

CARBON MECHANISMS REVIEW

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From Kyoto to Paris

New market initiatives
combine both the old and the
new UNFCCC framework

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Dear Reader!

While the ratification of the Paris is coming closer and closer, an increasing number of initiatives is paving the way for the transition of the market mechanisms of the Kyoto world into the new Paris framework. This holds especially true for the Nitric Acid Climate Action Group initiative (NACAG), launched by Germany at the Paris climate summit. It aims at equipping all facilities used for manufacturing nitric acid worldwide with nitrous oxide abatement technology by 2020, thereby stopping N₂O emissions in an entire sector. NACAG combines an innovative results-based financing approach with CER purchase while at the same time integrating the host countries in policy terms (please see the adjacent article).

Another example of combining the old and the new climate world is presented in our article on possible synergies through enhanced coordination of local CDM/GCF authorities. The authors argue that especially PoAs represent important existing pilot activities which could be scaled up with GCF resources. Further, on the occasion of the 39th ICAO assembly which is to decide on the organisation's global market-based mechanism, we present an analysis on provisions to avoid double counting in ICAO's offsetting mechanism. Against this background, expectations are high for robust and stringent rules taking us into a climate friendly Paris world. On behalf of the editorial team, I wish you an informative read!

Christof Arens



**Wuppertal
Institut**

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A Transformative Policy Approach

Germany launches initiative on abatement of nitrous oxide emissions in nitric acid production

by Enrico Rubertus, GIZ, and Thomas Forth, German Environment Ministry Advisor

In many ways, Paris was a turning point in climate change policy effort. Looking back, this naturally applies first and foremost to the new Climate Change Agreement. It also applies, though, to a range of climate change initiatives launched either before or during the Paris talks.

In contrast to the bipolar division of responsibilities under the Kyoto Protocol (between industrialised nations and developing countries), the focus regarding market-based mechanisms has been shifting away from pure offsetting potential for quite some time. Instead, attention has increasingly been placed on the additional effects of specific reduction activities and associated policies. The central aspects here are host countries' own capabilities and other forms of cooperation between funding countries and implementing states.

For example, the Partnership for Market Readiness (PMR) approaches focus, in the broadest sense, on national-level market-based climate change policy goals in the host countries. Development policy aspects lie at the forefront of the Carbon Initiative for Development (CI-DEV), while the CDM with its results-based financing (RBF) is to be used as a supportive vehicle. With the Pilot Auctioning Facility (PAF), emission reductions achieved under the old offsetting market of the Kyoto Protocol are used to enable stranded climate change projects to be continued with new funding models and also for models to be developed with which, on the basis of scarcity and competition, incentives can be introduced for entirely new emission reduction activities.

In Paris, transformative activities came to the forefront under two new programmes. These are the Transformative Carbon Asset Facility (TCAF) launched jointly in Paris by Norway, the UK, Sweden, Switzerland and Germany, and the German Nitric Acid Climate Action Group (NACAG). While TCAF is designed to support large-scale financing of transformative developments, NACAG hails a change at the level of climate policy management and long-term responsibility for emission reductions in a specific sector of nitric acid production.

In this issue, the Carbon Mechanisms Review looks at the status of NACAG. The subsequent issue will contain a report on TCAF.

NACAG approach and aim

At the Climate Change Conference in Paris, Germany launched the Nitric Acid Climate Change Action Group (NACAG) with the aim of equipping all facilities used for manufacturing nitric acid with nitrous oxide abatement technology by 2020. This will stop N₂O emissions in an entire sector. More than 200 million tonnes of CO₂-equivalents can be saved by 2020. This would amount to approximately 500 million tonnes between 2020 and 2030. Estimated at about 70 million tonnes of CO₂-equivalents, the potential reductions achieved in 2020 represent almost one percent of the emissions gap that needs to be closed by 2020 to ensure that the 2 °C target is met. While in many sectors achieving reductions is either difficult or costly, a range of mitigation technologies for the nitric acid production sector have already been developed. These are



The required technology in operation: CDM project "Catalytic N₂O Destruction Project in the Tail Gas of the Nitric Acid Plant PANNA 3 of Enaex S.A."

affordable and can quickly be installed in existing plants. The associated avoidance costs are comparatively low, at around g2 to g3 per tonne CO₂eq. In the face of rapidly progressing climate change, this low-cost potential must be exploited without delay. The focus here lies exclusively on abatement of nitrous oxide emissions in nitric acid production. As the additionality of this abatement approach is highly questionable for facilities in which adipic acid is produced (which is eligible in principle under the CDM), the potential of equipping adipic acid facilities is therefore not addressed.

The concept

One particularly important aspect of and contribution to sustainable development is that where facilities are refurbished or are equipped with new abatement technology, partner countries agree to continue the emission reduction activities

as an own contribution under national policy after 2020. By taking over control of this reduction potential, the host countries gain the chance to use this cost-effective emission reduction potential for their own NDCs. The cherry picking seen under the CDM, whereby cost-effective reduction potential is transferred abroad, will thus stop as of 2021 – a situation from which host countries will likely benefit.

By integrating the host countries in policy terms, the NACAG initiative differs greatly from existing CER purchase programmes. Another significant difference is that CERs acquired through NACAG cannot be used for offsetting or compliance purposes, but must instead be cancelled by transferring them to a special UNFCCC account. This means that the NACAG is funded via climate financing which uses a result-based finance approach (see below for details of how NACAG works in practice).



Source: © Amazonen-Werke Dreyer, Hasbergen

Reducing the footprint: Nitric acid is primarily a raw product for nitrogen fertilizers. Nitrous oxide (N₂O) is created as an unwanted byproduct in nitric acid production.

The clear intention is thus to strengthen climate change efforts, both before 2020 and beyond, and to signal the transfer of successful, market-based emission reduction activities from the Kyoto Protocol to the Paris Agreement. Many countries will understandably want to use the comparatively less costly reduction potential to reach their own targets under their NDCs, but they will need help in building the capacities needed to do so. The economic advantage of host countries using the low-cost reduction option needs to be transferred to the business logic of nitric acid producers. The fact that, thanks to the NACAG initiative, the sector will be best prepared by 2020 in that it provides both the financial resources and the advisory services needed, should be an attractive

incentive for those countries wanting both to tackle climate change at sectoral level and implement sustainable national policy.

It is, however, important to understand that simply continuing with CDM logic beyond 2020 – meaning the sale of CERs to other countries – would prevent host countries from using this low-cost potential to achieve their own targets. This is why NACAG does not promote the financing of policy solutions which continue to rely on the sale of offsets. An additional effect of a long-term offsetting solution would be that the countries concerned could set more ambitious climate change goals.

CDM methodologies up to 2021 and beyond

When calculating the emission reductions achieved, it will be necessary to differentiate between the additional emission reductions attained using existing CDM methodologies (particularly ACM0019) and the actual changes in the inventory. Especially regarding the host countries, the effects of the calculation on a country's NDC after 2020 are considerably greater than those up to and including 2020 under the CDM. An important aspect of the NACAG will be how reductions achieved after 2020 will be reflected in the register and added to the inventory. This calls for new methodologies to be developed in addition to those used with the CDM.

Replicability of the NACAG model

It is conceivable that the NACAG approach can be transferred to other emission reduction sectors and thus become a model which, as mentioned earlier, can be used to transfer successful approaches from the Kyoto Protocol to the Paris Agreement in the course of the coming years. Also, it is important to understand that the transition from the Kyoto Protocol to the Paris Agreement is a short-term phenomenon. The underlying concept can, however, be combined not just with the CDM but with other mechanisms that will exist under Article 6. Central to all such considerations is the question of how transformative processes can be introduced. Questions which arise include: which bilateral agreements are needed? How can a cooperative approach be developed under the market mechanisms which is characterised by an increasing own contribution by host countries to avoid emissions? One thing that is completely clear, however, is that there will be no standard, one size fits all approach, but instead country-dependent and potential-dependent variations which will no doubt lead to customised solutions.

How NACAG works in practice

Germany also invites other funding countries as well as countries interested in transformation to join the German Nitric Acid Climate Action Group. To achieve the goal of reaching the entire nitric acid sector by 2020, the initiative is reliant on additional financial support and reduction pledges from

NACAG Declaration on N₂O Mitigation in Nitric Acid production

Transforming a sector

The international community has agreed to the common goal of keeping global warming below a threshold of 2°C. Countries and stakeholders are working on measures in all sectors. However science tells us that we are still facing a mitigation gap of 8-10 Gt in 2020. That is we need an additional 8-10 Gt of emission reduction to remain on a 2° consistent pathway.

In view of the climate change challenges, we cannot allow emissions that can be avoided with moderate efforts to continue.

N₂O emissions in nitric acid production can be abated relatively easily and at a low cost. Abatement technology is available and can be installed quickly in existing plants.

Nitric acid is primarily a raw product for nitrogen fertilizers. Nitrous oxide (N₂O) is created as an unwanted by-product in nitric acid production and frequently vented to the atmosphere without any treatment. It has a GHG effect 264 times that of CO₂. A rough estimate puts the currently unabated GHG potential from nitric acid production at above 200 million tons of CO₂ equivalents until 2020. Abatement technology is however available and can be installed quickly in existing plants.

However a significant part of the nitric acid producing installations worldwide, especially but not only in developing countries and economies in transition, are not abating yet – or even stop once started N₂O destruction due to ongoing costs for abatement.

The signatories affirm their commitment to help ensure abatement of N₂O from nitric acid production with the aim to globally phase out these emissions by 2020.



