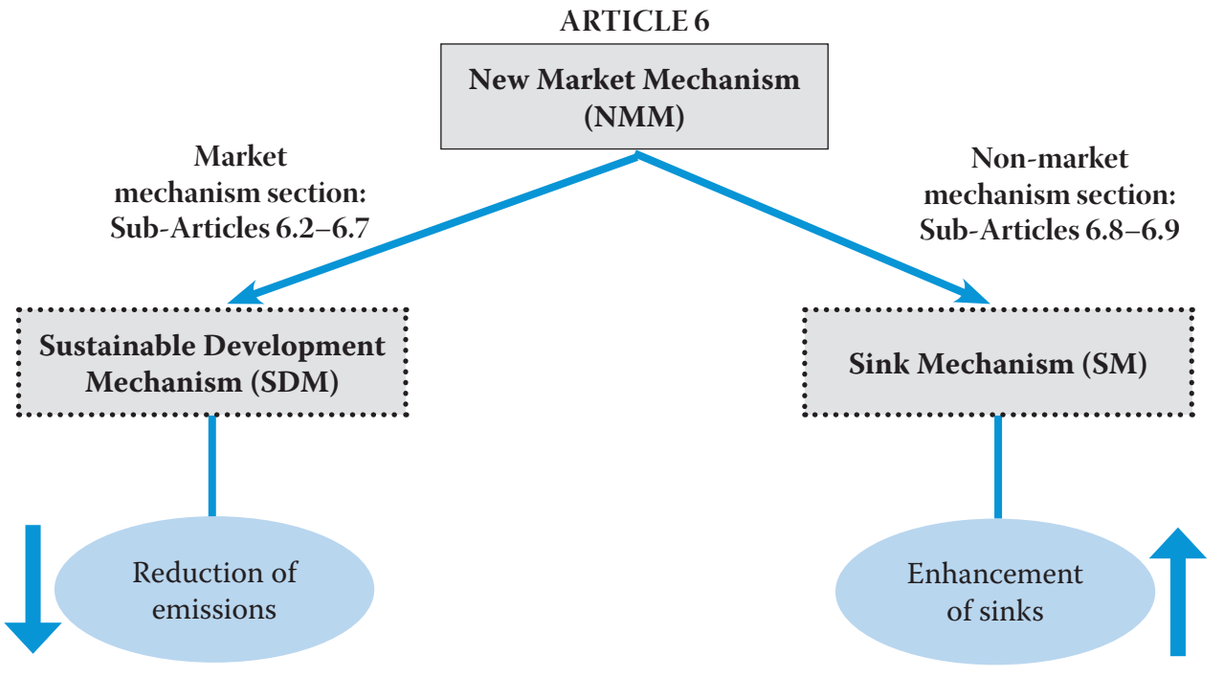
Centre for Science and Environment

New Market Mechanism under the Paris Agreement

Chandra Bhushan
Vijeta Rattani
Padmini Gopal
Tarun Gopalakrishnan

A CSE proposal—structure of the New Market Mechanism under the Paris Agreement



INTRODUCTION

THE PARIS AGREEMENT, which entered into force on 4 November 2016, has re-established the importance of using market mechanisms to galvanize action against climate change. Prior to Paris, the Kyoto Protocol committed the developed country Parties to binding emission reductions targets, and created three market-based mechanisms—Emissions Trading Mechanism (ET), Clean Development Mechanism (CDM) and Joint Implementation (JI)—to aid them in achieving these targets. However, many issues plagued the Kyoto mechanisms and they failed to generate significant overall reductions in global emissions (see *Box: Lessons from the Kyoto Protocol*).

The New Market Mechanism must be more robust, accountable, transparent and sustainable, and avoid repeating the mistakes of previous market mechanisms

It is imperative that the New Market Mechanism (NMM) under Article 6 of the Paris Agreement is more robust, accountable, transparent and—most importantly—sustainable, to avoid repeating the mistakes of previous market mechanisms. The Paris Rulebook, which would make the Paris Agreement operational, is currently being negotiated with the aim of being adopted at the 24th session of the Conference of the Parties (COP24) in December 2018. This policy brief is concerned with the design and nature of rules needed to activate Article 6—the portion of the Agreement which deals with markets.

We argue that in its current form Article 6 lacks ambition and environmental integrity, and needs a scaffolding of appropriate rules, definitions and measures. To address this, the paper proposes the creation of two separate mechanisms under Article 6:

(i) A Sink Mechanism (SM) to be created under the provision of non-market approaches in sub-Articles 6.8 and 6.9 to enhance global carbon sinks that shall include reduction in emissions from the sinks, and

(ii) A Sustainable Development Mechanism (SDM) under sub-Articles 6.2 to 6.7 based on tradable emissions units, with certain restrictions on the creation and transfer of such units.

The policy brief also proposes various solutions that would aid in making each of these mechanisms operational and environmentally sustainable.

1. ARTICLE 6 OF THE PARIS AGREEMENT
Lacking ambition and environmentally detrimental

Understanding Article 6

Generally known as the "markets Article" (even though the term "carbon market" is not explicitly used in it), Article 6 is the font of market and non-market mechanisms in the Paris Agreement. The New Market Mechanism is intended as a means to stimulate ambitious climate action by the Parties, and the public and private sectors. It is likely to be complex, with participation from both developed and developing countries.

The New Market Mechanism is likely to be complex, with participation from both developed and developing countries to stimulate ambitious climate action by the Parties, and the public and private sectors

Sub-Articles 6.2 and 6.3 outline a framework for the Parties to voluntarily pursue cooperative approaches in order to reduce greenhouse gas (GHG) emissions.* The Parties can transfer mitigation outcomes through Internationally Transferable Mitigation Outcomes (ITMOs) to meet their Nationally Determined Contributions' (NDCs) emission reduction targets.

Sub-Articles 6.4–6.7 provide that the new market mechanism should "contribute to the mitigation of greenhouse gas emissions and support sustainable development".[1] This is often referred to as the new "Sustainable Development Mechanism" (SDM). It can be used to contribute to the reduction in emission levels in the host Party or can be credited to other Parties towards achieving their NDC targets. The SDM is to be guided and supervised by a body created by the "Conference of the Parties serving as the meeting of the Parties to the Paris Agreement" (CMA), which is composed of representatives from countries who have signed and ratified the Paris Agreement.

Sub-Articles 6.8 and 6.9 create a framework for non-market approaches (such as technology transfer, capacity building, and support in mitigation and adaptation) to assist the Parties in implementing their NDCs. Discussions regarding the creation of a work programme that would coordinate these different non-market approaches and facilitate sharing of best practices have been undertaken, but the structure of this mechanism is yet to be defined.

Other provisions in Article 6 outline the Parties' obligations towards accounting, environmental integrity, sustainable development and transparency. These are also awaiting further clarity of definition.

* Besides carbon dioxide (CO_2), GHGs also include gases such as methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC-23), perfluocarbons (PFCs) and sulphur hexafluoride (SF_6)

Lessons from the Kyoto Protocol

Carbon markets under the Kyoto Protocol were created in the hope that their expansion would lead to the scaling up of investments in low-carbon and mitigation technologies.[1] The three market mechanisms under this protocol—Emissions Trading Systems (ETS), the Clean Development Mechanism (CDM) and Joint Implementation (JI)—were meant for developed countries to take the lead in reducing emissions and meet their global mitigation requirements. While their nature and the procedure they followed differed from one another, all three of these mechanisms essentially allowed mitigation projects in developed countries to receive credits for international transfer.

