surrender) what is the CV of those carbon assets.
- For any scheme under which allowances are issued to compliance entities¹³, it is most likely that the scheme administrator/regulator would assign a value of CV=1, for allowances issued by it in the first place (i.e., domestically).

¹⁰ this is the MV of the trading scheme, in the context of the jurisdiction, overall, taking into account all PPPs it has in place. The MV assessment process itself is yet to be defined, including whether it is the jurisdiction, the trading mechanism program, or the carbon asset itself, whose MV is being assessed. By analogy, when corporate or public debt is issued, both the issuer and the instrument may be rated by credit rating agencies. [NB this needs to be considered further]

¹¹ The general aim of the principle of subsidiarity is to guarantee a degree of independence for a lower authority in relation to a higher body or for a local authority in relation to central government. It therefore involves the sharing of powers between several levels of authority, a principle which forms the institutional basis for federal

States:

http://www.europarl.europa.eu/aboutparliament/en/displayFtu.html?ftuid=FTU_1.2.2.html, accessed 3 August 2015

¹² '... the use of the mechanisms [International Emissions Trading, CDM, JI] shall be supplemental to domestic action and that domestic action shall thus constitute a significant effort made by each Party included in Annex I to meet its quantified emission limitation and reduction commitments under Article 3, Paragraph 1.' (Article 1 Draft Decision -/CMP.1 (Mechanisms) contained in Decision 15/CP.7, Marrakech Accords). NB to be considered further ¹³ whether by grandfathering (i.e., for free) or by auction (i.e., at a price)

- The question will be what CV the scheme administrator assigns to, say, project generated credits/offsets accepted under the scheme, or carbon assets from another jurisdiction? In the case of the credits, a risk-based rating could provide guidance to the administrator/regulator as to the CV to assign. Similarly, the MV of the other jurisdiction could translate into a rate of exchange, or ratio, applicable to carbon assets traded from that jurisdiction: this would provide guidance to the administrator/regulator as to the CV it should assign to those traded carbon assets.¹⁴

G. What determines financial value ('FV') of a carbon asset?

- The financial value ('FV') of a carbon asset is the price a buyer is willing to pay for it. As such, FV will depend on a number of market factors, including demand and supply, market liquidity, and depth of the market, as well as marginal cost in a jurisdiction of mitigating emissions as opposed to buying carbon assets in order to acquit compliance obligations (marginal abatement cost).
- When a carbon asset generated under a scheme in one jurisdiction, is traded into the scheme in another jurisdiction, the relative MVs of the two jurisdictions are relevant, as they can translate into a rate of exchange, or ratio, for the carbon assets of each jurisdiction.
- As noted above at F, the exchange rate, or ratio, of carbon assets traded across jurisdictions, might provide guidance to the administrator/regulator of the jurisdiction into which they are traded, then surrendered, as to the CV it should assign to those carbon assets on surrender.
- If the administrator/regulator of the scheme where these carbon assets are surrendered does give a CV to those assets based on the MV exchange rate, then since the value to the end user is ultimately the asset's use for acquittal of compliance obligations by surrendering the assets, the likely effect will be that buyers in the market will be more inclined to take account of the exchange rate, or ratio, when entering trading transactions.
- Conversely, if the administrator/regulator of the trading scheme in a particular jurisdiction does not base its decision concerning allocation of a CV to a carbon asset traded into its scheme on the MV exchange rate, then the MV exchange rate will be a

less relevant consideration in relation to price, for buyers in that jurisdiction.

- Whatever level of significance attaches to the MV exchange rate, or ratio, between two jurisdictions, as a result of the approach to CV taken by the administrator/regulator, market factors such as demand and supply, liquidity, and depth of the market, will remain important in determining the FV of the carbon asset traded. It will always be up to the buyer to decide what price they are willing to pay, in the overall circumstances.¹⁵
- The design of NCM trading will have an influence on the relative significance of the MV exchange rate, or ratio, in the decision-making process: for example,
 - if the exchange rate was published as an 'official rate', by a recognised body, or by entities officially recognised to do so, as opposed to being just the unofficial difference between the MVs of the two jurisdictions; or
 - if the administrators/regulators of schemes that participate in NCM trading were encouraged, or even required, to signify their acceptance of officially-quoted MV exchange rates for the purposes of setting CVs; or
 - if the exchange rate were to be built into the NCM transaction process, by providing for conversion of traded carbon assets, either into the domestic units of the buyer's jurisdiction, or by introducing the concept of an index and a transaction currency in the form of 'International Transaction Units'.

Consideration is given to design of the NCM transaction process in Section 4 following.

[12] While the concept of MV can be described as above, a finally agreed definition is yet to be settled, but it is important to note that there will be a range of ways in which the concept of MV can be applied.¹⁶ Similarly, while elements of the MV assessment process can be proposed as above, many issues remain to be resolved and the mechanics and structure of any assessment process are yet to be determined. Nevertheless, elements of the concept, by whom the assessment process might be carried out and how they might be regulated can all be considered and are, in this paper. In doing so, it is important to keep in mind that for there to be any value in the process these elements seek to inform, the design must ensure that environmental integrity is maintained and promotes the objectives of the UNFCCC, but equally, that

¹⁴ This question explored more in Sections 4 and 7 of this paper

¹⁵ MV:CV:FV relationship considered more in Sections 4 and 7 of this paper

¹⁶ see [35] following

design should afford certainty, clarity and operational efficiency such that the market can perform the role for which it is intended.

Figure 1. How Mitigation Value protects the environmental integrity of trade of carbon allowances

- **Scene:** 10 million x 'Country A' carbon allowances are purchased by Country B. The actual mitigation value of each 'Country A' asset is 0.5 tonne

Scenario 1: The actual mitigation of Country A's carbon assets are not accounted for in the trade

Scenario 2: The actual mitigation of Country A's carbon assets are accounted for in the trade

Mitigation Value is intended to preserve the environmental integrity of the trade

4. Glossary of Key Definitions

[13] This section explores in more detail the carbon asset, its compliance value, its financial value, and the relationship between these elements. It introduces the concepts of an international transaction unit and an index against which the mitigation value of carbon assets might be assessed. A proposed glossary of key definitions is set out in full at Annexure “C”. However, the relevant definitions for the purposes of this section, extracted from the glossary are as follows.

Selected definitions

[14] Carbon asset:

A carbon asset is an instrument generated as part of a scheme, project or program the purpose of which is mitigation of carbon emissions. In some jurisdictions, the legal system may classify a carbon asset as a ‘chose in action’, meaning that it confers a right enforceable at law. It may be classified also as a ‘financial instrument’, depending on application of financial regulations in the particular jurisdiction. Carbon assets are usually measured in base units of a tonne of carbon dioxide equivalent greenhouse gas (CO₂-eq GHG), whereby Global Warming Potentials of other GHGs are used to give the equivalent number of tonnes of CO₂, and GWP CO₂ = 1. Carbon assets can take a variety of forms:

- **Allowances:**
 - are usually issued (either free or by auction) by a compliance scheme (ETS) administrator to scheme participants (‘compliance entities’) – entities emitting GHGs who have obligations under the scheme to mitigate their emissions;
 - compliance entities will be required to surrender allowances equivalent to their GHG emissions for the compliance periods determined under the scheme (e.g. annually);
- **Credits/offsets:**
 - are generated by projects which avoid or reduce emissions that would otherwise occur, or which sequester GHGs from the atmosphere, in both cases, compared to a baseline;
 - need to be real, measurable and verifiable, as well as additional to BAU;
 - can be surrendered on a voluntary basis, by entities that do not have compliance obligations;

- depending on the rules of the relevant compliance scheme, may also be able to be surrendered in respect of compliance obligations;
- other forms of carbon asset might include any sort of units issued pursuant to an INDC, for example, energy intensity units, tax credits, etc. under other carbon pricing mechanisms.

However, for the purposes of this paper, the concept will be confined to allowances issued pursuant to an ETS.

[15] Compliance value:

The value ascribed by the administrator/regulator of an ETS, to a unit of a carbon asset, at the time it is surrendered for compliance purposes under that ETS. This will drive demand for the carbon asset and hence it is expected would be directly relevant to the price. If the carbon asset has been issued by the administrator under that scheme, it would be usual for it to be given a value CV=1; if the carbon asset has been issued under the scheme of another jurisdiction, the administrator might be guided by the MV of that other jurisdiction in ascribing a CV to that scheme’s carbon asset at the time of surrender.

[16] Financial value:

The price a buyer is willing to pay for a unit of a carbon asset. It will depend on a number of market factors, including demand and supply, market liquidity, and depth of the market; it will be influenced also by the respective marginal abatement costs in the two jurisdictions to the trade; and will also be influenced by the carbon asset exchange rate between the relevant jurisdictions.

[17] International Transaction Unit:

The unit of a ‘transaction currency’ introduced for the purpose of facilitating trading between schemes in diverse, heterogeneous jurisdictions. The nature and characteristics that such a unit might have are discussed in more detail below at [28] and [29] and in Section 7.

[18] Index:

A statistical composite that measures changes in the economy or a financial market, often expressed as changes from a base year or a preceding month. Each index has its own method of calculation;¹⁷ components may be weighted according to certain characteristics, e.g., stock index weighted for market cap.

Design differences and fungibility

¹⁷ this might include an index based on reference to a global emissions budget, or similar concept. These are discussed in Section 7.

[19] Carbon trading schemes have differences in design aspects, such as those mentioned above at [9], which mean that the carbon assets issued under them will differ from one jurisdiction to another. There are also important similarities, such as the fact that the schemes under which the carbon assets are issued all have the same purpose, namely mitigation of GHG emissions; and that the carbon assets are intended to be tradable, and are surrendered against compliance obligations, under the respective schemes.

[20] As noted in Section 3, the fact that these schemes have a common purpose, namely mitigation, provides the means to evaluate the differences between them and, thereby, to arrive at a relative measure of their effectiveness in achieving that purpose.¹⁸

[21] The NCM initiative aims to enable comparison of different carbon pricing systems and trade across different carbon assets by providing for fungibility of carbon assets. To be 'fungible', means that a thing is mutually interchangeable with another thing that is, for all intents and purposes, identical to it. The comparison of carbon assets across jurisdictions will be a function of the extent to which differences in the trading schemes can be reduced to relative values in terms of mitigation. The actual carbon assets themselves, will retain their differences (due to scheme designs) and, not being identical, will not be interchangeable with, or able to be substituted for, each other, *per se*: that is, they are not 'fungible', in the full meaning of the word. Rather it will be their relative value – in mitigation terms – that will be capable of being traded into another scheme. This is achieved by deriving an exchange rate, or ratio, for the carbon assets issued under the schemes of different jurisdictions, based on the respective mitigation value assessment outcomes of those jurisdictions.

Transaction scenarios

[22] The form that transactions take will have implications for how key elements interact. To illustrate this, three scenarios are set out in Annexure "D". It is presumed that each of these transactions will be via an intermediary, namely a settlement platform. The form, role and functions of the settlement platform are considered in Section 7. However, all transactions will need to be settled and cleared, so it is reasonable to assume that there will be such an intermediary in all transactions. The first two scenarios are:

(i) foreign unit converted model;

(ii) foreign unit imported model;

[23] In both these scenarios, units from the scheme in Jurisdiction A (A units) are being sold by Seller A to Buyer B, who has compliance obligations in Jurisdiction B, which trades B units. In scenario (i), upon the transaction taking place, the A units purchased by Buyer B are converted into the equivalent number of B units by the Jurisdiction B scheme administrator, at the prevailing exchange rate, and the A units are cancelled. In scenario (ii), the A units are not cancelled but credited to Buyer B's registry account in Jurisdiction B as A units.

[24] In scenario (i), the Buyer B account in the Jurisdiction B registry only ever receives B units. The Jurisdiction B scheme administrator cancels the A units and credits Buyer B with the relevant number of B units. This contrasts with scenario (ii), in which A units are transferred into Buyer B's account in the Jurisdiction B registry. It then becomes a matter for the Jurisdiction B scheme administrator to determine how to ascribe value to those A units in the Jurisdiction B scheme, bearing in mind that there are differences between A units and B units (due to differing scheme design aspects – see [9]). Further, under this scenario compliance entities in Jurisdiction B (as in all trading jurisdictions) would need to have accounts for units from all other trading jurisdictions from which they might possibly acquire units. If this applied across all transactions and all jurisdictions engaged in NCM, it would make administration more complex and may lead to inconsistencies.

[25] These transaction scenarios illustrate how MV, translated into an exchange rate for the carbon assets, interacts with the CV and the FV of the carbon assets.¹⁹

[26] In scenario (i), as it is B units that are credited to Buyer B's account in the Jurisdiction B registry, the CV of the purchased units is whatever the Jurisdiction B scheme administrator has set under that scheme for B units (e.g., probably, CV = 1). As such, the FV of the carbon assets should be substantially influenced by the exchange rate on the transaction date. Hence the relative MVs of the respective jurisdictions should be a factor in the price paid.

[27] By contrast under scenario (ii), on the transaction date Buyer B will not know what CV the Jurisdiction B scheme administrator will place on the A units. This decision may be influenced by a number of factors, including the way NCM trading is designed, for instance, whether exchange rates are 'official' or 'unofficial'; the degree to which scheme administrators agree to apply them; and also the period of time between the transaction and surrender of

¹⁸ What mitigation is and how a value is attached to it, and how mitigation value is measured, have been considered in the preceding Section 3, at sub-sections D and E, respectively.

¹⁹ When a carbon asset is to be traded between two jurisdictions, what determines the compliance value and what determines the financial value have been considered in the preceding Section 3, at sub-sections F and G, respectively.

the A units, by Buyer B, for compliance purposes under the Jurisdiction B scheme: the longer the time between the two events, the greater the chance that the exchange rate will change, which may affect the decision of the Jurisdiction B scheme administrator. Under this scenario, this risk is carried by Buyer B. It could be a powerful disincentive to purchase from another scheme.

International Transaction Unit

[28] The introduction of a 'vehicle' for transactions in the NCM could greatly simplify the process. In foreign exchange transactions, use of a vehicle currency (\$USD) greatly reduces the number of exchange rates that must be dealt with in a multilateral system. For example, in a system of 10 currencies, with one a vehicle, 9 rates need to be quoted; without the vehicle, 45 rates need to be quoted. Hence using a vehicle currency can yield the advantage of fewer, larger and more liquid markets with fewer currency balances, reduced informational needs and simpler operations. In theory, the same principles should hold for exchange rates in NCM. Such simplification should allow the NCM transactions to flow more rapidly and efficiently, reducing also the scope for error and capacity for manipulation and fraud.

[29] The nature, characteristics and other aspects posited for an 'International Transaction Unit', such as how it could be comprised and what it would represent, are considered in later in this paper. For the purpose of setting out here a transaction scenario involving an International Transaction Unit, it is proposed that its value derives from an index. However, it might equally be based on a standard or emissions budget (or the index might be), which refers back to a globally agreed emissions target (e.g., such as the UNFCCC objective of keeping average global temperature increase to less than 2° above pre-industrial levels). These alternatives are explored in Section 7.

