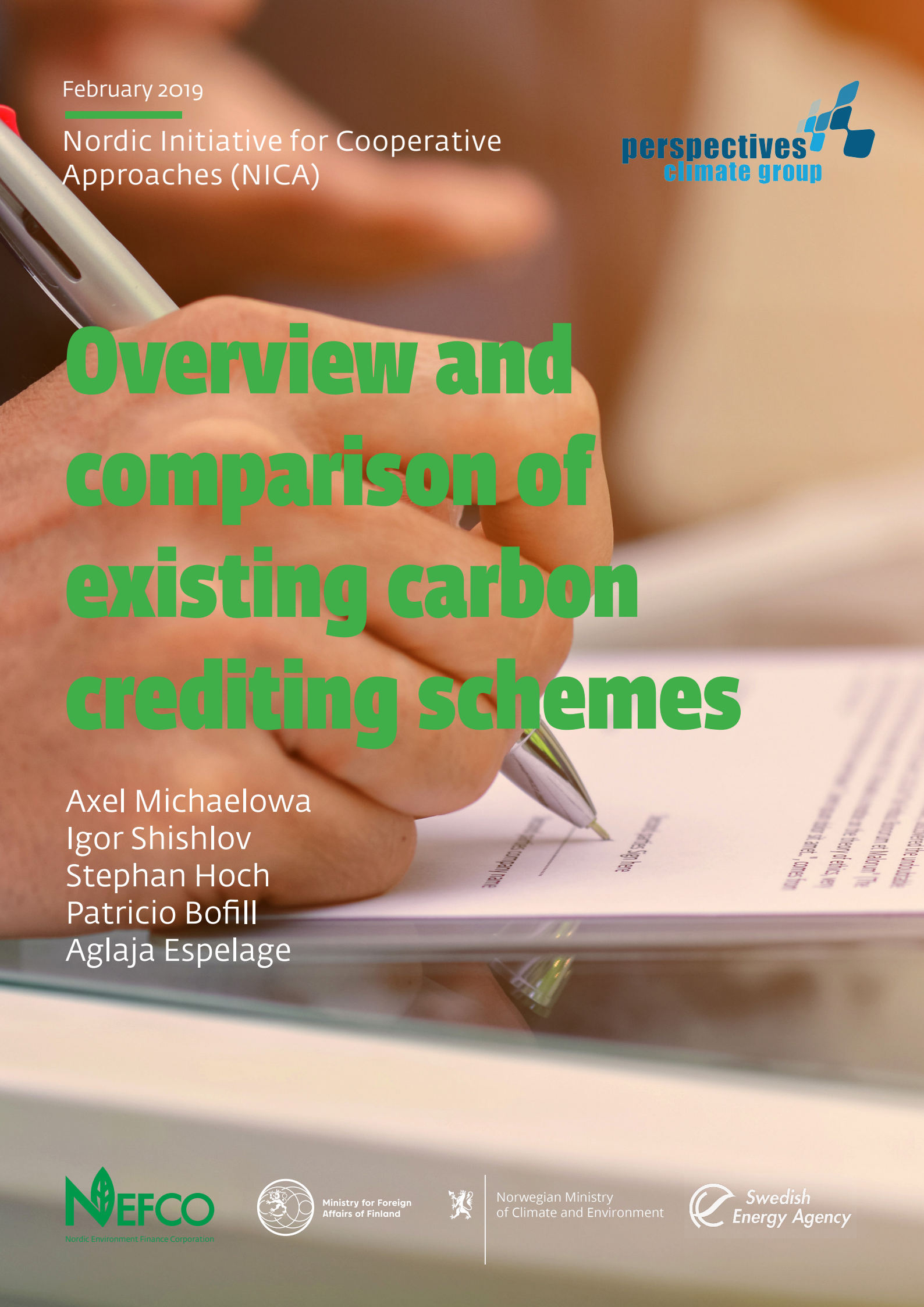

February 2019

Nordic Initiative for Cooperative Approaches (NICA)

perspectives climate group

# Overview and comparison of existing carbon crediting schemes

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# Acknowledgments and disclaimer

The paper was prepared by Axel Michaelowa, Igor Shishlov, Stephan Hoch, Patricio Bofill, and Aglaja Espelage from Perspectives Climate Group.

This work has been commissioned by NEFCO and financed by the Nordic Initiative for Cooperative Approaches (NICA). NICA was jointly developed by Finland, Norway, Sweden and NEFCO, and established by NEFCO in 2018.

NICA aims to contribute to the implementation of the Paris Climate Agreement, in particular to the operationalization of international market-based collaboration under Article 6 of the Paris Agreement. NICA strives to demonstrate how international partnerships can scale up and accelerate ambitious climate action, such as broader sectoral approaches, promote sustainable development and harness private sector finance and innovation. NICA aims to build capacity among Nordic actors and their global peers for collaboration that is compatible with the Paris Agreement framework.

The authors would like to thank Terje Kronen and Peer Stiansen (Ministry of Climate and Environment, Norway), Sandra Lindström (Swedish Energy Agency), Hanna-Mari Ahonen (Ministry for Foreign Affairs of Finland), Karoliina Anttonen (Ministry of the Environment of Finland), Kari Hämekoski (NEFCO) and Tina Nyberg (NEFCO) for their review and comments.

# Executive Summary

At COP24 in December 2018, Parties adopted a large part of the so-called “rulebook” operationalizing the articles of the Paris Agreement and the accompanying decision 1/CP.21. Due to lack of consensus on several contentious topics surrounding accounting, integrity and ambition, the rules for the market mechanisms under Article 6 have been postponed to COP25. Even if the guidelines for transfers of international emission reduction credits in cooperative approaches (Article 6.2) and the rules, modalities and procedures for the UNFCCC-supervised crediting mechanism (Article 6.4) are adopted as planned at COP25, the full operationalization of these mechanisms is expected to take several years. In this context, the objective of this study is to provide a comprehensive overview of key design elements implemented in existing “baseline and credit” carbon crediting schemes and to draw lessons that can inform the negotiations on Article 6.

In a first step, the paper identifies the most important carbon crediting schemes at different levels of governance and of different geographical focus for analysis and subsequently compares them along six main dimensions: Governance and accounting; scope and eligibility; environmental integrity; monitoring, reporting and verification (MRV); sustainable development (SD) contributions; and linkages with other carbon pricing instruments. While international crediting schemes have suffered from a lack of demand since the early 2010s, domestic crediting schemes are spreading at national and subnational levels. At the international level, the study reviews key features of the international crediting schemes under the Kyoto Protocol, notably the Clean Development Mechanism, Joint Implementation and Green Investment Schemes for International Emissions Trading. As an example for bilaterally implemented schemes, the Joint Crediting Mechanism is included. At a (sub)national level, schemes from Australia, California, Canadian provinces, China, Spain and Switzerland were selected. Finally, the voluntary offset standards Gold Standard and Verra are discussed. The analysis is of common features and differences is completed by discussing alternative implementation approaches (see the Table below).

**Overview of key commonalities and differences among carbon crediting schemes**

| Design elements | Commonalities | Differences | Alternatives |
|---|---|---|---|
| **Governance and accounting** | - Most schemes have a dedicated governance body, e.g. the CDM EB, supervising the activity cycle<br>- Most schemes have a dedicated GHG registry | - Schemes have different levels of governance: international, national and sub-national<br>- Schemes have different nature of governance: public and private. Mixed governance is not found. | - Common overarching governance for centralized mechanism and bilateral cooperation<br>- Mixed governing body with public and private actors<br>- Tendering of registry operations to private actors subject to specifications |
| **Scope and eligibility** | - Most schemes allow for both projects and PoAs following the CDM<br>- Most schemes define clear crediting periods<br>- Most schemes define eligible host countries / jurisdictions<br>- Most schemes have some explicit project type | - Schemes differ in the length of crediting periods, which may also be differentiated by project type (from 5 to 100 years)<br>- Schemes differ in their geographical eligibility (from global to national)<br>- Schemes differ in their negative lists (e.g. nuclear, forestry, industrial gases, etc.) | - Upscaled crediting approaches for sector- and economy-wide policy instruments<br>- Aligning crediting periods with NDC implementation cycles<br>- Restricting eligible activities to sectors with particular NDC characteristics (inside/outside; conditional/unconditional) |

| Design elements | Commonalities | Differences | Alternatives |
|---|---|---|---|
| | exclusions (particularly nuclear)<br>- There is an increasing trend to ban high-GWP industrial gases (HFC, $N_2O$)<br>- Existing schemes currently do not consider negative emissions technologies, such as biofuels with CCS | | - Restricting eligible activities to particularly sustainable technologies<br>- Special access for LDCs and SIDS<br>- Allowing for crediting of mitigation co-benefits of adaptation actions |
| **Environmental integrity** | - Most schemes set clear requirements in terms of MRV<br>- Most schemes require some form of additionality demonstration<br>- Most schemes address the double-counting issues through unique serial numbers of carbon credits | - Some schemes define baselines project-by-project, some offer standardized baselines, some offer both<br>- Approaches to additionality demonstration differ: project-by-project with different levels of stringency and positive lists<br>- Some schemes offer net mitigation through conservative baselines and limited crediting periods | - Dynamic baseline approaches<br>- Ambitious baseline setting in the context of NDCs<br>- Requiring LEDS for long-term persistence of mitigation<br>- Corresponding adjustments, also for voluntary standards<br>- Discounting/automatic cancellation of credits for overall mitigation |
| **MRV** | - Methodologies are often developed in a bottom-up manner and accepted by a governing body<br>- Monitoring approaches are typically defined in a methodology | - Schemes differ with regards to reporting frequency and the requirement to make the reports public<br>- Schemes vary in their approaches to verification: some do not require it, some are verified by a public entity, some by accredited auditors | - Top-down methodology development/standardization<br>- Verifier allocation by governing entity, common fee schedule<br>- Allow for alternative metrics in ITMOs |
| **Sustainable development** | - Most schemes mention SD in their general principles but their implementation in practice varies greatly | - Schemes differ in the level of emphasis which is put on SD in practice: some schemes mandate the demonstration of SD benefits<br>- Some schemes offer concrete tools and metrics to measure SD contributions<br>- Schemes differ in the way they provide safeguards against negative impacts and some do not have safeguards | - Quantifying SD benefits for sale on voluntary markets |
| **Link with other policies** | - Most mechanisms are linked in some way with compliance or voluntary markets or other policies | - Mechanisms vary in the way their carbon credits can be used: offsets in ETS, against carbon taxes and other policies, such as result-based finance | - Linking of domestic carbon pricing instruments at the regional level through Article 6.2 |

*Source: authors' compilation*

When operationalizing the Article 6 mechanisms, negotiators should take into account the lessons these schemes offer, in particular with regard to contentious issues such as accounting, integrity and sustainable development (SD). Preventing lenient baselines and accounting ambiguities, as well as activities that jeopardize SD is key to ensure the mechanisms' credibility and to prevent a repetition of the CDM's "credibility crisis". The required balance between demand and supply of credits is dependent on the linking of the crediting schemes to domestic mitigation policy instruments such as carbon pricing in the context of NDCs. In this regard, the stability and strength of the Article 6 mechanisms will depend on the willingness of the EU to revive its role as the international leader on crediting schemes in the post-2020 period, as well as the demand from other large players such as China and the US.