Decades after the inception of carbon markets through Kyoto, they cannot be termed successful interventions in terms of carbon reductions, as there has not been significant overall global emission reductions from these mechanisms. This can be attributed to the reasons outlined as follows:

1. **Emission reduction targets of developed countries were largely outsourced:** The Kyoto target of developed countries translated to a reduction of 2.59 $GtCO_2eq$ between 2008 and 2012.[2] The Clean Development Mechanism (CDM) allowed emission reduction projects in developing countries to earn Certified Emission Reduction Credits (CERs), each equivalent to one tonne of CO_2 reduction. By 2012, expected CERs from all registered CDM projects totaled nearly 2.5 $GtCO_2eq$.[3] Basically, all developed countries' emission reduction obligations were capable of being outsourced.

2. **Massive surplus of assigned amount units:** The targets defined under the Kyoto Protocol for some countries were excessively liberal. This resulted in some countries being allocated "assigned amount units" (AAUs), i.e. tradable units or credits which represented an emissions allowance of one metric tonne of carbon dioxide equivalent. Russia and some Eastern European economies-in-transition were assigned nearly 13 billion AAUs, resulting in a massive surplus which was enough for all countries to avoid any mitigation action until well after 2020. Some restrictions were placed on the trade of these units after 2012, but the damage for the first commitment period (2008–12) had already been done.[4]

3. **Excessively cheap non-CO_2 reductions:** The CDM mechanism did not differentiate between reductions in emissions of CO_2 and other greenhouse gases (such as HFC-23) which have a warming potential much higher than CO_2. This resulted in a disproportionate generation of cheap CERs from these non-CO_2 gases. The investment required to generate nitrous oxides (N_2O) - or PFC-based CER was estimated at around US $0.79 per tonne CO_2eq—the lowest among all sectors.[5] HFC, PFC, SF and N_2O projects account for 1.7 per cent of the projects approved under the CDM, but 46 per cent of the CERs issued.[6] This is a problem—even though CO_2 has a lower warming potential, its use is much more widespread and ingrained in the economy. The CDM, therefore, allowed emission reductions without making fundamental changes in economies of developed countries.

4. **Concerns about carbon leakage**: "Carbon leakage" refers to a reduction in emissions in one country or sector causing an increase in emissions in a different country or sector. This negates the effect of emission reduction efforts and causes concerns about trade competitiveness. Leakage is measured as a percentage, which represents the emissions increase within non-regulated jurisdictions divided by the reductions within regulated jurisdictions. The European Union considered that its Emission Trading System was

at risk of causing a leakage of between 2 per cent to 73 per cent. It identified 44 sectors (including refineries, iron and steel, and cement) which were most at risk between 2015 and 2019. It then allocated free credits to European companies within these sectors to ensure that they would not lose out to competitors outside the EU.[7] This further reduces the potential for such market solutions to achieve real emission reductions.

5. **Excessively cheap forestry reductions**: The inclusion of afforestation and reforestation in the CDM resulted in the creation of some of the cheapest CERs available. They were estimated to require an investment of around US $10 per tonne CO_2eq—significantly cheaper than sectors such as wind (closer to US $40 per tonne CO_2eq) and solar (US $391 per tonne CO_2eq).[8] This was despite the imposition of a cap on the use of CDM forestry sink projects by Annex I Parties to fulfill their emission reduction commitments. This was also despite the exclusion of the "avoided deforestation" sector which, based on evidence from voluntary markets, has the potential to generate even cheaper offsets (estimated at US $5.2 per tonne CO_2eq versus US $7.7 per tonne CO_2eq for the afforestation–reforestation sector).[9] Hence, the inclusion of the forestry sector in any Paris market mechanism threatens to generate offsets without significant economic changes in developed countries.

6. **Skewed interpretation of additionality:** The interpretation of additionality for the CDM's purposes is excessively slanted towards business and financial criteria at the cost of environmental criteria. This only serves to maintain an unsustainable status quo. Supply-side "energy efficiency" projects (which effectively subsidize the continued use of fossil fuels) were allocated 4.8 per cent of all CERs.[10] In comparison, demand-side efficiency (which does not lock in current patterns of fossil fuel usage), accounted for 0.3 per cent of all CERs. Hydroelectric power was considered additional enough to merit 15 per cent of the allocated CERs, while solar power was allocated just 0.34 per cent.[11] Additionality apparently seeks something more, but the current application of the concept is decidedly business-as-usual.

7. **Possible net increase in global emissions:** The actual mitigation effectiveness of the CDM is very hard to assess. A 2014 study estimated that the global effect of the CDM by 2020 could be anywhere between an *increase* in total emissions by 3.6 billion tonne CO_2eq or a reduction of 3.2 billion tonne CO_2eq.[12]

8. **Corruption, conflicts of interest and lack of transparency:** Even though the CDM has mechanisms in place for oversight, and third party validation and verification, their credibility has been repeatedly challenged. The CDM executive board, which registers projects and issues CERs, has faced allegations of conflicts of interest and lack of transparency because its decisions are made behind closed doors. Designated Operational Entities (DOEs), which are certified by the Board to act as third party verifiers of CDM projects, have been subject to concerns about their independence and the susceptibility of their third party verifiers to bribes or collusion. In 2008–09, the UN suspended two individuals (who were responsible for validating nearly two-thirds of the emission reductions now being utilized by industries in the developed world) for irregularities found in their project assessments. Concerns have also been raised about the revolving door in the highly specialized CDM industry, which fosters conflicts of interest.[13]

In addition, the Paris Agreement calls for the new mechanism to be guided by the following principles:

- Voluntary participation authorized by each Party involved
- Real, measurable, and long-term benefits related to the mitigation of climate change
- Promotion of sustainable development, environmental integrity and transparency
- Robust accounting with no double counting of emission reductions towards targets of countries' NDCs
- Reduction in emissions through activities (via projects or schemes or programmes or policies) which are additional to "business-as-usual"
- Delivery of an overall mitigation in global emissions
- Verification and certification of emission reductions resulting from mitigation activities by designated operational entities
- Experiences gained and lessons learned from existing mechanisms and approaches

Current status of negotiations

As the negotiations on Article 6 currently stand, it seems more than likely that the NMM will follow in the footsteps of the CDM, with minimal improvements. In terms of its design and basic rules, the provisions under sub-Articles 6.2 and 6.4 are almost the same as their equivalent provisions under the CDM.

1) **Trading and accounting of units:** ITMOs under sub-Article 6.2 can be understood as tradable units, broadly similar to CERs under the Kyoto mechanisms. With regard to the issue of double counting, there is difference of opinion among the Parties regarding the meaning of the term. However, most parties do not outline how double counting should actually be addressed. While Alliance of Small Island States (AOSIS) does highlight the need for a "common international accounting framework", they do not specify how it should be structured.[2]

2) **Governance:** The NMM is to be supervised by a principal international body, which is similar to the executive board of the CDM. This body is to be accountable to the CMA, which effectively succeeds the "Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol" (CMP) as the body responsible for overseeing carbon credit transfers and maintaining a carbon registry. In informal meetings, a majority of the proposed options for governance stem from the structure of the CDM executive board.[3]

Institutionally and structurally, therefore, the NMM is not very different from the CDM.