Tapping the potential: fertilizer plant in China.

developing countries because it is clear that the funds allocated by the German government to NACAG will not be enough to reach all nitric acid production plants in every country in the world. NACAG thus hopes to also attract membership of industrialised countries which have not yet achieved nationwide abatement of N₂O.

Interested countries can express their interest in NACAG by signing a membership declaration (see Box 1: Declaration). In this way, the partners strengthen their policy commitment to continue emission reduction activities beyond 2020 on their own account.

NACAG makes consulting services available to partner countries and facility operators, covering both regulatory and technical issues in using the available abatement technology or

catalytic converters. The actual financing of emission reduction activities through NACAG is to occur through the sale of CERs. While alternative forms of financing are not completely ruled out, there are no signs of a comparable substitute on the horizon. However, as the aim of NACAG is a global one, the focus cannot be placed solely on abatement of N₂O emissions in CDM countries. Some non-CDM countries, such as the traditional developing countries, still require financial support. However, this situation is likely to be the exception rather than the rule. But also in Germany, which makes global transparency an utmost priority, a bilateral substitute solution (if needed) is by no means being sought because of the lack of the CDM, JI 2nd Track or the requirement for cooperation under the Kyoto Protocol. This is undoubtedly a legitimation deficit which can be addressed if continuation under the Paris

Agreement is guaranteed on the basis of an accounting system that upholds environmental integrity and prevents double counting when calculating specific emission reductions and counting them towards a host country's NDC.

Secretariat established

To implement the initiative, BMUB has asked Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) to establish a NACAG Secretariat. The secretariat will be the main point of contact for issues concerning the initiative and will provide technical consulting services for facility operators and partner governments. It will also be responsible for promoting the initiative, offering informational products and training, and building a network that potentially boasts all stakeholders in the nitric acid production sector (governments, facility operators, technology suppliers, NGOs, science and research, and interested parties in the professional community).

Countries approached / Individual financing agreements

In a number of countries that have expressed interest in the NACAG initiative, exchange has already begun at government level and/or with local facility operators. Among these are Tunisia, Egypt, India and Trinidad and Tobago. In Tunisia, a technical audit of a nitric acid production plant has taken place and the next steps discussed regarding installation of a secondary catalytic converter which is based on abatement technology along with the respective financing. In this case, it is important that the facility be registered as a CDM project without delay to ensure its environmental integrity and avoid double counting of the emission reductions achieved. At the moment, NACAG is looking into the development of a Programme of Activities (PoA) for the sector to simplify the possibility of CER-based financing for facilities not yet registered under the CDM.

Cooperation partners

Cooperation partners are a key prerequisite for NACAG's success, to penetrate the nitric acid production sector, generate acceptance for the approach and ensure sustainable emissions abatement. When it comes to the transfer of emission

Initiative wins strong partner in VCI

The German Chemical Industry Association (VCI) joined the German Nitric Acid Climate Action Group (NACAG) at the beginning of September 2016. As a NACAG member, the VCI will, for example, support companies in the abatement of nitrous oxide emissions. "We welcome the fact that the VCI has signed the Declaration on N₂O abatement in nitric acid production," says Jochen Flasbarth, German State Secretary at the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. "We have won an important partner for the Climate Action Group. VCI will provide excellent consulting advice to nitric acid producers in countries in the South."

As Utz Tillmann, Director-General of the German Chemical Industry Association (VCI), explains: "The German chemicals industry has set the global benchmark for sustainable production of fertiliser. With sector-wide use of abatement technology, the chemicals sector has reduced greenhouse gas emissions to a minimum. Using modern catalytic converter technology, the sector reduced its nitrous oxide emissions by 97 percent between 1990 and 2014. As proactive NACAG members, we aim to use the knowledge we have gained to contribute to the global climate change effort by making this technology available worldwide."

reduction activities from the Kyoto regime to partner countries' NDCs under the Paris Agreement, both government representatives who are responsible for climate change policy and those who regulate the nitric acid production sector play an important role. The industry associations in the respective countries, and also global-level umbrella associations to which the chemicals industry belongs, can make a key contribution to technology and knowledge transfer (see Box 2: VCI Joins NACAG Initiative). Non-governmental organisations (NGOs), especially those at local level, must be approached at an early juncture to explain the potential benefits of NACAG, not just with regard to global climate change effort, but also for local environment protection which is made possible, for example, through the use of tertiary catalytic converter technology to destroy NO_x in addition to N₂O.

The World Bank's Pilot Auction Facility (PAF) is another important partner for NACAG (see Box 3: PAF at a glance). The PAF Participants Committee recently decided that the next auction, which will be held this autumn, will only address CERs from the nitrous oxide sector. For the BMUB, it is particularly important to point out that parties interested in attending the PAF auction must take note of this and should not speculate on potentially higher NACAG yields. The NACAG and the PAF N₂O auction are consistent with a global approach, whereby PAF will generate important pricing signals for subsequent financing requests under the NACAG initiative.

PAF at a glance

The Pilot Auction Facility is an innovative climate finance model developed by the World Bank Group to stimulate investment in projects that reduce greenhouse gas emissions while maximizing the impact of public funds and leveraging private sector financing.

Its results-based payment mechanism will set a floor price for future carbon credits in the form of a tradeable put option, which will be competitively allocated via auction.

The PAF is backed by several government donors and has a capitalization target of \$100 million. In a first phase, it will support projects that cut methane emissions at landfill, animal waste, and wastewater sites facing low carbon prices. effort by making this technology available worldwide.”

What membership of NACAG means

As mentioned earlier, countries, associations, businesses and civil society organisations can become members of the global NACAG Group. By joining, they signal that they want to contribute to the initiative's core objectives by using their respective capacities to equip the entire nitric acid production sector with nitrous oxide abatement technology. Based on their differing roles, partners can facilitate the transfer of knowledge

and expertise – both at facility and government regulation level. NACAG is designed to build a proactive community and a knowledge network. By joining the initiative, new partners are in no way subject to financial or investment commitment.

Under NACAG, the initiative lies with the financing partners, the funders and the facility operators themselves.

Outlook

The next steps under NACAG are clear – apart from providing technical consulting services via the Secretariat and building a broad-based network, financing agreements for CER purchases need to be arranged without delay. A call for tenders will likely be published in 2017, whereby proposals may be submitted by either the facility operators or the service providers on their behalf. The procedure will take account of the experience gained and results achieved with other funders (such as PAF). Worthy of note in this regard is the tendering process used by the Norwegian Carbon Procurement Facility (NorCaP), which has proven successful in recent years. The World Bank Pilot Auction Facility (PAF) is also of great interest as it has already held two auctions in the methane sector and these have revived competition in the ailing carbon market. The third PAF auction addresses the nitric acid production sector. The pricing signals this will send are also a key point of reference for pricing under NACAG. To avoid misunderstandings, these pricing signals will not be adopted as is. They must be adapted to the respective project's lifecycle, as this can vary for existing and new activities, and also depending on the abatement technology used.

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Defining the Essentials

ICAO's offsetting mechanism: avoiding double counting of emission reductions

by Martin Cames, Öko-Institut and Lambert Schneider, SEI Associate

The adoption of the Paris Agreement in late 2015 was a major breakthrough in the history of international climate policy. Parties agreed to hold the increase in the global average temperature to well below 2°C and pursue efforts to limit the increase to 1.5°C above pre-industrial levels, to reach global peaking of greenhouse gas (GHG) emissions as soon as possible, and to achieve a balance between anthropogenic emissions and removals by sinks of greenhouse gas (GHG) emissions in the second half of this century.

International aviation is not explicitly mentioned in the Paris Agreement. However, since emissions from aviation are clearly anthropogenic, they are implicitly included. To achieve the Paris Agreement's objectives, addressing emissions from international aviation will be critical. In the period of 1990 to 2012, CO₂ emissions from international aviation increased by 86% or 3.0% per year while its share of global CO₂ emissions increased from 0.9% in 1990 to 1.3% in 2012. International and domestic aviation accounted for 2.1% of global CO₂ emissions in 2012. In addition to carbon dioxide, emissions from aviation also impact cloud formation, ozone generation and methane reduction, amongst other effects.

In 2010, at its 37th Assembly, the International Civil Aviation Organization (ICAO) agreed a global aspirational goal of Carbon Neutral Growth from 2020 onwards (CNG 2020). Three years later ICAO established a working group for developing a Global Market-Based Measure (GMBM) to achieve this goal. The GMBM should be adopted in 2016 and come into force in 2021. In 2016, ICAO published several versions of the "Draft Assembly Resolution text on a Global Marketbased Measure (GMBM) Scheme" in which the fundamental design of the "Carbon Offsetting and Reduction Scheme for International Aviation" (CORSIA) is elaborated. In addition, ICAO has set up a task force in order to elaborate eligibility criteria for offset units under the GMBM (Emission Units Criteria, EUC) and to

draft modalities and procedures for measuring, reporting and verifying emissions.