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## Abbreviations

| | |
|---|---|
| AAU | Assigned Amount Unit |
| ACCU | Australian Carbon Credit Unit |
| ACR | American Carbon Registry |
| AFOLU | Agriculture, Forestry and Other Land Use |
| ARB | Air Resources Board |
| BAT | Best-available technology |
| BAU | Business-as-usual |
| CAFE | Corporate Average Fuel Economy |
| CAR | Carbon Action Reserve |
| CCBS | Climate, Community and Biodiversity Standard |
| CCER | Chinese CER |
| CCS | Carbon Capture and Storage |
| CDM | Clean Development Mechanism |
| CDM EB | CDM Executive Board |
| CER | Certified Emission Reduction |
| CFI | Carbon Farming Initiative |
| Ci-Dev | Carbon Initiative for Development |
| CMP | Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol |
| COP | Conference of the Parties |
| CORSIA | Carbon Offsetting and Reduction Scheme for International Aviation |
| CRS | Climate reserve tonnes |
| DOE | Designated operational entity |
| EAOC | Early action offset credit |
| EE | Energy efficiency |
| ERF | Emissions Reduction Fund |
| ERU | Emission Reduction Unit |
| ESD | Effort-Sharing Decision |
| ETS | Emissions Trading Scheme |
| EU ETS | European Union Emissions Trading Scheme |
| FES-CO2 | Carbon fund for a sustainable economy |
| FOEN | Swiss Federal office for the environment |
| GHG | Greenhouse gas |
| GIS | Green Investment Scheme |
| GS | Gold Standard |
| GS4GG | Global Standard for the Global Goals |
| ICAO | International Civil Aviation Organization |
| ICER | Long-term CERs |
| IET | International Emissions Trading |
| IPCC | Intergovernmental Panel on Climate Change |
| ITMO | Internationally Transferred Mitigation Outcomes |
| JCM | Joint Crediting Mechanism |
| JI | Joint Implementation |
| JISC | Joint Implementation Supervisory Committee |
| KP | Kyoto Protocol |
| LDC | Least Developed Countries |
| LEDS | Low Emissions Development Strategies |
| LoA | Letter of Approval |
| MoU | Memorandum of Understanding |

| | |
|---|---|
| MRV | Monitoring, reporting and verification |
| NDC | Nationally Determined Contributions |
| NDRC | National Development and Reform Commission |
| NEFCO | Nordic Environment Finance Corporation |
| NGO | Non-governmental organization |
| NICA | Nordic Initiative for Cooperative Approaches |
| NorCaP | NEFCO Norwegian Carbon Procurement Facility |
| ODS | Ozone depleting substances |
| PA | Paris Agreement |
| PAF | Pilot Auction Facility |
| PoA | Programme of Activity |
| PRE | Projects to Reduce Emissions |
| RE | Renewable energy |
| ROC | Registry offset credit |
| SBSTA | Subsidiary Body for Technological and Scientific Advice |
| SD | Sustainable Development |
| SD VISta | Sustainable Development Verified Impact Standard |
| SDG | Sustainable Development Goal |
| SIDS | Small Island Developing States |
| tCER | Temporary CER |
| UNFCCC | United Nations Convention Framework on Climate Change |
| VCM | Voluntary carbon market |
| VCS | Verified Carbon Standard |
| VCU | Verified Carbon Unit |
| VER | Verified emissions reduction |
| VVB | Validation and verification body |
| WCI | Western Climate Initiative |

# 1. Introduction

The Paris Agreement (PA) includes a new generation of international market mechanisms for climate change mitigation. Notably, Article 6 of the PA lays down the general framework for countries that wish to cooperate in achieving their Nationally Determined Contributions (NDCs). In addition to non-market approaches (Article 6.8), Article 6 offers both a decentralized approach to enable Parties to transfer and use Internationally Transferred Mitigation Outcomes (ITMOs, Article 6.2), and a new multilaterally governed crediting mechanism to support mitigation and sustainable development (Article 6.4).

In December 2018, Parties to the United Nations Convention Framework on Climate Change (UNFCCC) adopted a large part of the rules of the PA – often referred to as the "Paris rulebook" in Katowice with the transparency framework as the cornerstone. However, the operationalization of the provisions for the market mechanisms under Article 6 of the PA was postponed to COP25 in 2019 in Chile. Despite good progress in the first week of negotiations, key areas of contention on markets related to accounting, the transition of the Kyoto Mechanisms to Article 6 and the scope of the adaptation tax could not be resolved. Therefore, Article 6 is now the "glaring gap" of the Paris Rulebook, as its successful and robust operationalization is key to design a system that incentivizes higher ambition and private sector mitigation action. The contested status of the negotiation texts adds to the complexity of the situation. The last draft negotiation texts reflecting consensus are those elaborated in the first week under the Subsidiary Body for Technological and Scientific Advice (SBSTA). However, these texts combined include 450 brackets (SBSTA, 2018a-c). During the second week of negotiations, the Polish presidency conducted bilateral negotiations and published several iterations of a "Katowice text". In its version of December 14th, this version still contains 131 brackets and no consensus could be reached by the end of the COP (COP Presidency, 2018b). A version of the Presidency text circulated on the final day of negotiations was later deleted from the UNFCCC website, which is highly unusual. In its decision, the CMA took note of both SBSTA and Katowice texts and decided that SBSTA should consider all versions in the continuation of the negotiations, while noting the lack of consensus on the Katowice text on Article 6 (UNFCCC, 2018a). Even if the rulebook on Article 6 can be adopted at COP25 in 2019 or early 2020, its full operationalization is expected to take several years.

The new rulebook on international market mechanisms will also inform the work of the "Nordic Initiative for Cooperative Approaches" (NICA), established in 2018 to support implementation of the Paris Agreement and in particular operationalizing Article 6. Sweden, Norway, Finland and NEFCO are the current donors and NEFCO acts as the implementing Agency. The Project Group (PG) oversees NICA activities. This initiative builds on the recently completed Nordic Partnership Initiative on Upscaled Mitigation Actions, initiated in 2011 with a focus on technical assistance for the waste management sector in Peru.

In the context of this new phase, the present study aims to provide a comprehensive overview of key design elements implemented in existing carbon crediting schemes on various levels[1]. Besides informing the further elaboration of the NICA, the study seeks to inform negotiators regarding the range of options available for designing a crediting scheme and their key conceptual differences. This is of particular importance to define the relationship between the Article 6.2 rules, where credits generated under any baseline-and-crediting mechanism could be traded and the operationalization of the Article 6.4 crediting mechanism under the UNFCCC supervision. The study is structured as follows: First, it identifies relevant existing carbon crediting schemes at international and (sub)national levels including public and private ones. Second, the study assesses the key design options chosen in these crediting schemes with regards to governance and accounting, scope and eligibility, achieving environmental integrity, monitoring, reporting and verification (MRV), SD contributions and linkage to carbon pricing instruments. Third, the study outlines alternative implementation approaches for these design options that have not been implemented in any scheme yet but could be potentially relevant for Article 6. Finally, the key commonalities and differences among the existing schemes as well as relevant alternatives in terms of key design elements and/or their application are synthesized in a tabular format.

## 2. Overview of existing carbon crediting schemes

This section provides a brief overview on the main carbon crediting schemes that have been used since the 1990s on various levels, describing the purpose and scope of each scheme.

### 2.1. Crediting schemes under the Kyoto Protocol

The Kyoto Protocol (KP) adopted in 1997 established the first generation of large-scale compliance carbon market mechanisms: the Clean Development Mechanism (CDM), Joint Implementation (JI) and International Emissions Trading (IET).

#### Clean Development Mechanism

The Clean Development Mechanism (CDM) (UNFCCC, 2018c), defined in Article 12 of the KP, allows a country with a greenhouse gas (GHG) emission reduction or emission limitation commitment under the KP – Annex B Party – to acquire Certified Emission Reductions (CERs) from emissions reduction projects in developing countries (non-Annex B Parties) and use them towards their commitment for compliance. To date, there has been more than 7800 registered projects and more than 300 programmes in over 100 countries, with over 1.9 billion CERs issued (UNEP DTU, 2018a). The CDM has a dual goal of supporting Parties in fulfilling their Kyoto commitments and contributing to

[1] The term “carbon crediting” is ***not*** used interchangeably with “carbon offsetting” in this report. “Carbon crediting” refers to the process of issuing a credit for one $tCO_2e$ that meets the criteria of the crediting scheme in question. Often, carbon credit schemes are called “baseline and credit” schemes”. “Carbon offsetting” refers to the use of carbon credits to compensate for an equivalent amount of emissions.

sustainable development (SD) in host countries, although the results regarding the latter objective have been mixed (Shishlov and Bellassen, 2012a). Given the CDM's large visibility, it has been assessed by a wide range of literature; evaluations have ranged from enthusiastic (e.g. Gillenwater and Seres 2011) to scathing (e.g. Cames et al. 2016). Demand for CERs was mainly triggered by the 2004 decision of the EU on the "linking directive" allowing the use of Kyoto credits by private sector companies for compliance under the European Union Emissions Trading Scheme (EU ETS) (Shishlov and Bellassen, 2012a). The New Zealand and South Korean Emissions Trading Schemes followed, but subsequent to limitation of CER imports by the EU, only the Korean ETS continues to allow use of certain CER types. CERs can be used for in-kind payment of the Mexican carbon tax, and be submitted instead of paying the Colombian carbon tax. A similar approach is considered for the existing Chilean and planned South African carbon tax. Due to the overall reduction of demand, the supply of CERs exceeds the demand, which has resulted in very low (less than USD 1/t$CO_2$eq) carbon prices since 2013. Recently, CERs have been used as evidence for mitigation outcomes under results-based climate finance instruments; they have also been used in voluntary carbon markets. For that purpose, the UNFCCC Secretariat has set up a voluntary CER cancellation account in the CDM registry, in which more than 150 million CERs have been cancelled to date.

### Joint Implementation

Joint Implementation (JI) (UNFCCC, 2018b), defined in Article 6 of the KP, allows an Annex B Party to buy emission reduction units (ERUs) from an emission reduction or emission removal project in another Annex B Party. ERUs have to be converted from host Parties' carbon budgets under the KP, i.e. Assigned Amount Units (AAUs). Unlike the CDM, the JI mechanism thus operates in a "capped environment" where host countries have their national emissions reduction commitments. Conceptually, JI is therefore similar to market mechanisms under the PA where all parties have emissions reduction commitments in their NDCs.

There are two possible procedures, known as "JI Tracks" (Shishlov et al. 2012):

- **JI Track 1** allows the host Party to govern the "determination" (i.e. official registration) of JI activities, verification of emission reductions and issuance of ERUs without the international oversight of the UNFCCC.
- **JI Track 2** involves international oversight by the Joint Implementation Supervisory Committee (JISC) and independent audit by UNFCCC-accredited third parties over the determination of JI activities and the verification of emission reductions. The host Party can only issue ERUs after the JISC has finalized the verification.

Different countries approached JI differently depending on their Kyoto compliance position – i.e. surplus or deficit of AAUs. Notably, countries with ambitious emissions reduction commitments had an automatic incentive to ensure additionality and environmental integrity of carbon crediting while countries with "hot air", i.e. large surplus AAUs, have treated additionality in a lenient way (Shishlov and Cochran, 2015). Given the current NDCs likely contain a material amount of "hot air", i.e. NDC

objectives are above business-as-usual emissions (La Hoz Theuer et al. 2017), market mechanisms under the PA face a similar challenge as JI in Russia and Ukraine. Some countries used JI creatively as a domestic policy tool, e.g. to incentivize emissions reductions in the priority sectors or to incentivize the private sector to directly contribute to the achievement of the national targets by "capturing" part of the emissions reductions. Different strategies of using JI as a policy tool are illustrated by the examples of France, New Zealand and Ukraine (see Box below).