Institutionally and structurally, the New Market Mechanism is not very different from the Clean Development Mechanism. This needs to change

3) **Conflation of emission reductions through mitigation and by sinks:** Despite numerous informal negotiations having taken place since Paris, not once has a distinction been made between emission reductions stemming from carbon sinks and emission reductions from greenhouse gas mitigation.[4&5] Qualitatively, there is a stark difference between the two—a tonne of CO_2eq emissions avoided or reduced is not the same as a tonne of CO_2eq absorbed by a sink. Besides, trading sink emission reductions can encourage unsustainable practices, such as mushrooming of monoculture plantations, and have negative impacts on land- and forest-dependent communities. Moreover, at present there is no provision in Article 6 to restrict that use of cheap emission credits from afforestation and REDD+ activities.* Allowing such cheap emission credits distorts market prices and clears the path for countries to buy out their NDC targets without having to invest in greening and sustainability efforts within their jurisdiction.

A distinction has to be made between emission reductions stemming from carbon sinks and emission reductions from greenhouse gas mitigation

4) **Criteria for assessing additionality do not have environmental integrity:** Negotiations on Article 6 have emphasized the need for projects under the NMM to be additional and beyond business-as-usual. However, informal discussions do not outline what criteria (environmental, financial or investment-based etc.) will be applied to assess projects for additionality. Continuing in the CDM's footsteps will mean repeating the mistake of prioritizing financial criteria for additionality. This will limit truly environmentally additional projects and reduce the ability to make real emission reductions.

Granted that most elements of Article 6 are still being fleshed out and need clarity and consensus, yet the emerging architecture does not seem too different from the Kyoto market mechanisms. There is, therefore, a need of new ideas and fresh approaches if we are to make Article 6 operational in a manner that helps secure environmental integrity and reduce overall emissions.

*REDD+ stands for Reducing Emissions from Deforestation and Forest Degradation, as well as conservation, sustainable management of forests and enhancement of forest carbon stocks

2. REIMAGINING ARTICLE 6
A CSE proposal

In order to make the market mechanism provisions under Article 6 environmentally more effective, we propose two separate mechanisms:

(A) A Sink Mechanism (SM) to be created under the provision of non-market approaches in sub-Articles 6.8 and 6.9 to enhance global carbon sinks that shall include reduction in emissions from the sinks and,

(B) A Sustainable Development Mechanism (SDM) under sub-Articles 6.2 to 6.7, with tradable carbon units (which would completely exclude fossil fuel-based projects).

(A) Sink Mechanism (SM) under sub-Articles 6.8 and 6.9

1) The need to enhance sinks

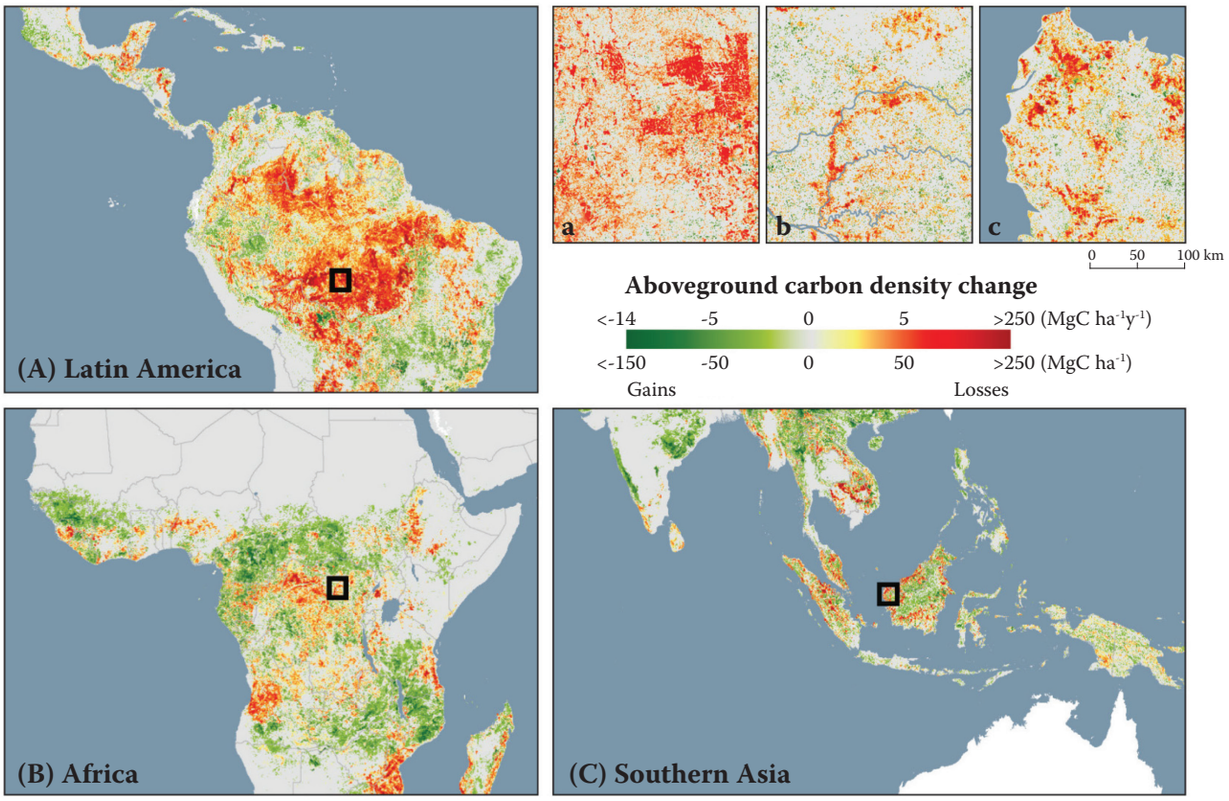
To address the disruptions to our climate, we must rapidly enhance the capacity of natural carbon sinks (such as forests, grasslands and soil) which put atmospheric carbon into land and forests. We do not advocate the use of oceans as sinks as they are already absorbing more carbon than their capacity, leading to increasing ocean acidification. The oceans of the world currently absorb about a third of anthropogenic CO_2 emissions and it is projected that by the end of the century, continued emissions could reduce ocean pH by another 0.5, gravely damaging marine ecosystems and life.[6]

The importance of sinks has been recognized by many countries and they have outlined their interest in enhancing carbon sinks through their NDCs

Currently, the world's biosphere absorbs around a third of all the fossil fuels emissions created by humans (approximately 2.3 $GtCO_2$ annually from fuel emissions of 6.3–6.5 $GtCO_2$ per year). Additionally, the amount of CO_2 emissions that have been released as a result of deforestation is approximately about 1.6–2 $GtCO_2$ per year.[7] While there is some growth in carbon sinks in the tropical forests of Africa, overall we have lost considerable carbon sinks, as can be seen in the forests of Latin America and Southern Asia (see *Map 1: Changes in carbon density in tropical forests between 2003 and 2014*). Much of this loss results from deforestation, change in land use and agriculture practices.