To achieve the carbon neutral growth envisaged by the GMBM, two issues are particularly important:

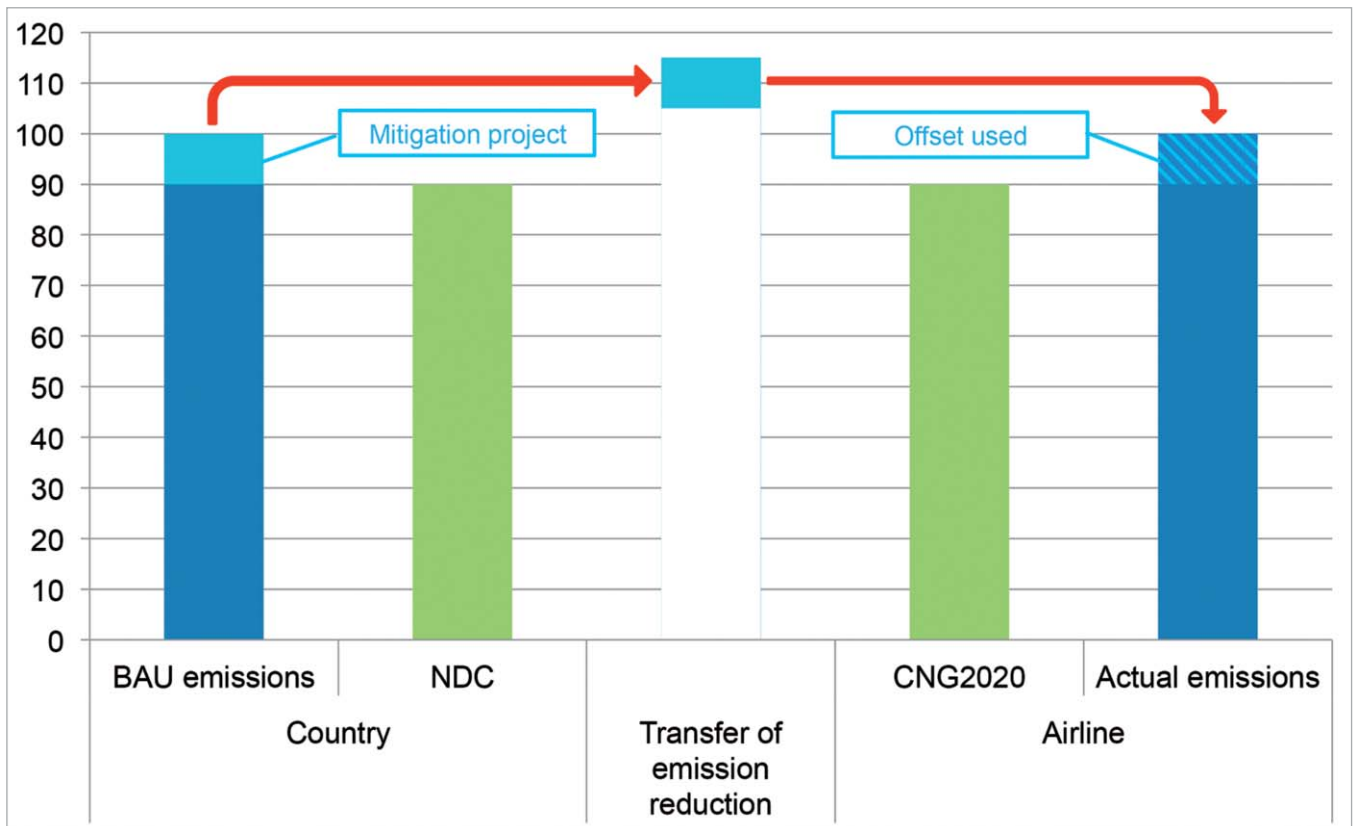
- **Quality of offset units:** To provide for environmental integrity, credited activities have to be additional – i.e. they would not be implemented without the incentives from the offsetting programme – and emission reductions should not be overestimated. Recently, general criteria for the quality of offsets have been agreed upon by ICAO (2016). These will require further elaboration. Moreover, the discussion about the eligibility of offset programmes (UNFCCC, Verified Carbon Standard, etc.) and sectors (e.g. forests) is still ongoing.
- **Robust accounting of units:** To ensure robust accounting, it is particularly important to avoid double counting of emission reductions and to carry out appropriate accounting for the vintage of emission reductions.

This article analyses key requirements for avoiding double counting of emission reductions under the GMBM.

How can double counting of emission reductions come about?

Double counting of emission reductions occurs when a single GHG emission reduction is used more than once towards any mitigation pledge. Three different forms of double counting need to be distinguished:

- **Double use** occurs if one offset unit is used more than once under the GMBM, e.g. if the same unit is used in two different years or by two different airlines for compliance.



- **Double issuance** occurs if more than one unit is issued for the same emission reduction. For example, with multiple programmes operating in parallel under different governance arrangements, two programmes could issue units for the same emission reductions.
- **Double claiming** occurs if an emission reduction is used by both the buyer and the seller. For example, if an emission reduction is counted by the buyer towards GMBM mitigation requirements under ICAO and by the seller towards NDCs under UNFCCC.

Double Claiming

Among the three forms of double counting, **double claiming** of emission reductions is a particularly serious threat for the environmental integrity of the GMBM. It would occur if the same emission reductions are accounted both by an airline under ICAO towards the offset requirements of the GMBM and by a country under UNFCCC towards the Nationally

Determined Contributions (NDC) submitted under the Paris Agreement.

If double claiming were not addressed, the GMBM may not result in actual GHG emission reductions beyond that which countries have already pledged in their NDCs. Double claiming could thus **significantly undermine the environmental outcome of the GMBM**.

The figure above illustrates how double claiming can occur in the context of the GMBM. Assume a country with a quantified NDC target of 90 and business-as-usual (BAU) emissions of 100 in 2030 and an airline with 2020 emissions of 90 (the CNG2020 target) and BAU 2030 emissions of 100. Without the GMBM and any international unit transfers, the country would need to reduce its emissions domestically by 10 units to comply with its NDC. Aggregated GHG emissions from the country and the airline would correspond to 190 (90 from the country and 100 from the airline).

Now the GMBM comes into play. The country reduces its emissions by implementing GHG mitigation projects through a

crediting mechanism. It also sells the emission reductions as offset units to the airline which surrenders them under ICAO to comply with its offset requirements. At the same time, the mitigation projects reduce the emissions in the country. The country thus reports lower GHG emission levels in its GHG inventory and thereby uses the emission reductions towards achieving its NDC. Both the country and the airline would be considered as complying with their obligations. However, aggregated emissions from the country and the airline would still correspond to 190 (90 from the country and 100 from the airline), as would be the case without the GMBM. The emission reductions are double claimed and the introduction of the GMBM has not contributed to reducing global GHG emissions. Double claiming can occur independently of which programme issues the offset units. In other words, offset units issued under UNFCCC or other programmes could result in the same effect.

How can double counting be addressed?

Avoiding the three forms of **double counting** requires actions at different levels, including international rules for robust accounting, appropriate design of mechanisms and programmes, as well as a system to ensure consistent tracking of units.

To avoid double claiming, robust international accounting rules are critical. Addressing double claiming in the context of the GMBM is particularly challenging because it requires action by and coordination among ICAO and UNFCCC. Under the Paris Agreement, double claiming through international unit transfers by countries is avoided on the basis of "corresponding adjustments" (paragraph 36 of the Paris decision). One way of implementing such adjustments could be that countries exporting units add them to their reported emissions and Parties importing units subtract them. In principle, the same approach could be used to avoid double claiming between NDCs under the Paris Agreement and obligations under ICAO. In the example in the figure above, the country would need to add 10 units to its reported emissions. This has the implication that the country could only sell units to ICAO from over-achieving its NDC target. For example, it could reduce its emissions by 20 units, of which 10 could be sold to

the airline. In that case, total emissions would correspond to 180 (80 from the country and 100 from the airline). The GMBM would contribute to global emission reductions. This approach could apply independently of which programme issues the offset units. Double claiming is not relevant when the host country does not have a mitigation target or if the emission reductions achieved through a project do not fall within the scope of its mitigation target. In such a case, no adjustments would need to be applied.

To avoid **double issuance**, the appropriate design and oversight of market mechanisms and programmes is important. This could, for example, include provisions that entities seeking credits must sign declarations that they do not seek credits for the same reductions elsewhere.

To avoid **double use**, transparent tracking and documentation of international transfers is important. Tracking the issuance, transfer and use of units could be implemented through a single registry, connected registries consistently operated by Parties and/or reporting requirements by Parties and airlines.

Finding Solutions

To technically address all forms of double counting, the following could be pursued:

- Ensuring that countries selling offset units to the GMBM conduct corresponding adjustments under the Paris Agreement; to ensure that countries can adjust appropriately, it is necessary that they authorize the use of offset units towards ICAO mitigation requirements;
- Making sure that such adjustments be applied to any offsetting programme and to any offset units covered by a country's NDC;
- Developing requirements for offsetting programmes to avoid double issuance (e.g. as part of the EUC);
- Developing systems (e.g. registries, reporting, review) to track the issuance, use and accounting of units towards ICAO obligations.

Options with regard to the process for addressing double claiming include:

- Establishing provisions under ICAO that double claiming of emission reductions with UNFCCC be avoided
- Initiating a coordination between ICAO and UNFCCC on how to deal with the issue;
- Establishing discussions under UNFCCC with a view to agreeing procedures which ensure avoidance of double claiming with ICAO.

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What's next?

The 39th Assembly of the ICAO, which will convene from 27 September to 7 October 2016 in Montreal, is expected to decide on the final design of the GMBM. The final Assembly Resolution on the GMBM should include a clear provision that any form of double counting, including double claiming is to be prevented. We also recommend that the issue be discussed under relevant agenda items under UNFCCC and be coordinated between UNFCCC and ICAO.

Tapping the Synergies

Accelerating mitigation ambition through enhanced coordination of local CDM/GCF authorities

by Stephan Hoch and Alberto Galante, Perspectives

The Paris Agreement (PA) reshuffles the landscape of international mechanisms to support climate action in developing countries. Not only has the PA committed all countries to contribute to global climate action, but it also establishes that both international climate finance and market mechanisms will be important means of international support for achieving the nationally determined contributions (NDC) of developing countries. Crucially, as the collective level of ambition is not yet commensurate with the mitigation needs to reach even the 2° C target, global mitigation ambition needs to be increased. This raises the question of how innovative linkages between carbon market and climate finance institutions may contribute to accelerating mitigation ambition.