**Box 1: Different uses of JI depending on the host country**

**JI host country New Zealand**

Before the start of the first Kyoto commitment period in 2008, New Zealand created a special framework – Projects to Reduce Emissions (PRE) – to encourage early offset projects that could later be included into the JI scheme (Shishlov et al. 2012). This framework included reverse auctioning for ERUs, i.e. project developers bid the number of ERUs for each t of mitigation achieved. This led to a differentiated level of discounting (Michaelowa and O'Brien, 2006). Under this scheme New Zealand conducted two tenders – in 2003 and 2004 – which resulted in the registration of 34 projects with a total emissions reduction potential of around 10 $MtCO_2eq$ (Ministry for the Environment of New Zealand, 2011). The example of New Zealand demonstrates how JI can be used as a domestic policy tool to incentivize emissions reduction projects in priority sectors.

**JI host country France**

In the beginning of the first Kyoto Commitment Period France's compliance position was uncertain. The country therefore approached JI cautiously. In order not to "oversell" its emissions reductions, France applied a "90% rule" to all JI projects, whereby only 9 credits were issued for every 10 $tCO_2eq$ abated. Moreover, in some sectors with cheap abatement opportunities, such as $N_2O$ emissions reduction projects, France implemented conservative crediting baselines, resulting in carbon "under-crediting" of projects and allowing the government to "capture" part of emissions reductions for compliance, resulting in a cumulative discount of 41.6% until 2011 and 60% in 2012 (Shishlov et al. 2012, Latvia and European Commission 2015). The example of France demonstrates how a host country can use JI to incentivize the private sector contribution to the achievement of national emissions reduction targets. In the context of the PA, countries with ambitious NDCs may adopt a similar approach where emissions reductions are "shared" between host and buyer country.

**JI host country Finland**

Finland also applied conservative crediting baselines in $N_2O$ emission reduction projects. The crediting threshold has been set to reflect a range of emission reductions feasible with the best available technology and taking into account domestic regulation. Emission reductions achieved by reaching the less ambitious end of the range were counted towards the host country. Only further emission reductions representing the more ambitious performance of best available technology were transferred to the buying country. This method to allocate credits between host and buyer country can provide an example for the allocation of credits between host and buyer country under Article 6. In Finland, three projects from 2009-2012 achieved 4.22 Mt of emission reductions of which 3.25 Mt were counted towards the host country and only 0.97 million ERUs were issued; i.e. a discount of 77% (Latvia and European Commission 2015).

**JI host country Ukraine**

Unlike France, Ukraine had a large surplus of AAUs under the KP, often dubbed as "hot air". This meant that the country – similar to other Eastern European countries – did not have to worry about "overselling" its emissions reductions. Contrary to France, Ukraine therefore applied the least conservative crediting baseline possible to its $N_2O$ emissions reduction projects (Shishlov and Bellassen, 2012b). Overall, the large surplus of "hot air" resulted in serious concerns about the environmental integrity of certain types of JI projects in Ukraine and Russia (Kollmuss and Schneider, 2015). The example of Ukraine demonstrates that in the absence of ambitious national emissions reduction targets, countries may not have any incentive to ensure conservative crediting baselines. In the context of the PA, a similar risk arises in countries with NDC objectives above business-as-usual emissions.

### *Green Investment Schemes for International Emissions Trading*

International Emissions Trading (IET) allows Annex I countries to directly trade their AAUs. The Green Investment Scheme (GIS) concept was introduced in order to tackle the hot air issue described above. The idea underlying the GIS can be described as "greening the hot air". Under a GIS, the revenues obtained by a country from the sale of its AAUs must be invested in concrete domestic emission reduction activities. The GIS is therefore supposed to link the surplus AAUs trades to tangible emission reductions, although not necessarily preserving the ratio of one AAU per $tCO_{2eq}$ abated (Shishlov et al. 2012). GIS have had various degrees of success, failing in Ukraine (Korppoo and Gassan-Zade 2014) while working well for certain energy efficiency technologies in the Czech Republic (Karásek and Pavlica 2016). Although not a crediting scheme per se, it is thus included in the analysis.

## 2.2. Bilateral crediting schemes

### Joint Crediting Mechanism

The Joint Crediting Mechanism (JCM) is a project-based bilateral crediting mechanism initiated by the Government of Japan from 2010 onwards. The JCM aims to facilitate the diffusion of leading low-carbon technologies, products, systems, services, and infrastructure resulting in the mitigation of GHG emissions and contributing to the SD of developing countries (ADB, 2016). It was developed because the Japanese government was unhappy with the complex international rulebook of the CDM. JCM is based on bilateral Memoranda of Understanding (MoUs) between Japan and partner countries. Methodologies are specific to each of the bilateral cooperation "pairs". It is not fully clear how JCM credits are counted towards the Japanese NDC[2]. However, the JCM aims to contribute to the host

[2] The Japanese NDC says : The Joint Crediting Mechanism (JCM) is not included as a basis of the bottom-up calculation of Japan's emission reduction target, but the amount of emission reductions and removals acquired by Japan under the JCM will be appropriately counted as Japan's reduction."[…] Japan establishes and implements the JCM in order both to appropriately evaluate contributions from Japan to GHG emission reductions or removals in a quantitative manner […] and to use them to achieve Japan's emission reduction target (GoJ, 2015).

Party NDC achievement through bilateral agreements on sharing and accounting for the mitigation outcomes and also through setting below business-as-usual (BAU) baselines and applying conservative default factors (GoJ, 2018).

## 2.3. (Sub)national crediting schemes

Domestic crediting schemes offset GHG emissions within the host country. Some domestic compliance markets, with a view to achieve domestic mitigation targets, are linked directly or indirectly to the international market, for instance, if they rely fully or partly on a multilateral standard such as the CDM. These schemes can also adopt voluntary carbon standards or develop their own protocols and principles. They have been mostly used in Anglo-Saxon countries, and are presented in alphabetical order of the implementing country/state below.

### Emissions Reduction Fund and Carbon Farming Initiative (Australia)

Under the Emissions Reduction Fund (ERF), created in 2014, Australia's Clean Energy Regulator can purchase offsets from the land-use (the Carbon Farming Initiative, CFI) and industrial sectors. The Clean Energy Regulator sets a benchmark price for each auction; all bids up to 25% of the volume offered under the benchmark price are accepted. Project developers can apply for Australian Carbon Credit Units (ACCUs). The ERF operates as a competitive reverse auction mechanism, with confidential bids submitted to the Regulator, and accepted subject to clearing rules. The ERF was preceded by a carbon pricing mechanism established by the Clean Energy Act 2011, which was repealed on July 17, 2014 (PMR, 2015). This mechanism had in-built flexibility through the National Carbon Offset Standard of Australia (no longer active).

### Offset use for government operations (British Columbia)

In 2010, British Columbia introduced a domestic offset scheme. The BC Carbon Registry enables the issuance, transfer and retirement of offset units that can be sold to government units that need to be carbon neutral, or to entities on the voluntary market.

### Compliance Offset Program (California)

California's emissions trading scheme caps the state's largest sources of GHG emissions. Part of the compliance obligation can be met with California Air Resources Board (ARB) offset credits. Projects include those from sectors not covered under California's ETS, such as livestock, mine methane capture, ozone depleting substances and forest. These can be generated through one of the standards approved by the ARB including the American Carbon Registry (ACR), Climate Action Reserve (CAR) and Verra (formerly Verified Carbon Standard, VCS). These standards are privately operated, and some of them are mainly used on the voluntary market.

### Supplementary mechanism for national emissions trading (China)

China operates seven provincial pilot ETS in preparation for the launch of a national ETS. These provincial schemes allow for the use of China Certified Emission Reductions (CCERs) to varying degrees. The majority of CCER issuance consists of emission reductions from CDM projects predating the registration date under the CDM. CCERs are validated and verified by the National Development and Reform Commission (NDRC). Most methodologies for CCERs are based on the CDM, assessed for their frequency of use and applicability in China. In most pilot ETS CCERs can be used to offset emission allowances at a ratio 1:1, however there are limits for the use of offsets ranging from 1-10%. Some pilots limit CCERs by geographic source, mostly to their province. Furthermore, CCERs from large hydropower projects are not eligible in any pilot (Environomist 2017, Swartz 2017).

### Compliance and voluntary offset programmes (Ontario)

Ontario developed two distinct carbon offsets programmes. One programme generates offset credits for compliance use in Ontario's emissions trading scheme, while the other one is aimed for use by organizations and companies that want to voluntarily reduce their GHG emissions. Offset credits can only be generated in sectors not covered by the Ontario's ETS. The compliance scheme has become obsolete after July 2018 when the ETS was abolished after a change in provincial government (Government of Ontario, 2018).

### Offset programme against ETS (Quebec)

Québec's Offset Program is a project-based offset mechanism under the Québec ETS. The programme considers sectors not covered by Quebec's Cap-and-Trade Program including livestock manure management, landfill gas and ozone-depleting substances. Covered entities can use offset credits to fulfil up to of 8% of their compliance obligation. Credits are also eligible for use in California's ETS (PMR, 2015).

### Carbon Fund for a Sustainable Economy offset acquisition (Spain)

The Carbon Fund for a Sustainable Economy (FES-CO2) was created in 2011 to purchase carbon credits, including Verified Emissions Reductions (VERs) from projects implemented in Spain. While the activities under FES-CO2 will happen primarily at national level, the fund can also buy credits in the international carbon markets. It includes those sectors outside of the EU-ETS for the national territory while projects on energy efficiency (EE) and renewable energy (RE) were prioritized internationally. VERs of each project achieved during the first four years of the project are purchased by FES-CO2 at a fixed price.

### Domestic motor fuel emissions offset programme (Switzerland)

Producers and importers of motor fuels can meet their mitigation obligations under the Swiss $CO_2$ law using domestic offsets (PMR, 2015). The programme includes all sectors except for nuclear, Carbon

Capture and Storage (CCS), research & development activities, biofuels and fuel switch to natural gas in transport and building sector. Additionality regulations are rather strict.

### Climate Action Reserve (CAR) (US)

The Climate Action Reserve is a private nonprofit organization that since 2008 has established standards for quantifying and verifying GHG emissions reduction from projects in the US, provides oversight to independent third-party verification bodies, and issues and tracks carbon credits over time on a transparent, publicly-accessible system. The CAR includes sectors and projects eligible under California's offset programme in the US and landfill gas, livestock, nitrogen and organic waste projects in the US and Mexico.

## 2.4. Voluntary crediting schemes/carbon standards

Voluntary carbon offset standards were developed to complement the KP mechanisms. The demand on voluntary carbon markets has been primarily driven by corporate and individual social responsibility objectives. Overall, voluntary carbon market activities have generated 430 million $tCO_2eq$ of emission reductions since 2005, but prices have declined in the last years. In 2017, there has been an uptick in issuances (62.7 $MtCO_2e$) and retirements (42.8 $MtCO_2e$) of voluntary credits. This can be attributed to the adoption of the PA and new emission reduction commitments of the private sector. In general, however, volumes of credits issued and sold on the market are to a significant extent dependent on the developments on the compliance markets. When compliance markets are expected to emerge, businesses prepare by purchasing voluntary offsets. When compliance markets are in place, project developers and standards that previously operated in the voluntary market now shift their focus to compliance market activities and volumes of the voluntary market fall. Moreover, prices vary significantly on the voluntary market depending on buyer preferences such as strong SD co-benefits and the type of transaction. Typically, offsets that are bought in a bulk from large emission reduction projects are sold at lower prices than offsets from small-scale activities, often with a sustainable-development and community focus (Hamrick and Gallant, 2018).