Carbon loss from soil has been happening since humans first started practicing agriculture. This can be attributed to tilling of soil, overgrazing and other agricultural practices that strip the top soil of carbon and release it into the air. However, since the industrial revolution, the rate of soil carbon loss has increased—out of 450 billion tonnes of carbon that has been emitted into the atmosphere since the industrial revolution, approximately 10–20 per cent could be attributed to soil carbon losses.[8]

Map 1: Changes in carbon density in tropical forests between 2003 and 2014



Note: Red = Carbon loss; Green = Carbon gains

Source: A. Baccini *et al.* "Tropical forests are a net carbon source based on above ground measurements of gain and loss", *Science*, 2017

Therefore, sinks under the land use, land use change and forestry (LULUCF) sector need to be protected, revived and rapidly increased, as their potential for sequestering carbon and tackling climate change is huge. Enhancing sinks through reforestation, reducing deforestation, and introducing and strengthening regenerative agricultural practices can not only reduce the concentration of carbon in the air, but also help restore biodiversity and the balance of nature.

The importance of sinks has been recognized by the Parties and many of them have expressed their interest in enhancing carbon sinks through their NDCs. An analysis of the submitted NDCs reveals that more than 100 countries have focused on or considered the LULUCF sector under their climate mitigation strategies. For instance, countries like India and China have quantified targets in their NDCs to increase their forest cover.[9&10] The World Bank indicates that there are 19 countries that have submitted an estimate of the cost of achieving their targets in the LULUCF sector, totalling around US $42 billion in "aggregated costs".[11] Many other countries, including Kenya, Canada and in the EU do not have such quantified sink targets, but look at the LULUCF sector as an avenue to undertake climate mitigation.[12,13&14] There is an inherent difficulty in meaningfully aggregating targets in the LULUCF sector because of large data uncertainties—and possible fluctuation—of emissions from the sector.[15] This could be one of the reasons why some countries have not outlined distinct sink targets.

Estimated projections show that if all conditional and unconditional NDCs are implemented, net LULUCF sector emissions would decrease by around 0.5 $GtCO_2eq$ per year by 2020 and 0.9 Gt CO_2eq per year by 2030 compared to 2010 levels. The largest absolute reduction in net LULUCF sector emissions (compared to 2010 levels) are expected to be in Indonesia and Brazil, followed by those in China and Ethiopia.[16] However, there is more scope for developing countries to ramp up sink enhancement beyond what is promised in their NDCs. According to the latest UN Emissions Gap Report, land-use related emission reduction solutions are estimated to have an annual reduction potential of between 4–12 $GtCO_2eq$ by 2030.[17] In order to realize this sink potential, developing countries will need financial support. Developed countries can fulfil this sink gap through various channels, including bilateral and multilateral partnerships, with developing countries.

2) Governing the Sink Mechanism

The Sink Mechanism should be supervised by a body that will be accountable to the CMA. Considering that most of the world's carbon sinks are in developing countries, the body should primarily be represented by the developing countries. This body should be tasked with the accounting and grievance management of sink projects, and ensuring that they do not create environmental and humanitarian harm. The body should also facilitate sink partnerships between countries.

3) Separating the Sink Mechanism from the SDM

It is imperative that the Sink Mechanism be separated from the SDM for the following reasons (that will be further elucidated in the following sections):

(i) To deter countries from offsetting their emissions cheaply without greening efforts domestically, thereby preventing market distortions

(ii) To avoid unsustainable practices such as monoculture plantations

(iii) To make the NMM equitable by providing more support to developing countries

The problem of trading sinks

To prevent countries from cheaply offsetting their emissions without any domestic efforts at greening and sustainable development, sink activities should not be considered for receiving emission reduction credits under SDM. Emission reductions that occur as a result of carbon sequestration through sinks are inherently of a different nature than emission reductions that occur due to avoiding fossil fuel usage. One of these emission reductions relates to carbon absorption whereas the other involves prevention. Since the quality of these two kinds of emission reductions are essentially different, they cannot be properly represented by the same tradable unit, i.e., 1 tCO_2eq.

Given that most of the world's carbon sinks on land are in developing countries, including sinks in a market mechanism, where motives are primarily profit-based, can negatively impact the poor

In addition, creating sinks is intrinsically cheap and this distorts carbon markets, which is why enhancement of sinks should be independent from the SDM. Offsetting emissions from sinks should not be a substitute for domestic efforts on emission reduction. We propose that the Sink Mechanism should be a non-tradable means of rejuvenating and improving the Earth's natural capital and should, therefore, be incorporated within the non-market mechanism provisions of the Paris Agreement. This can help promote mitigation ambition, and with financial and capacity building support from developed countries, can help significantly increase carbon sink volumes and reduce emissions globally at a low cost.

To effectively separate emission reductions due to the SDM from that due to the Sink Mechanism, countries should only report sink contributions generated within their jurisdiction

Avoiding unsustainable and harmful practices

Given that most of the world's carbon sinks on land are in developing countries, a rapid expansion of sinks will inevitably involve working with the poor in developing countries, as most of them depend on soil and forests to sustain their livelihoods.[18,19&20] Including sinks in a market mechanism, wherein motives are primarily profit-based, can negatively impact the poor and can lead to unsustainable practices such as monoculture plantations. This has been observed in areas of Latin America and Africa, where monoculture plantations supported through the Kyoto Protocol have contributed to declining biodiversity and displacement of communities.[21] So it is essential to have the Sink Mechanism as a non-market mechanism in order to help avoid such unsustainable and harmful social and ecological practices.

Sinks involve "carbon sequestration plus"

Creating a Sink Mechanism is about implementing "carbon sequestration plus". Besides scaling up carbon sequestration, the mechanism can also create additional ecological and social co-benefits, such as promoting better land management, improving communities' livelihoods and sustainable development.[22] It would also complement the implementation of the Sustainable Development Goals (SDGs), particularly Goals 13 and 15 (relating to climate action and life on land respectively).

Creating equity

In order to improve equity between countries through the mechanism, developed countries should finance sink efforts in developing countries to maintain and enhance the world's biggest land sinks. Creating the Sink Mechanism under the non-market mechanism provision would help deter unsustainable practices and market distortions, while supporting sink activities in developing countries through capacity building and finance (as required by sub-Articles 6.8 and 6.9). Doing so will also help realize Article 5 of the Agreement, which stipulates that Parties should take action to conserve and enhance carbon sinks, and support the implementation of such action (including financially) in developing countries.[23]

To effectively separate emission reduction due to the SDM from that due to the Sink Mechanism, countries should only report sink contributions generated within their jurisdiction. The financing by developed countries of sink efforts in developing countries should only count towards their financial contributions to the UNFCCC and not in efforts to achieve their NDCs.

(B) The Sustainable Development Mechanism (SDM) under sub-Articles 6.2–6.7

In order to make SDM environmentally sustainable, robust and equitable, we propose the following solutions to move past the issues that have plagued earlier mechanisms.

1) Additionality

The criteria for the application of additionality should make environmental sense. This has three implications:

(i) No project should lock in fossil fuel usage

(ii) A presumption that renewable energy projects are generally additional

(iii) The exclusion of "climate-friendly" projects which have significant environmental and humanitarian impacts

> We need to step back and examine the potential environmental and humanitarian harm which large hydroelectricity, "clean" biomass, waste-to-energy and nuclear power projects might cause before holding them up as climate solutions

The International Renewable Energy Agency (IRENA) outlines a pathway to emission reduction which largely involves scaling up renewable energy generation and energy efficiency efforts. It estimates that these sectors can together provide over 90 per cent of the energy-related CO_2 reduction required to achieve global climate goals.[24] However, the report also emphasizes the need to move beyond fossil fuels. This over-arching goal is important, especially to define what "energy efficiency" in the SDM should include.