Linking market mechanisms and climate finance: political context and rationale

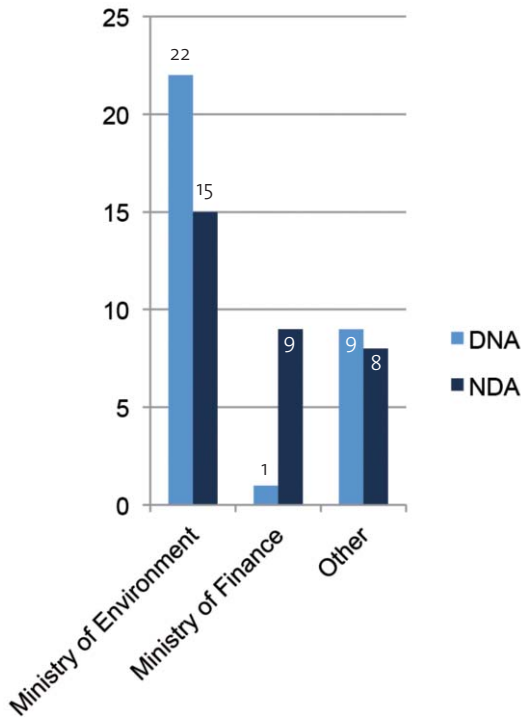
The Kyoto Protocol's (KP) Clean Development Mechanism (CDM) has successfully implemented reforms such as introducing programmatic and standardized approaches. In September 2016, the CDM pipeline comprised almost 10,000 mitigation activities in more than 100 developing countries¹. All registered CDM activities have an aggregated mitigation potential of up to 10.9 billion certified emission reductions (CER) by 2020, and up to 18.7 billion CERs by 2030 (all figures from UNEP DTU a, b). These figures should be

treated with caution and are indicative at best, as traditional carbon market demand cannot absorb such quantity with current mitigation pledges. This leads to low CER prices that make it impossible for some of these projects to continue. Still, the theoretical mitigation potential of the CDM portfolio illustrates that the mechanism could make a substantial contribution to closing the ambition gap if conditions were sufficiently attractive. The CDM is already being used as a tool for the monitoring, reporting and verification (MRV) of climate finance activities. This means that CERs are not used as offsets, but are being cancelled in order to demonstrate mitigation impacts according to UNFCCC standards (meaning CDM methodologies).

International climate finance is also becoming increasingly important. At COP 15 in 2009, the international community agreed to mobilize USD 100 billion annually for climate action in developing countries by 2020. The major share of international climate finance has so far been channelled through bilateral initiatives and multilateral development banks. However, parties to the UNFCCC have also decided to set up a dedicated Green Climate Fund (GCF), which is part of the financial mechanism of the UNFCCC and thus, similarly to the CDM, operates completely within the UNFCCC governance architecture. The GCF has been capitalized with USD 10.2 billion in 2015, and has an official target to commit up to USD 2.5 billion annually. By September 2016, however, the GCF Board had approved only 17 projects in

¹ This number is a sum of circa 7700 single CDM projects and circa 2070 component projects of CDM Programme of Activities.

Table 1 Institutional base for DNAs and NDAs in Latin America



two rounds of funding approvals, with a total GCF investment volume of USD 424 million.

Hence, a huge gap remains between reaching the GCF’s ambition of supporting transformative climate action at scale and the actual GCF pipeline. While some barriers have to do with the GCF’s early stage of institutional development, there have also been complaints about the insufficient quality of funding proposals. Given the UNFCCC checks that registered CDM activities have undergone, linking the CDM and the GCF promises synergies: First, the CDM portfolio is at risk of not realizing its mitigation potential. Second, the CDM has generated a set of UNFCCC-approved MRV methodologies. The GCF has financial resources available, but no large activity pipeline. The Fund does have a results framework, but no set of approved MRV tools to monitor and verify climate

impacts. This, however, will become increasingly important as developing countries are reporting on their NDC achievement.

The institutional dimension of linking carbon markets and climate finance

These initial observations suggest that the respective strengths and weaknesses of the CDM and the GCF complement each other. At COP21, decisions in the Kyoto Protocol negotiations track have for the first time formally suggested exploring possible linkages between the CDM and the GCF. As a result, at SB44 in May, Parties to the UNFCCC held an in-session workshop² that discussed possible CDM-climate finance linkages. There is not yet a specific set of multilateral rules on how to implement such linkages practically, although recommendations for conceptual models have been put forward (Mikolajczyk et al 2016).

In light of current regulatory vagueness, practical experience may best serve the development of multilateral rules. Most developing countries have established their national institutions. Designated National Authorities (DNA) supervise CDM implementation by confirming sustainable development contributions, while National Designated Authorities (NDA) fulfill a similarly supervisory role for the GCF. Table 1 shows the institutional bases for CDM DNAs and GCF NDAs in Latin America, respectively, distinguishing between Ministries of Environment, Ministries of Finance, as well as other institutions.

This demonstrates that the CDM has been predominantly supervised by Ministries of Environment, while for the GCF, Ministries of Finance have begun to supervise GCF activities. Having different ministries involved naturally requires a higher degree of coordination compared to if only one ministry is responsible. Therefore, proactive coordination between these institutions is necessary to identify

² A brief report and the presentations can be accessed here: <http://cdm.unfccc.int/stakeholder/index.html#>

Title	Host country	Coordinating Entity	PoA-Type	CPAs	2012 ktCO ₂	2020 ktCO ₂	Issuance kCERs
PoA for the Reduction of emission from non-renewable fuel from cooking	Madagascar, (many)	Green Development AS	EE households	59	0,000	29.854,592	0,000
Uganda Municipal Waste Compost Programme	Uganda	National Environmental Management Authority	Landfill gas	12	136,847	1.018,526	16,549
DelAgua Public Health Program in Eastern Africa	Burundi, Rwanda, Tanzania, Uganda	DelAgua Health and Development Programs	EE households	7	0,000	1.593,909	66,217
Improved Cook Stoves programme for Rwanda	Rwanda	atmosfair gGmbH	EE households	6	9,948	2.221,250	6,517
Renewable Energy CDM Programme of Rwanda (RECPR)	Rwanda	Ngali Energy	Hybrid renewables	6	0,000	256,389	0,000
Tanzania Renewable Energy Programme	Tanzania	Rural Energy Agency	Mixed renewables	5	0,000	504,859	0,000
KTDA Small Hydro Programme of Activities	Kenya	Kenya Tea Development Agency	Hydro	1	0,000	180,456	0,000
Accelerating Electrification through Grid Extension and Off-Grid Electrification in Rural Areas of Uganda	Uganda	Rural Electrification Agency Uganda (REA)	Energy distribution	1	0,000	640,000	0,000
Ethiopia – Clean Cooking Energy Program	Ethiopia	Development Bank of Ethiopia (DBE)	Biomass energy	1	0,000	245,228	0,000
Ethiopia Off-Grid Renewable Energy Program	Ethiopia	Development Bank of Ethiopia (DBE)	Solar	1	0,000	158,094	0,000

Table 2 Registered CDM Programme of Activities in Eastern Africa. Black characters indicate a private coordinating entity, white characters indicate a public CME.

linkages that enable resource mobilization for realizing the mitigation potential of the CDM pipeline.

Accelerating mitigation ambition through greater institutional coordination

The case for establishing linkages between CDM and GCF can best be illustrated with the practical example of the CDM Programme of Activity Pipeline in Eastern Africa. Table 2 shows all registered CDM PoAs in the region. The PoAs are sorted by number of component project activities (CPA) in order to illustrate the scaling up potential of programmatic approaches in the CDM. Furthermore, the PoA coordinating and managing

entities (CME) are highlighted in order to draw attention to which ones are private sector (yellow) and which ones are public sector (green) organizations.

Several key observations stand out:

- CDM PoAs have successfully added further component projects into existing PoAs, demonstrating that the CDM's programmatic approach works. Therefore, CDM PoAs can serve as ideal pilot activities and frameworks that can be scaled up with GCF resources.
- The PoAs support activities with high sustainable development impacts and benefit the most vulnerable low-income communities, which is an important dimension of the GCF result framework.



PoAs work: off-grid renewable energy in Ethiopia.

- Both private and public sector organizations operate CDM PoAs. While the CDM offers a framework for mobilizing the private sector, there is also strong public sector engagement. Therefore, such PoAs could serve as possible pilot activities that create precedents for CDM-GCF linkages.

While the examples are arguably the most salient activity types, any CDM activity that has passed both the CDM project cycle and meets GCF investment criteria could theoretically apply for GCF funding. A proposed 2013 Business Model Framework for the GCF Private Sector Facility (PSF) suggests to “provide price guarantees on CERs from CDM projects that supply clean efficient cook stoves, high-efficiency lighting, solar photovoltaic supply and solar energy appliances, small-scale biomethanation projects” (GCF Secretariat 2013, p.7f.). An important precondition for establishing such a link between the CDM and the GCF, however, is that any issued CERs resulting directly from mitigation outcomes supported by the GCF would need to be cancelled in order to avoid so-called “double dipping”, i.e. receiving two sources of financial support (in this case from CER sales as well as GCF finance).