The standard administrators have been valuable innovators, in particular with regards to simplification of MRV requirements, environmental integrity safeguards and SD co-benefits. In the last years, many voluntary standards work towards a holistic perspective on climate protection and the implementation of the Agenda 2030 for Sustainable Development with its agreed 17 Sustainable Development Goals (SDGs).

### Gold Standard

The Gold Standard is a foundation established in 2003 by WWF and other international NGOs that operates an offset standard focusing on environmental and social benefits. It can also be applied as an add-on quality label to CDM activities. Eligible sectors are RE, EE, waste, land use and forests (afforestation, reforestation and agriculture) and water (supply, purification and conservation) (Gold

Standard, 2018f). Under this standard, more than 550 registered projects have achieved emission reductions of about 78 million $tCO_2eq$ in the period 2008-2017 (Gold Standard 2018a). The foundation has launched a new generation of standards with the dual objective of pursuing climate action and the fulfilment of SDGs, Gold Standard for the Global Goals (GS4GG) in 2017 (Gold Standard, 2018g).

### Verra (VCS)

Verra (formerly known as the VCS) is a not-for profit organization founded in 2005, serving as a secretariat to various standards (Verra, 2018g). Verra's flagship is the Verified Carbon Standard (VCS). with CDM-like MRV requirements. It issues Verified Carbon Units (VCUs). In terms of volume, it is the largest voluntary standard in the world, having certified reductions of more than 200 million $tCO_2eq$ from more than 1300 projects since 2006 in a wide range of sectors[3] (Verra, 2018f).

Verra furthermore manages the Climate, Community and Biodiversity Standard (CCBS), certifying land-based climate change projects that pursue multiple benefits: improve livelihoods, create employment, protect traditional cultures and endangered species, help secure tenure to lands and resources, increase the resiliency of ecosystems and help to combat climate change. CCBS certification can be applied also to VCS projects. So far, more than 100 projects covering more than 10 million hectares of land have been validated, with 40 having achieved full verification (Verra, 2018e).

### American Carbon Registry (United States of America)

The American Carbon Registry (ACR) was founded in 1996 as a nonprofit enterprise of Winrock International as the first private voluntary greenhouse gas registry in the world. The ACR is furthermore an approved offset project registry issuing Registry Offset Credits (ROCs) and early action offset program, issuing Early Action Offset Credits (EAOCs) for the California Cap-and-Trade program. Both offset types can be converted to ARB compliance offset credits. In the voluntary market, the ACR oversees the registration and independent verification of projects that meet ACR standards and methodologies.

## 3. Key elements and principles of carbon crediting schemes

This section provides an overview of key design elements and principles of carbon crediting schemes across six dimensions: governance and accounting, scope and eligibility, MRV, ensuring environmental integrity, ensuring SD and linkages with other carbon pricing instruments.

[3] Sectors covered by the VCS: Energy (Renewable/Non-renewable); Energy Distribution; Energy Demand; Manufacturing Industries; Chemical Industries; Construction; Transport; Mining/Mineral Production; Metal Production; Fugitive Emissions from Fuels; Fugitive Emissions from Industrial Gases; Solvents Use; Waste Handling and Disposal; Agriculture Forestry and Other Land Use; Livestock and Manure Management.

## 3.1. Governance and accounting

Governance can vary according to various dimensions, discussed below.

### *Composition of the governance body*

On one side of the "centralized-decentralized" spectrum of governance, one can find the CDM and JI Track 2 that are overseen by UNFCCC bodies, notably the CDM Executive Board (EB) which consists of 10 members plus 10 alternates and the JISC, which are accountable to the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP). International voluntary standards such as Verra and Gold Standard also feature centralized governing bodies that operate, however, outside the UNFCCC – the VCS Board and the Gold Standard Foundation Board respectively. Moving towards bi-national governance, in the JCM for each host country, a separate Joint Committee consisting of representatives from both participating governments is formed and acts as the executive body. This committee develops the rules, guidelines, methodologies, registers projects and oversees their implementation. Finally, domestic carbon crediting mechanisms naturally have national or sub-national governing bodies. For example, under Switzerland's domestic offset programme, the steering committee is composed of representatives from the Federal Office for the Environment (FOEN) and the Swiss Federal Office of Energy. In Quebec, the executive body is the Ministry of Sustainable Development, Environment and Climate Change which is responsible for project approval and registration, credit issuance and approving protocols.

### *Public vs private*

Governing bodies can be public or private. Most compliance instruments, such as the UNFCCC mechanisms and national offset standards that issue credits eligible for compliance under carbon pricing policies are managed by a public governing body. Conversely, voluntary carbon crediting mechanisms are mostly managed by private entities, typically NGOs and foundations. For example, the Gold Standard is a private foundation with a foundation board of six members responsible for strategic governance (Gold Standard, 2018j). Verra is a not-for-profit organization, steered by a board of directors with representatives from the private or non-profit sector, working in a variety of working groups. Furthermore, private advisory committees have been set up for the development of specific standards and methodologies (Verra, 2018a).

### *Validation procedures*

Carbon crediting mechanisms usually require validation of the project activities before their registration and the verification of emission reductions achieved by the project. Sometimes, however, validation and verification can be undertaken at the same time, for instance under the JCM or the voluntary standards Gold Standard and Verra. In most cases, such as the CDM, JI Track 2, JCM, the offset scheme of British Columbia and voluntary standards, validation is done by independent third party

entities. Under some subnational schemes, such as the Australian ERF, but also in Chinese ETS, validation is done by the executing government agency.

### *Supervision of activity cycle*

Carbon crediting mechanisms typically include some degree of supervision of the three key phases of the activity cycle, notably, validation, MRV and credit issuance. Most compliance mechanisms, such as the CDM, are closely supervised along the activity cycle. The CDM EB is responsible for the final approval of registrations, credit issuance and baseline and monitoring methodologies. The largest voluntary standards provide a similar degree of oversight. For example, under the Gold Standard the secretariat manages the day-to-day issues and project certifications together with the NGO supporter network for advocacy and the third-party auditors responsible for validation and verification (Gold Standard, 2018j).

### *Accounting and registries*

The issuance and transfers of carbon credits are typically accounted for in dedicated registries that allow to prevent double-counting. For example, under the CDM all CERs get issued to a central registry, with a serial number that allows tracking down the project and crediting year ("vintage") to which they correspond. The CERs are first issued to the CDM EB's pending account in the CDM registry, then forwarded to the respective holding accounts (minus 2% that go to the Adaptation Fund). They are finally transferred to a buyer's account provided that there is a Letter of Approval (LoA) of a buyer country (Shishlov and Bellassen, 2012a).

Public offset programmes usually have public registries, but there are some hybrid approaches. The Californian programme requires the use of one of three private registry operators, one of them being the ACR. Offset credits from these registries must be converted into Californian offset credits before being eligible under the Cap-and-trade program. The regulatory body (Air Resources Board) approves eligibility of these projects after review of all documentation. If the review shows conformity with the regulation and applicable "Compliance Offset Protocol", offset credits are issued after ARB receives confirmation that the credit owner has retired the corresponding registry offset credits (ARB 2018).

Most private standards have their own registries. For example, Gold Standard projects are listed in public platforms recording the project documentation, managed by the private company IHS Markit[4] to disclose project documentation and track related issuances, as well as transfer and retire credits. On this platform, different account holders display their ongoing projects, although (unlike the CDM) it is possible for account holders to decide not to disclose the information on projects and issuances

[4] Markit environmental registry- public view: https://mer.markit.com/br-reg/public/index.jsp?entity=project&sort=project_name&dir=ASC&start=0&entity_domain=Markit,GoldStandard

publicly. The Gold Standard foundation itself also hosts the "Water Benefit Standard Registry"[5] containing information on the registered projects and issuances of Water Benefit Certificates. The VCS registry system is a multi-registry system connected to one central project database. Currently, VCS registries are administered by APX and IHS Markit. Project developers must open an account with one of these two registry operators to apply for registration of projects and issuance of credits. The central project database serves as a platform to ensure no double counting is taking place (Verra, 2018h). The table below presents the key commonalities and differences in terms of governance.

[5] Water Benefit Standard Registry: https://www.goldstandard.org/our-work/water-registry

**Table 1: Comparison of carbon crediting mechanisms: Governance and Accounting**

| Governance & Accounting | Governance body | Public vs private | Validation procedure | Supervision of activity cycle | Accounting and registries |
|---|---|---|---|---|---|
| **ACR** | International | Private | Validation by accredited third party entities | Winrock Board of Directors | ACR of projects and credits issued |
| **AU CFI** | National | Public | Pre-registration assessment by the Clean Energy Regulator | Australian Government; Clean Energy Regulator | CFL Registry |
| **British Columbia** | Subnational | Public | Validation by accredited third party entities | Ministry of Environment. | The BC Carbon Registry |
| **California** | Subnational | Public | Verification of eligibility of offsets by ARB-accredited offset verification bodies | California Air Resources Board | Western Climate Initiative's Compliance Instrument Tracking System Service (CITSS) |
| **CDM** | International | Public | Validation by DOE | CDM EB | CDM registry |
| **China** | National | Public | Verification of offset eligibility by NDRC | NDRC | National registry system with trading platforms in seven pilot provinces |
| **GIS** | Bilateral | Public | N/A | N/A | ITL (for AAU transactions) |
| **GS** | International | Private | Validation by accredited validation and verification body | Gold Standard Foundation Board | GS registry of projects and VER credits |
| **JCM** | Bilateral | Public | Validation by Third Party Entity | Joint Committee with representatives from both governments | JCM registry |
| **JI** | International | Public | Validation by independent entity | JISC (Track 2) | International transaction log (ITL) and national registries |
| **Ontario** | Subnational | Public | Validation of project activity by Director | Ministry of Environment and climate change | Compliance Instrument Tracking System Service (CITSS) |
| **Quebec** | Subnational | Public | Application for project registration is reviewed by the Ministry of Environment | Ministry of Environment (MDE) | Local Ministry of Environment registry |
| **Spain** | National and International | Public | Selection of project activity through OECC | Consejo Rector and Comisión Ejecutiva, Climate Change Spanish Office (OECC) | National registry |
| **Switzerland** | National | Public | Validation by accredited third parties | Steering committee with members from FOEN and the Swiss Federal Office of energy. | National registry |
| **US (CAR)** | International | Private | Eligibility check by the Reserve staff | Board of Directors and Climate Action Reserve Staff | CAR registry |
| **VCS** | International | Private | Validation by accredited validation and verification body | VCS Board | VCS registry system |

*Source: authors' compilation*

## 3.2. Scope and eligibility

### *Scope of activities*

Most crediting mechanisms are focused on individual emissions reduction or sequestration projects. In addition, the CDM, JI, Gold Standard and Verra also allow for Programmes of Activities (PoAs), a framework that allows implementing an unlimited number of usually small single component programme activities (CPAs) under one registered PoA. This framework aims at reducing the transaction costs – particularly for small-scale distributed emissions reduction activities, such as for example efficient cooking stoves or efficient lighting solutions, and large-scale renewable energy activities. Broader sectoral approaches or policy instruments have so far been ineligible under carbon crediting schemes, with the exception of attempts to pilot jurisdictional REDD+ activities. The GIS is one of the few examples that allows the use of proceeds from selling AAUs to finance sector-wide policies in host countries, although, as mentioned earlier, the GIS does not make an explicit link in terms of payments per $tCO_2eq$ abated.