Energy efficiency cannot include "supply-side efficiency" projects, which mostly seek to improve the profitability of generating carbon-based energy. These only serve to lock in the continued use of fossil fuels. Projects should focus on achieving demand-side efficiency, which can play a genuinely critical role in reducing the overall demand of fossil fuels.[25] An exception could be made for domestic supply-side projects being reported towards achieving a country's own NDC, but emission reductions from such projects should not be internationally traded in any form.

Secondly, the experience with the CDM is being interpreted by many experts, particularly in developed countries, as a need for a more conservative and stringent definition of additionality. Over the lifetime of the CDM, newer criteria have been added

to the term, particularly in the form of financial tests.* [26] As a result, current understanding and application of the term has increased focus on economic and financial assessments as opposed to an environmental assessment.

This is a flawed understanding of additionality. For instance, a study by Öko-Institut argues that renewable energy projects are not additional since their revenues do not change much by having participated in the market mechanism.[27] This kind of highly business-centric assessment ignores the fact that renewable energy projects generally reduce carbon emissions significantly. It could also discourage the development of policies which support renewable energy, since this kind of policy support is included in the "baseline" from which additionality is assessed.[28] Hence, in order to achieve overall reduction in global emissions under the SDM, additionality should focus on adding environmental rather than business value. It should not disincentivize the implementation of inherently climate-friendly projects.

There should be a cap on the amount of emission reductions which can be internationally purchased. This should be equal to 25 per cent of a Party's target of emission reductions

It is also important to take into consideration what kind of "renewable" energy projects are being put in place. Projects consisting of large hydroelectricity, "clean" biomass, waste-to-energy and nuclear power are often branded and upheld as climate solutions. These technologies have the potential to create significant environmental and humanitarian harm.

While nuclear power is heavily promoted as a GHG-emissions reducer, challenges of safety prevail in even the most modern of nuclear reactors. Moreover, reactors consume and degrade vast quantities of water. Nuclear waste storage sites can degrade land and the natural environment permanently.[29] As for hydroelectricity, at least 40–80 million people have been physically displaced by dams worldwide. Compensation is usually limited to one-time cash payments; when housing or land is provided for resettlement, it is often in resource-depleted and environmentally degraded areas.[30] Yet, large hydroelectricity projects account for 26 per cent of the projects under the CDM and 15 per cent of the total CERs issued till date.[31]

Biomass projects account for 9 per cent of the projects under the CDM and nearly 3 per cent of the CERs.[32] It has been proposed that the use of biomass as fuel is preferable to allowing the decomposition of biomass and the burning of fossil fuels. But the actual GHG emission reduction from this process is highly doubtful. "Clean" biomass is simply a misnomer because, regardless of the source of the fuel—low or high carbon—burning things to produce energy is inherently a dirty (polluting) process. The combustion of biomass in power plants releases harmful air pollutants such as particulates, NO_x and SO_x. For this reason biomass has been termed "new coal" in some quarters.[33] A similar fundamental problem exists with waste-to-energy projects.

* Finance-based additionality tests generally determine if a project is financially not feasible without the market mechanism

If environmental integrity has any meaning, such projects cannot be included in the Paris market mechanism.

2) Limitation on offsetting carbon emissions

We propose a percentage limit or a cap on the amount of emission reductions which can be internationally purchased through the mechanism. This limitation should be equal to 25 per cent of a Party's target of emission reductions (or other mitigation targets) as declared in its NDC, beyond which the Party will have to meet its NDC target through domestic mitigation initiatives. To minimize the loss of value to holders of surplus units which cannot be used for transfers, excess credits can be retained under a Party's domestic credit reserve and used towards achieving the NDC targets in a forthcoming commitment period.

Mitigation of emissions at the global level must be ensured while discouraging market speculation with every transaction. The Overall Emission Reductions Discount can help achieve this

3) A need for overall emission reductions

We view environmental integrity as the achievement of overall reduction in global emissions through international transfers of emission reductions while also taking into consideration the environmental impacts (including those on biodiversity, land and water) of the projects or activities that are being implemented. It is important that the Parties and Rules of the Paris Agreement view the Earth in totality, as a way to recognize the value of the planet and to highlight that the objectives of Agreement go beyond just the Parties and the private sector.

This can be achieved through applying an overall emission reductions discount (OERD), a method that was also proposed by the AOSIS.[34] The OERD is essentially a fixed percentage of the emissions reduced by the host party that should be cancelled at the time of the transaction to the acquiring party. As the AOSIS suggests, the proposed OERD should be distinct from, and additional to, the share of proceeds (SOP) that is stipulated for transactions under SDM.

We propose that 25 per cent of the emission reductions should be deducted from every transaction. This deducted value should not be attributable to any Party (the host or the acquiring Party), rather, it should be considered as a benefit to the atmosphere. If a unit is traded more than once, the OERD percentage should increase with every subsequent transaction, to create a diminishing value of emission reductions trade. Creating such an OERD would encourage real overall mitigation of emissions globally while also discouraging market speculation with every transaction.

4) Equity

The Paris Agreement is based upon the principle of "common but differentiated responsibilities" (CBDR), which highlights the need to account for the differences in the Parties' historical responsibility for, and capacity and responsibility towards addressing

climate change. It has been estimated that global emissions should not exceed 2,900 $GtCO_2eq$ for a less than 2°C rise in temperature of the planet from pre-industrial revolution levels. In the last couple of centuries, developed countries have emitted a lion's share of the 2,200 $GtCO_2eq$ emitted globally.[35]

To achieve equity, developed countries must provide technical assistance and capacity-building support to developing countries, to help the latter build a domestic basis for an international SDM. This support can include assistance in collecting sectoral baseline data; developing a time series of emissions; establishing domestic regulatory systems for data collection or for monitoring, reporting and verifying emissions; preparing reports that propose sectoral caps or crediting thresholds; and assistance in establishing the infrastructure for national registries or links to the centralized international transaction log. The finances required to implement such initiatives can also be counted towards the developed countries' climate finance obligations under the Paris Agreement.

5) Double counting

Double counting of emission reductions in international market mechanisms creates inconsistencies between the actual and reported global emissions.[36] Double counting undermines transparency, threatens environmental integrity and, in the long-term, will reduce the global ambition in NDCs.[37] Double counting can occur in various forms:

The basic unit for mitigation targets should be standardized as tonnes of CO_2 equivalent (tCO_2eq). Targets under NDCs should be converted and expressed in the form of tCO_2eq

- **Double issuance:** The same emission reduction is issued by a Party to more than one Party
- **Double registration:** The same activity or mitigation outcome is registered under two or more "markets", such as non-UNFCCC emission reduction mechanisms or other programmes
- **Double usage:** The use by one Party of an ITMO towards achievement of its NDC more than once; or the use by one Party of an ITMO towards achievement of its NDC and the use by the same or another Party of that ITMO for a purpose other than towards achievement of its NDC
- **Double claiming:** Both the host and purchasing country count emission reductions towards their NDCs[38&39]

In order to ensure that double counting is avoided in all its forms, we propose a course of action as enumerated in *Table 1: Measures to avoid double counting.*

6) Ensuring price stability

To ensure smooth functioning of the mechanism, there needs to be a limit on the total supply of credits. Beyond this limit, credits should be retained by the supervisory body under the authority of the CMA in the form of a credit reserve.