Practical steps towards stronger institutional coordination

What is the way forward for working towards CDM-GCF linkages? Even today, without further political decisions, CDM DNAs and GCF NDAs can coordinate and strengthen their national resource mobilization. As a first step, both GCF NDAs and DNAs may want to explore jointly whether there are existing CDM activities in their country which could apply to the GCF in order to provide the resources for scaling up existing activities. In addition, we recommend the following steps for enhancing CDM DNA and GCF NDA:

- Aligning sustainable development criteria for assessing CDM and GCF activities. This harmonizes procedures and reduces transaction costs. This alignment should consider how CDM and GCF activities contribute to the sustainable development goals (SDG). As NDAs are new institutions, lessons from the establishing CDM DNAs can be harnessed (Michaelowa 2005).

- Harmonizing MRV approaches: The CDM provides the only UNFCCC-approved MRV methodologies. Well-tested methodologies have been increasingly simplified, and are at least partially transferable. Therefore, NDAs should ensure that GCF funding applications are building on (further simplified) CDM methodologies, and can solicit the support of DNAs. This is particularly relevant given the importance of reporting on NDC achievement. Fragmentation among different MRV approaches would complicate the task of aggregating the impact of NDC related activities, and would also undermine comparability and transparency.
- Improving climate finance resource mobilization. When developing GCF pipelines, existing CDM activities should be screened with regard to their potential to serve as pilots for GCF activities. CDM activities have undergone comprehensive UNFCCC processes only to find that carbon market demand is insufficient to cover the incremental cost needed to sustain their operations. This should focus on high quality CDM activities with demonstrable sustainable development contributions and which meet the GCF investment criteria.
- Seeking technical assistance and capacity development for enhanced DNA NDA cooperation. As explained above, the proposed CDM GCF linkages are a very recent development. Therefore, awareness needs to be raised for potential synergies, in particular when working with further sector ministries that are responsible for implementing the mitigation actions. The delivery models for how to access GCF resources for CDM activities are not readily available and require tailor-made solutions.
- Once initial experiences have been made, provide feedback to the multilateral rule-making process that reflects on practical lessons learned that are useful for the international climate negotiations.

As the elaboration of the Paris Agreement rules is only beginning, there is a window of opportunity to raise the mitigation ambition of developing country NDCs by identifying synergies between the CDM and the GCF. CDM Programme of Activities represent important existing pilot activities which could be scaled up with GCF resources. This would not only leverage the partially untapped mitigation potential of the CDM

pipeline, but may also strengthen the effectiveness of the GCF, in particular with regard to the MRV of climate impacts. The recommendations above also show the diversity of potential synergies between the CDM and GCF. Piloting them in practice would strengthen climate action in developing countries, and would generate further lessons for the institutional design of the policy instruments of the future climate change regime.

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Minimizing the Risks

Addressing environmental integrity challenges for crediting under Article 6 PA

by Nicolas Kreibich, Wuppertal Institut

With the unexpected adoption of Article 6 in Paris at the end of last year, the global climate community has been given a new reference framework for using market mechanisms: Article 6.2 will allow for the development of bilateral crediting mechanisms as well as for linking national carbon pricing instruments, while Article 6.4 lays the foundation for a new crediting mechanism that is to be governed by the UNFCCC. At the same time, the Paris Agreement established an entirely new governance structure, which builds on transparency and political commitment. While this new bottom-up approach was one of the key prerequisites for the adoption of the agreement, it is also associated with significant challenges, in particular in the context of using crediting approaches.¹ Against this backdrop, this article examines the diverse environmental integrity risks associated with the use of crediting mechanisms under the Paris Agreement as well as possible ways of addressing them.

Integrity risks of crediting under the Paris Agreement

The well-known issue of non-additionality and its new interplay with host countries' NDCs

Some environmental integrity risks are closely related to the process of designing and implementing the mitigation activity. One key risk in this regard is lack of additionality. Lack of additionality means that the mitigation activity would have also been implemented without the additional incentive or the infrastructure provided by the overarching crediting mechanism. The degree to which a non-additional

activity can undermine environmental integrity depends on its relationship with and the design of the host country's mitigation goal. This is particularly relevant in the context of the Paris Agreement, where Parties have been given quite some leeway in defining their individual mitigation goals, or nationally determined contributions (NDCs). Furthermore, the level of detail and accuracy (granularity) of the national GHG inventory is of key relevance for the environmental integrity impact of non-additional activities. The following discussion builds on the assumption that GHG reductions are reflected in the host country's GHG inventory and that exported emissions will be accounted for.

Non-additional activities that are outside the scope of the host country's NDC can be expected to have the most severe impact on environmental integrity. Therefore, host countries that have adopted an NDC with a limited scope are particularly prone to this type of risk. Consider, for instance, a country with a NDC that only covers its industrial sector emissions and where a Bus Rapid Transport (BRT) project that would have been implemented anyways – because it has already been planned as a means to reduce traffic jam – is used for crediting. Its (non-additional) mitigation outcomes would then be transferred and used by another country for pledge attainment. As the transport sector is not covered by the NDC, the host country will not (be able to) account for the exported mitigation outcomes that were generated by the BRT project, thereby necessarily leading to an increase of global emissions.

¹ Environmental integrity risks not related to crediting, such as the over-allocation of Emission Trading Schemes in the context of linking, will not be considered in this article.

But non-additional activities located in countries with an economy-wide NDC can also undermine environmental integrity. Assume, for example, that the BRT project is implemented in a country with an economy-wide NDC. Here, the host country can (and should) account for the mitigation outcomes from the BRT project that are to be exported by adjusting its national mitigation target or its emissions budget/inventory accordingly. In theory, therefore, even if the BRT is non-additional it will not undermine environmental integrity. In practice, however, if the country's mitigation target lacks ambition (i.e. is weaker than the business as usual case), the NDC can be reached easily even after inventory emissions have been adjusted for the exported mitigation outcomes. Hence, even if the inventory emissions have been adjusted to compensate for the exported emission reductions from the BRT project, no additional mitigation effort will be needed to reach the national mitigation target (cp. trading of hot air in the JI context). Under these circumstances, the non-additional BRT project will challenge environmental integrity even if it is within the scope of the host country's NDC.

Determining mitigation outcomes

The process of determining mitigation outcomes is associated with multiple risks to environmental integrity. In the context of crediting, emission reductions are calculated by comparing the hypothetical reference emissions (also called baseline emissions) with project emissions. One situation that leads to the miscalculation of emission reductions is overestimating the hypothetical reference emissions. For instance, if reference emissions in the electricity sector are calculated without taking into account falling prices for renewable energy technologies, reference emissions will presumably be too high, resulting in a net plus on emissions.

A second situation leading to the same outcome is the underestimation of project emissions, for instance by excluding emission sources that are not



A question of additionality: Bus Rapid Transit Project in Colombia.

directly related to the project activity but still contribute to the project emissions.

A third risk is the application of a crediting period that is longer than the actual lifetime of the activity. A similar risk is non-permanence of mitigation outcomes, for instance in the context of forestry projects. Other, more indirect effects that can also lead to an increase of global GHG emissions are carbon leakage and the rebound effect.

Carbon leakage refers to the situation when carbon dioxide or another GHG is transferred in time or space outside the scope of the mitigation activity. While emissions within the project scope are reduced, the impact outside the scope might lead to an increase of emissions. The rebound effect is a similar phenomenon. It refers to a situation where the implementation of a mitigation activity leads to a reduction of GHG emissions associated with a specific activity, which are, however, countered by changes in behaviour and consumption that lead to an overall increase of emissions. If ignored, all these effects can significantly reduce the climate mitigation impact of an activity.

Integrity risks related to the transfer of credits

In crediting schemes, the process of determining the mitigation outcome is usually followed by the

issuance of credits. One key risk in this process is double issuance. It refers to the situation when one emission reduction results in the issuance of two (or more) mitigation units that can be used for pledge attainment. The most obvious case of double issuance is when one mitigation activity is registered twice in one GHG mitigation programme, leading to one emission reduction to result in the issuance of two units of the same type.

If not addressed properly, this and the other types of double issuance can lead to double counting of emission reductions, which is when one mitigation outcome is used more than once to account for the achievement of one or more climate change mitigation targets.

Double counting and other accounting challenges related to the use of mitigation outcomes

But even if the issuance process has been properly carried out, there are still numerous situations that can undermine environmental integrity during the phase of using mitigation outcomes, many of which can lead to double counting. One of the key risks that result in mitigation outcomes being counted more than once is double claiming. Consider a Party implements an energy efficiency programme and exports the credits generated by the programme to another Party, which then uses these credits to achieve its mitigation target. At the same time, since the energy efficiency programme is within the scope of the host country's NDCs, the mitigation outcomes generated by the programme are used for meeting this NDC. Another situation that can lead to double counting is double use. It occurs when one transferred mitigation outcome is used for mitigation pledge attainment more than once, either by the same Party or by different Parties.

There are other accounting challenges that can be subsumed under the term flawed accounting, referring to a situation when properly accounting for the transfers is not possible. Flawed accounting can be a result of very diverse mitigation contributions of the countries involved in a transfer process, making it difficult to ensure that the climate impact of the mitiga-

tion outcome generated in the exporting country is equivalent to the climate impact of the mitigation outcome which it replaces in the importing country (a-ton-is-a-ton principle). Consider two countries with different timeframes: if a country with a single-year target exports a mitigation outcome generated in a year preceding the target year to a country with a multi-year target, the "climate value" of the mitigation outcome is not the same for both countries. For the exporting country, the mitigation outcome is not covered by the single-year target and has therefore no direct impact on the achievement of its individual target. For the importing country, by contrast, the mitigation outcome does have a high climate value as it contributes to achieving its mitigation target.