Index

[30] In scenario (iii), there is an index (the 'Index').²⁰ Again, as in the previous two scenarios, units from the scheme in Jurisdiction A (A units) are being sold by Seller A to Buyer B, who has compliance obligations in Jurisdiction B, which trades B units. In this scenario, Seller A converts the A units being sold into International Transaction Units ("ITUs") at the applicable exchange rate; Buyer B then buys the number of B units into which those ITUs convert,

at the applicable exchange rate. The B units are transferred to Buyer B's account in the Jurisdiction B registry, relieving the Jurisdiction B scheme administrator of the need to make the conversion by issuing B units and cancelling A units. The exchange rate for A units converted to ITUs²¹ would be derived from the MV of Jurisdiction A relative to the Index. Similarly, the exchange rate for the conversion of ITUs to B units, would be derived from the value of the Index relative to the MV of Jurisdiction B.

[31] The purpose served by the Index in scenario (iii) is to provide a way of comparing the relative MVs of the jurisdictions. In this example, the MV of each jurisdiction is measured against the weighted average for all trading jurisdictions. As noted above, in so doing it provides for ITUs to operate as a 'vehicle currency', analogous to the role of the \$US in FX transactions. The ITUs might be just a notional transaction currency, facilitating the transaction as in the scenario, or they might also serve an investment purpose in their own right. There are many other possible mathematical configurations and variations on the idea of an index. These depend on what information is sought to be communicated, and to whom. Some of these other variations, the feasibility and benefits of an index are discussed in Section 7.

One possible application of MV assessment: to exchange rate

[32] In each of the three scenarios outlined, domestic CV=1. The difference between (i) and (iii), versus (ii), demonstrates that the form of the transaction, in relation to when and how the traded carbon asset is ascribed a CV in the buyer's scheme, will impact on the risk and certainty of the value derived from the trade. Scenario (iii) centralises the administrative aspect (conversion of A to B units), which would enhance the certainty and efficiency of the process. However, in all three scenarios, the application of the exchange rate is translated into the number of units converted, which could have implications for the environmental integrity of the overall scheme, since it could potentially result in more units (which are rights to emit) being created in the scheme. While this risk might be addressed through design aspects,²² it raises a fundamental question: should the scheme design be such that the MV assessment process can translate into differentials between jurisdictions **both** in terms of (a) the environmental integrity (manifested as the CV awarded to traded carbon assets) and (b) the FV of the traded assets

²⁰ For example, the Index could be based on a basket of, say, the average of MV assessment outcomes for all the jurisdictions engaged in NCM, weighted according to their respective GHG emissions. Note however, that indices all have their own method of calculation and the Index could be constructed in any one of many different ways

²¹ Whether these ITUs themselves would be tradable, or simply notional units for the purposes of facilitating transactions, is another issue that is touched on briefly in Section 7 of this paper

²² This issue considered in 'Networked Carbon Markets – Concept Development – Using Mitigation Value to Guide Design of Trading Rules', by Jennifer Austin

(i.e., the price)? Or should there be 'only one moving part', so to speak?

[33] An alternative approach to that outlined in the above scenarios would be if the exchange rate were to be reflected only in the price. However, this would mean that each jurisdiction could only ever buy its own units, so that $CV=1$ would always apply. This is because if lower value units were to be bought from another jurisdiction, and $CV=1$ applied to them automatically, the environmental integrity of the overall system would again be impaired. Overvaluing the CV of low MV units has the same effect

as converting high MV units into a bigger number of low MV units (which still equate to emission rights). But, as noted, this situation would be avoided if each jurisdiction could only ever buy its own units. It is anticipated that market participants might also be more receptive to such a mechanism, as it would be simpler to understand and interpret movements in the market. The drawback is that jurisdictions could not trade with each other directly, but rather might only do so indirectly through a market maker. This alternative is elaborated further in Section 7.

[34] To summarise the transaction mechanisms floated above:

<i>Scenario</i>	<i>Price</i>	<i>No. of units on trade occurring</i>	<i>CV</i>	<i>Administration</i>
1. Foreign unit converted	Depends on market, but exchange rate relevant	Depends on exchange rate	CV=1 as only domestic units credited	Decentralized
2. Foreign unit imported	Depends on market, exchange rate possibly less relevant due to CV uncertainty	Depends on exchange rate	CV depends on buyer's scheme administrator	Decentralized and more complex
3. International Transaction Unit transaction currency	Depends on market, but exchange rate relevant	Depends on exchange rate	CV=1 as only domestic units credited	Centralized
Via market maker, no direct trade between counterparties	Depends on market, exchange rate very relevant	Will be whatever number buyer contracts to purchase	CV=1 as only domestic units credited	Centralized

Other applications for MV Assessment

[35] Stepping back from the transaction level described in the preceding paragraphs, there are other possible applications for the MV assessments at an earlier stage in the process. For example, jurisdictions may use MV assessments to inform their decision making whether or not to engage in NCM transactions in the first place. Going a further step back, governments may see a benefit in MV

assessments in an introspective sense, as a yardstick for measuring the success of their own PPPs, as a tool for internal review and enhancement of policies. All the same, for jurisdictions that do wish to engage in trading with other jurisdictions, the NCM initiative is developing concepts to facilitate application of MV assessments to inform exchange rates.

5. Key roles and available tools

[36] Building on analysis of existing financial markets, this section considers the types of institutions that might be suitable to participate in the mitigation value assessment process, providing practical examples, and considering the

types of expertise and tools those institutions might leverage. However, before proceeding, it may be helpful to put them in an overall context by quickly reviewing all the institutions and parties that might be involved:

<i>Institutions and parties</i>	<i>Comment</i>
Individual jurisdictions opting into NCM	Each maintains their own scheme registry
Compliance entities from individual jurisdictions	Engage in trading across jurisdictions
Other market participants	Brokers, dealers, market makers, etc: private sector entities
Suitable entity/entities to perform MV assessments	Considered in this Section 5
Regulatory supervisory body for MV assessments	Considered in Section 6 of this paper
Exchange rate determination and regulatory supervision	Considered in a separate paper commissioned by NCM
Settlement platform and clearing	Considered in Section 7 of this paper
Central registry	Could be linked to settlement platform, see Section 7
ICAR	Considered in a separate paper commissioned by NCM
Overriding governance structure for NCM	Considered briefly at the end of Section 6, but beyond scope of terms of reference for this paper

[37] Diagrammatically, the institutions, parties and their relationships might be considered as follows:

[38] This section begins by examining what the mitigation value assessment process requires of a 'suitable institution', including in terms of tools and expertise. Without disregarding the possibility of other options, two specific examples of types of institutions that, at least in part, already may meet the requirements of the process are considered.

What does the process require of a 'suitable institution'?

[39] What are practical examples of the types of suitable institutions that would participate in the mitigation value assessment process? What tools and expertise would they need to leverage? To answer these questions, the logical starting point is to consider what that process is, what it entails:

- 'assessment' requires suitably qualified analysts, access to relevant information and the hardware for the analysts to evaluate that information;
- it is posited that 'mitigation value' means "a relative measure, as between jurisdictions, of the effectiveness of their emission reduction programs in 'mitigating', which takes account of their respective

jurisdictional 'circumstances'", so on this basis, analysts need to be qualified in:

- assessing emission reduction programs,
- evaluating mitigation effectiveness,
- evaluating mitigation ambition, or pledges,
- evaluating jurisdictional circumstances and all that entails²³, and

apart from being able to review and evaluate large amounts of factual information, the analysis needs to be able to account for large data sets, complex statistical analysis and mathematical modelling, critical weighting of factors, detailed and extensive research, and the exercise of experienced, expert judgment;

- as a relative measure as between jurisdictions, it would involve a process similar to rating processes, that is, design of a process to score the mitigation value of jurisdictions' PPPs.

[40] These technical requirements presuppose:

- financial resources necessary to ensure in-house (or access to) research materials;

²³ See Section 3, sub-section E preceding

- not only the ability to access and obtain databases and datasets, but also:
 - the ability to store the information,
 - to assess, analyse and interpret the information,
 - the capacity to evaluate and form opinions based on that information, and
 - the capacity to communicate the outcomes of these deliberations in meaningful ways that are readily accessible to stakeholders;
- mathematical analytics;
- skilled and experienced personnel, premises in which to house those personnel in suitable locations (probably needing to be near a financial centre), appropriate organisational IT and communications infrastructure;
- these personnel requirements presuppose not only financial resources, but the appropriate support systems such as an effective management structure, operational and administrative systems, training and governance systems.

[41] Bearing these requirements in mind, a minimum size of organisation would appear to be necessary, needing to be capitalised to a minimum extent. In view of the need to avoid conflicts of interest or perceptions of bias, it is unlikely that national or sub-national public sector bodies would be suitable. It is possible that a multilateral agency might be considered suitable, however, this might also be viewed as ‘putting all the eggs in one basket’, limiting the scope for a diversity of views and methodological approaches, and also increasing the potential for bureaucratic hurdles. So, focusing on private sector entities, a certain type of organisation would more readily have the personnel profile and internal infrastructure to undertake the process elements described above. These considerations point initially towards: (a) credit rating agencies; and (b) organisations that have been accredited as Designated Operational Entities (DOEs), under the Kyoto Protocol.

[42] This is not to exclude other organisations that might equally undertake such operations, such as:

- large international (ex-accountancy) consultancies (PwC, KPMG, EY, etc);
- investment banks;
- large global accounting firms or other large global multi-disciplinary consultancies (e.g., non-DOE environmental consultancies);
- organisations like Climate Action Tracker (a consortium of consultancies and NGOs); or even

- large global law firms (now that they can have multi-disciplinary teams), or
- consortia, made up from combinations of any of these types of organisations.

Credit Rating Process similar to MV assessment process

[43] To the extent that this exercise is to look for suitable institutions to participate in the ‘mitigation value assessment process’, it is worth considering that the closest comparable business process would be that carried out by credit rating agencies in rating public sector debt and public sector issuers of debt, including sovereign governments.

[44] It is in the context of the bond market, and in relation to debt and borrowings generally, that the concept of ratings is most often used. When borrowing, sovereigns, all levels of government, corporate borrowers, even individuals, are rated on their creditworthiness, that is, their willingness and capacity to meet their commitments: to pay interest and repay their capital borrowing. Continuing the analogy for NCM, the jurisdiction issuing the carbon asset would be evaluated as a whole, in terms of the MV of the PPPs in place to mitigate emissions from within its boundaries. The carbon trading scheme would be evaluated as a part of this MV assessment process. The MV of the jurisdiction could be considered relative to that of other jurisdictions (or against a composite weighted average thereof), to give an ordinal ranking similar to that of sovereign or other governmental issuer credit ratings.

Points to be drawn from consideration of credit ratings and credit rating agencies

[45] A number of important points can be drawn from the experience of credit ratings and credit ratings agencies:

- just as is the case with credit rating agencies, suitable institutions for performing the MV assessment process should be independent, private sector and, preferably, for-profit organisations. The aim would be to avoid any potential risk of national, or sub-national jurisdictional bias, or even the perception of such bias, on the part of the entities carrying out the assessments. For-profit organisations are preferred, as most not-for-profit organisations derive some form of governmental benefit – even if only in the form of non-taxable status, and this could leave open suggestions of partiality, no matter how unfounded;
- suitable institutions should be subject to regulatory supervision:
 - this is now the case with credit rating agencies under, for example:

- the EU Regulation on Credit Rating Agencies – Regulation (EC) 1060/2009, and
- in the US, the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act;
- under the EU Regulation, for instance, credit rating agencies must fulfil certain obligations, such as:
 - avoiding conflicts of interest;
 - ensuring the quality of their ratings and rating methodologies; and
 - ensuring transparency;
- under the EU regulation, credit ratings agencies will be subject to a high level of supervision, including investigatory powers, centralised under European Securities & Markets Authority (ESMA);
- what might be appropriate in this respect is considered more in Section 6;
- there should be encouragement for a multiplicity of organisations to become MV assessment agencies: the greater the number of suitable organisations there is, independently performing MV assessments, in theory, the greater the reliability of the MV assessment process should be. In light of some of the criticism levelled at the credit ratings sector in the wake of the global financial crisis²⁴, it would be preferable to avoid a small number of large organisations dominating the market, for example, it has been reported that just three organisations, Moodys, S&P and Fitch, have about 95% of the global credit ratings market²⁵;
- remuneration of MV assessment agencies should be structured so as to avoid potential conflicts of interest or the perception of such and, if possible, so as to foster desired policy outcomes:
 - the ‘issuer pays’ model, (versus subscriber pays) which is the usual method of remuneration in credit ratings at the very least gives rise to a perception of possible conflicts of interest risk;
 - one possible alternative approach to remuneration for MV assessment agencies might be to have a small levy on transactions arising from NCM trading (as in the example of Share of Proceeds (SOP-Admin) in CDM) to create a pool from which MV assessment agencies would be remunerated. This and other possible approaches need to be explored;
- the type of organisation and the number will ultimately be up to the relevant supervisory body; however, it is suggested that:
 - organisations should be required to satisfy minimum criteria in order to be considered suitable to become an MV assessment agency, including for example:
 - technical and financial capacity;
 - access to resources;
 - governance;
 - knowledge-base;
 - management systems and personnel;
 - training; and
 - any other matters pertinent to the requirements mentioned at [39] and [40] above;
 - the methodologies for carrying out the MV assessment process should either be:
 - (i) specified by the supervisory body; or
 - (ii) accredited by the supervisory body and transparent, for example, by being made publicly available: the opacity of ratings methodologies was another criticism levelled at the credit ratings sector in the wake of the global financial crisis;²⁶
 - while suitable institutions for conducting MV assessments should be afforded regulatory recognition, this should not be allowed to become a hurdle for potential new entrants;
 - in considering the types of organisations that might be suitable institutions for conducting MV assessments, it is important to remember that, from the perspective of both their core business and their regulatory obligations, credit rating agencies are solely focused on rating their subjects’ creditworthiness, that is, the willingness

²⁴ World Bank Group, Financial and Private Sector Development Vice Presidency, ‘Credit Rating Agencies, No Easy Regulatory Solutions’, Crisis Response, Public Policy for the Private Sector, Note Number 8, October 2009, <http://siteresources.worldbank.org/EXTFINANCIALSECTOR/Resources/282884-1303327122200/Note8.pdf>, accessed 15 April 2015

²⁵ European Commission, Memo/ 13/571, 18 June 2013, New Rules on Credit Rating Agencies (CRAs) enter into force [http://europa.eu/rapid/press-release MEMO-13-571_en.htm](http://europa.eu/rapid/press-release_MEMO-13-571_en.htm), accessed 15 April 2015; note that this was in part due to the quasi-regulatory status they were afforded as “*nationally recognised statistical rating organisations*” per 1975 US SEC Regulations

²⁶ Note 25 supra

and capacity to meet commitments: to pay interest and repay capital. Hence, while there are useful principals to be drawn from the experience of credit rating agencies, *per se*, they may not be suitable institutions to conduct MV assessments.