Table 1: Measures to avoid double counting

Types of double counting	Measures
Double issuance Double claiming	• Creating a publicly available online platform or an IT tool that requires host Parties* to enter data about the project, sector, activity etc. and its emission reductions • Every approved project or sector or activity etc. will have a unique designated serial number that cannot be attributed to more than one party • An independent body created by the CMA will audit, approve and double check the projects to make sure the same project has not been issued for transfer to more than one Party or been claimed by more than one Party
Double registration	• The online platform should be connected and in line with emissions tracking or transfer registries of mechanisms or programmes that are not under UNFCCC jurisdiction, such as the International Civil Aviation Organization's (ICAO) Carbon Offsetting Scheme for International Aviation (CORSIA)
Double usage	• The online platform should be coded in a manner that would automatically make corresponding adjustments** of the credits and emission reductions transferred on both the host Party's as well as the acquiring Party's end. The reductions or units to be transferred will be subtracted from the total emission reductions made by the host Party towards their NDC and will be added towards the NDC target of the acquiring party***

Notes: * Host Parties are those that are participating in the carbon market mechanism and under whose jurisdiction the mitigation action has occurred; ** The actual additions and subtractions of the emission reductions and credits are referred to as the corresponding adjustments; *** The amount finally transferred will be based on the share of proceeds and overall emission reductions discount that will be levied for every transaction. This can be done automatically by the online platform
Source: CSE

An international credit reserve could function in a similar manner to that of the European Union Emission Trading System's (EU-ETS) Market Stability Reserve (MSR), which removes permits from the market when the supply is over 833 million or adds permits when supply drops below 400 million.[40] A similar system can be devised for the SDM. Retained surplus credits can be pumped into the system when the demand is high so as to maintain stability in carbon prices. Ensuring that there is demand for credits would be a matter of assuring the quality of carbon credits in terms of additionality and environmental integrity.

7) Standardization of units

NDCs are heterogeneous in terms of the nature of their targets, their baselines and the sectors which they address. Parties differ on whether NDCs should be standardized or left as varied as they are. For instance, least developed countries (LDCs) argue for the standardization of measurements by having NDC mitigation targets quantified as tCO_2eq.[41] Like-minded developing countries (LMDCs), however, consider that the Paris Rules should allow for varied mitigation metrics and that the "Parties can decide on the minimum comparability of their metrics in accordance with their respective NDCs".[42]

We propose that the basic unit for targets should be standardized as tonnes of CO_2 equivalent (tCO_2eq). Mitigation targets under NDCs should be converted and expressed

in the form of tCO_2eq. For example, renewable energy targets are currently expressed in terms of "percentage of total energy production" or "total capacity in megawatts or gigawatts to be added". Energy intensity targets are expressed in terms of units of energy per unit of GDP. These metrics are a useful way of setting targets domestically, but they are too heterogeneous to build a smooth picture of global ambition.

Hence, for the purpose of NDCs, targets across sectors should be expressed in terms of total emissions that can be reduced as a result of reaching the domestic sectoral targets. Not only would this ease emissions accounting, it would also make the global stocktaking process (as stipulated under the Paris Agreement) simpler. It would lucidly illustrate where the world stands in its overall emissions curbing efforts and how that compares to the leftover carbon budget (which is also measured in tCO_2eq). As some observers suggest in their submission to the UNFCCC, it is also best to standardize the NDCs toward multi-year targets as it would make the measurement of emission reduction more accurate, on account of being more representative of a general trend.[43]

At the global level, the body supervising the SDM should ensure sustainable development and transparency through the monitoring, review and verification of emission reduction transfers

However, instead of immediately converting NDC targets in terms of tCO_2eq, a more measured approach would be to encourage countries to gradually move towards standardization of the targets and the NDC format, which can be considered for the next round of NDC review in 2020.

8) Governance structure

With regard to the relationship between the provisions of sub-Articles 6.2 and 6.4, we contend that these two mechanisms can be overlapping and complementary—with the SDM being the overarching mechanism within which mitigation transfers (i.e., transfer of ITMOs) will take place. This structure can make emissions accounting, verification and tracking transfers simpler and more coherent. At the global level, the body supervising the SDM should ensure sustainable development and transparency through the monitoring, review and verification of emission reduction transfers. This centralized body should be represented by different members of civil society, with experience or technical expertise from different countries (developing, developed, AOSIS, LDC etc.). It should be tasked with the following responsibilities:

- Oversight of the entire process of issuance of ITMO units and emission reductions, its accounting and tracking, as well as creating and maintaining the online platform that will serve as the international transaction log
- Vetting of projects or activities or sectors etc. to ensure additionality

- Issuance of certificates for every transfer after socio-environmental risk assessments and verification against a list of agreed upon criteria that would declare that the transfer does not create environmental harm (vis-à-vis biodiversity, land and water) or human rights violations
- Quality review and approval of private sector transfers

At the international level, creating a transaction log or an IT tool (which will connect national and international registries) will be essential to ensure transparency and robustness of the mechanism. For the purpose of checks and balances, there should also be a process to address any grievances against the mechanism.

At the national level, supervisory and validation bodies within national carbon trading mechanisms should function as the first line of project quality assurance and vetting before units are traded internationally. This would require investments in improving domestic institutional structures. Developed countries can support such improvements through readiness activities in developing countries—such as setting up of a national registry, gathering the data required for establishing a market and developing methods of quality assurance which would be aligned with the SDM rules, guidelines and procedures.

3. KEY RECOMMENDATIONS

To ensure that the New Market Mechanism (NMM) is environmentally beneficial, robust and equitable, we make the following key recommendations:

- Creation of a **Sink Mechanism** as a non-market approach:
  - Governed and managed by a body accountable to the CMA, with majority representation from developing countries
  - Supplemented by funds from developed countries to support sink projects in developing countries, which can be counted towards the developed countries' financial contribution to the Paris goals
  - Countries can only report emission reductions by sinks if the activity or project takes place within their jurisdiction
- A **market-based Sustainable Development Mechanism**, which would be the overarching mechanism for transfer of ITMOs, based on the following guidelines:
  - **Selection of projects** should prioritize environmental additionality over financial additionality. This excludes projects which lock in fossil fuel usage, and which cause significant environmental and humanitarian impacts. Renewable energy projects (except large hydro-power, biomass and nuclear projects) should be considered environmentally additional
  - **Limits on trading**
    - A limit of 25 per cent on the amount of emission reductions that can be internationally transferred through the mechanism, subject to certain limited exceptions
    - One-fourth of the emissions reduced by the host Party should be cancelled (discounted) at the time of transaction to the acquiring Party, and should not be counted toward any NDC targets
    - Creation of a credit reserve in times of credit over- or under-supply
  - **Developed countries' support** for setting up emissions markets in developing countries should be counted towards countries' financial obligations
  - **Transfer units should be standardized** and all NDC mitigation targets should be converted into tonnes of CO_2 equivalent (tCO_2eq)
  - **Structure**
    - Should be governed by a supervisory body represented by civil society and experts from different countries (developing, developed, AOSIS, LDC etc.)
    - Creation of a publicly available online international transaction log, requiring host parties to enter data about a projects or sector or activity etc. and the emission reductions from it. The online platform should be connected to non-UNFCCC mechanisms such as ICAO's CORSIA

REFERENCES

1 United Nations Framework Convention for Climate Change (UNFCCC) 2015. *The Paris Agreement.* Available at https://unfccc.int/sites/default/files/english_paris_agreement.pdf, as accessed on 25 June 2018