Making crediting environmentally safe(r)

The use of crediting mechanisms under the Paris Agreement is associated with numerous environmental integrity risks. This raises several fundamental questions: Can these risks be addressed while maintaining the new open structure of the agreement? What experience has been gained on which we can build? And where do we enter uncharted territory?

Addressing the risk of non-additional activities

Non-additional mitigation activities can have a detrimental effect on environmental integrity, in particular if they are beyond the scope of the NDC or if the NDC within which they are implemented lacks ambition. Provisions are thus needed that require Parties to demonstrate that their activities are additional. For this purpose, they would first have to show at the activity level why the activity as such would not have been implemented without the additional incentive provided by Article 6. For this first kind of additionality demonstration, the additionality provisions under the CDM and the experience gained in their application can provide valuable input. However, additionality will in the future also have to be demonstrated at the climate policy level by indicating how the activity



Safeguarding integrity: phasing out coal-based power generation offers many opportunities for international cooperation.

relates to the NDC, whether it is within or beyond the scope of the NDC, and if it is used to achieve the NDC or if it is an additional contribution. This will require an increased level of detail and transparency when communicating the NDCs to the UNFCCC, including information on an NDC's level of ambition and respective multilateral processes for reviewing the information provided.

Correctly determining mitigation outcomes

One key prerequisite for the correct determination of mitigation outcomes is their measurement, reporting and verification (MRV). A robust MRV framework can ensure that mitigation impacts are real and increase certainty regarding their attribution to the mitigation activity. Therefore, MRV rules and a respective framework will have to be established at the international level (under Article 6.4), and minimum requirements to develop such a framework for activities undertaken under Article 6.2. agreed upon

at UNFCCC level. Here again, the experience gained with existing Kyoto mechanisms should be taken into account. By expanding the scope of the MRV framework beyond the scope of the mitigation activities' direct impacts, it can also be used to address impacts that are beyond the scope of the activity itself, such as carbon leakage and rebound effects. The risk of inflated baselines can however only be addressed to a certain extent by establishing robust rules for baseline setting. However, the uncertainty intrinsically linked to their counterfactual nature will remain.

Rules to address accounting risks

For addressing the risk of double issuance, internationally agreed rules are needed. These could for instance require proponents of mitigation activities to submit a written attestation that they have the sole right to the credits. In order to preserve integrity after the transfer has taken place, robust accounting

rules are essential. In Paris, Parties agreed on some basic principles. As a result, the Paris Agreement requires host Parties not to use emission reductions resulting from the use of Article 6.4 to demonstrate achievement of their NDC if they are used by another Party (Article 6.5).

Similarly, with regard to participation under Article 6.2, the agreement requires Parties to ensure environmental integrity and transparency, and apply robust accounting to avoid double counting. According to the accompanying decision, Parties will be required to make corresponding “adjustments” for emissions and removals covered by their nationally determined contributions (NDCs) to ensure that double counting is avoided (Decision 1/CP.21, para 37). The most promising approach for implementing such adjustments is accounting for net flow of mitigation outcomes.

This, however, only relates to mitigation outcomes falling within the scope of the NDC. For mitigation outcomes not occurring within the NDC’s scope, reporting should be made a requirement. These rules should be combined with technical tools, such as mitigation outcome registries and transaction logs, which can assist in addressing some double counting risks and are important elements of a robust accounting system.

One possibility to address some of the remaining accounting challenges would be to agree on rules that guide the design of NDCs. A process to develop guidance on NDCs’ features has already been agreed under the Paris Agreement (Decision 1/CP.21 para 26). In addition, specific design provisions for NDCs of those countries willing to participate in transfers of mitigation outcomes could be established. With these provisions, the variety of the NDCs of Parties using Article 6 would be minimized to an extent.

However, due to their bottom-up nature, NDCs will presumably continue displaying some diversity. In order to allow different NDC types to use crediting approaches under Article 6, the participation of Parties with specific NDC types could be made subject to

certain conditions. For instance, the participation of Parties with a particular NDC type could be limited to transfers with Parties that have adopted the same type of NDC. With this approach, a balance between the bottom-up nature of the Paris Agreement and the goal of ensuring robust accounting could be reached.

In addition to the differences among countries in relation to the design of their NDCs, countries will also continue to differ in terms of their institutional and technical capacities. These different levels of “readiness” could be taken into account when regulating access of Parties to the different types of market mechanisms. For instance, participation of Parties with limited technical and institutional capacities could be limited to Article 6.4, where activities are supervised internationally, while countries with larger capacities and experience could be granted access to use Article 6.2.

Conclusions

Most of the integrity risks identified are already well known from the experience gained under the Kyoto Protocol and elsewhere. Some of these can be addressed on a technical level. This relates, among other things, to the risks of underestimating the activity emissions as well as to carbon leakage and rebound effects. Here, robust MRV provisions should be established. Another set of risks that can be addressed with technical provisions are those related to double counting. Robust and uniform accounting rules applicable to all countries combined with clear reporting provisions and registries (for mitigation activities and outcomes) are substantial elements for addressing these risks.

However, for some other risks, the Paris Agreement adds a new layer of complexity. This relates for instance to the risks of non-additionality. Technical approaches can reduce subjectivity and increase certainty when demonstrating the additionality of a mitigation activity. However, a minimum risk level will prevail, as emission reductions calculated on the

basis of reference scenarios will always be hypothetical by nature. Under the Paris Agreement, this is further exacerbated by the fact that additionality might in the future have to be demonstrated at the level of the individual activity as well as against the national climate policy. In this regard, it will be very challenging to develop a set of provisions that provide incentives for countries to develop truly additional activities while raising the ambition of their NDCs. The process of establishing such provisions can be expected to be politically controversial, potentially significantly reducing the attractiveness of crediting approaches.

Another set of risks that will be difficult to address are those related to accounting among countries with diverse types of NDCs. Transferring mitigation outcomes internationally and using these for pledge attainment requires a certain level of comparability. With very diverse NDCs, such comparability cannot be provided. In this context, the issue of single-year targets is particularly problematic. Therefore, clear and uniform requirements for the design of NDCs for those countries willing to use crediting approaches will have to be established. This, again, can be expected to lead to political controversies that potentially reduce the attractiveness of using crediting under Article 6.



Further information:

Nicolas Kreibich is co-author of a new JIKO Policy Paper:

Kreibich, Nicolas and Lukas Hermwille (2016): “Robust Transfers of Mitigation Outcomes—Understanding Environmental Integrity Challenges”. The Paper can be downloaded at www.carbon-mechanisms.de/en/accounting_II

An Example for Future Voluntary Activities

Carbon Neutral Business Trips of the German Federal Government

by Sebastian Hussels, Kay Köhler, Marcel Kruse and Stefanie Böther, German Emissions Trading Authority

The German Federal Government decided in 2015 to offset the climate impact of their employees' business trips via air and road from the beginning of the current legislative period (2014-2017). This is achieved by using emissions savings from elsewhere. The climate impact of business travel will therefore be offset by acquiring emission credits from ambitious climate protection projects and cancelling them according to the "first avoid, then reduce and offset" principle. Credits will be obtained from projects which are certified according to UN rules under the Kyoto Protocol's Clean Development Mechanism (CDM).

The climate impact of the German Federal Government's business trips has successfully been neutralized for the first year of offsetting (2014). CERs – Certified Emission Reductions generated by the CDM projects – have been acquired and thus emissions of 138,038 tonnes of carbon dioxide equivalent (t CO₂eq) have been offset by investing in valuable climate protection projects in developing countries.

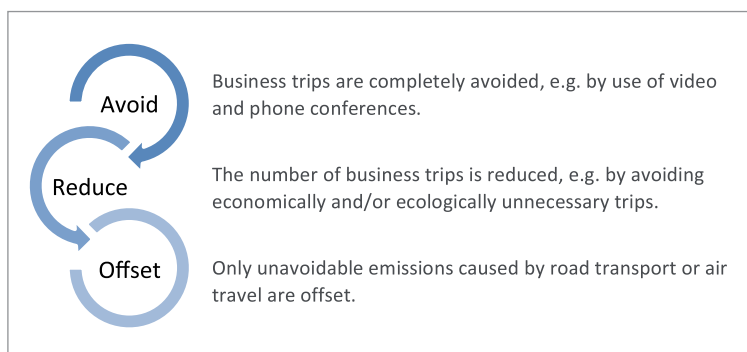
Background

The "first avoid, then reduce and offset" principle
In general, the German Federal Government follows the basic approach for climate-friendly behaviour:

Why CDM projects?

To be registered as a CDM project, climate protection projects must pass a scrutiny according to the rules and institutions of the Kyoto Protocol and be approved by the CDM Executive Board (CDM EB) after their compliance with the CDM rules have been checked. Because only CDM projects are eligible, the use of emission reductions that are certified by a central body under the umbrella of UN rules is ensured.