DOE roles and functions comparable to MV assessment process

[46] The other types of organisations that have experience conducting similar types of assessments to those envisaged in the MV assessment process are Designated Operational Entities (DOEs), accredited under the Kyoto Protocol. DOEs will have already had a taste of the type of assessments described, albeit in the context of CDM projects, and Programmes of Activities (POAs).

[47] DOEs are accredited by the CDM Executive Board and designated by the COP/MOP²⁷ to undertake usually either validation, or verification and certification, of CDM projects and POAs. They are independent auditors that assess whether a potential project meets all the eligibility requirements of the CDM (validation) and whether the project has achieved greenhouse gas emission reductions (verification and certification). In one sense, the experience of DOEs is more pertinent, since it involves risk-based evaluations of processes designed to mitigate GHG emissions. However, in another sense it is more limited, since it might be characterised as a rule-based audit process of mitigation activities, based to some degree more on box ticking and to a lesser extent on the exercise of professional judgment.

[48] The roles and functions of DOEs include:

- Validating proposed CDM project activities;
- Verifying and certifying reductions in anthropogenic emissions by sources of greenhouse gases;
- Complying with applicable laws of the Parties hosting CDM project activities when carrying out functions;
- Demonstrating an absence of real or potential conflict of interest with the participants in the CDM project activities for which validation or verification and certification functions being carried out;
- Maintaining a publicly available list of all CDM project activities validated, verified and certified;
- Submitting an annual activity report to the Executive Board;
- Making information obtained from CDM project participants publicly available, as required by the Executive Board. Information marked as proprietary or confidential shall not be disclosed without the

written consent of the provider of the information, except as required by national law.

[49] It can be seen that the DOE roles and functions are quite closely prescribed. The CDM Executive Board is quite prescriptive in its approach to supervising performance by the DOEs of their roles and functions. For example, the annual activity report must include information on activities relating to the consideration of project activities as follows:

- List of project activities;
- Status of project activities;
- Regional distribution of project activities;
- Sectoral distribution of project activities;
- List of project activities declined, if any, including the reasons for doing so;
- List of the project activities undertaken in countries having less than 10 registered project activities;
- Number of project activities under validation or verification per qualified auditor;
- Average timeframes for the validation and verification of project activities (from the signing of contract to submission of the request to the CDM EB), divided by region;
- Average fees for the validation and verification of CDM project activities, divided by region.

[50] DOE functions are to independently audit the project methodologies, including baselines and to assess whether the project has achieved the intended mitigation. In this sense their roles are very much aligned with the types of activities that suitable institutions participating in the mitigation value assessment process would be expected to carry out, that is, in relation to the subject matter. However, as noted above, the actual activity performed being more a rule-based audit process of mitigation activities, would probably be less aligned than the activities carried out by, say, credit ratings analysts.

[51] The analysts employed by DOEs would clearly satisfy at least the first two requirements outlined above at [39], that firstly, they need to be qualified in assessing emission reduction programs; and secondly, they need to be qualified in evaluating mitigation effectiveness. On the other hand, analysts from credit ratings agencies would be more likely to satisfy the third requirement that they need to be qualified in evaluating jurisdictional circumstances and all that entails.

²⁷ Conference of Parties to the Convention serving as the meeting of Parties to the Protocol

Points to be drawn from a consideration of DOEs

[52] Guidance and regulatory supervision of the MV assessment process is considered in more detail in Section 6, however, to summarise the preceding points, it is noted in relation to DOEs under the Kyoto Protocol that:

- the subject matter of their activities is directly relevant as it relates to risk-based evaluations of processes designed to mitigate GHG emissions;
- consequently, DOE analysts need to be qualified in assessing emission reduction programs and in evaluating mitigation effectiveness;
- however, the process they carry out might be characterised more as a rule-based audit process of mitigation activities; and
- the CDM Executive Board exercises a tight rein on the scope of their activities.

[53] In spite of the current lower level of demand for certified emission reductions produced by CDM registered project activities and programmes of activities, there were still fifty-one entities accredited and provisionally designated to carry out various ranges of sectoral scopes by the Executive Board in the period October 2013 to

September 2014, as reported to the COP/MOP in December 2014.²⁸ This suggests there is a large potential pool of suitably qualified professionals available from this source. Whether this potential might be borne out, depends to a degree on the processes carried out by these entities and the quality of the training provided to their analysts.

Suitable institutions to participate in the mitigation value assessment process

[54] A conclusion that might be drawn from the foregoing is that the type of institution most suitable for participating in the mitigation value assessment process may be one that combines the skills, knowledge, experience and resources of a credit rating agency with that of an organisation that has been accredited as a DOE.

[55] It is suggested that suitable institutions should be independent, private sector organisations. They would need to be well resourced technically and financially, and should be subject to regulatory oversight. Encouragement should be provided for a reasonable number of organisations to participate in the MV assessment process and consideration should be given, in particular, to how they are remunerated to avoid the potential conflict of interest, inherent in 'issuer pays' arrangements.

²⁸ Annual report of the Executive Board of the clean development mechanism to the Conference of the Parties serving as the meeting of the Parties to the Kyoto

Protocol. Lima, Peru. December 2014.
<http://unfccc.int/resource/docs/2014/cmp10/eng/05.pdf> ,
 accessed 17 August 2015

6. Guidance and regulatory supervision of mitigation value assessments

[56] MV and the MV assessment process are integral to the NCM initiative. Given the need to avoid, and to be perceived to avoid, conflicts of interest in undertaking the MV assessment process, it is unlikely that state entities or even intergovernmental organisations could be involved in performing this role. This paper has proceeded on the basis that the MV assessment process will be carried out by independent, private sector, for-profit organisations, to the extent feasible, without connections to the government of (a) their domicile, or (b) their location of residence for tax purposes, or (c) their main operational location.

[57] On the other hand, it is likely that an intergovernmental organisation, or organisations, will have an important role to play in providing regulatory supervision of both the entities that carry out the MV assessments and of the process itself. In view of the importance of the MV assessment process and the proposition that it be conducted by the private sector, regulatory supervision of the MV assessment agencies and the MV assessment process is a critical part of the model. But what level of regulatory supervision will be required and why?

Financial regulation

[58] In considering these questions, it is noted as a broader point, that carbon assets are already regulated as financial instruments in some jurisdictions. This may not be the case in all jurisdictions that potentially may participate in NCM. Furthermore, where they do apply, the financial regulations may apply to some carbon assets, but not to others. For example, in the EU, Directive 2014/65/EU²⁹, defines ‘financial instrument’ to include emission allowances, consisting of any units recognised for compliance with requirements of Directive 2003/87/EC (Emissions Trading Scheme)³⁰. This means that EUAs and some, but not all, CERs are financial instruments. Other carbon assets that may come under NCM, do not fall within that definition. In time, these financial regulations may need to be modified to take account of carbon assets under NCM more uniformly. However, the basic point is that there already exist bodies of rules that will need to be taken into account in developing NCM and, once the NCM is functioning, observed by participants.

Regulation of CRAs

[59] Returning to regulatory supervision of the MV assessment process in particular, reference has been made to US and EU rules at [45] above in the context of credit ratings. These rules of themselves would not directly apply to MV assessment, since they deal specifically with credit rating agencies (‘CRAs’). Hence, irrespective of whether carbon assets in NCM are characterised as financial instruments and the NCM as a financial market, it will still be necessary to provide specifically for regulatory supervision of the MV assessment process and the institutions considered suitable to undertake that process.

[60] To illustrate an approach that might be taken for regulatory supervision of institutions undertaking MV assessments, it is useful to consider the CRA regulations more closely. For example, the EU Regulation on Credit Rating Agencies – Regulation (EC) 1060/2009³¹ includes provisions that:

- to perform ratings for regulatory purposes, a CRA must be registered and in order to be registered, must fulfil certain obligations (i) on the conduct of their business, (ii) intended to ensure the integrity and independence of the rating process and (iii) to enhance the quality of the ratings issued;
- the European Securities and Markets Authority (ESMA) is responsible for registering and directly supervising CRAs;
- CRAs must avoid conflicts of interest (e.g., to ensure an employed analyst does not rate an entity in which they have a financial interest); must ensure the quality of the ratings (e.g., carry out on-going monitoring of credit ratings); must ensure the quality of the methodologies (e.g., methodologies must be rigorous and systematic); and must have a high level of transparency (e.g., by publishing an annual transparency report);
- ESMA is endowed with comprehensive investigatory powers, including the power to demand documents or data; to summon persons to hearings; to conduct on-site inspections; to impose administrative sanctions, fines and penalties;

²⁹ Directive on Markets in Financial Instruments and amending Directives 2002/92/EC and 2011/61/EC (‘MiFID II’)

³⁰ Directive on Markets in Financial Instruments and amending Directives 2002/92/EC and 2011/61/EC (‘MiFID II’), Annex I, Section C, paragraph (xi)

³¹ As amended by Regulation 462/2013 and Directive 2013/14/EC

- places requirements on CRAs as to when ratings of sovereign debt are undertaken, how many unsolicited such ratings can be made per year, the timing of publication of outcomes, and for six-monthly (as opposed to annual) reviews;
- make CRAs accountable for their ratings, which are no longer considered 'mere opinions';
- require publication of all ratings on a European Rating Platform (established by ESMA) to improve comparability and visibility of all ratings;
- address conflicts of interest by imposing restrictions on shareholdings covering CRAs and rated entities and requiring rotations of CRAs at least every four years where the 'issuer pays' model applies;
- encourage issuers to use smaller CRAs with less market share to encourage broadening of the market.

[61] The CRAs still devise and apply their own ratings methodologies. However, process timing requirements mean issuers have more time to respond before they are made public, so at least there is time for factual errors to be rectified and publication is less distortive of markets. If CRAs intend to change materially existing or use new methodologies, models or key rating assumptions that may impact rating outcomes, they must first publish the intended changes and invite comment for a fixed period, together with detailed explanation of the reasons and implications.

DOEs and the CDM Executive Board

[62] The other specific example considered in relation to suitable institutions for undertaking the MV assessment process was that of DOEs accredited under the Kyoto Protocol. These entities are accredited ('provisionally designated') by the CDM Executive Board upon a recommendation by the CDM Accreditation Panel, which is advised by a specially constituted CDM Accreditation Team.³² They are then designated by the COP/MOP and are required to submit annual activity reports to the CDM Executive Board. Annual reports must satisfy CDM Executive Board guidance to ensure consistency and completeness of reporting with respect to the key CDM activities of a DOE.

[63] DOEs are accountable to the COP/MOP through the CDM Executive Board and are required to comply with the decisions and instructions of the Board, which have been many and frequent. Problems have arisen due to the fact that DOEs are under contractual arrangements with client project developers, while at the same time being obliged

to satisfy CDM Executive Board requirements. DOEs are fully responsible to the CDM Executive Board for the quality of their work, and therefore cannot include disclaimers, but the same is not true for client relationships. Client contracts routinely disclaim liability other than in situations of gross negligence and even then, often limit commercial liability. This is understandable, given that DOEs do not want to carry the risk of liability to the client stemming from a third party intervention, namely that of the CDM Executive Board. The inevitable consequence is that clients suffer the consequences, such as delays, due to DOEs not meeting the CDM Executive Board's prescriptive requirements, a situation exacerbated by the market for DOE services being a seller's market.

[64] The roles and functions of the CDM Executive Board, include:

- making recommendations to the COP/MOP on further modalities and procedures for the CDM;
- approving new methodologies relating to, inter alia, baselines, monitoring plans and project boundaries;
- being responsible for the accreditation of operational entities, in accordance with accreditation standards, and making recommendations to the COP/MOP for the designation of operational entities. This responsibility includes:
 - decisions on re-accreditation, suspension and withdrawal of accreditation;
 - operationalization of accreditation procedures and standards;
 - review the accreditation standards;
- making publicly available relevant information, submitted to it for this purpose, on proposed CDM project activities in need of funding and on investors seeking opportunities, in order to assist in arranging funding of CDM project activities, as necessary;
- making any technical reports commissioned available to the public and provide a period for public comments on draft methodologies and guidance before documents are finalized and any recommendations are submitted to the COP/MOP for their consideration;
- developing, maintaining and making publicly available a repository of approved rules, procedures, methodologies and standards;

³² Membership is open to both external experts and secretariat staff: see 'Procedure: Selection and performance evaluation of experts on the CDM

accreditation roster of experts', version 01.0, document CDM-EB79-A02-PROC, UNFCCC

- developing and maintaining the CDM registry;
- developing and maintaining a publicly available database of CDM project activities containing information on registered project design documents, comments received, verification reports, its decisions as well as information on all CERs issued; and
- addressing issues relating to observance of modalities and procedures for the CDM by project participants and/or operational entities, and report on them to the COP/MOP.

[65] In spite of this seemingly broad mandate, in a number of respects the COP/MOP, not the CDM Executive Board, is the final decision maker. Additionally, the level of transparency with regard to the performance of DOEs and actual issues arising from registration and issuance has been found to be generally low. A 2010 report commissioned by WWF,³³ found that meeting reports and case-specific recommendations information was kept confidential in the case of accreditation, and registration and issuance.

Regulatory conclusions

[66] While the illustrations outlined above evidence significant levels of regulatory supervision of the respective activities, they offer different approaches to how regulatory supervision might be applied to the MV assessment process. In both cases, the entities need to satisfy the requirements to become registered or accredited/designated. However, the CRAs devise and apply their own ratings methodologies, whereas DOEs must conform to the methodologies, modalities and procedures laid down for the CDM by the Executive Board. In the case of CRAs, there is a shift towards greater accountability for their decision-making. In the case of DOEs, the CDM Executive Board performs its role in relation to the DOEs, but largely leaves the DOE and its project developer client to sort out liability and risk issues as between themselves. In a similar vein, regulation of CRAs is moving towards greater transparency, whereas the evidence suggests regulation of DOEs has been treated as confidential, hence less transparent.

[67] Bearing these points in mind, and taking account of the fact that the process of MV assessment is closer to that performed by the CRAs in making credit ratings, but noting also that the process of credit rating has been around for over one-hundred years and so is developed, refined and, within boundaries, a settled process, whereas MV assessment is an entirely new concept, an approach

to the level of regulatory supervision appropriate might be along the following lines:

- institutions considered suitable to undertake MV assessments should be registered and maintain their registration with the supervisory body at all material times;
- to be eligible for registration, institutions would need to satisfy criteria, such as those outlined at [39] and [40] above;
- registered suitable institutions would also need to submit their proposed methodologies for undertaking MV assessments, which would need to be accredited by the supervisory body;
- it would be important for the supervisory body to exercise close oversight of the methodologies for MV assessments: referring again to the illustration of CRAs, one of the main points of criticism of credit ratings agencies' roles in the 2008 financial crisis, was that they created complex but unreliable models to calculate probability of default for mortgages as well as securitised mortgage-backed products;³⁴
- the supervisory body might publish guidelines on the factors and criteria on which it would accredit methodologies, then it would be up to the registered institutions to submit their proposed methodologies, criteria, factors to be taken into account in making MV assessments, to the supervisory body for accreditation. In determining these guidelines, the supervisory body might obtain useful guidance from expert bodies such as the International Standards Organisation (ISO);
- MV assessment methodologies would be publicly available, either on the supervisory body's website and/or the relevant institution's website;
- if a registered institution intended to change materially existing or use new methodologies, models or key assumptions that may impact MV assessment outcomes, they would be required first to publish the intended changes and invite comment for a fixed period, together with detailed explanation of the reasons and implications;
- registered institutions would be required to publish a schedule of the MV assessments (solicited and unsolicited) proposed to be undertaken over specified forthcoming (e.g. next six-months, annual) periods;

³³ Öko-Institut e.V., Berlin June 2010. '2010 rating of Designated Operational Entities (DOEs) accredited under the Clean Development Mechanism (CDM)', report for WWF.