### *Temporal scope*

Most carbon crediting mechanisms set limits on crediting periods. For example, for CDM projects the crediting period can be either 10 years non-renewable or 7 years with the option to renew up to two times for a total maximum of 21 years; for forestry activities these periods are 30 years and 20 years renewable twice, respectively (Shishlov and Bellassen, 2012a). The Gold Standard offers a five-year renewable certification cycle (Gold Standard, 2018r), while the VCS offers 10-year crediting periods, renewable up to two times for non-AFOLU projects (Verra, 2018f). Other standards also typically offer crediting periods between 5 and 10 years with a notable exception of forestry projects that may have significantly longer crediting periods, e.g. up to 100 years under the VCS and CAR.

### *Geographical eligibility*

Carbon crediting mechanisms vary considerably in their geographical eligibility. For example, CDM projects may only be hosted by developing countries (non-Annex B Parties to the KP), while JI projects may only be hosted by industrialized countries (Annex B Parties to the KP). VCS is one of the few standards that has no geographical limitations. (Sub)national carbon crediting programs typically limit the geographical eligibility to the specific jurisdiction, e.g. Switzerland, California or Québec.

### *Sectoral eligibility*

The CDM accepts all projects except nuclear facilities and limits forestry projects to afforestation and reforestation. Under JI there is no limitation on forestry projects and there are examples of JI forest management projects, e.g. in Russia. The VCS allows all project types except for nuclear facilities and recently excluded HFC-23 reduction. The JCM allows anything, Gold Standard explicitly excludes project types associated with geo-engineering or energy generated from fossil fuels or nuclear, fossil fuel switch or any project enhancing or prolonging such energy generation. An exception is made for

some energy efficiency programs involving fossil fuels, such as LPG stoves (Gold Standard, 2018d). New project types can be submitted to the Gold Standard for eligibility inclusion. The foundation will then establish new requirements, if needed with expert peer reviewers at the project developer's expense (Gold Standard, 2018d). An interesting example is California's Offset Program where carbon credits may only come from sectors not covered under California's ETS, for example, livestock management, mine methane capture, ozone depleting substances and urban forest. Reasons for limitation are diverse, ranging from low cost of mitigation (Shishlov and Bellassen, 2014) to perceived risks for SD. The table below presents the key commonalities and differences in terms of scope and eligibility.

**Table 2: Comparison of carbon crediting mechanisms: Scope and Eligibility**

| Scope & Eligibility | Scope of activities | Temporal scope (crediting period duration) | Geographical eligibility | Sectoral eligibility |
|---|---|---|---|---|
| **ACR** | Projects | The standard crediting period is 10 years, except for AFOLU projects, renewal is possible | Worldwide, some sectors only United States | Fuel combustion, industrial processes, land use, land use change and forestry, carbon capture and storage, livestock, waste handling and disposal |
| **AU CFI** | Projects | The standard crediting period is 7 years, for reforestation and revegetation projects 15-years, for native forest protection projects 20 years. | Australia | Land and waste sector (CFI), the ERF is expanding the scope across the economy. |
| **BC** | Projects | The crediting period may be up to 25 years for sequestration projects and up to 10 years for other project types | British Columbia | All sectors, as long as it drives clean economic opportunities while cutting emissions |
| **California** | Projects | Non-sequestration 7 - 10 years, unless specified otherwise. Sequestration 10 - 30 years | California and Quebec | Sectors not covered under California's ETS |
| **CDM** | Projects and PoAs | 7 years (20 years forestry) renewable up to 2 times or 10 years (30 years forestry) non-renewable | Developing countries (KP non-Annex B) | All except nuclear, some limits on forestry projects (only A/R allowed) |
| **China** | Projects | Same as CDM. Most schemes only allow for credits issued after 2013 | Seven piloting regions allowing use of CCER. Most pilots restrict eligible credits to credits issued in the region | Varying between the seven piloting regions allowing use of CCER. Regulation allows trading activities of GHG emissions from $CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, and SF. All pilots exclude credits from large hydropower projects |
| **GIS** | Any | Not defined | Developed countries (KP Annex B) | No explicit exclusions |
| **GS** | Projects and PoAs | Same as CDM. | Global | RE; EE; Industrial Waste handling and LULUCF |
| **JCM** | Projects | The crediting period for a JCM project is determined by the project lifetime | International JCM partner countries | No explicit exclusions |
| **JI** | Projects and PoAs | 5 years (2008-2012) | Developed countries (KP Annex B) | All except nuclear |
| **Ontario** | Projects | Defined in each specific methodology, but up to 30 years for GHG sequestration initiatives and up to 10 years for non-sequestration initiatives. | Ontario | Sectors not covered under Ontario's ETS |

| Scope & Eligibility | Scope of activities | Temporal scope (crediting period duration) | Geographical eligibility | Sectoral eligibility |
|---|---|---|---|---|
| **Quebec** | Projects | 10 years for manure and landfill projects. 5 years for ODS projects. | Quebec and California | Sectors not covered under Quebec's ETS |
| **Spain** | Projects | Up to 7 years | Mainly Spain, but open to international credits. | For the National Territory (sectors outside the EU-ETS). For International Territory EE, RE and waste management projects will be prioritized |
| **Switzerland** | Projects and PoAs | 7 years (renewable for 3 years at a time after re-validation during the project life time) | Switzerland | All except for nuclear; CCS; R&D activities; Biofuels; Fuel switch to natural gas in transport and building sector |
| **US (CAR)** | Projects | Defined in each methodology. In general: 2 times 10 years for non-AFOLU projects. For AFOLU projects, crediting period may be 5 yrs x 3 (agriculture) and up to 100 yrs (forestry) | U.S. and Mexico | Sectors and Projects eligible under California's OP + Landfill gas, Livestock, Nitrogen and Organic waste in the US and Mexico |
| **VCS** | Projects and PoAs | Two times 10 years for non-AFOLU projects, 20-100 years for AFOLU projects, with renewal of baseline every 10 years. | Global | All CDM sectoral scopes |

*Source: authors' compilation*

## 3.3. Environmental integrity

Environmental integrity means that global GHG emissions must not increase because of the use of crediting mechanisms (Spalding-Fecher et al. 2016). Most mechanisms explicitly or implicitly require that environmental integrity is ensured. For example, the CDM requires that emissions reductions are "real, measurable and additional to any that would occur in the absence of the certified project activity". In addition, the CDM requires emissions reductions to be permanent, while crediting is only allowed ex-post, i.e. only after they are realized (Shishlov and Bellassen, 2012a). Several key concepts related to environmental integrity are discussed in this section: baseline setting, additionality, permanence of emissions reductions, avoidance of double counting and contribution to overall mitigation.

### *Baseline setting*

Baseline usually refers to a scenario that reasonably represents anthropogenic GHG emissions that would most likely have occurred in the absence of the project. There are different approaches in setting baseline emissions, mainly between standardized and project-based baselines, with all offset programmes using standardized approaches to some extent. For example, the CDM's rules on baseline setting are determined project-by-project, although standardized approaches exist for some project types. Project participants may select an approved standardized baseline that is applicable to the proposed CDM activity. Switzerland's domestic offset programme, JI and the JCM follow similar approaches where the baseline is determined on a project-by-project basis. On the other hand, programmes such as California's offset programme, CAR and Quebec use protocols that incorporate standardized baselines set in line with regulations and common practice. In order to enhance environmental integrity, baselines also have to be determined based on the principle of conservativeness. This means that in case of inconclusive data, assumptions need to be taken that

ensure that calculated emissions reductions may be lower than the actual values in order to prevent over-crediting.

### *Additionality*

Additionality ensures that only those projects that would not have happened anyway should be eligible to receive carbon credits. Similar to setting baseline emissions, determining additionality under carbon crediting schemes requires to consider the respective country's circumstances. In practice, there are several ways to assess additionality (Schneider et al., 2017):

- Investment analysis: demonstration that an activity is not economically viable without crediting (investment comparison analysis, benchmark analysis, simple cost analysis);
- Barrier analysis: demonstration that an economically attractive activity faces prohibitive barriers of some other kind;
- Positive lists, negative lists, eligibility criteria and decision trees: delimitation of what type of activities are likely to be additional or non-additional.

The NEFCO Norwegian Carbon Procurement Facility (NorCaP) - established in 2013 - assesses the "vulnerability" of specific CDM projects, i.e. their risk of discontinuation, based on the regulatory and contractual context, and the dependency on carbon revenues (Sharma 2015). Warnecke et al. (2017) conducted a vulnerability assessment at the project type level in the CDM portfolio. They identified vulnerable project types that should be supported with priority in the context of results-based climate finance or climate policy instruments in the period of pre-2020.

Building on CDM standards, the Gold Standard proves financial additionality by either UNFCCC- or Gold Standard-approved tools (Gold Standard, 2018c). Some offset programmes determine a list of project types ex-ante that are automatically deemed additional, such as the AU CFI where to be eligible, activities must be on the positive list. To be on the positive list, activities must be assessed to be additional, with requirements including that the project must go beyond common practice and must not be required by another law. Verra is testing standardized additionality tests applied on the basis of performance indicators (exceeding a performance benchmark set for a certain type of project) or on the basis of an activity method defined per project type (e.g. positive list of technologies per project type) (Verra, 2017b). The California Air Resources Board (2013) checks the rules of eligible offset protocols according to their ability to show that an activity is not common practice and that it goes beyond current regulation.

### *Permanence of emissions reductions*

Emissions reductions have to be permanent, which may not be the case for some forestry and land use projects due to the risk of reversing emissions reductions, e.g. if there is a forest fire. This is why under the CDM; reforestation projects may only issue temporary CERs – tCERs – or long-term CERs – lCER. VCS, by contrast, uses a "buffer" which sets aside a certain percentage of issued credits on

which can be drawn in case some emission reductions are reversed. California's Offset Program ensures the permanence of emissions and manages risks of reversal or potential double counting with the provision that credits generated under the program can be invalidated for up to eight years after the end of the reporting period (or after issuance of the credit).

### *Avoiding double counting*

Double counting is an umbrella term commonly used to describe situations in which a) the same emission reduction leads to issuance of more than one unit (double issuance), b) the same emission reduction is counted by the buyer country and at the same time by the seller country (double claiming), or c) the same unit is used twice (double use) (Schneider and La Hoz Theuer, 2018). To manage double counting risks, the Gold Standard has identified a list of countries that could pose a risk of double counting including: KP Annex B countries, countries having international commitments that trade emission permits with other countries, and any country, region or locality that has a domestic level emissions trading scheme or carbon tax in place (Gold Standard, 2015). For programmes on a national level, double counting risks are typically lower, as there is more control of the emissions reduction calculations and overall volume of carbon credits. For example, entities covered by the California ETS or by the Québec ETS may use offsets to cover up to 8% of their compliance obligation under the ETS. To avoid double counting, no offset can be issued in sectors covered under the ETS or in those that fall into specific regulation (e.g., landfills in California). Beyond that, to manage risks of reversal or potential double counting, Californian offsets can be invalidated ex post as described above. International schemes such as the CDM typically address the double-counting issue through a dedicated registry, in which each carbon credit has a unique serial number and can only be held in individual accounts. Similar to this mechanism, CAR climate reserve tonnes (CRTs) are tracked in CAR's registry where units have individual serial numbers.