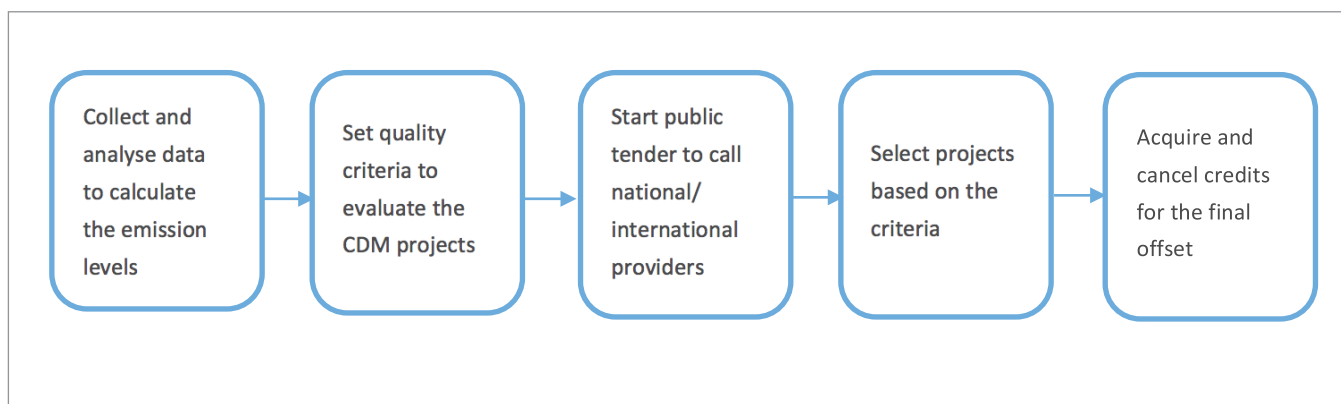
The overall rationale for choosing selected CDM projects was to benefit from experiences of a centrally UNFCCC controlled mechanism and to contribute to the elaboration of new market mechanisms under the Paris Agreement. Furthermore, the CDM projects were selected in order to support the current CDM reform process in particular.



How does it work?

General procedure

The Federal Government purchases carbon credits from ambitious CDM climate protection projects to offset the greenhouse gas emissions of their business trips. The German Emissions Trading Authority (DEHSt) at the German Environment Agency (UBA)



announced a public tender proposing the acquisition of carbon credits by inviting national and international suppliers to offer carbon credits from one or more CDM projects. However, the amount of emissions must be known and a set of quality criteria for further evaluation must be established before a tender. DEHSt assessed the bids based on selected criteria and acquired the selected carbon credits. Finally, the carbon credits were cancelled permanently in the German Kyoto Register, i.e. cancelled by DEHSt.

For the first year of offsetting (2014), greenhouse gas emissions caused by all business trips of 17 supreme federal authorities (e.g. all Federal Ministries, Federal Government Commissioner for Culture and the Media and the Press and Information Office of the Federal Government) and 57 higher federal authorities were offset.

Which greenhouse gas emissions are offset?

Emissions offset include travel by air and road vehicles.

The emissions from business trips by road are determined by the actual fuel consumption of the vehicles and emission factors for different fuels (diesel, petrol, and compressed natural gas). According to a query response to the Federal Government, the 2013 fuel consumption data was already available.

In order to determine emissions from air travel booking data is used (route and number of passengers per booking class). The routes are broken down into individual travel sections so that a flight from Berlin to New York with a change in Frankfurt is considered

as two individual events. This breakdown is important because different aircraft types can be used for the two travel sections and treating it as a direct flight generally has a shorter distance and would result in an underestimation of emissions. In order to increase accuracy, the booking class and the most common type of aircraft are taken into account. Climate-relevant 'non-CO₂' effects (such as water vapour, nitrogen oxides and carbon black particle emissions) at high altitudes are also considered for all travel sections. A radiative forcing index (RFI) of three is applied to the CO₂ emissions. The climate active emissions of air travel are determined from all of these data which include almost 200,000 individual flight events.

The Federal Government acquires so-called "green tickets" for regional and long-distance rail travel. Hence there is no compensation for this kind of travel.

Price versus quality

Both the set of quality criteria as well as the price per CER played a role for the final selection.

High-quality CERs were expected to be used to offset the business trips of the Government. Therefore, CERs issued for the following project types were not considered:

- Biological or geological CO₂ sequestration
- Destruction of trifluoromethane (HFC-23) and nitrous oxide (N₂O) from adipic acid production

- Projects associated with the extraction and processing of fossil fuels or where fossil fuels are primarily used, with the exception of energy efficiency measures in households
- Use of hydroelectric power with an installed capacity above 5 MW

To best serve the German Federal Government's climate objectives, appropriate bids were evaluated based on their cost-effectiveness. Further criteria in the procurement of high-quality CDM projects included support of sustainable development in host countries, e.g. additional international Gold Standard certification or documentation in accordance with CDM Sustainable Development Co-benefits reports (SDC reports, the documentation required by the Sustainable Development tool of the CDM EB). Integration into the climate protection policies of the host country and the promotion of small programmatic projects (PoA) as well as projects in the least developed countries (LDCs) were also part of the evaluation process. Finally, the bids were ranked accordingly.

Overview of the selected climate protection projects

After a review of the projects by the DEHSt, the credits are purchased from these ambitious climate protection projects under the CDM. In addition to the UN rules for CDM, careful attention is paid to compliance with additional criteria to ensure high quality of the projects: climate protection projects should show impact over and above purely the reduction of CO₂ and have a sustainable added value for developing countries (so-called co-benefits). The related co-benefits are, for example, the protection of other environmental, social and economic elements such as air/soil/water resource protection, rural electrification, strengthening of local jobs, training of local workers, support of local facilities and health protection.

According to the Federal Government's energy and climate policy objectives, the projects selected were in the sectors of renewable energy and energy efficiency that mainly meet the Gold Standard criteria.

Small-scale projects were selected chiefly because they are usually economically disadvantaged by their cost structure compared to large projects. The generally significant project development costs of small projects usually receive lower rev-

enues from the smaller number of credits than large projects. At the same time, particularly small projects provide a number of co-benefits, thus making a direct contribution to local sustainable development. They strengthen local/regional labour markets through the creation of new jobs or sources of additional revenue – for example in production, sales and maintenance of small biogas digesters for households or the purchase of previously unused crop residues.

The purchased CERs of the following five projects represent the total amount offset for 2014.

Household biogas in China

Project name: Sichuan Rural Poor-Household Biogas Development Programme

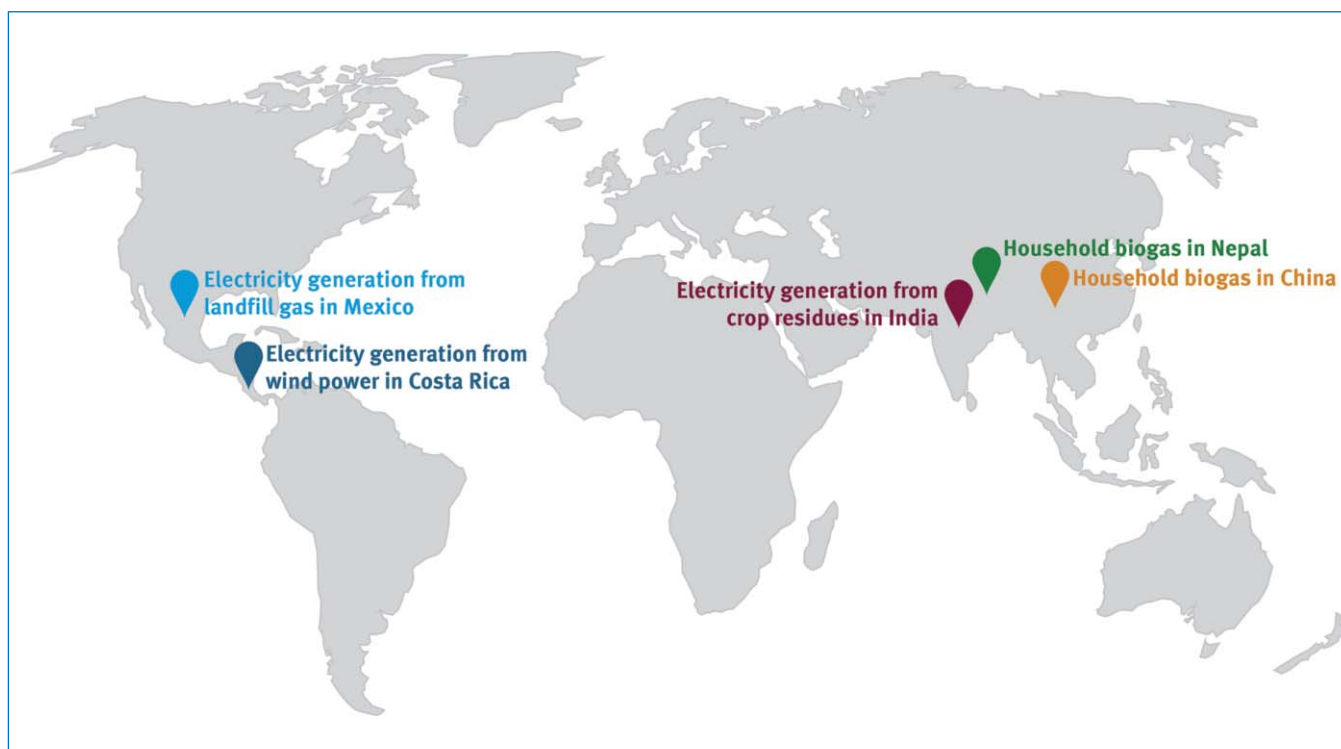
Project number: CDM PoA 2898

Project type: Household biogas

Specifics: PoA, Gold Standard

Number of cancelled credits: 10,000

The project makes a significant contribution to sustainable development in Sichuan and provides high socio-economic and environmental benefits by improving the substantive quality of life. It aims to provide up to one million low-income smallholder households with climate-friendly biogas fermenters and practical biogas burners. Instead of widespread disposal of animal faeces in open slurry pits, these biogas plants treat the excrement anaerobically in closed tanks and the resulting methane provides clean biogas for cooking for the farms. Thus, the usually extremely smoky and harmful burning of coal and firewood in outdated ovens becomes redundant. Women and children are especially affected by a lot of smoke when cooking in households. Through the use of methane emissions from animal husbandry and the substitution of coal and firewood with biogas, the project covers two major emission sources in rural areas, thus increasing the project-related and individual greenhouse gas reduction. In addition, exposure to smoke is reduced, sanitary conditions are improved and the production of organic fertilisers promoted. This project, certified by the Gold Standard, is one of the world's biggest and most ambitious CDM climate protection programmes.