³⁴ for example, in 2007 as US housing prices began to fall, Moody's downgraded 83% of the US\$869 billion in mortgaged-backed securities it had rated AAA in 2006

- all MV assessment outcomes would be published, along with reasons, key assumptions, etc, in accordance with the accredited methodology applied; and
- registered institutions would be accountable for the MV assessment outcomes they publish; and
- the supervisory body might be vested with investigatory and regulatory powers and functions similar to those vested in ESMA, under the EU Regulation on Credit Rating Agencies (as amended).

[68] There are many models for how the supervisory body might be constituted. For example, the CDM Executive Board is established by the Kyoto Protocol and various decisions of the UNFCCC COP have determined its role and functions. Its rules of procedure have been adopted by the COP and cover matters such as its composition; nominations and appointments; terms of service of members; qualifications and conduct; officers; meetings, voting rules and so on. On the other hand, it is noted that the supervisory body would be performing a role similar in many respects to that performed by ESMA in relation to CRAs, so ESMA might provide another pertinent model, as a financial market regulator.

[69] Whichever way the supervisory body is constituted, the question arises of to what higher authority the

supervisory body should be accountable? This question would arise also for any other regulatory bodies formed under NCM, such as the one that might be needed to supervise exchange rate determination, setting and adjustments. Bearing in mind the ultimate objective of mitigation, and the purpose of the NCM initiative, one answer would appear to be that oversight should be exercised by the UNFCCC COP, possibly by making the supervisory body a Constituted Body under a new protocol. But bearing in mind also that the NCM, in essence, will be a new global financial market, other possibilities need to be considered. While there may be no single body responsible for overseeing the entire global financial system, there are treaty-based bodies whose functions encompass global roles: for example, the Bank of International Settlements (BIS), the International Monetary Fund (IMF), International Organisation of Securities Commissions (IOSCO), while in Europe, there is the European Central Bank (ECB) and now ESMA. The World Trade Organisation (WTO) might also provide a useful comparative example for such a supervisory body. If the NCM initiative develops and carbon markets continue as instruments of policy for mitigating anthropogenic GHG emissions, it may be appropriate to consider the need for a treaty-based organisation to ensure both environmental and financial market regulatory coordination and governance going forward. This is an area for further research.

7. Relationship between mitigation value and compliance value, settlement platform; and ITUs and the Index

[70] This section, firstly, revisits in more detail the relationship between mitigation value and compliance value and, in so doing, considers the role and function of the settlement platform; and secondly, examines the concept of ITUs in more detail, and the feasibility and potential benefits of an index, as introduced in Section 4 above.

Relationship between mitigation value and compliance value

[71] Carbon assets trading in the ETS of the jurisdiction in which they were created, will most usually have CV=1. By giving the domestic units a CV of 1, the scheme administrator/regulator is implicitly saying, $MV=CV=1$.³⁵

[72] When units of a carbon asset from one jurisdiction are traded into another, comparison of the MVs of the two jurisdictions participating will translate into an exchange rate. There are a number of options for how the exchange rate might relate to the CV the scheme administrator/regulator in the buyer's jurisdiction might give to it:

- If the asset is transferred into the buyer's registry account in the buyer's jurisdiction:
- If the exchange rate is not binding, for instance, because participating jurisdictions have not agreed to be bound by it, then the scheme administrator/regulator in the buyer's jurisdiction may or may not take account of the relative MVs at the time it is surrendered for compliance purposes under that scheme;
- If, on the other hand the jurisdictions have given the exchange rate binding, or official status, then the scheme administrator/regulator in the buyer's jurisdiction may be bound to award a CV that reflects the exchange rate and hence relative MVs. However, this may be affected by any time delay between the transaction date and the date when the asset is surrendered for compliance;
- If the transaction mechanism provides for conversion of the traded asset into units under the buyer's jurisdiction at the time of the trade, then the units received will all be CV=1 (since they are now buyer's jurisdiction units) so the decision is taken out of the hands scheme administrator/regulator in the buyer's jurisdiction. The relative MVs of the two jurisdictions, through the exchange rate, will determine the number of those units received – hence determining the total CV of the carbon assets traded on the transaction date.

[73] The following table summarises these possibilities:

<i>Transaction mechanism</i>	<i>Exchange rate</i>	<i>Outcome</i>
Asset transferred to buyer's account	Not official for scheme administrators	CV determined by buyer's scheme administrator
Asset transferred to buyer's account	Official as between scheme administrators	MV informs exchange rate, buyer's scheme administrator takes into account in setting CV – but note, also may be affected by time delay between transaction and surrender
Asset converted into buyer's units at transaction	Exchange rate applied in transaction to determine number of buyer's units credited	MV informs exchange rate, which determines number. CV=1, but number of units credited = total CV

[74] It can be seen that a critical link between the MV and the CV is the exchange rate, which is derived from the MV

assessment process outcomes for the participating jurisdictions. How the MVs translate into the exchange

³⁵ per Marcu, 'NCM and the Post-2020 Global Climate Change Regime': see Annexure "A"

rate, by whom the process is carried out and the supervisory regulation exercised over that process, and the nature of the exchange rate, itself, once it has been derived, for instance, how dynamic it is, are all fundamental issues, considered by another paper commissioned under the NCM initiative.³⁶

[75] However, in the third example above, the exchange rate determines the number of units the traded carbon assets are converted into and credited to the buyer. This may affect the total number of units in the overall scheme, by either increasing or decreasing that number, depending on the prevailing direction of trade. An increase in units would correspond to more rights to emit, which would impact the environmental integrity of the scheme. Another way to look at this is to ask whether the application of an 'exchange rate' to carbon assets based on MV, should apply to the environmental integrity of the asset (its CV), or its price (its FV), or both.³⁷

[76] While this risk to the environmental integrity of the scheme might be addressed through design features applied to the exchange rate,³⁸ it could also be removed if CV=1 and the number of units credited are fixed. The exchange rate would then only affect the price. Such a transactional mechanism would be possible if all trading was through a single counterparty market maker. This alternative possibility is explored further in the context of the role and functions of the intermediary/settlement platform following.

Nature and role of the intermediary – the settlement platform

[77] Whatever the transaction structure, there will need to be a way to effect the physical and financial settlement of transactions. This will be the case irrespective of whether the transactions are OTC or exchanged traded. Hence, for the purpose of the transaction scenario set out in Section 4 involving the Index (scenario (iii) in Annexure "D"), it was assumed that there would be an intermediary – the settlement platform (referred to in that example as the "International Settlement Platform") where the conversion of units into and out of Index Units would take place.³⁹

[78] The settlement platform would probably also provide central counterparty clearing, since settlement and clearing are frequently handled together. For clearing, there would need to be clearinghouse member firms that would act for counterparties to transactions. Under this structure, just as with the exchange traded segment of the FX market, there would be daily marking to market and settlement, and margin calls, thus frequent payments to and from brokers and clearers, reducing counterparty default risk as well as the risk of fraud.

[79] For such an arrangement to be viable, however, it would need to be supported by an adequate volume of trading. If all transactions needed to take place via a single centralised settlement platform, this would be more likely.⁴⁰ It is probable also that, with such an arrangement, the risk of double counting (as well as fraud) could be more easily controlled.

[80] The settlement platform would need to be linked to the scheme registries of the participating jurisdictions. As such, it would make sense for the settlement platform to either incorporate or be linked also to a central registry tracking the movement of carbon assets between jurisdictions across the NCM.⁴¹ This would provide a means to ensure double counting was avoided.⁴² A central registry could also facilitate an audit mechanism for crosschecking the individual scheme registry holdings.

[81] Apart from a settlement platform, central clearing counterparty and registry, the other types of institutional entity that may be involved in the transaction is the asset reserve (ICAR). The settlement platform/central clearing and registry functions could be fulfilled without needing also to include the ICAR function. It is beyond the scope of this paper to look at the purpose and role of the ICAR.⁴³ However, it is understood the ICAR role is to support administrators of the schemes participating in NCM to maintain domestic prices in the target ranges envisaged by the policies of their respective jurisdictions. If so, this would seem to be more policy related and fundamentally different to the transactional management nature of the settlement platform/central clearing/registry functions.

³⁶ 'Networked Carbon Markets – Concept Development – Using Mitigation Value to Guide Design of Trading Rules', by Jennifer Austin

³⁷ see also earlier discussion at [32]-[33]

³⁸ see Austin, note 36 supra

³⁹ Note: the nature and role of the intermediary/settlement platform are not strictly part of the terms of reference for this paper.

⁴⁰ this is envisaged under the NCM proposals – the International Settlement Platform

⁴¹ the International Transaction Log (ITL) under the Kyoto Protocol and the European Union Transaction Log (EUTL) under the EUETS provide models for centralised checking of transactions and holdings. For example, the EUTL

automatically checks, records, and authorizes all transactions that take place between accounts in the Union registry. This verification ensures that any transfer of allowances from one account to another is consistent with EUETS rules. The Union registry centralised the national registries of the 31 participating states in 2009.

⁴² Although, if the transaction mechanism was index-based with IUs, conversion into and out of IUs should ensure that this is the case.

⁴³ See, for example, 'Design Options for an International Carbon Asset Reserve' prepared by Juerg Fuessler and Martin Herren, *INFRAS* Consulting Group, July 2015, Networked Carbon Markets, A Knowledge Series, World Bank Group

Sole market maker function

[82] However, as an alternative way to remove the risk to the environmental integrity of the scheme, where traded units convert to a greater number of domestic units, hence more emissions, it is worth considering the possibility that the intermediary/settlement platform, or ICAR, or the two in conjunction, might also act as sole market maker, quoting both bids and offers and standing ready to make a two-sided market for compliance entities in any participating jurisdictions who wish to trade carbon units, for whatever reason, externally to their domestic situation. The idea would be that both the offer/bid prices and the buy/sell spread would reflect the exchange rate in the case of any jurisdiction.

[83] If the market structure were such that a single market maker was counterparty to all transactions, where an entity sought to buy units from a seller outside their jurisdiction, or wished to sell excess units to a buyer outside their jurisdiction, application of the exchange rate would affect only the price. Hence the exchange rate would not determine the number of carbon asset units transacted. The scheme administrator or each participating jurisdiction would still be free to set CV=1, since it would only ever deal with its own domestic units.

[84] Whatever entity were to perform such a role as the sole market maker, whether the intermediary/settlement platform, or ICAR, the two acting in conjunction, or some other entity, it would need to be capitalized with units from the participating jurisdictions. This may recommend ICAR for the role, since ICAR may probably need to be active in the markets that make up the NCM anyway.

[85] A drawback of this proposal is that jurisdictions would not actually be trading with each other, but just with the market maker, so it would be a more limited form of networking. However, if there is a limited trading environment when NCM begins, the introduction of a single market maker might be useful for generating liquidity. Such an arrangement may prove helpful in fostering initial trading and promote familiarity with concepts such as MV, MV assessment and the exchange rates based on it.

[86] Irrespective of the transaction mechanism which is applied in NCM, there will be scope for MV assessments and the exchange rate to be based around a 'transaction currency' and an index. Consideration is now given to the feasibility and potential benefits of doing so.

International Transaction Unit

[87] Mention has been made above at [28] and [29] of the benefit to be derived by introducing a transaction 'vehicle

currency', in the form of International Transaction Units (ITUs). As noted, the introduction of the ITU, would be analogous to the use of the US\$ as a "vehicle" currency in FX transactions. However, the fact that the US\$ is the most widely transacted currency reflects not only its use as a vehicle currency in FX transactions, but also its roles⁴⁴ as:

- investment currency in many capital markets;
- reserve currency held by many central banks;
- transaction currency in many international commodity markets;
- invoice currency in many contracts; and
- intervention currency used by monetary authorities.

It is unlikely the ITU would perform similar roles (except possibly as an asset for investment in its own right). In fact, it is conceivable that ITUs might only exist in pending accounts on the International Settlement Platform, for the purpose of facilitating NCM transactions. Entities wishing to sell carbon assets would convert those assets into ITUs (at the applicable exchange rate) and entities wishing to buy carbon assets would need to hold ITUs in their pending account for conversion into the desired carbon asset denomination (at the applicable exchange rate).

[88] Irrespective of whether the ITU were to be notional or a tangible asset for investment, its purpose, how its value is derived, how and by whom it is created and issued and pursuant to what authority, are characteristics that need to be considered and defined. Much further work will be required to elaborate and define this instrument.

[89] For example, the ITU might be defined as a transaction unit for the purposes of facilitating trading between networked carbon markets, its value being a function of the Index: this might be a composite average of the MV assessment values of all jurisdictions that have opted into NCM trading, weighted according to their respective emissions budgets, which might be derived from the global level of emissions necessary for keeping average global temperature increase to less than 2° above pre-industrial levels. Governments might agree by treaty that ITUs be created and issued by an overriding supervisory body established to ensure proper governance in globally networked carbon markets.

[90] Continuing this example, the environmental value of an ITU might be set at one metric tonne CO₂-equivalent gas, calculated using GWP as defined by decision of 2 of the third meeting of the COP/MOP (Decision 2/CP.3) or as subsequently revised in accordance with Article 5 of the KP.⁴⁵ Other considerations that would need to be

⁴⁴ Query the extent to which these other roles for the US\$ underpin its role as a vehicle currency in FX trading?

⁴⁵ Cf. definition of a CER – Decision 17/CP.7 (Marrakesh Accords)

addressed include definition of its delivery mechanism, how further definition or limitation might be made, how legal restrictions on the use of an ITU might be made and communicated, what facility an ITU would have as an investment vehicle and how a price could be placed on it.

Feasibility of an Index

[91] As noted earlier, an index is a statistical composite that measures changes in the economy or a financial market, often expressed as changes from a base year or a preceding month. Each index has its own method of calculation. Components may be weighted according to certain characteristics, as in for example, a shares index weighted for market capitalisation.

[92] The first question, then, might be what will the Index be a composite of? If it is an MV Index, then it could be formed by a basket of MV assessment outcomes for all jurisdictions involved in NCM, as in the transaction scenario in Annexure “D”. Another possibility is a composite formed by a basket of MV assessment outcomes for all sovereign (national) jurisdictions (irrespective of whether they engage in NCM). There are many other possible variations on this theme. In any case, however, the MV assessment outcomes for individual jurisdictions would be compared against the composite. Which of these methodologies would be more appropriate for the purposes of NCM and why that would be the case, are questions to be considered.