### *Contribution to overall mitigation*

The term "overall mitigation in global emissions" was first introduced in the PA, although similar concepts were previously discussed in the context of the review of the CDM and JI under the KP and as part of the conceptualization of new market mechanisms. While the existing carbon crediting mechanisms are not explicitly targeting "net mitigation", overall emissions reductions have likely occurred due to conservative baselines, limited crediting periods and the use of results-based climate finance to cancel units. For example, the revised CDM methodologies for HFC-23 projects allowed for crediting of only part of emissions reductions, effectively resulting in "net" emissions reductions. Similarly, the JCM is using crediting thresholds that are more ambitious than BAU, and therefore also achieves a net mitigation impact. However, it should be noted that in the context of the PA, where all countries have emissions reductions commitments, changing baselines will only affect the distribution of emissions reductions between the buyer and the seller country rather than the level of mitigation.

**Table 3: Comparison of carbon crediting mechanisms: Environmental integrity**

| Environmental integrity | Baseline setting | Additionality | Double counting | Overall mitigation |
|---|---|---|---|---|
| **ACR** | Project-to-project basis | Additionality test against a performance standard or three-prong test (regulatory context, common practice, implementation barriers) | Unique serial number within the region and annual attestation of ownership | Through conservative baselines |
| **AU CFI** | Mostly standardized baselines | Additionality test | Unique serial number | Standardized baselines build on conservative protocols. |
| **BC** | Not specified | Established in the greenhouse gas industrial reporting and control act. | Not specified | Not specified |
| **California OP** | Mostly standardized baselines | Additional to regulation and not common practice | Offset credits are traded and tracked in the CITSS | Standardized baselines build on conservative protocols |
| **CDM and JI Track 2** | Mostly project-to-project basis | Usually determined project-by-project / some positive lists | Unique serial number | Through conservative baselines and limited crediting periods |
| **China** | Based on CDM, but going beyond | Based on CDM | Unique serial number, tracked in national registry | Conservativeness is a requirement when establishing baselines and standardization |
| **GIS** | N/A | Some additionality requirements, e.g. in the EU member states | N/A | N/A |
| **GS** | Mostly project-to-project basis | Usually determined project-by-project /relies on UNFCCC rules | Unique serial number | Conservativeness is stated as one of the fundamental principles of the GS |
| **JCM** | Project-to-project basis | Additionality determination is substituted by eligibility criteria for each of the methodologies, similar to a positive list | Double counting is excluded: “neither side uses any mitigation projects registered under the JCM for the purpose of any other international climate mitigation mechanisms” | Crediting thresholds that are more ambitious than BAU |
| **JI Track 1** | Mostly project-by-project basis | Set by the host Party and determined on a project-by-project basis | Unique serial number | Varies by requirements set by the host party |
| **Ontario** | Mostly standardized baselines | Offset credits can only be generated in sectors not covered by the Ontario’s Cap-and-Trade Program | Positive verification statement | Standardized baselines build on conservative protocols. |
| **Quebec** | Mostly standardized baselines | Offset credits can only be generated in sectors not covered by the Quebec Cap-and-Trade Program | Declaration of not double counting | Standardized baselines build on conservative protocols. |
| **Spain** | Not specified | Must be additional to current climate legislation. | Not specified | Not specified |
| **Switzerland** | Mostly project-to-project basis | Usually determined project-by-project | Restricted national buyers | Conservativeness as a requirement when establishing baselines |
| **US (CAR)** | Mostly standardized baselines | GHG reductions must be additional | Unique serial number | Mention of conservative assumptions, values and procedures to avoid overestimation |
| **VCS** | Mostly project-to-project basis | Usually determined project-by-project | Secure registry system | Use of conservative assumptions, values and procedures to ensure that net GHG emission reductions are not overestimated |

*Source: authors’ compilation*

## 3.4. Monitoring, Reporting and Verification (MRV)

MRV structures aim at ensuring transparency and ensuring that the number of carbon credits corresponds to actual GHG emissions reductions[6].

### *Methodologies*

The CDM and JI use a bottom-up process to develop baseline and monitoring methodologies. Methodologies are typically developed by individual project participants and consultants that propose methodological approaches specific to their project that are then evaluated and approved by the UNFCCC. The CDM has thus so far generated over 200 methodologies, and these have been used as the basis for the majority of methodologies of other carbon crediting programmes, being directly used (JI, GS, VCS) or modified to fit requirements (CAR, CCER, GS, VCS, Switzerland). VCS accepts CDM and CAR methodologies but also develops new methodologies involving public consultations and two reviews by external validation/verification bodies (Verra, 2018b).

### *Monitoring*

Monitoring stands for the collection of the data through direct measurement or the use of proxies, necessary for calculating the emission reductions within a given scope and timeframe (Shishlov, 2015). In the CDM, the monitoring plan to identify and regularly measure (or estimate) anthropogenic GHG emissions from sources within the project boundaries has to be implemented in accordance with methodologies, guidance documents and standards provided by the CDM EB. For California and Switzerland their monitoring requirements are linked to their local jurisdictions The former specified them in the local cap-and-trade regulation and compliance offset protocols, while in the latter the monitoring approach is developed by the project owner and approved by the government agency. The Gold Standard has innovated by not only monitoring GHG reductions but also positive SDG impacts, stakeholder engagement and climate-related monitoring parameters (Gold Standard, 2018c).

### *Reporting*

Reporting includes the aggregation, recording and communication of this data to the relevant authorities (Shishlov, 2015). For any programme several reporting periods will be contained in the crediting period of a project. The duration of monitoring periods in the CDM, i.e. the frequency of submission of monitoring reports, is not predefined and larger projects usually submit monitoring reports more frequently. In the case of Australia's Emission Reduction Fund and CFI, participants have to complete and submit project reports to the Clean Energy Regulator at the end of each reporting

6 The overall approach to transparency of crediting mechanisms is of great importance, but resources did not allow for any deeper analysis in this assignment. Therefore, the analysis is restricted to MRV-specific elements of crediting schemes.

period. The first reporting period begins at the start of a project's crediting period and subsequent reporting periods begin immediately after the end of the previous reporting period. The reporting periods under the CFI vary between six months to five years. Credits can only be issued to a project once a report is received and assessed (Clean Energy Regulator, 2016). In British Columbia, project proponents must report on emission reductions or removals on a yearly basis.

### *Verification*

Verification is aimed at detecting errors and/or fraudulent reporting and is usually conducted by an independent third party (Shishlov, 2015). Most carbon crediting mechanisms require some form of verification by an independent third party, which usually has to be accredited by the governing body. For example, under the CDM the consistency between the project description and the relevant methodology to calculate emissions reductions, the monitoring plan, and the correct implementation of the project have to be periodically verified by an independent UNFCCC-accredited auditor (Shishlov and Bellassen, 2012a). In the case of California's Offset Program each report must be verified by an ARB-accredited verification body before compliance offsets are issued. Some voluntary standards, such as, for example, VCS automatically allow auditors that have been accredited by the UNFCCC. Some schemes, such as for instance GIS, do not require any verification. Some programmes, such as VCS and GS allow for simultaneous validation of a project and verification of emissions reductions.

**Table 4: Comparison of carbon crediting mechanisms: MRV**

| MRV | Methodologies | Monitoring | Reporting | Verification |
|---|---|---|---|---|
| **ACR** | CDM-based and new methodologies bottom-up and top down | Defined in approved methodologies | Monitoring reports, no specified frequency | Third party verification by ACR-approved validation and verification bodies |
| **AU CFI** | Both bottom and up-top down. Assessed by the Domestic Offsets Integrity Committee | Rules defined in approved methodology | Monitoring reporting between 0.5 to 5 years depending on the project type | Mandatory audit report, by registered GHG energy auditor Conducted by the Clean Energy Regulator |
| **BC** | Adapted from existing regulated and voluntary offset markets | Defined in each methodology (template is provided) | Annual monitoring report. | Independent validators and verifiers. Ministry of Environment |
| **California OP** | CDM-based and new methodologies | Defined in ETS regulation and Compliance Offset Protocols | Mandatory offset project data report | ARB accredited verification bodies |
| **CDM** | Mostly bottom up/ project by project | Defined in CDM methodologies | Monitoring reports, no specified frequency | Third-party verification done by DOE |
| **China** | CDM-based and new methodologies | Defined in each methodology. Rules defined by the NDRC | Mandatory public reporting | Third party verification/ NDRC |
| **GIS** | N/A | N/A | N/A | None |
| **GS** | CDM, CDM-based and new methodologies | For GHG uses UNFCCC standards. Sustainability defined in GS Project Passport | Monitoring report (including GHG and sustainability aspects) | DOE and GS Secretariat |
| **JCM** | CDM-based and new methodologies, project by project | Defined in each methodology | Monitoring reports, no specified frequency | Third Party Entity /Joint Committee |
| **JI** | Mostly bottom up/ project by project | Requirements set by host Party | Monitoring reports, no specified frequency | Third-party verification by AIE |
| **Ontario** | Adapted from existing regulated and voluntary offset markets | Defined in each methodology | Monitoring reports, no specified frequency | Ministry of Environment and climate change. |
| **Quebec** | Developed by the government of Quebec. CDM-based and new methodologies | Defined in each methodology | Monitoring reports, no specified frequency | Accredited Verification Body /MDE staff |
| **Spain** | CDM-based and new methodologies | Defined in each methodology | Monitoring reports, no specified frequency | Consejo Rector FES-CO2 |
| **Switzerland** | CDM-based and new methodologies | Defined in standardized methodologies (CDM) / guidance by the governmental agency | Monitoring reports, no specified frequency | DOE / Governmental agency. |
| **US (CAR)** | Top-down, and CDM based. | Defined in each methodology. | Monitoring reports, no specified frequency | Accredited Verification Body / Climate Action Reserve Staff |
| **VCS** | CDM, CDM-based, new methodologies and CAR (except for forest protocols) | Defined in each methodology | Monitoring reports, no specified frequency | VCS approved auditor and staff |

*Source: authors' compilation*

## 3.5. Sustainable Development contributions

Most carbon crediting schemes require explicitly or implicitly that projects contribute to SD objectives in their local jurisdiction, but the importance that they give to this topic varies significantly.

### *Sustainable development as an explicit objective*

The CDM, JI, AU CFI, JCM, CAR, VCS and GS mention the contribution to SD in their principles and in some of the projects under the respective schemes. The CDM establishes SD as one of the two main objectives of the mechanism. Voluntary standards have been explicit in their commitment to SD. The Gold Standard states to be a standard for "the global goals" with the objective to develop a "next generation of standards to quantify, certify and maximize impact toward climate security and sustainable development", thereby setting the dual goal of achieving the Paris Agreement and the SDGs (Gold Standard, 2018i). GS has also established that any projects or programmes seeking validation must demonstrate their contribution to at least three SDGs, including SDG13 on climate action (Gold Standard, 2018c). Under the JCM, information on SD impacts, an environmental impact assessment and local stakeholder consultations are required in the project design documents. A national scheme that also mentions the use of the SDGs is Ontario's carbon offsets programme stating that it will utilize the SDGs to facilitate identification of co-benefits in project development.