Household biogas in Nepal

Project name: Nepal Biogas Support Program

Project number: CDM PoA 9572

Project type: Household biogas

Specifics: PoA, LDC, Gold Standard

Number of cancelled credits: 40,000

The Nepal Biogas Support Program PoA supports the development and use of biogas plants in rural households across Nepal. Biogas replaces the usual firewood for cooking and therefore reduces carbon dioxide emissions; it is also a smoke-free, affordable and decentralised energy source, particularly beneficial for poorer households in rural areas. Small subterranean biogas plants (two to eight cubic metres) are used to convert cow dung, other agricultural waste and faeces by anaerobic fermentation into biogas that can be used for cooking. Two or three cattle supply a sufficient amount of manure to operate a small plant. A biogas plant saves an average of

three tonnes of CO₂ or about 2,000 kg of firewood per year compared to the use of an open three-stone fire.

Electricity generation from crop residues in India

Project name: Electricity generation from mustard crop residues: Tonk, India

Project number: CDM 1774

Project type: Biomass for electricity generation

Specifics: Gold Standard

Number of cancelled credits: 40,000

The 8 MW biomass power plant uses crop residues to generate electricity. Thousands of small farmers have been supplying their crop residues to the power plant since 2007 – and selling the previously worthless waste to the plant operator. Also, the farmers, who often have no means of transport, are not required to transport the fuel over long distances to the power plants as fuel collection centres have been established at a radius of 50 km around the power plant. There, the bags

of mustard residues are weighed, the farmers receive immediate payment and the fuel is then transported to the power plant. A large store ensures that a sufficient amount of material is available all year to produce electricity, even out of season. The fuel is burned by direct combustion and thus generates hot water vapour in a boiler. The steam drives the turbines and generators to produce electricity which is fed into the regional grid. Although mustard plant crop residues are the prime source of energy (energy production by direct combustion), other available crop residues can be used as biomass to generate electricity using the same technology.

Electricity generation from wind power in Costa Rica

Project name: Los Santos Windpower Project
Project number: CDM 6275
Project type: Windpower for electricity generation
Specifics: Partially Gold Standard
Number of cancelled credits: 19,117

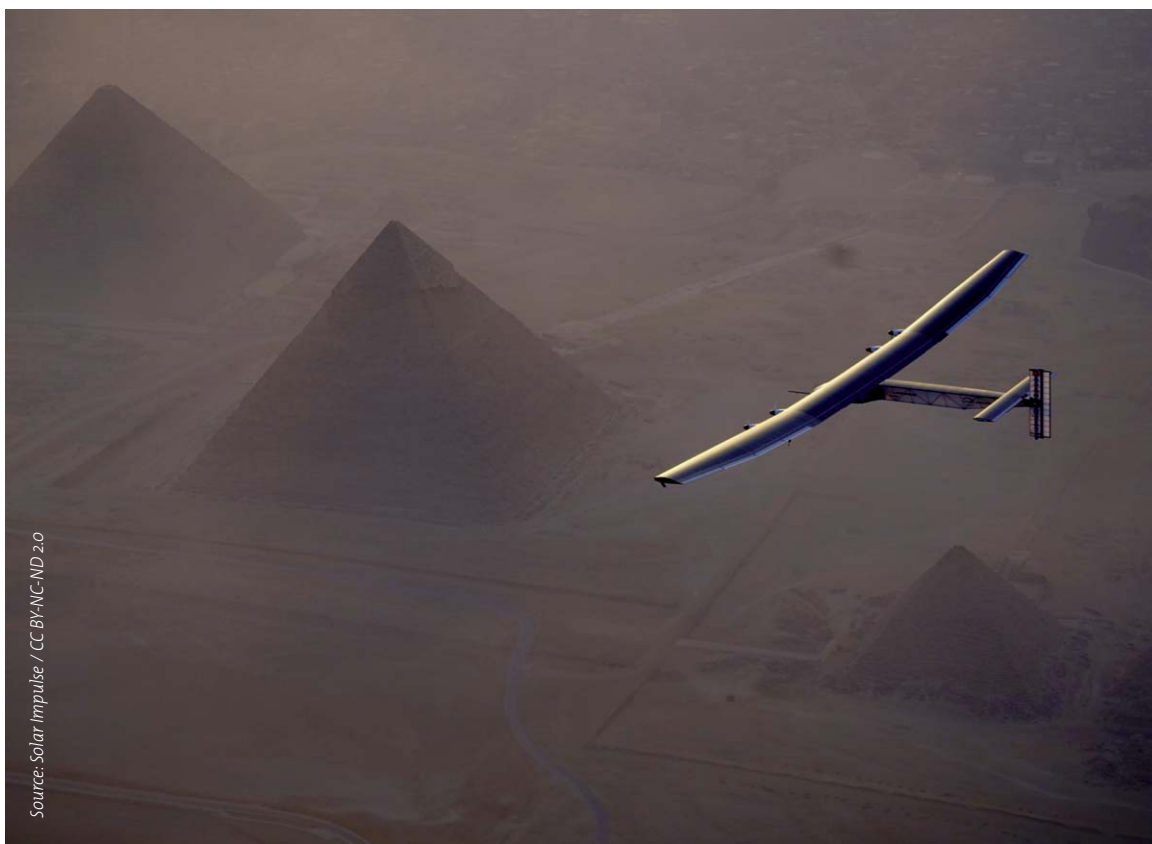
The project is a wind farm with a total capacity of 12.75 MW situated in Costa Rica's San Isidro and San Cris total districts. The 15 turbines are designed to feed 42 GWh of electricity to the Costa Rica national grid annually. This corresponds to a supply of over 20,000 households (as measured by average household consumption). Thus, not only is the national grid stabilised, but the local availability of electricity in this rural area of Costa Rica is also substantially improved. The project is run by a local energy cooperative (members are owners, operators and customers), resulting in local/regional added value, and the improving network stability contributes to the economic development of the rural region. Furthermore, the project activity includes the expansion of the local infrastructure and supports local educational programmes and the distribution of information about sustainable energy consumption, climate change and biodiversity.

Electricity generation from landfill gas in Mexico

Project name: Monterrey I LFG to Energy Project
Project number: CDM 4598
Project type: Landfill gas for electricity generation
Number of cancelled credits: 28,921

With over 120 million inhabitants, Mexico is one of the most populous countries of the world. The population, living mostly in cities, suffers in particular from air pollution (as is the case in many large cities), unresolved household waste management issues and increasing problems concerning drinking water supply.

The project to generate electricity from landfill gas is situated in the Monterrey metropolitan area. The landfill meets modern waste management principles so that overall environmental compatibility of waste disposal could be enhanced. Odour nuisance for local residents is significantly reduced by the extraction and combustion of landfill gases. Approximately 50,000 MWh of electricity is fed into the local grid annually. This corresponds to a supply for about 28,000 households (as measured by average household consumption). The installations of this landfill currently face the huge challenge of a major overhaul. The necessary investment cannot, however, be covered from the proceeds of electricity production. Without additional revenue from carbon credit sales to provide the necessary funds for investment, the landfill faces closure. As a consequence, there is a risk that the project-related installations must be decommissioned and dismantled. This would result in the climate protection project being stopped and landfill gas being released untapped.



Avoiding emissions. The solar impulse is a long-range experimental solar-powered aircraft, which in July 2016 completed the first circumnavigation of the Earth by a piloted fixed-wing aircraft using only solar power.

And now?

The first year of offsetting (2014) is over and UBA can draw a satisfactory conclusion:

- On behalf of the Federal Government, UBA cancelled carbon credits totalling 138,038 tonnes of carbon dioxide equivalent for 2014 business trip emissions from the CDM.
- There were positive responses from project providers.
- However, UBA found that African projects were rarely offered and were not among the projects selected.

UBA is now preparing a public notice to offset the emissions for 2015. The focus will be on PoA projects, projects in LDCs and sustainable development. Fur-

thermore, more public authorities intend to include the climate impact of their employees' business trips in the Government's offsetting project for business trips.

UBA has yet to announce a timeline, but will publish it on their website once it has been confirmed:

<https://www.umweltbundesamt.de/das-uba/ausschreibungen-zuwendungen>

Disclaimer:

This article is a personal contribution by Sebastian Hussels, Kay Köhler, Marcel Kruse and Stefanie Böther and does not necessarily express the opinions of the German Federal Environmental Agency (UBA) or the German Emissions Trading Authority (DEHst).

CARBON MECHANISMS REVIEW

MRV in Chinese ETS – Report online

A dialogue event hosted by the AHK Greater China Beijing discussed the MRV challenges arising from the upcoming Chinese ETS. See www.carbon-mechanisms.de/en/chinese_ets

Non-state actor dialogues

A synthesis report on a series of dialogue workshops held in June and July on how to implement Article 6 is now online and be viewed at <http://newsroom.unfccc.int/paris-agreement/regional-dialogues-on-article-6-of-the-paris-agreement/>

Glossary

All Carbon Market terms and abbreviations are explained in detail in the glossary on the JIKO website. You can view the glossary here: www.carbon-mechanisms.de/en/service/glossary/