[93] Components of the composite may be weighted, and there is any number of possible different weightings that might be applied to a basket of MV assessment outcomes including, for example:

- weighting according to annual emissions;
- weighting by some measure of economic size, such as GDP;
- weighting according to population size.

[94] If the Index is a composite of MV assessment outcomes for all jurisdictions involved in NCM only, then the weighting might take account of factors such as the % of the jurisdiction’s economy covered by the trading scheme, or the % of the jurisdiction’s overall emissions covered by the trading scheme. On the other hand, from the perspective of traders, the most important weighting of the Index might be according to FV. Again, which of these methodologies would be more appropriate for the purposes of NCM and why that would be the case, are questions that need further detailed consideration.

[95] While it would be possible to have the Index as a composite in these terms, the question is what purpose would it serve? An index of the MV assessment outcomes of all sovereign (national) jurisdictions (irrespective of whether they engage in NCM), whichever way it is weighted, might serve to provide an indicator tracking the progress of countries generally towards the UNFCCC objective. Comparing an individual jurisdiction’s performance against such an index would provide a valuable independent marker on how well or poorly that jurisdiction’s PPPs were addressing emissions, relative to the weighted average. This would be of benefit to governments, as well as interested third parties. But its application to NCM is not clear, as the comparison would not be like-with-like if some of the jurisdictions included in the composite were not trading.⁴⁶

[96] Another possibility is for the Index to be a composite of a limited number of NCM jurisdictions’ MV assessments, based on pre-determined criteria for inclusion in the basket. A model for such an index is the composition and valuation of the IMF’s Special Drawing Rights (SDR) basket. In the case of SDRs, the basket comprises the four currencies issued by member states that had the largest exports of goods and services over the preceding five year period, and have been determined by the IMF to be ‘freely usable’, that is, widely used to make payments in international transactions and widely traded on exchange markets. What the pre-determined criteria for inclusion in a limited NCM basket might be, to ensure validity of application of such an Index, requires careful consideration. The criteria for inclusion could, for example, be derived so as to ensure the basket provided a more stable yardstick, rather than one for which the basket composition changed regularly. Stability would foster greater confidence in the Index. However, it would also be important that the basket covered a substantial part of the overall market in carbon assets, for the Index to be relevant for traders⁴⁷.

[97] A further possibility would be for the Index to be based on a basket of the MV assessment outcomes of *all* jurisdictions engaged in NCM. Such an Index could serve as a proxy for how effective the NCM market is performing to bring about mitigation. Ultimately, the questions to be answered are what information is the Index communicating, and who wants it? Commercial exchanges offer index products to their clients after conducting thorough market research to ascertain what would be of most value to them. This would be a good approach to follow.

⁴⁶ Query whether this would be a technical problem with the Index?

⁴⁷ In November 2015, the IMF Executive Board decided that, effective October 1, 2016, the Chinese renminbi is

determined to be freely usable and will be included as a fifth currency, along with the U.S. dollar, euro, Japanese yen, and pound sterling, in the SDR basket.

Benefits of an Index

[98] Direct comparison between jurisdictions may be exactly what is better avoided, pointing to a clear benefit served by having the Index: no direct jurisdictional comparisons. As can be seen in transaction scenario (iii) in Annexure “D”, interposing the Index avoids direct comparison of MV assessment between jurisdictions. All jurisdictions’ assessments are considered only against the Index, the weighted average of all such assessments. Similarly there would not be an exchange rate directly between the carbon assets of two jurisdictions, as all carbon asset units are only ever exchanged for transaction vehicle units (in the case of transaction scenario (iii), ITUs, where exchange rates measure jurisdictions’ carbon assets against ITUs).

[99] Another clear purpose served by the Index is that, by introducing the ITUs, there is a transaction mechanism to provide for physical settlement not by the movement of carbon asset units from one jurisdiction to another, but by movement of the value – the mitigation value – that they embody. Hence each jurisdiction will only ever need to deal with its own carbon asset units.⁴⁸

[100] The other benefit of this mechanism is that investors and market makers might need only to hold ITUs in a pending account on the international settlement platform, rather than maintaining accounts in denominations of all participating jurisdictions in which they might wish to trade. This would significantly reduce transaction costs and administration, making participation in the market a more attractive option.⁴⁹

Other benefits?

[101] Can the use of the Index bring other benefits, such as greater liquidity, to the NCM? As a statistical composite, there is no capacity to invest in the Index itself. An investor or market maker that wished to trade speculatively might hold ITUs, just as they might hold units of the carbon assets under any of the individual schemes, or hold project generated credits if these are tradable under NCM. As proposed in scenario (iii) in Annexure “D”, the ITUs would only come into existence as a result of a jurisdiction’s carbon asset units, or project credits (if included), being converted into ITUs. In order to hold ITUs, the investor would need either to have purchased them as

ITUs, or to have converted units from one of the NCM participating trading schemes, or project credits, into ITUs. As envisaged, the ITUs would exist in pending accounts on the settlement platform and of themselves would not be able to be surrendered against the compliance obligations of any participating scheme, but might also be capable of being traded on other exchanges. Thus the ITUs might serve two purposes: firstly, as initially outlined in Section 4 above, as the ‘transaction currency’ – a simple pass through to facilitate transactions; and secondly, as an investment vehicle.

[102] The degree of liquidity in the NCM will depend on the number of buyers and sellers there are willing to trade across jurisdictions. This in turn, will be a function of the potential arbitrage opportunities from one participating jurisdiction to another. The ability of investors to hold ITUs would increase their ability to find those opportunities, not least because it would facilitate price disclosure across the entire market at a glance. However, it also raises the question of whether, in maintaining holdings of ITUs, the investors wouldn’t at the same time be draining supply, hence liquidity, from the market.

[103] This is a relevant consideration in a market based on a number of ETSs, since by definition, in an ETS there is a limited, finite number of carbon assets available, with that number, in theory, reducing over time. NCM addresses this by facilitating compliance entities from one ETS accessing carbon assets from another ETS. But as all participating schemes are based on the same premise, namely that a limited, finite number of carbon assets is available, and is reducing over time, this benefit is, to a degree, nugatory.⁵⁰

[104] The limited supply issue would, of course, be countered by project credits being available. However, not all participating jurisdictions may accept project credits under the terms of their scheme: introduction of project credits to NCM cannot be assumed as automatic. An index-based transaction mechanism might help overcome this difficulty, as the risk-assessed project credits would be converted to ITUs, which in turn would be converted at the applicable exchange rate to the carbon asset denomination of a buyer’s jurisdiction, eliminating the risk of non-acceptance of the project credits by the scheme

⁴⁸ Note that in the case of the sole market maker proposal, this would be implicit, so the Index would not add anything in this respect

⁴⁹ although with the sole market maker proposal, if the carbon assets were converted into and held as ITUs, their electronic certificates would need to have identifiers to show from which jurisdiction they originated; since they would just be converted back to the carbon assets of that same jurisdiction, query what benefit would be gained from holding them as ITUs

⁵⁰ This issue of satisfactory balancing of supply and demand to ensure that the NCM, as well as its constituent trading schemes, continues to provide a price signal in keeping with the overall UNFCCC policy objective is principally addressed by the NCM proposal for an International Carbon Asset Reserve (ICAR). While this is the subject of research by other parties for the World Bank, it is noted that ICAR may have a significant role through the Index by acquisition and disposal of ITUs

administrator.⁵¹ Participating jurisdictions would need to be in agreement over the methodology for inclusion of risk-assessed project credits, in the first place.

[105] An index can form the basis for an investment fund, as in the case of some exchange-traded funds (ETFs). However, whether investment funds based on the Index would add to liquidity in the NCM would depend on how actively those funds were traded, rather than the fact that there is an index on which they are based. ETFs themselves have a widely varying range of liquidity. The popularity and hence degree of trading in a fund would be more a function of how it is set up, its overall structure, rather than just the fact that it is based on an index.

[106] It is noted also that an investment fund based on an MV index will be holding carbon assets, but investors will be trading shares in the fund.⁵² The mechanism for how such a structure may generate liquidity in the NCM is yet to be explored, as are other possible structures and indices. Other products such as forward contracts based on the Index, or spreads between future prices of the Index and the carbon assets of various jurisdictions, could also generate liquidity and depth in the market. It is likely that commercial exchanges such as the LSE, EEX and ICE would develop derivative products along these lines.

8. Recommendations for Next Step

[107] As a general observation, the overall body of work for developing the NCM initiative might be considered to comprise seven modules/strands:

- development and refinement of the concept of 'mitigation value' and developing the process for mitigation value assessment;
- derivation of the 'exchange rate' between carbon assets, based on mitigation values;
- development of the transaction mechanism for NCM trading;
- development of the role and functions for the settlement platform;
- elaboration of a market design;
- development of the International Carbon Asset Reserve (ICAR); and
- identifying and fostering development of the market – participants, size, demand, modelling.

[108] It is understood that work under the NCM initiative has been progressing in relation to each of the strands listed above. Work to develop some of these modules will involve identifying and engaging important stakeholders at an early stage. It is noted also that some of these modules need to be developed sequentially, while others do not. For example, the last item listed above, the market, can be worked on independently of the other items, however, it will provide a critical plank for engagement of stakeholders in relation to some of the other strands. As such, it is recommended that, as an initial step, consideration be

given to the sequencing of these activities, especially in relation to the identification and timing of engagement with relevant stakeholders.

[109] There are a number of areas identified in this paper that invite specific, follow up work. For the purpose of making recommendations as to next steps, these might be grouped into the following five categories:

- (i) general development of mitigation value concept and process for assessment;
- (ii) forming the 'view' on level of ambition;
- (iii) translating mitigation values into exchange rates;
- (iv) the supervisory body for suitable institutions making mitigation values assessments; and
- (v) International Transaction Units and the Index.

General development of the Mitigation Value concept

[110] Firstly, a basic outline for the MV assessment process in a jurisdiction is:

- (a) assess the individual PPPs;
- (b) assess the jurisdiction's PPPs collectively;
- (c) evaluate overriding factors such as strength of supervising institution, political will of government, etc;
- (d) set the above in the context of the jurisdiction's circumstances – level of emissions, structure of

⁵¹ NB: the inclusion of project credits will have a bearing on how the index is devised: needs further consideration as introduces potentially invalid comparisons

⁵² Exact mechanism to be checked

economy, financial profile, demography, institutions, politics;

Assuming something along these lines is settled on for the framework for an MV assessment process, follow up work would be required on how such assessment process might be structured. Engagement with CRAs would assist this work.

[111] Secondly, there is the overlay of the 'level of ambition' and whether, in the jurisdiction's circumstances, that is sufficient in a global context ('level of expectation'). Further work would be necessary to consider how this might be linked, or relate to, the assessment made by undertaking the assessment process.

[112] Thirdly:

For jurisdictions that have an ETS, (as one of the jurisdiction's PPPs), there should be the same approach to the jurisdiction's MV assessment, as if it didn't have an ETS: in other words, all jurisdictions' MV assessments should be carried out the same way, whether or not they have an ETS as one of their PPPs (that is, all PPPs looked at equally),

OR

For all jurisdictions that have an ETS, there should be the same approach to the jurisdiction's MV assessment, but that this might differ from the MV assessment for jurisdictions that don't have an ETS, in that (as noted at Section 3, B above):

'If one of the PPPs, that a jurisdiction has in place, is a carbon trading mechanism generating carbon assets for trading within the scheme but which, by participating in NCM, might also be traded into schemes in other jurisdictions, then not only will that particular PPP be evaluated, but it will be evaluated in the context of the jurisdiction overall...'

In other words, when there is an ETS, the MV assessment process focuses on that PPP in the context of all the others (as opposed to just looking at them all equally).

More thorough consideration needs to be given to which of these two propositions is the more valid from a ratings/statistical perspective and why that is the case. Engagement with CRAs would facilitate this work.

[113] The MV assessment process would apply to national and sub-national jurisdictions that have an ETS, with the intention that trading could take place between national and sub-national jurisdictions, if desired. Follow up work is required to examine and resolve questions such as how the assessment process could provide for the need to be able to compare MV of national jurisdictions with the MV of sub-national jurisdictions, the criteria that might be

required to account for differences; how account could be taken of factors such as sub-national jurisdictions not having a level of ambition, or there not being a global expectation of ambition placed on them (whereas there would be for national jurisdictions) and whether this difference would invalidate comparisons between the two; and in making MV assessments of sub-national jurisdictions, how issues such as the application of the principles of subsidiarity and complementarity could, if necessary, be taken into account.

Forming the 'view' on level of ambition

[114] It is posited that a jurisdiction's 'level of ambition' might be compared against a 'view', formed by an independent, unbiased, expert group, as to what the level of ambition for that jurisdiction *should* be (taking account of its circumstances) in the context of achieving the ultimate objective of the UNFCCC. This gives rise to another area of follow up work in researching and forming proposals as to how such a group might be constituted and the boundaries set within which they form their 'view'.

Translating mitigation values into exchange rates

[115] How the MVs translate into the exchange rate, by whom the process is carried out and the supervisory regulation exercised over that process, and the nature of the exchange rate, itself, once it has been derived, for instance, how dynamic it is, are all fundamental issues. Work is being undertaken on the definition of exchange rates, and how they might relate to MV and CV. Follow up work may be required to expand upon this current work.

The supervisory body for suitable institutions making mitigation values assessments

[116] The nature of the role for the supervisory body, how it might be constituted, to what higher authority the supervisory body should be accountable and many other questions concerning this element of the NCM governance framework will require further follow up work.

International Transaction Units and the Index

[117] The possibility of introducing the Index and the roles it might perform invites a great deal of further investigation. For example, questions such as what will the Index be based on – a budget approach or a composite approach and, if the latter, a composite of? What weighting factors might be taken into account in devising a composite index for NCM? Whether in composing it, the weighted average might only be composed of similar entities e.g. MVs of trading jurisdictions, or could risk assessed project credits be included – must the comparison be like-with-like? If the Index were to be based on an emissions budget approach, who would determine jurisdictions' budgets and by what methodology? On the other hand, if the Index were to be a basket of just a limited number of NCM jurisdictions, based on pre-determined criteria (like SDRs), what would those pre-determined criteria be aimed at achieving? Whether investors holding ITUs would act as a drain on supply so as to cause problems with liquidity, rather than fostering greater liquidity? Whether the inclusion of risk-assessed project-based credits could address liquidity concerns? And whether and how basing the transaction mechanism on an index would increase market liquidity? Engagement with NCM partners, such as the EEX, London Stock Exchange and other exchanges, should help to address these and related questions.