### *Sustainable development evaluation metrics and tools*

The assessment of the SD contribution in the CDM is a responsibility of a host country's Designated National Authority that has to confirm this contribution in its letter of approval, without which a project cannot be registered. This reflects the sovereignty principle which affirms that host countries are independent in prioritizing their own development needs (Shishlov and Bellassen, 2012a). There is therefore no mandatory requirement or metric to assess the SD contribution. The CDM EB sought to address this issue by developing a tool to streamline SD-reporting, although this was only published in 2014 and has not been used widely. This tool could potentially serve as a starting point to develop rules and procedures for SD assessment under Article 6.4 of the PA. It is voluntary and can be used at any time in the lifetime of a CDM project. Co-benefits of the three main dimensions of SD (environmental, social and economic) re reported using 70 different indicators. From the data gathered in the tool, a SD Co-benefit (SDC) report is generated and made public on the CDM website (UNFCCC, 2015). Some countries, such as Uganda and Cambodia, use these SDC reports as a basis for local stakeholder consultations and for issuing the Letter of Approval. Most countries, however, have no specific SD criteria among their CDM project requirements.

The GS posits that project developers have three options to demonstrate SD-impacts: (1) select and monitor against internationally adopted UN SDG targets and indicators; (2) follow a GS approved SDG tool or (3) follow a GS approved methodology (Gold Standard, 2018r). It offers SDG impact methodologies under its GS4GG, with more specific tools for SDGs 13 (climate action), 7 (affordable and clean energy), 6 (clean water and sanitation), 5 (gender equality), and 3 (good health and well-

being) (Gold Standard b). Verra is currently developing the Sustainable Development Verified Impact Standard (SD VISta)[7] as framework to assess and report upon the SD co-benefits of project-based activities (Verra, 2018d). The standard is planned to be released in January 2019 (Verra, 2018c).

### *Safeguards against negative impacts*

There are different types of safeguards against negative impacts. One of the most common mechanisms is the application of a "negative list" of projects that might cause adverse outcomes for the environment or the community. For example, the CDM excludes nuclear projects, while Australia's CFI excludes establishment of vegetation on illegally or recently cleared land, and establishment of vegetation on illegally or recently drained wetlands. Generally, voluntary standards have been leading the establishment of safeguards, also expanding the scope of what is considered a SD impact. The GS social, economic, environmental and ecological safeguard principles have been enhanced by two SDG-related safeguards: a gender related safeguard meaning that the equal opportunity for men and women to participate in the project must be central to the design of any project as well as a water related safeguard, to ensure water accesses is not reduced or endangered (Gold Standard, 2018h).

Overall, the GS Safeguards are conceptualized to ensure the respect of principles related to:

- Social safeguards: Human rights; Gender equality and women's rights; Community health, safety and working conditions; Cultural heritage, indigenous peoples, displacement and resettlement; Corruption; Economic impacts (equitable and sustainable growth, worker's rights)
- Environmental and ecological safeguards: Climate and Energy (not increase emissions, not restrict local energy access); Water (impacts on natural water patterns/flows, erosion or water body instability); Environment, ecology and land-use (landscape modification and soil, vulnerability to natural disasters, genetic resources, release of pollutants, hazardous and non-hazardous waste, pesticides and fertilizers, harvesting of forests, food, animals, conservation of value areas and critical habitats, endangered species) (Gold Standard, 2018e)

CCBS is aligned with the UNFCCC REDD+ safeguards, addressing transparency, participation of stakeholders, protection of biodiversity and ecosystem services, and respect for rights of indigenous and local communities (Verra, 2017a).

Another way of addressing potential negative impacts is a stakeholder complaints mechanisms. Such a mechanism exists under the Gold Standard and VCS. It was also proposed under the CDM reform, but never implemented.

[7] Project developers will assess benefits of the project across two dimensions "People and their prosperity" and "Planet". Projects will have to demonstrate positive impact on at least one SDG covering one of the two dimensions (Verra 2018t).

**Table 5: Comparison of carbon crediting mechanisms: Sustainable Development**

| Sustainable Development | Sustainable Development/SDGs | SD Requirements | Safeguards against negative impacts |
|---|---|---|---|
| **ACR** | Projects may disclose positive contributions to SDGs, but no particular tool or protocol | No requirement, but ACR can be combined with the Climate Community and Biodiversity Alliance (CCBA) Standard | Impact assessment to ensure compliance with environmental and community safeguards best practices. |
| **AU CFI** | No specific sustainability objective | Decided by the Domestic Offsets Integrity Committee and the Minister | Negative list against projects that might cause adverse outcomes |
| **BC** | Mentions the programme as part of their sustainability targets | No specific sustainability requirement | Not mentioned |
| **California OP** | No specific sustainability objective | No specific sustainability requirement | Analysis on potential harm under the California Environmental Quality Act. |
| **CDM** | Stated as one of the two main objectives of the mechanism | No UNFCCC rules, requirements established by host country | Not mentioned |
| **China** | Contribution to SD is an approval criterion | N/A | Not mentioned |
| **GIS** | N/A | N/A | Not mentioned |
| **GS** | Sustainability is a core requirement | Sustainability assessment to be performed both ex-ante and ex-post | Safeguarding principles of the UNDP |
| **JCM** | Part of the JCM's concept | SD impacts, and EIA are required in the design documents for the project's development | Not mentioned |
| **JI** | Requirements set by the host party | Not required for project approval, set by the host party | Not mentioned |
| **Ontario** | Recognizes the value of ecosystem services and environmental co-benefits | Use of the United Nations SDGs framework to identify co-benefits of the projects | Not mentioned |
| **Quebec** | No specific sustainability objective | No specific sustainability requirement | Not mentioned |
| **Spain** | No specific sustainability objective | No specific sustainability requirement | Not mentioned |
| **Switzerland** | No specific sustainability objective | No specific sustainability requirement | A negative list excludes potentially harmful project types |
| **US (CAR)** | Programme manual stablishes the avoidance negative social and environmental outcomes | Only for forestry projects | "Do not harm" legal requirements |
| **VCS** | No specific sustainability objective | Reports on environmental impact assessment | Various provisions for AFOLU projects. |

*Source: authors' compilation*

## 3.6. Linkages with other carbon pricing instruments and policies

This section explores how to generate demand for credits through linkage with other pricing and/or command and control instruments, including in developing countries which previously exclusively generated supply.

### *Cap and trade schemes*

Some emissions trading schemes (ETS) allow for the use of carbon credits in order to provide a "safety valve" cost containment tool and to stimulate emissions reductions outside the scope of an ETS. For example, the EU ETS was the largest source of demand for Kyoto carbon credits allowing the import of around 1.65 billion CERs/ERUs in 2008-2020 (Shishlov and Bellassen, 2012a) – or around 60% of all Kyoto credits issued by November 2018 (UNEP DTU, 2018a and UNEP DTU, 2018b). Some ETS

only allow for the use of domestic credits to stimulate emissions reductions outside the scope of an ETS but inside the jurisdiction. For example, California ETS allows for the use of domestic credits with a quantitative limit of up to 8% of each entity's compliance obligation. Eligible domestic credits can be generated from sectors not covered by the ETS if certified under one of six eligible “protocols”. Other examples of ETS that allow for the use of offsets are the NZ ETS and South Korea ETS, with the latter allowing CERs but only from activities with “Korean participation”. Some regulations set an absolute mandatory cap on GHG emissions in a given sector or sub-sector and allow for the use of carbon credits in order to mitigate the potential prohibitive cost of such a regulation. One example of this approach is the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) developed by the International Civil Aviation Organization (ICAO). In order to enable airlines to achieve mandatory carbon-neutral growth post-2020, airlines are allowed to use eligible carbon credits, including those generated under the UNFCCC, voluntary carbon markets (VCM) and REDD+ (IATA, 2018). The ICAO is due to start defining CORSIA rules in spring 2019 and it is expected that references to Article 6 will be removed given the deferral of Article 6 rules to COP 25 (Carbon Brief, 2018).

### *Carbon taxes*

Some carbon taxes allow for full or partial “offsetting” through carbon credits, typically using domestic offsets. The latter condition is put in place in order to ensure that emissions reductions are achieved in the same jurisdiction as the carbon tax and thus avoid the “outsourcing” of emissions. For example, in Colombia entities regulated under the carbon tax can be certified as “carbon neutral” leading to the exemption from the tax liability. Entities can achieve “carbon neutrality” through selected carbon credits coming from projects registered after 1 January 2010 on the Colombian territory under (IETA, 2018):

- Clean Development Mechanism (CDM);
- certification programs or standards that have been either publicly consulted and verified appropriately or issued by the UNFCCC;
- projects recognized by the national government through a National Normalization Body or meet the requirements for the registration of initiatives established by the REDD+ registry.

In Mexico, since 2018, companies can pay the carbon tax in kind with carbon credits from Mexican CDM projects issued after January 2014 at market value up to 20% of their carbon tax liability. It means that to pay tax for 1 $tCO_2e$, at current CER prices, about 15 CERs would have to be paid.

### *Domestic regulatory instruments*

Domestic regulation (technology standards or mandates) can principally become include offsetting. For example, the US Corporate Average Fuel Economy (CAFE) standard simultaneously regulates fuel economy and GHG emissions from new vehicles. Manufacturers are permitted to use credits not related to improvements in fuel economy to assist in reaching their goals. While to date, carbon credits have not been made eligible under CAFE, this would be principally possible without any problem.

### *Result-based finance*

Result-based finance aims at incentivizing targeted outcomes through payments done upon the delivery of pre-defined and verified results. Result-based finance can be linked with carbon credits by using the existing MRV frameworks, such as that of the CDM. For example, the World Bank's Carbon Initiative for Development (Ci-Dev) concluded emission reduction purchase agreements with CDM Programme of Activities in low-income countries (World Bank, 2015). Ci-Dev focuses on underrepresented sectors, as well as innovative and transformational projects, including rural electrification, improved energy efficiency, and waste management (Michaelowa et al. 2016). Another example is the World Bank's Pilot Auction Facility (PAF) launched in 2014 – a results-based payment mechanism which sets a floor price for future carbon credits in the form of a tradeable put option, competitively allocated via auctions. The PAF targets CDM methane and $N_2O$ reduction projects at risk of discontinuation. It demonstrated that subsidies offering a guaranteed price for future emission reductions through auctions help maximize climate impact per public dollar while incentivizing private investment in low-carbon technologies (Bodnar et al. 2017).