2 Alliance of Small Island States (AOSIS) 2017. *Submission of views on the content of Article 6.2 guidance and Article 6.4 rules, modalities and procedures, presented by the Republic of the Maldives on behalf of the Alliance of Small Island States.* Available at http://www4.unfccc.int/Submissions/Lists/OSPSubmissionUpload/167_344_131542508049675849-AOSIS%20Submission%20on%20Art%206.2%20and%20%206.4.Nov.2017.cleandocx.pdf, as accessed on 4 July 2018

3 United Nations Framework Convention for Climate Change (UNFCCC) 2018. *Revised informal note containing draft elements of the rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement.* Available at https://unfccc.int/process-and-meetings/conferences/bonn-climate-change-conference-april-2018/sessions/sbsta-48#eq-23, as accessed on 18 August 2018

4 United Nations Framework Convention for Climate Change (UNFCCC) 2018. *Revised informal note containing draft elements of the guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement.* Available at https://unfccc.int/process-and-meetings/conferences/bonn-climate-change-conference-april-2018/sessions/sbsta-48#eq-23, as accessed on 18 August 2018

5 United Nations Framework Convention for Climate Change (UNFCCC) 2018. *Revised informal note containing draft elements of the rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement.* Available at https://unfccc.int/process-and-meetings/conferences/bonn-climate-change-conference-april-2018/sessions/sbsta-48#eq-23, as accessed on 18 August 2018

6 National Geographic. 2017. *Ocean Acidification.* Available at https://www.nationalgeographic.com/environment/oceans/critical-issues-ocean-acidification/, as accessed on 10 August 2018

7 Food and Agriculture Organization. *Forests and climate change.* Available at http://www.fao.org/docrep/005/ac836e/AC836E03.htm , as accessed on 8 August 2018

8 *Ibid.*

9 Government of India 2015. *India's Intended Nationally Determined Contributions.* Available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf, as accessed on 8 August 2018

10 Government of People's Republic of China 2015. *China's Intended Nationally Determined Contributions.* Available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/China%20First/China%27s%20First%20NDC%20Submission.pdf, as accessed on 8 August 2018

11 The World Bank 2018. *The NDC Platform.* Available at http://spappssecext.worldbank.org/sites/indc/Pages/CostFilterVisualization.aspx, as accessed on 8 August 2018

12 Government of Kenya 2015. *Kenya's Intended Nationally Determined Contribution.* Available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/Kenya%20First/Kenya_NDC_20150723.pdf, as accessed on 8 August 2018

13 Government of Canada 2017. *Canada's 2017 Nationally Determined Contribution to the United Nations Framework Convention on Climate Change .* Available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/Canada%20First/Canada%20First%20NDC-Revised%20submission%202017-05-11.pdf, as accessed on 8 August 2018

14 European Union 2015. *Intended Nationally Determined Contribution of the EU and its Member States.* Available at http://www4.unfccc.int/ndcregistry/PublishedDocuments/European%20Union%20First/LV-03-06-EU%20INDC.pdf, as accessed on 10 August 2018

15 Climate Action Tracker 2018.*(I)NDC Ratings and LULUCF*, Available at https://climateactiontracker.org/methodology/indc-ratings-and-lulucf/, as accessed on 8 August 2018

16 Nicklas Forsell, Olga Turkovska, Mykola Gusti, Michael Obersteiner, Michel den Elzen and Petr Havlik 2016. *Assessing the INDCs' land use, land use change, and forest emission projections*. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5145905/, as accessed on 8 August 2018

17 UNEP 2017. *The Emissions Gap Report 2017*. Available at https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf, as accessed on 28 August 2018

18 The World Bank 2018. *Forests—Overview*. Available at https://www.worldbank.org/en/topic/forests/overview, as accessed on 17 August 2018

19 The World Bank 2018. *Employment in agriculture (% of total employment)*. Available at https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS, as accessed on 17 August 2018

20 Food and Agricultural Organisation 2014.*Contribution of the Forestry Sector to National Economies, 1990–2011*. Available at, http://www.fao.org/3/a-i4248e.pdf, as accessed on 18 August 2018

21 Inés Acosta 2011. "'Green desert' monoculture forests spreading in Africa and South America," the *Guardian*. Available at https://www.theguardian.com/environment/2011/sep/26/monoculture-forests-africa-south-america, as accessed on 7 August 2018

22 Wageningen University and Research. *Ecological and social co-benefits*. Available at https://www.wur.nl/en/Value-Creation-Cooperation/Collaboration-and-partnerships/REDD-research-network-for-science-policy-and-services/Expertise/Ecological-and-social-co-benefits.htm, as accessed on 17 August 2018

23 United Nations Framework Convention for Climate Change (UNFCCC) 2015. *The Paris Agreement*. Available at https://unfccc.int/sites/default/files/english_paris_agreement.pdf, as accessed on 17 August 2018

24 International Renewable Energy Agency (IRENA) 2018. *Global Energy Transformation: A Roadmap to 2050*. Available at http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Global_Energy_Transformation_2018_summary_EN.pdf?la=en&hash=2335A542EF74D7171D8EC6F547C77395BDAF1CEE, as accessed on 17 August 2018

25 International Energy Agency 2017. *Energy Efficiency*. Available at http://www.iea.org/publications/freepublications/publication/Energy_Efficiency_2017.pdf, as accessed on 15 August 2018

26 Axel Michaelowa and Sonja Butzengeiger 2017. "Ensuring additionality under Art. 6 of the Paris Agreement," *Perspectives, Climate Research*. Available at https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/5a8b5e288165f58a19e13f5f/1519083068591/Art._6_Additionality_Perspectives_PRINT.pdf , as accessed on 18 July 2018

27 Öko-Institut 2016. *How additional the Clean Development Mechanism?*. Available at https://ec.europa.eu/clima/sites/clima/files/ets/docs/clean_dev_mechanism_en.pdf, as accessed on 27 June 2018

28 H Winkler 2004. *National policies and the CDM: Avoiding perverse incentives*. Available at https://open.uct.ac.za/bitstream/item/19409/Winkler_National_2004.pdf?sequence=1, as accessed on 17 August 2018

29 Benjamin K. Sovacool 2010. "A Critical Evaluation of Nuclear Power and Renewable Electricity in Asia," *Journal of Contemporary Asia*, Vol. 40, No. 3

30 CDM Watch 2012. *Hydro Power Projects in the CDM*. Available at https://www.internationalrivers.org/sites/default/files/attached-files/120228_hydro-power-brief_lr_web.pdf, as accessed on 17 August 2018

31 UNEP-DTU, *CDM projects by type*. Available at http://cdmpipeline.org/cdm-projects-type.htm, as accessed on 15 August 2018

32 *Ibid.*

33 Nathanael Greene 2014. *Biomass: Not Carbon Neutral and Often Not Clean*. Available at https://www.nrdc.org/experts/nathanael-greene/biomass-not-carbon-neutral-and-often-not-clean, as accessed on 18 August 2018

34 Alliance of Small Island States (AOSIS) 2017. *Submission of views on the content of Article 6.2 guidance and Article 6.4 rules, modalities and procedures, presented by the Republic of the Maldives on behalf of the Alliance of Small Island States.* Available at http://www4.unfccc.int/Submissions/Lists/OSPSubmissionUpload/167_344_131542508049675849-AOSIS%20Submission%20on%20Art%206.2%20and%20%206.4.Nov.2017.cleandocx.pdf, as accessed on 4 July 2018