9. Glossary of acronyms

BAU	Business as usual
CCC	Central counterparty clearing
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CO₂	Carbon dioxide
CO₂-eq	Carbon dioxide equivalent gas
COP	Conference of Parties to the UNFCCC
COP/MOP	Conference of Parties serving as the Meeting of Parties to the Kyoto Protocol
CRA	Credit Rating Agency
CV	Compliance value
DOE	Designated Operational Entity
EC	European Commission
EEX	European Energy Exchange
ESMA	European Securities and Markets Authority
ETS	Emission Trading Scheme
EU	European Union
EUETS	European Union Emissions Trading Scheme
FTSE	Financial Times Stock Exchange
FV	Financial value
FX	Foreign exchange
GHG	Greenhouse gas
GWP	Global warming potential
ICAR	International Carbon Asset Reserve
ICE	Intercontinental Exchange
IISD	International Institute for Sustainable Development
ITU	International Transaction Unit
IMF	International Monetary Fund

INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organisation
LSE	London Stock Exchange
MV	Mitigation value
NCM	Networked Carbon Markets
NGO	Non-governmental organisation
POA	Programme of Activities
PPP	Programs, policies and pledges
QELRC	Quantified emission limitation and reduction commitment
S&P	Standard & Poor's
SDR	Special Drawing Rights
SO₂	Sulphur dioxide
SOP	Share of proceeds
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USEPA	US Environmental Protection Agency
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
WTO	World Trade Organisation
WWF	World Wide Fund for Nature

ANNEXURE “A”

This Annexure sets out an extract of relevant sections of the discussion paper titled “NCM and the Post-2020 Global Climate Change Regime” by Andrei Marcu.

3. Basic Concepts

A number of concepts and definitions need to be examined, and well understood, as they will appear frequently in this paper and used to answer the questions identified in Section 2. It is especially important to understand what NCM is, and especially what it is not.

The concepts that will be reviewed include:

- Markets: Natural vs. Regulatory;
- Markets: Voluntary vs. Compliance;
- Markets: Domestic vs. International;
- Markets: Under international agreement vs. outside international agreement;
- Markets: Linked vs. Networked
- Value of Units: Financial, Mitigation, Compliance
- Networked Carbon Markets

3.1 Value of units

In GHG markets units can have a number of values: Financial Value (FV), Mitigation Value (MV) and Compliance Value (CV). The concept of Mitigation Value is fundamental to the discussions on NCM, as is the relationship between the Mitigation Value and Compliance Value.

Mitigation value: The Mitigation Value refers to the relative value of a unit versus a defined Standard Unit of reduction. What the concept of Mitigation Value is can be described in a number of ways, but it is also important to define what it does not refer to.

MV is a relative value that is helpful in defining the fungibility of units in heterogeneous carbon markets where it is difficult to compare the value of different units.

MV does not refer to the atmospheric impact of a unit of a ton of CO₂e reduced. It is used as a relative value to help define the value of units coming from different carbon pricing systems. One expression that has been sometimes in relation to MV is that “a ton is not a ton”. This has been interpreted as implying that a ton of GHG reduced in one place does not have the same environmental effect in terms of combating climate change. That is not the case, and indeed, can never be the case

The MV, as a relative value, can be interpreted in more than one way. One perspective is that it shows how much the effort to reduce a unit (e.g. a ton of CO₂e) in a jurisdiction is worth – relative to another jurisdiction. Alternatively, it could be expressed as how the effort to contribute to addressing climate change is rated in a jurisdiction, relative to a defined standard.

The MV of unit can also be described as the value stakeholders/society attaches to the effort to reduce a unit in terms of what **it thinks** that the jurisdiction **should do** to address climate change. In this perspective, the MV can be a function of a number of factors, which may include:

- The level of the effort that is promised and undertaken
- Characteristics of the economy – what is the abatement cost curve
- Characteristics of the program or activity undertaken to reduced GHG – that is the quality of the program and the certainty of delivery of the reduction.
- Resources available to dedicate to mitigation efforts.
- Capacity to undertake mitigation efforts

Another perspective can be a probabilistic one (or risk based), and refers to the probability that a unit of reduction in a jurisdiction (credit issued, or allowance to emit a ton of CO₂e) represents a ton of CO₂e. The MV value is therefore a 1 ton x MV= amount of CO₂e reduction that a unit represents. In this perspective the elements of risk that define the MV are discussed below.

Program level - Carbon Integrity risk

This risk relates to the extent to which a specific low-carbon program or activity (e.g., regulatory instrument, price instrument and quantity instrument) will achieve its intended outcome. The challenge is to establish an approach that can accommodate the wide range of new and heterogeneous low-carbon programs that are now emerging. Currently, systems like the Clean Development Mechanism provide only a binary ‘yes or no’ outcome on the validity and verification of emissions reductions. However, this limits the ability to differentiate among projects that have met minimum requirements, or to evaluate to what degree projects perform, vis-à-vis the threshold. As a result, there a wide range of low-carbon programs and activities whose overall benefits/risks are not captured by this approach. This is evident in certain sectors, geographies and areas of activity with the highest sustainable development potential, or those, which contribute most to transformational change.

Jurisdiction level - Policy/regulatory risk

Policy/regulatory risk relates to the extent to which a jurisdiction's collective low-carbon policies will achieve the intended outcomes. It involves technical considerations, such as the extent to which the set of policies designed to achieve the mitigation target within the existing policy context are likely to achieve the intended outcome. It also involves political considerations, such as the extent to which the government has the political will, track-record, and institutional strength to maintain or adjust policies to achieve appropriate mitigation targets.

Global level - Relative climate mitigation contribution

Assessing a jurisdiction's relative climate mitigation contribution relates to the extent to which its climate mitigation targets are perceived as a sufficient contribution to the global effort to limit global warming. The objective of this approach is to incentivize jurisdictions to increase their level of effort.

A Mitigation Value can be determined and assigned by a regulator, or by any stakeholder. Those that wish to assign a MV to a unit of GHG reduction can use many algorithms and factors.

It is important to note that both concepts outlined above represent a valid point of view in terms of relativity concepts, and are in some ways, a mirror image of each other. The former sees relativity in the effort that is put into reducing a ton of CO₂ in different jurisdictions. The latter sees relativity in what can be achieved with a unit of effort, or in a more classic way, what is the probability that a unit reduction in a jurisdiction represents 1 ton of CO₂e.

What these two concepts also share is a degree of subjectivity in assigning value, whether it is to the relative effort, or the probability of delivery. The body of knowledge and experience developed in assigning probability of outcome is much better understood and consequently this paper will take the definition of Mitigation Value as being the probability of a unit of reduction from a jurisdiction represent 1 ton of CO₂e.

For illustration purposes we will provide an example. When the KP was agreed, AAUs were assigned by the regulator (the COP) at a MV=1 (that is representing the probability of representing a reduction, in terms of probabilities defined above). However, the as circumstances changed, and “hot air” emerged as an issue, the MV of an AAU from the former Eastern Block was seen as less than 1, and less than the MV of a Japanese or NZ AAU.

This is a relative and judgmental value, but there was a clear differentiation that emerged. AAUs from one jurisdiction were seen as representing a high probability of

1 ton of reduction, while the other one, rightfully or wrongfully, were seen as less probable as representing 1 ton of reduction. This was reflective of the desire of those purchasing an AAU that it represent a 1 ton actual effort to reduce, not an incidental reduction.

The MV of CERs provides another example. Gold Standard CERs and “regular CERs”, in spite of having gone through the same CDM regulatory cycle, receive a higher MV from stakeholders. The added Gold Standard filter re-assures those willing to purchase CERs or reductions that it has a high probability to actually represent a ton CO₂e reduced.

Compliance value: this is the value that the regulator decides to assign to a unit used for compliance purposes in a jurisdiction. A unit could have multiple CVs:

- Domestic, in the jurisdiction where it was issued
- International
- Domestic, in the jurisdiction where it is imported, and used for compliance.

As opposed to the Mitigation Value of a unit, where any stakeholder can assign a MV, in a compliance regime it is only the regulator that can decide the compliance value in a given jurisdiction. Alternatively, the regulator may decide, voluntarily, that it delegates that decision to another body.

For illustration purposes, CERs resulting from HFC projects have different CVs. Whereby a CER is worth a tone for UNFCCC compliance, it is valued at 0 (zero) for compliance under the EU ETS. It is therefore possible that the issuing regulator and the regulator that controls the compliance process, if not the same, may assign different values to the same unit.

Relationship between MV and CV

An important element in creating fungibility across heterogeneous markets is the relationship between MV and CV. That relationship is not well understood, and yet it can be used to explain many of the symptoms emerging in GHG markets, and which need to be addressed.

As discussed above, the regulator, or any stakeholder can set a MV. It is an important value as it provides the credibility of the GHG market, which is purely regulatory in nature, and therefore needs a license to operate.

The tendency of the regulator is to set (assume) a $CV=MV=1$. As long as this equation holds true, the GHG market will maintain credibility, and will be allowed to function.

Once the set CV is different from the generally accepted MV, then the market loses credibility, and is under

pressure to introduce measures to address the situation. A few examples can illustrate this type of situation.

When KP was signed, the COP, as a regulator, saw AAUs as having as $MV=CV=1$. Stakeholders initially accepted this MV. However, as soon as significant amounts of “hot air” starting to emerge in Russia, Ukraine, etc. perception of AAU having a MV less than 1 became prevalent. However, the CV of the AAUs was maintained at 1 for KP compliance, which led to a loss of credibility of AAUs (the ones available on the market were from former Eastern Block countries) as a trading for compliance unit, while maintaining its accounting function.

This situation eventually led to pressure to “do something” about surplus AAUs. That pressure materialized in Doha, when provisions were introduced to eliminate the surplus AAU in the SCP of the KP.

The EU ETS finds itself in a situation that is not dissimilar. There is currently a huge surplus of EUAs primarily due to the economic recession (could be seen as EU ETS “hot air”). This has led the MV of the EUA to be seen as less than it assigned CV, resulting in efforts to address the situation in an ad-hoc manner through back loading, and through the MSR, on a more permanent and predictable basis.

One aspect that needs to be highlighted is the fact that the MV and CV of units, can be **binary or risk adjusted**. For

illustration purposes, currently a CDM project is deemed to be additional (and meet the rest of the regulatory cycle). In the case that project is deemed additional a CER is issued. If not there is no issuance.

The reality is that as a counterfactual argument, a project can never be said with 100% certainty to be additional or not. As such, an alternative approach would be to assign it a **risk-adjusted** value (between 0% and 100%). This would be an approach more in line with the realities of the how credits are created and the MV of a unit of reduction.

Financial value. This is the value that the market place assigns to a compliance unit, and will be dependent on a number of issues, including demand/supply balance, market liquidity of the product, etc. However, the FV is likely to be dependent on the MV as well as the perceived relationship between the Mitigation Value and the Compliance Value. The FV is a function of the MV in two ways. Firstly, if the $CV=MV$ then the market will pay accordingly, 1 or less than 1. Alternatively, if there is a discrepancy between the determined MV, and assigned CV, this leads to the expectation of a regulatory intervention, with implications for its FV.

While market actors set the FV in the marketplace, it is by no means a rare occurrence to have legislation of regulation or legislation interfere in setting a FV.

ANNEXURE “B”

This Annexure sets out the findings of the earlier discussion paper titled “Designing a Model for Networked Carbon Markets”, which draw on the examination of three comparable financial markets, namely the bond/debt market; the foreign exchange market; and physical commodities markets.

Section 4: NCM model, as a focus for further discussion

[55] To summarise points/issues elicited from the foregoing, for the purpose of proposing elements of a model:

- Trading should be on an exchange, as opposed to OTC, through a central clearing counterparty model;
- Rating:
 - MV rating will be of the jurisdiction overall;
 - however, at the beginning, there will also need to be an evaluation made of the carbon asset and trading scheme⁵³ to assess whether electronic trading architecture can be applied to it – that is, whether the carbon assets under different schemes can be described or expressed in terms of trading attributes in such an architecture. As this involves costs, a preliminary question is whether it can be demonstrated empirically that price dislocations exist in the market as it stands, that warrant development of the architecture. In other words, is there a demand for NCM that will justify the cost of this work?
 - MV rating is expressed as an opinion – what level of confidence will need to be attached to the opinion to make it acceptable to the market?
 - MV rating is relative – as between schemes this is acceptable, but query need also to be against an empirical standard – and, if so, what is that standard?
 - MV rating should be capable of applying at any jurisdictional level, that is, national, provincial, local; it should be possible to have an MV rating of a jurisdiction irrespective of whether it engages in NCM trading
- MV raters:
 - should be subject to regulatory supervision;
 - rating methodologies should be accredited by the supervisory body and transparent;
- there should be encouragement for multiplicity of MV raters;
- ‘issuer pays’ problems should be avoided – payment for MV ratings should be structured to foster desired policy outcomes, rather than offering excessive arbitrage opportunities;
- the NCM model should be flexible enough to allow for policy adjustment, in other words, to allow for the management of the supply of carbon assets in the market to ensure policy goals, just as is the case with monetary policy. In this respect, the proposed International Carbon Asset Reserve is relevant, but how should it intervene in the market? Under what conditions?
- In terms of the trading mechanism, is it to be an exchange mechanism (i.e., based on an exchange of carbon assets between the schemes) or a price mechanism?
 - under an exchange mechanism, since carbon assets move in both directions, the asset holdings of each scheme should be the same immediately after the transaction as before. Query the effect on the MV ratings of the jurisdictions engaged in such exchange? Also query what the effect is when the MV ratings of those jurisdictions fluctuate up or down subsequently: does that affect the rate at which those assets may be traded in the future?
 - under the price mechanism, the movement of carbon assets is in one direction only. Hence, immediately after the transaction, the asset holding of one scheme will be less, and the holding of the other scheme more, than before the transaction. Will this be material to the MV rating of those jurisdictions?
 - there is also the possibility of the exchange mechanism being via a ‘vehicle’ carbon asset – would this be useful?
- MV rating should be based on a broad range of factors, being broader than the concept of “creditworthiness”, more akin to FX rate setting, and equally dynamic. As market confidence/sentiment derives from the MV rating, this process should be able to withstand rigorous scrutiny;
- Pegging of MV ratings – would this be possible? Desirable? What purpose would it serve?
- Market participants should include not only entities under the trading schemes, but also market makers

⁵³ Some of the issues that might arise in this context include banking and borrowing; grandfathering; the length of time a carbon asset can be held before it must be

surrendered under one scheme or another (annual?); whether carbon assets based on allowances should be fully fungible with carbon assets based on project credits.

and other investors (the application of KYC, anti-fraud and AML protocols being implicit);

- Trading contract wording should be standardised (e.g. ISDA);
- If it transpires that the carbon assets under different schemes cannot be described or expressed in terms of trading attributes in an electronic trading architecture, such as FpML or FIX, it may be possible to define standardised grades of asset which can.

Proposal for a model:

[56] Elements of the proposed model might include:

- the MV rating and an empirical reference standard;
- the MV raters;
- Regulatory supervision;
- carbon asset characterization;
- the Trading mechanism;
- infrastructure; and
- institutions.

1. The MV rating and an empirical reference standard:

[57] The MV rating lies at the heart of the NCM idea. The MV rating is a rating of the jurisdiction within which the carbon trading scheme is located. The jurisdiction issuing the carbon asset is evaluated as a whole, in terms of the mitigation value of the P&Ms – including the trading scheme which generates the carbon assets – it has in place to mitigate emissions from within its boundaries. Factors taken into account might include the profile of its economy, levels of production, levels of emissions, level of ambition in setting targets to mitigate those emissions and so on. A broad range of factors.

[58] The task of devising frameworks and methodologies for assessing MV is beyond the scope of this paper. For the purpose of this paper, it is assumed simply that there will be an MV rating. In terms of proposing a model for NCM, however, some further thoughts about the nature of MV ratings are as follows:

[Author note: these early ‘thoughts’ should be distinguished from the discussion of the carbon assets having ‘Compliance Value’ and ‘Financial Value’ cf AM’s paper]

- (i) the MV rating is of the jurisdiction as a whole; by this it is meant, the jurisdiction in which the trading scheme operates – hence, if the scheme operates at a provincial level, then the MV rating is of the provincial jurisdiction;
- (ii) the MV rating will translate into the rate of exchange, or the price, or the ratio, at which a carbon asset generated by the trading scheme in that jurisdiction, will be exchanged or purchased;

(iii) it will be relative to the MV ratings of other jurisdictions;

(iv) the MV rating, or exchange rate, may be relative as between jurisdictions and their respective carbon assets, however, ultimately there needs to be an empirical standard against which they would be measured to impart sufficient confidence to the market and regulators. The ‘value’ in carbon assets comes from the degree of confidence there is that the reductions are being made, that the scheme is enforced so that the cap on a participant’s permitted emissions is not exceeded, that emissions permitted under the scheme will gradually be reduced and that the scheme will continue to be operated, managed and policed appropriately throughout its anticipated lifetime;

(v) for illustration, two suggestions as a way to determine an empirical reference standard (the “Standard”) against which MV ratings, and hence the value of carbon assets, might be judged are:

firstly:

- based on international consensus to limit temperature increase to 2° C, which in turn translates into a specified level of global emissions per year (annual global emission cap);
- the annual global emission cap is allocated on a per capita basis to give annual nation state emission caps (the per capita approach accords with various UN principles on equality and objections can be offset by dropping the historical emissions argument from the debate);
- the ‘value’ is self-evident: scientists say that the 2° C cap is the level necessary to avoid serious climate disruption;

OR alternatively,

- annual nation state emission caps are based on a country’s INDC (this might risk being considered as being too imprecise/susceptible to manipulation, and so as having less ‘value’, by the financial markets, on the basis of the proposition that the ‘value’ of the asset is what ultimately drives market sentiment – confidence that what is being purchased has a value that will be honoured);
- (vi) if the Standard were to be based on either of the two alternative approaches outlined above, then clearly, each nation state could have an MV rating. If the jurisdiction that housed the trading scheme were sub-national – provincial or local – then the MV rating methodology would need to be able to provide a rating at that sub-national level as a subset of the national MV rating. This would be analogous to the way in which credit ratings can be made at sovereign, provincial, or municipal levels of government. The MV rating of the sub-national jurisdiction would contribute to/be considered in reaching the MV rating of the national jurisdiction overall [or probably vice versa];
 - (vii) being the result of a large suite of variables, it is envisaged that the MV rating will be dynamic in

nature, more akin to the daily rate settings of currencies for FX, in its fluctuations, than to the possibly longer timeframe settings of credit ratings;

- (viii) an MV rating could be ascribed to a jurisdiction, at any time, even without the jurisdiction opting into NCM. While the MV rating translates to an exchange rate, or ratio, of a carbon asset and be dynamic and subject to [daily/regular] fluctuations, in practice it will only be specifically relevant [in terms of its compliance value] at the time the carbon asset is surrendered or cancelled for compliance purposes, [or possibly also when it expires due to effluxion of time in accordance with the rules of the scheme by which it was created].

2. The MV raters

[59] There are a number of types of organizations that might serve as possible models for the MV raters: Designated Operational Entities (DOEs) under the Kyoto Protocol; credit rating agencies; global consulting firms [such as PwC or KPMG??]; environmental economics consultancies [??].

[60] The nature of the activity suggests that a cross between a DOE and a credit rating agency might produce an entity with the right mix of skills, resources and expertise.

[61] The MV raters should be independent, private sector organizations, subject to regulatory supervision. The actual entities deemed suitable to provide MV ratings will be a matter for the supervisory body. This will be an important function, in view of the importance of the role performed by these entities, although it will be important not to elevate them to the special quasi-regulatory status which has been afforded credit rating agencies, leading to some of the problems identified in the fall out from the global financial crisis. One way to address this issue would be to encourage a significant number of organizations to seek recognition as an MV rater. Greater numbers would operate against a small number having dominance in the market as well as offering other benefits, such as better, more diverse scrutiny and evaluation of jurisdictions' mitigation efforts, the trading schemes and carbon assets.

[62] How many entities are deemed suitable, in the end, will be up to the supervisory body (see paragraphs [65] and [66] following). The entities seeking to be recognized as MV raters should satisfy minimum criteria, for example, in terms of technical and financial capacity; in terms of access to resources, governance, knowledge base, systems and personnel, training, etc. The methodologies applied by the MV raters should be accredited by the supervisory body and should be transparent – for instance, by being publicly available (at least to some degree which also takes in account commercial confidentiality issues to the extent relevant).

[63] How the MV raters are remunerated for providing the MV ratings should be structured to foster the desired policy outcomes, rather than offering excessive arbitrage opportunities for parties. One possibility might be for payment setting to be based on a small levy on the transactions arising from NCM trading. This idea of a transaction levy has already been applied in the CDM in

relation to the Share of Proceeds levies for administrative expenses and adaptation.

[64] [For example, in the case of NCM, any number of MV raters could quote a particular rate (e.g. for Korean ETS-v-EUETS). The pool of funds generated by transactions Korean ETS/EUETS would then be shared between them, except for outliers e.g. those MV raters whose quoted rates differ by more than a specified percentage from the [mean/mode/median?] of quotes. This could encourage rate setting towards a norm, avoiding more extreme assessments skewing the MV rating, and generate greater confidence in the rate applied. In cases where an MV rating is made for a jurisdiction, but it is not engaging in NCM trading, there could be an alternative mechanism, for example, a fixed amount payment, from the pool.] *[needs more consideration]*

3. Regulatory Supervision

[65] Oversight of the MV raters might be exercised by the UNFCCC/COP through [a constituted body under a new protocol, possibly structured along similar lines to the CDM Executive Board]. As noted above, they would be recognized as MV raters if they satisfy minimum criteria, for example, in terms of technical and financial capacity; in terms of access to resources, knowledge base, systems and personnel, training, etc. The supervisory body might also specify methodologies, criteria, etc. to be applied, factors to be considered in carrying out the ratings. Alternatively, the MV raters might submit what they proposed as their methodologies, criteria to be applied, factors to be taken into account, to the supervisory body for certification, the supervisory body having published guidelines on what criteria it would apply in making that decision.

[66] The methodologies should be transparent, for example, by being made publicly available (at least to some degree which also takes in account commercial confidentiality issues to the extent relevant). As noted earlier, the EU Regulation on Credit Rating Agencies might serve as a model.

4. Carbon asset characterization

[67] How should carbon assets be characterised for the purposes of NCM? In one sense, they are more like a currency: the value derives from the integrity of the scheme that stands behind them. In another sense, they are more like debt securities or physical commodities: ultimately, the contract they represent needs to be honoured – there needs to be a mitigation of carbon emissions, tonnes of CO₂-eq not emitted or sequestered from the atmosphere – they need to be surrendered or cancelled against the compliance obligation of a regulated entity.

[68] Carbon assets cannot be characterized as falling neatly into one or another financial market model. They have characteristics of all three considered. More important, perhaps, is whether the electronic trading architecture can be applied to them: whether the carbon assets under different schemes can be described or expressed in terms of trading attributes in such an architecture. This will determine the extent to which they are fungible.

5. Trading mechanism

[69] How will trading take place? Is the trading mechanism an exchange mechanism (i.e., based on an exchange of carbon assets between the schemes) or a price mechanism?

[70] Under an exchange mechanism, since carbon assets move in both directions, the asset holdings of each scheme should be the same immediately after the transaction as before. However, what might be the effect on the MV ratings of the jurisdictions engaged in such exchange? Also query what the effect is when the MV ratings of those jurisdictions fluctuate up or down subsequently: does that affect the rate at which those assets may be traded in the future? ***[NB: this does not yet address the CV that might be attached by each jurisdiction to the exchanged assets, or what implications there may be for the MV rating of each jurisdiction by such determinations]***

[71] Under a price mechanism, the movement of carbon assets is in one direction only. Hence, immediately after the transaction, the asset holding of one scheme will be less and the holding of the other scheme more, than before the transaction. [Also query whether this change in asset holdings will be material to the MV rating of the jurisdiction]

[72] There is also the possibility of the exchange mechanism being via a ‘vehicle’ carbon asset. Further consideration needs to be given as to whether this might be useful or desirable in the NCM context. However, what does seem clear is that the ‘vehicle’ carbon asset would need to be from a jurisdiction with a large over-supply for there to be sufficient carbon assets available at any time to perform this role. They would also need to have a reliably stable MV rating. [At this stage, it’s hard to see what benefit there would be for any jurisdiction to have its carbon assets used in this capacity, however this issue might still be researched further.]

[73] In the absence of a primary transaction, such as an international trading transaction in the case of FX, necessitating an exchange mechanism for carbon assets, a price mechanism seems simpler and more efficient. As the carbon assets will move only in one direction, there will be half the administrative adjustments in registries that would be required by the exchange mechanism. This may not be a significant issue in an electronic age, nevertheless, less administration would mean less costs.

[74] Trading should be through an exchange, with a central clearing counterparty to reduce counterparty default risk. There should be standardized wording for trading contracts used globally, with schedules attached according to which carbon asset was being traded into which other trading scheme. Parties wishing to trade should do so through brokers registered with the exchange (and it is implicit that appropriate KYC, anti-fraud and AML protocols would be applied). Whether there is a single exchange, in the form of the proposed International Settlement Platform, or a number of

exchanges spread globally but linked electronically, will probably depend on the size of the NCM market. The exchange (or exchanges) will perform settlement and clearing and should be linked electronically to registries in the jurisdictions that have opted into the NCM, either directly or through a central registry such as, or modeled on, the ITL.

[75] The exchanges and the brokers would all be regulated under applicable financial regulatory provisions. Whether all trading contracts for carbon assets would be regulated as financial instruments, or whether financial regulation would only apply to derivatives contracts, would need to be resolved, in the context of developments in financial regulation.

6. Infrastructure

[76] Will the carbon assets across all the heterogeneous trading schemes be fungible and, if so, to what extent? To answer this question, the different schemes need to be evaluated to see whether an electronic trading architecture can be applied to them: whether the carbon assets under those different schemes can be described or expressed in terms of trading attributes in such an architecture. Standardised contract wording will be required for transactions involving those assets which do fit within the trading architecture. The other infrastructure required comprises the electronic links between exchanges (if more than one) and between the exchange(s) and registries, or the ITL-type central registry (if it is decided to establish one). [There would be a need to develop cross-border [trading] rules and a crossing-platform.]

7. Institutions

[77] As noted above, a supervisory body to recognise MV raters and accredit their MV rating methodologies should be set up and the proposal is that this be done by the UNFCCC/COP [as a constituted body under a new protocol, possibly structured along similar lines to the CDM Executive Board].

[78] Whether an International Settlement Platform needs to be established as a central clearing and settlement institution is an open question. A determination would need to be made whether it may be simpler and more efficient to engage with existing exchanges – the majority of which do not have international reach – or create a new dedicated platform to clear trades via existing clearing bodies.

[79] Whatever approach is taken to the exchange(s), they will need to be linked to the registries operated by the different trading schemes. In this context, it may be decided to establish a further institution in the form of a central registry, modeled along the lines of the ITL [or just use the ITL]. This institution would then have links to each of the registries in the different schemes.

[80] The importance of NCM to global efforts to mitigate the effects of climate change may be considered such as to warrant the establishment of dedicated institutions as an exchange and as a central registry. If this were the case, then it would be more efficient for these functions to be carried out by the same institution.

[81] The NCM proposals include the establishment of the International Carbon Asset Reserve which, as considered above, would perform a role analogous to that which central banks have in applying monetary policy. How the ICAR would be established and how, when and why it

might intervene in the market are matters for further consideration beyond the scope of this paper.
ANNEXURE “C”

ANNEXURE “C”

A glossary of key definitions is proposed as follows:

*NB: initials signify source

<i>Concept/expression /term</i>	<i>Definition</i>	<i>Explanatory Notes</i>
administrator or regulator	JDM*: the legal entity that operates, manages and has the legal power to enforce compliance with an ETS or cap-and-trade scheme	JDM: will most usually be an arm of government in the jurisdiction where the scheme operates
allowances	JDM: means a carbon asset that is: <ul style="list-style-type: none"> usually issued (either free or by auction) by a compliance scheme administrator to scheme participants ('compliance entities') – entities emitting GHGs who have obligations under the scheme to mitigate their emissions; compliance entities will be required to surrender allowances equivalent to their GHG emissions for the compliance periods determined under the scheme (e.g. annually); 	JDM: Usually measured in base units of a tonne carbon dioxide equivalent greenhouse gas (CO ₂ -eq GHG), whereby Global Warming Potentials of other GHGs are used to give the equivalent number of tonnes of CO ₂ , and GWP CO ₂ = 1
baseline	JDM: the emissions scenario that exists in the absence of the PPP	JDM: the starting point for measurement of the MV of a PPP
business-as-usual (BAU) scenario	JDM: the level of emissions that will occur if no mitigation action is taken	JDM: also can be the baseline against which to measure mitigation performance
cap-and-trade	JDM: an emissions mitigation scheme in which regulated entities' emissions are capped; they must surrender carbon assets against actual emissions; can trade units of carbon assets: selling if emissions below cap, buying if their emissions exceed cap	JDM: caps are reduced over time to send a price signal to the regulated entities as to when abatement is cheaper than paying for more carbon assets
carbon asset	JDM: An instrument generated as part of a scheme, project or program the purpose of which is mitigation of carbon emissions. In some jurisdictions, the legal system may classify a carbon asset as a 'chose in action', meaning that it confers a right enforceable at law. May be classified also as a 'financial instrument', depending on application financial regulations in the particular jurisdiction. Usually measured in base units of a tonne carbon dioxide equivalent greenhouse gas (CO ₂ -eq GHG), whereby Global Warming Potentials of other GHGs are used to give the equivalent number of tonnes of CO ₂ , and GWP CO ₂ = 1	BS: carbon assets include: <ul style="list-style-type: none"> ETS allowances INDC units Credits/offsets JDM: carbon assets will be issued as part of a scheme that allows for trading in those assets, so that entities with compliance obligations can buy assets to make up any shortfall for compliance purposes, or sell any assets that are surplus to requirements, to derive a financial gain from having emissions below their limit