35 Nick Evershed 2017. "Carbon countdown clock: how much of the world's carbon budget have we spent?," the *Guardian*. Available at https://www.theguardian.com/environment/datablog/2017/jan/19/carbon-countdown-clock-how-much-of-the-worlds-carbon-budget-have-we-spent, as accessed on 10 August 2018

36 Aryanie Amellina 2018. *Institutional arrangements for reporting the use of market mechanisms under the enhanced transparency framework to avoid double counting.* Institute for Global Environmental Strategies (IGES). Available at https://pub.iges.or.jp/system/files/publication_documents/pub/workingpaper/6350/Working%20Paper_Institutional%20arrangements%20for%20reporting%20market%20mechanisms%20to%20avoid%20double%20counting_April2018.pdf, as accessed on 27 June 2018

37 Conservation International, Environmental Defense Fund, Forest Trends, IETA and The Nature Conservancy 2017. *Joint Submission by Conservation International, Environmental Defense Fund, Forest Trends, IETA and The Nature Conservancy regarding views on the guidance referred to in Article 6, paragraph 2, of the Paris Agreement*, UNFCCC. Available at https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/687.pdf, as accessed on 28 June 2018

38 The Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA) 2016. *Views on "guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement" (FCCC/SBSTA/2016/2, para. 96*), UNFCCC. Available at https://unfccc.int/files/parties_observers/igo/submissions/application/pdf/705.pdf, as accessed on 28 June 2018

39 Institute for Global Environmental Strategies (IGES) 2016. *Views on guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement.* Available at https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/689.pdf, as accessed on 28 June 2018

40 European Commission 2018. *Publication of the total number of allowances in circulation in 2017 for the purposes of the Market Stability Reserve under the EU Emissions Trading System established by Directive 2003/87/EC.* Available at https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/c_2018_2801_en.pdf, accessed on 17 August 2018

41 Least Developed Countries (LDC) 2017. *LDC Submission on Accounting under Article 6, paragraph 2 of the Paris Agreement.* Available at https://ldcclimate.files.wordpress.com/2018/02/ldc-group-submission-on-article-6-2.pdf, accessed on 4 July 2018

42 Like Minded Developing Countries (LMDC) 2017. *Submission on Items Related to Article 6 of the UNFCCC's Paris Agreement.* Available at http://www4.unfccc.int/Submissions/Lists/OSPSubmissionUpload/713_346_131534482078702475-LMDC%20Submission%20on%20Article%206%20Oct%202017.pdf, as accessed on 5 July 2018

43 Climate Advisers, Conservation International, Environmental Defense Fund, Forest Trends, International Emissions Trading Association and The Nature Conservancy 2017. *Views on the guidance referred to in Article 6, paragraph 2 of the Paris Agreement.* Available at https://unfccc.int/sites/default/files/0920.pdf, as accessed on 29 June 2018

Box

1. Steffen Bohm 2013. "Why are carbon markets failing?," the *Guardian*. Available at https://www.theguardian.com/sustainable-business/blog/why-are-carbon-markets-failing, as accessed on 26 June 2018
2. Chandra Bhushan 2011. *CDM: Experience and way ahead?* Available at https://cdn.cseindia.org/docs/photogallery/ifs/IFS%202015-CDM.pdf, as accessed on 12 August 2018
3. UNFCCC 2018. *Total potential supply of CERs from end KP 1st CP to 2020.* Available at https://cdm.unfccc.int/Statistics/Public/files/201403/CER_potential.pdf, as accessed on 15 August 2018
4. Anja Kollmuss 2013. *Doha Decisions On The Kyoto Surplus Explained.* Available at https://carbonmarketwatch.org/wp-content/uploads/2013/03/CarbonMarketWatch-CO18-Surplus_decisions_explained_4March20131.pdf, as accessed on 17 August 2018
5. Michael Gillenwater 2011.*The Clean Development Mechanism: A Review of the First International Offset Program.* Available at http://www.indiaenvironmentportal.org.in/files/clean-development-mechanism-review-of-first-international-offset-program.pdf, as accessed on 17 August 2018
6. United Nations Environment Programme (UNEP) 2018. *CDM projects by type.* Available at http://www.cdmpipeline.org/cdm-projects-type.htm, as accessed on 17 August 2018
7. Andrei Marcu et al. 2013.*Carbon Leakage: An overview.* Available at https://www.ceps.eu/system/files/Special%20Report%20No%2079%20Carbon%20Leakage_0.pdf, as accessed on 17 August 2018
8. Michael Gillenwater 2011. *The Clean Development Mechanism: A Review of the First International Offset Program.* Available at http://www.indiaenvironmentportal.org.in/files/clean-development-mechanism-review-of-first-international-offset-program.pdf, as accessed on 17 August 2018
9. Kelley Hamrick 2015. *State of the Voluntary Carbon Markets (Presentation).* Available at: https://www.forest-trends.org/wp-content/uploads/2015/06/SOVCM-Webinar-Presentation-June-25-2015.pdf, as accessed on 17 August 2018
10. UNFCCC 2018. *Supply side energy efficiency improvements—generation: Version 9.0.* Available at https://cdm.unfccc.int/methodologies/DB/69MEFLV8HH6LBRAFQRAZ3XEF2BYTMG/view.html, as accessed on 17 August 2018
11. United Nations Environment Programme (UNEP) 2018. *CDM projects by type.* Available at http://www.cdmpipeline.org/cdm-projects-type.htm, as accessed on 17 August 2018
12. Peter Erickson et al. 2014. *Net climate change mitigation of the Clean Development Mechanism.* Available at https://www.sciencedirect.com/science/article/pii/S0301421514002730?via%3Dihub, as accessed on 17 August 2018
13. Transparency International 2015.*Carbon market corruption risks and mitigation strategies.* Available at https://www.transparency.org/files/content/corruptionqas/Carbon_market_corruption_risks_and_mitigation_strategies_2015.pdf, as accessed on 17 August 2018

Centre for Science and Environment is a public-interest research and advocacy organization, which promotes environmentally sound and equitable development strategies. The Centre's work since its establishment in 1980 has led it to believe and argue, both nationally and internationally, that participation, equity and community-based natural resource management systems alone will lead the nations of the world towards durable peace and development.

As a public-interest organization, the Centre supports and organizes information flow in a way that the better organized sections of the world get to hear the problems and perspectives of the less organized. Environmental issues are seen in an anthropocentric perspective that seeks to bring about changes in the behaviour of human societies through appropriate governance systems, human–nature interactions and the use of science and technology.

Though the public awareness programmes of the Centre have been its key strength and focus of work, it has endeavoured to move into associated areas of work like policy research and advocacy. Learning from the people and from the innovations of the committed has helped the Centre spread the message regarding environment without its normal association with doom and gloom. Rather, the effort of the Centre is to constantly search for people-based solutions and create a climate of hope.

The Centre has always been, and will continue to be, editorially independent of interest groups, governments, political parties, international agencies and funding sources. It never accepts funding to push a donor's viewpoint. All its outputs are available for public dissemination.

Centre for Science and Environment
41, Tughlakabad Institutional Area New Delhi 110 062
Phone: 91-11-40616000 Fax: 91-11-29955879
E-mail: vijeta@cseindia.org **Website:** www.cseindia.org