	<p>Can take the form of an 'allowance' or a 'credit/offset':</p> <ul style="list-style-type: none"> • Allowances: <ul style="list-style-type: none"> ○ are usually issued (either free or by auction) by a compliance scheme administrator to scheme participants ('compliance entities') – entities emitting GHGs who have obligations under the scheme to mitigate their emissions; ○ compliance entities will be required to surrender allowances equivalent to their GHG emissions for the compliance periods determined under the scheme (e.g. annually); • credits/offsets: <ul style="list-style-type: none"> ○ are generated by projects which avoid or reduce emissions that would otherwise occur, or which sequester GHGs from the atmosphere, in both cases, compared to a baseline; ○ need to be real, measurable and verifiable, as well as additional to BAU; ○ can be surrendered on a voluntary basis, by entities that do not have compliance obligations; depending on the rules of the relevant compliance scheme, may also be able to be surrendered in respect of compliance obligations; 	
carbon asset exchange rate concept yet to be tested for feasibility	JDM: the rate, or ratio, at which a carbon asset generated under a scheme in one jurisdiction might be traded into a scheme in another jurisdiction	JDM: the exchange rate may not exist as a separately defined metric, but rather simply be the price agreed by parties to a transaction, as informed by the MVs of the respective jurisdictions
carbon integrity risk concept yet to be tested for feasibility	<p>AM: the risk that a PPP will achieve its intended outcome;</p> <p>IISD: the risk that emission reductions or removals reported for a PPP actually occurred and are attributable to the interventions implemented as part of it;</p> <p>IISD: the risk that reductions or removals resulting from a PPP are not (i) real, measurable and verifiable and additional to what would have occurred in their absence; or not (ii) real, permanent, additional, verified, avoid double counting and achieve net decrease and/or avoidance of GHGs to preserve environmental integrity;</p>	IISD: CI risks are: characterization; governance and management; GHG assessment boundary; GHG estimation; GHG monitoring; reporting
central counterparty clearing	Federal Reserve, Chicago: a process by which financial transactions are cleared by a single (i.e., "central") counterparty who interposes itself between contract parties to become buyer to every seller and seller to every buyer	UNK: clearing denotes all activities from the time a commitment is made for a transaction until it is settled. Clearing of payments is necessary to turn the promise of payment into actual movement of money from one bank to another. In trading,

		clearing is necessary because the speed of trades is much faster than the time for completing the underlying transaction. It involves the management of post-trading, pre-settlement credit exposures to ensure that trades are settled in accordance with market rules (even if a buyer or seller should become insolvent prior to settlement). Processes included in clearing are reporting, monitoring, risk margining, netting of trades to single positions, tax management and failure risk management.
clearinghouse	UNK: a financial institution that provides clearing and settlement services for financial transactions	
compliance value (CV) concept yet to be tested for feasibility	JDM: the value ascribed by the administrator/regulator of an ETS, to a unit of a carbon asset, at the time it is surrendered for compliance purposes under that ETS	JDM: if the carbon asset has been issued by the administrator under that scheme, it would usually be given a value CV=1; if the carbon asset has been issued under the scheme of another jurisdiction, the administrator might be guided by the MV of that other jurisdiction in ascribing a CV to that scheme's carbon asset at the time of surrender
credit	JDM: means a carbon asset which is: <ul style="list-style-type: none"> generated by projects which avoid or reduce emissions that would otherwise occur, or which sequester GHGs from the atmosphere, in both cases, compared to a baseline; need to be real, measurable and verifiable, as well as additional to BAU; can be surrendered on a voluntary basis, by entities that do not have compliance obligations; depending on the rules of the relevant compliance scheme, may also be able to be surrendered in respect of compliance obligations; 	JDM: Usually, but not necessarily, measured in base units of a tonne carbon dioxide equivalent greenhouse gas (CO ₂ -eq GHG), whereby Global Warming Potentials of other GHGs are used to give the equivalent number of tonnes of CO ₂ , and GWP CO ₂ = 1
emissions trading scheme (ETS)	JDM: an emissions mitigation scheme, that usually operates as a cap-and-trade scheme	
exchange	JDM: a central location bringing together brokers and dealers/traders in commodities or financial instruments	JDM: can be either physical location or electronic location
financial value (FV)	JDM: the price a buyer is willing to pay for a unit of a carbon asset	JDM: will depend on a number of market factors, including demand and supply, market liquidity, and depth of the market; will also be influenced by the carbon asset exchange rate between the relevant jurisdictions
Intended Nationally Determined Contributions (INDC)	UNFCCC: national statement to be made by UNFCCC Parties setting out their mitigation goal which eventually can be transformed into	

	a legally binding commitment, must be transparent, quantifiable, comparable, verifiable and ambitious, reflecting the principles of Art.s 4.1 and 4.2 re national circumstances, etc	
INDC unit	JDM: carbon asset generated by an ETS introduced as part of the PPPs established by a country's INDC	
Index (NB feasibility of using an Index considered in Section 6)	UNK: statistical composite that measures changes in the economy or a financial market, often expressed as changes from a base year or a preceding month.	UNK: each index has its own method of calculation; components may be weighted according to certain characteristics, e.g., stock index weighted for market cap
International Transaction Unit	JDM: The unit of a 'transaction currency' introduced for the purpose of facilitating trading between schemes in diverse, heterogeneous jurisdictions.	JDM: a large number of issues need to be considered before a more definitive definition can be settled: see Section 7.
jurisdiction	JDM: means the relevant level of government, which may be national or sub-national; to be a jurisdiction there needs to be clear legislative and administrative control exercised over a geographic area with clearly defined and accepted boundaries	JDM: although some sub-national ETS are applied at provincial level, while others are at city or local level, these distinctions are unhelpful as not all countries apply province/city/ municipal distinctions in the same way
level of ambition	JDM: the intended target level of mitigation, sought to be achieved by all the PPPs implemented, as stated by a jurisdiction; for UNFCCC Parties is a component of their INDC, which eventually can be transformed into a legally binding commitment	JDM: each individual PPP may also have its own intended target level of mitigation, so query whether the 'level of ambition' concept should/could also be applied to each PPP?
mitigation	UNFCCC: means stabilising GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, which is the ultimate objective of the UNFCCC	UNFCCC: can be achieved in two ways: (i) limiting or reducing anthropogenic GHG emissions by sources to the atmosphere, or (ii) preserving or enhancing sinks or reservoirs of GHGs
mitigation value (MV) concept yet to be tested for feasibility	JDM: a relative measure, as between jurisdictions, of the effectiveness of their emission reduction programs in 'mitigating', which takes account of their respective jurisdictional 'circumstances'	JDM: level of performance in carrying out mitigation actions might also be compared against jurisdiction's 'level of ambition' and level of ambition assessed in terms of its adequacy
mitigation value outcome concept yet to be tested for feasibility	JDM: the numeric outcome of the mitigation value assessment process, which may evaluate a jurisdiction relative to other jurisdictions, but may also provide an assessment of mitigation actions against the jurisdiction's 'level of ambition', and assess the level of ambition in terms of its adequacy in global terms	JDM: methodology yet to be derived
mitigation value assessment agency	JDM: an entity accredited or otherwise sanctioned, by the appropriate authority, to carry out and publish assessments of	JDM: entities so accredited will satisfy a suite of criteria, as will the methodologies applied by them;

concept yet to be tested for feasibility	jurisdictions' performances in carrying out mitigation	
Networked Carbon Markets (NCM) initiative	JDM: WBG initiative, inter alia, to facilitate fungibility of carbon assets between heterogeneous efforts to mitigate GHG emissions	
offset	JDM: same as a credit	
programs, policies and pledges (PPP)	JDM: means the policies, programs and pledges put in place by a jurisdiction to mitigate its GHG emissions	
settlement	JDM: delivery of the transacted financial instrument (carbon asset) against payment, usually simultaneously, and otherwise in accordance with the counterparties' contractual agreement	JDM: settlement comprises the 'physical settlement' (delivery) and the 'financial settlement' (the payment against delivery)
settlement platform	JDM: similar to a clearinghouse, a financial institution that performs the role of central clearing counterparty so as to minimise transactional risk of counterparty failure	JDM: these days the functions of exchange, settlement platform and central clearing counterparty might be bundled up into a single financial institution [TBC]
unit of measurement	JDM: the base unit in which a carbon asset is measured, or in which emissions are measured	JDM: most often, a tonne carbon dioxide equivalent greenhouse gas (CO ₂ -eq GHG), whereby Global Warming Potentials of other GHGs are used to give the equivalent number of tonnes of CO ₂ , and GWP CO ₂ = 1

ANNEXURE “D”

This Annexure sets out three example NCM transaction scenarios:

- the Foreign Unit converted model
- the Foreign Unit imported model
- the International Transaction Unit model

Example NCM transaction scenario: Foreign Unit conversion model

Jurisdiction A	Jurisdiction B
MV = A	MV = B
Trades A units	Trades B units
Compliance entity A wishes to sell 12000 A units to Compliance entity B	Compliance entity B wishes to buy 12000 A units from Compliance entity A
On xx/yy/zz date:	
e.g., MV A/B translates into an exchange rate of 0.67 (that is, 1.5 A units = 1 B unit)	
12,000 A units debited Compliance entity A's account in A registry	8,000 B units credited Compliance entity B's account in B registry

Transaction:

- The respective MVs of the two jurisdictions translate into an exchange rate between them (how this is worked out will be critical, but assume for purpose of this example it can be)
- The counterparties agree how many of the seller's carbon units they wish to transact
- The applicable exchange rate, on the date of the transaction, determines the number of carbon units that are credited to the buyer's account in the buyer's registry in the carbon units of the buyer's jurisdiction: the regulator/scheme administrator in Jurisdiction B cancels the 12000 A units received in the registry account and issues in their place 8000 B units
- The transacted number of seller's carbon units are debited from the seller's account in the seller's registry: regulator/scheme administrator in Jurisdiction A doesn't need to do anything after the 12000 A units have been transferred out of the A registry account

Compliance value:

- Jurisdiction A regulator/scheme administrator determines the CV of A units
- Jurisdiction B regulator/scheme administrator determines the CV of B units
- CV doesn't come into the transaction equation, because the units surrendered against compliance in any jurisdiction will always only ever be the domestic units of that jurisdiction

Financial value:

The price reached by Seller A and Buyer B will be substantially influenced by the exchange rate on the date of the transaction, as in effect, this will determine the compliance value

- As the exchange rate derives from the respective MVs, the price should be a reflection of the relative MVs of the two jurisdictions.

Example NCM transaction scenario: Foreign Unit imported model

Jurisdiction A	Jurisdiction B
MV = A	MV = B
Trades A units	Trades B units
Compliance entity A wishes to sell 12000 A units to Compliance entity B	Compliance entity B wishes to buy 12000 A units from Compliance entity A
On xx/yy/zz date:	
e.g., MV A/B translates into an exchange rate of 0.67 (that is, 1.5 A units = 1 B unit)	
12,000 A units debited Compliance entity A's account in A registry	12,000 A units credited Compliance entity B's account in B registry

Transaction:

- The respective MVs of the two jurisdictions translate into an exchange rate between them (how this is worked out will be critical, but assume for purpose of this example it can be)
- The counterparties agree how many of the seller's carbon units they wish to transact
- The applicable exchange rate, on the date of the transaction, is immaterial to the transaction as the number of carbon units that are credited to the buyer's account in the buyer's registry are the same as the number debited from the seller's account in the seller's registry: the regulator/scheme administrator in Jurisdiction B by agreement with Jurisdiction A, accepts A units and credits the 12000 A units received in the registry account to Compliance entity (buyer) B
- The transacted number of seller's carbon units are debited from the seller's account in the seller's registry: regulator/scheme administrator in Jurisdiction A doesn't need to do anything after the 12000 A units have been transferred out of the A registry account

- Jurisdiction A regulator/scheme administrator determines the CV of A units
- Jurisdiction B regulator/scheme administrator determines the CV of B units
- CV becomes relevant on the date [aa/bb/cc] that Compliance entity (buyer) B wishes to surrender them to the Jurisdiction B regulator/scheme administrator against compliance obligations under Jurisdiction B ETS. On that date, Jurisdiction B regulator/scheme administrator determines what CV to give to the Jurisdiction A units. If the exchange rate has changed between the dates, xx/yy/zz and aa/bb/cc, then the CV Buyer B gets for the 12,000 A units on aa/bb/cc may be different from that which would have applied on xx/yy/zz. Buyer B carries that risk.

Financial value:

- The price reached by Seller A and Buyer B will be influenced by the exchange rate on the date of the transaction, but only to the extent that: (a) the exchange rate is relevant to the CV on that date, which may be a function of the NCM arrangements, e.g., might be exchange rate on date of transfer converts directly to CV, or alternatively, might be left up to Jurisdiction B regulator/ scheme administrator; and (b) the surrender date for compliance in Jurisdictional B is proximate to the transaction date.

Compliance value:

Example NCM transaction scenario: International Transaction Unit ‘transaction currency’ model

Jurisdiction A	Index (‘II’) based on e.g., all MVs of trading jurisdictions; Index has notional International Transaction Units (ITU)	Jurisdiction B
MV = A		MV = B
Trades A units		Trades B units
Compliance entity A wishes to sell 12000 A units to Compliance entity B		Compliance entity B wishes to buy 12000 A units from Compliance entity A
On xx/yy/zz date:		
e.g., MV A/II translates into an exchange rate of 0.67 (that is, 1.5 A units = 1 ITU)		
12,000 A units debited Compliance entity A’s account in registry A	8,000 ITUs held in Seller A’s pending account on International Settlement Platform	
	8,000 ITUs transferred from Seller A’s pending account to Buyer B’s pending account	
e.g., MV II/B translates into an exchange rate 1.2 (that is, 0.8 ITUs = 1 B unit)		
		10,000 B units credited Compliance entity B’s account in registry B

Transaction:

- The respective MVs of the two jurisdictions translate into an exchange rate between each of them respectively and the Index (how this is worked out will be critical, but assume for purpose of this example it can be)
- The counterparties agree how many of the Seller A’s carbon units they wish to transact;
- The applicable exchange rate A/II, on the date of the transaction, determines the number of ITUs that are credited to the Seller A’s pending account on the International Settlement Platform;
- On financial settlement, the ITUs in Seller A’s pending account are transferred to Buyer B’s pending account;
- The applicable exchange rate II/B, on the date of transaction (or on whichever date Buyer B decides to move them from its International Settlement Platform pending account to its account in registry B), determines the number of B units that are credited to the Buyer B’s account in registry B.

Compliance value:

- Jurisdiction A regulator/scheme administrator determines the CV of A units;

- Jurisdiction B regulator/scheme administrator determines the CV of B units;
- CV doesn’t come into the transaction equation, because the units surrendered against compliance in any jurisdiction will always only ever be the domestic units of that jurisdiction.

Financial value:

- The price reached by Seller A and Buyer B should be substantially influenced by the two exchange rates applicable on the date of the transaction, as in effect, this will determine the number of B units received by B;
- As the exchange rates derive from the respective MVs in relation to the Index, the price should be a reflection of the relative MVs of the two jurisdictions to the Index and ultimately, to each other;
- However, nothing above prevents the Buyer B from speculating on an improvement of the exchange rate II/B, by continuing to hold the ITUs in its pending account and only transferring them to its account in registry B as B units, when that more favourable rate applies or when it absolutely needs to, e.g., for compliance reasons. This would not impact in any way on the other elements, such as the CV, since it would just be the number of B units received in the B

registry that might vary. The ITUs held in this way in the pending account would only be able to be converted into B units.