**Table 6: Comparison of carbon crediting mechanisms: Linkages to carbon pricing & other policies**

| Linkages to carbon pricing & other policies | Cap and Trade schemes (ETS) | Carbon Taxes | Regulation | Result-based finance |
|---|---|---|---|---|
| **ACR** | Standard is eligible under California Cap-and-trade program | No | No | No |
| **Australia CFI** | Voluntary market | No | No | Emissions Reduction Fund |
| **BC** | No | No | No | No |
| **California OP** | Link with Quebec | No | No | No |
| **CDM** | EU ETS, NZ ETS, South Korea ETS, ICAO (TBC), voluntary market | Colombia, Mexico | No | Ci-Dev, Pilot Auction Facility |
| **China** | Use in pilot ETS schemes, planned link to national ETS | No | No | No |
| **GIS** | No | No | No | No |
| **GS** | ICAO (TBC), voluntary market | Colombia | No | No |
| **JCM** | No | No | No | No |
| **JI** | EU ETS, NZ ETS, voluntary market | No | No | No |
| **Ontario** | No | No | No | No |
| **Quebec** | Link with California | No | No | No |
| **Spain** | Offsets will come primarily from national level, although it can also buy credits in the international carbon markets | No | No | No |
| **Switzerland** | No | No | Swiss $CO_2$ law | No |
| **US (CAR)** | California, Quebec, voluntary market | No | No | No |
| **VCS** | California, Quebec, ICAO (TBC), voluntary market | Colombia | No | No |

*Source: authors' compilation*

# 4. Alternative implementation approaches

Apart from the key design elements that are already being discussed, there are further and so far untested approaches being negotiated in the context of the Paris Rulebook that will become relevant in the finalization of the Article 6 negotiations by COP25 in 2019. These alternatives, responding to specific new requirements in the context of the PA, are briefly presented in this section. We would like to draw attention to the fact that the basis of the negotiations consists of different texts (SBSTA 2018a,b; COP Presidency 2018b), and that governments may come back on compromises made in the early phases of COP 24 negotiations.

## 4.1. Governance and accounting

### *Composition of the governance body*

Instead of having different institutions for Article 6.2 and 6.4, the pre-COP 24 negotiation text (APA et al. 2018) had the option to establish an "Article 6 body" overseeing both mechanisms with specific windows for the centralized / decentralized approach. This would strengthen international oversight on Article 6.2 and allow for a coherent application of the principles of environmental integrity and accounting. The latest generally accepted version of the text (SBSTA 2018a) did no longer contain this option. Moreover, APA et al. (2018) contained the so far untested option of mixing state representatives and non-state actors in the "Supervisory Body" of the Article 6.4 Mechanism. This option could benefit the participation of civil society and thereby enhance the legitimacy of the mechanism. It is however not likely to be accepted due to the potential infringement on the Party-led process and not contained in SBSTA (2018b). Moreover, historically there have been demands about a "professionalization" of the CDM EB, in order to achieve greater independence from governments. However, this is unlikely to succeed given the need for country representation in multilateral schemes.

### *Public vs private governance*

There seem to be no viable alternatives to public governance of crediting schemes under public authority, and private governance of schemes under private authority. However, there is a trend by public policy instruments to rely on the "services" of privately governed crediting schemes, e.g. in some of the domestic offset programs in North America. This trend could for the first time be adopted by a multilateral mechanism if CORSIA accepts units certified by voluntary standards. The role of such voluntary standards for achieving NDC goals will also need to be discussed further.

### *Supervision of activity cycle*

The CDM has been criticized for the geographical imbalance in the distribution of designated operational entities (DOEs) in charge of validation and verification. Institutionalizing the requirement for a more diverse geographical distribution of these entities could enhance equity in participation and lower the transaction costs especially for low-income countries.

Instead of free choice of verifiers which has led to perverse incentives for sloppy verification as well as an explosion of fees in times of high demand, a model of allocation of verifiers by the supervisory bodies combined with mandatory fee structures could be developed.

### *Accounting and registries*

A private registry approach for public crediting mechanisms can be tested, e.g. having the governance body specify the registry performance and then tendering out registry operation to private service providers.

It has been proposed to apply blockchain technologies for creating unique transaction histories of credits; this is an issue linked to MRV (see section below).

## 4.2. Scope and eligibility

### *Scope of activities*

It is widely accepted that upscaled crediting approaches for sector- and economy-wide policy instruments will be eligible in the long term under the new mechanisms. This would have implications on baseline calculations and additionality testing (see section 4.3).

### *Temporal scope*

Aligning crediting periods with NDC implementation cycles would be preferable to the fixed periods of other mechanisms in order to allow for the ratcheting up of ambitions also in market-based activities. Furthermore, as already discussed in the CDM reform process, but so far not implemented with few exceptions (e.g. for LEDS lighting in order to get the full crediting period in AMS III AR one needs to demonstrate quality standards), technology-specific crediting periods could be introduced. CDM crediting periods have been criticized for not taking into account the different time horizons of technologies “maturing” and penetrating the market, with some technologies having a shorter time horizon than seven or ten years (Carbon Market Watch, 2013). It has been recommended to limit crediting periods for activities in sectors that are highly dynamic and complex, while allowing for longer crediting periods for project types that require a continuous stream of credit revenues to continue operation such as landfill gas utilization/flaring (Öko-Institut, 2016).

### *Activity type eligibility*

Regarding the sectoral eligibility for crediting mechanisms, an important debate will be whether emission reductions in high carbon infrastructure will continue to be eligible (e.g. efficiency gains in coal power plants). Only those activities that are compatible with the long-term objectives of the Paris Agreement and commensurate NDC ambition levels should remain eligible for future Art.6 activities. In this regard, Parties could decide to introduce the participation criterion to having communicated a LEDS and even explaining how the activity contributes to the implementation of this strategy (APA et al. 2018).

The result could be the automatic non-eligibility of any coal project, even in LDCs and SIDS because contradicting 2°C-consistent pathways. However, the link to long-term strategies has been weekend in the last versions of negotiation texts. Information on LEDS must only be submitted if available (SBSTA, 2018a; COP Presidency, 2018b).

In the context of ensuring the additionality of activities, it is being discussed to restrict eligible activities to sectors or activities being labelled as "conditional" in Parties' NDCs, assuming that unconditional parts would be implemented in any way. In order to prevent perverse incentives to create "hot air" and label more activities as conditional, this eligibility criterion could not supplement additionality tests (Michaelowa and Butzengeiger, 2017). Furthermore, in the context of the varying types of NDCs it is considered to restrict eligible activities to sectors covered in NDCs to allow for robust accounting of transfers. In order to set incentives for including sectors in the NDCs, activities could be eligible under the condition of the inclusion of the respective sector in the next round of NDCs (Howard, 2018). Restricting crediting to activities in sectors covered by the NDC has been a major stumbling block in the negotiations that could not be resolved and remains bracketed (COP Presidency, 2018b). Also, safeguards to ensure NDC implementation could be introduced. There could be limits on the creation and transfer of ITMOs/emission reduction units with regard to a certain share of emission reductions in NDC in order to prevent the "overselling" of emission reductions that could pose risks to the NDC implementation of the host country. This approach has been taken by some countries under JI, such as France that imposed a "90% rule" to all JI projects, whereby only 9 credits were issued for every 10 $tCO_2eq$ reduced (see Section 2.1), but so far has not been institutionalized at a level of a crediting mechanism. The discussion of safeguards is contentious and will become difficult to resolve in the run-up to COP25.

Crediting of mitigation co-benefits of adaptation actions is pushed in the negotiations by Parties whose NDCs focus on adaptation and economic diversification. Operationalizing it would allow for broader participation but would also need to ensure stringent additionality testing and development of new MRV-approaches (Michaelowa et al., 2018).

An activity type that has not yet been considered under crediting schemes are negative emissions technologies. These are highly important for achieving both the 2°C but even more the 1.5° target but have not yet received sufficient attention (Honegger and Reiner, 2018). While methodologies for some technologies such as direct air capture could be straightforward to account for, those for other processes involving ecosystem functions may be highly complex.

### *Recognize special circumstances for LDCs and SIDS*

Less rigid eligibility and accounting criteria could be introduced for Least Developed Countries (LDCs) and Small Island Developing States (SIDS), for instance with regards to baseline setting, additionality testing and other preconditions such as inventory reports, LEDS, etc. So far, these special circumstances have been institutionalized only on the buyer's side in the CDM, when the EU ETS

allowed for credits from CDM projects registered after 2013 only from LDCs (Shishlov and Bellassen, 2012a).

## 4.3. Environmental integrity

### *Baseline setting*

BAU emissions forecasts have often proven considerably off the mark, especially if established for longer time periods. They are heavily dependent on external influences hard to foresee such as technology innovation, changes in the structure of national economies and sectors or even economic crises. A potential solution and alternative to developing policy specific additionality tests could be baselines that are updated at a very high frequency during the crediting period (for instance, every two years) or "dynamic baseline approaches", where the baseline calculation is defined ex-ante, but the parameters that enter the calculation are only quantified ex-post (Michaelowa and Butzengeiger, 2017).

Moreover, "ambitious baselines" have been proposed to take the principle of conservativeness further in order to explicitly achieve a net mitigation impact, as the assumed baseline is more ambitious than the "real" one. In the draft SBSTA texts, baseline guidance on Article 6.2 is bracketed. The included text proposes that baselines in Article 6.2 activities must be set in a conservative manner and below BAU (SBSTA, 2018a). In the "Katowice text" these principles are un-bracketed and it is specified that Parties must demonstrate furthermore that baselines take into account all existing policies and address potential leakages (COP Presidency, 2018b). The SBSTA text on Article 6.4 lists different options for baseline setting, including historic emissions (in brackets), BAU, conservative baselines including best-available technology (BAT) approaches, other benchmark approaches and standardized baselines (SBSTA, 2018b). This list has been turned into a complex menu of options in the Katowice text, with a BAT and/or performance-based approach as default option and "where not considered appropriate" the possibility to set baselines based on BAU or historic emissions. It remains however unspecified, who will determine the appropriate method for baseline setting according to which criteria (COP Presidency, 2018b). Standardized baselines are recognized in both versions of text.

### *Avoiding double counting*

Preventing the double counting of emission reductions will become a pressing issue in the new market mechanisms of the Paris Agreement, as now all Parties have to implement their NDCs. Seller and buyer Party will need to undertake "corresponding adjustments" reflecting the use of transferred credits against the fulfillment of their NDCs. The Paris Rulebook on transparency has clearly stated that corresponding adjustments for ITMOs under Art. 6.2 apply to emissions levels (COP 2018a, section X.A, para 77d). This represents a stringent accounting base, as GHG inventories are compiled on the basis of common IPCC rules and methodologies and offer comparability.

The operationalization of corresponding adjustments has been a key stumbling block of the negotiations at COP24. Eventually, negotiations clashed on corresponding adjustment modalities for

the international transfers of Article 6.4 units. Accounting of credits under Art. 6.4 may be done according to various options, including a "buffer registry" shielded from NDC and GHG inventory, starting at zero and reflecting sum of transfers and acquisitions (SBSTA 2018b). Whereas most Parties insisted on the need for full accounting of any transfer of mitigation outcomes to avoid double counting, Brazil opposed corresponding adjustments for the 'initial transfer' of emission reductions as this would limit private sector investments. Negotiations under Art. 6 had agreed that all ITMOs measured in any other metric than emissions, Parties shall adjust a balance sheet starting from zero and apply this balance subsequently to the NDC in the accounting process. It remains however unclear, how the comparability of these processes is to be ensured (COP Presidency, 2018b).

Furthermore, the nature of the post-2020 climate regime will have an impact on the voluntary carbon markets that requires a readjustment of the double counting policies of voluntary standards. Without formal recognition of the host country followed by a "corresponding adjustment" of the target or inventory of the host country for the voluntary action implemented and the credits resulting, any voluntary credit issued would contribute to the mitigation goal of the country and thus necessarily result in double counting by the private entity and the host country (Hermwille and Kreibich, 2016). Therefore, the UNFCCC decision 1/CP21 adopting the Paris Agreement highlights the need of corresponding adjustments to prevent double counting, including for approaches involving non-Parties such as CORSIA (Gold Standard, 2018c). One option would be to enhance transparency of both compliance and voluntary markets and to subject transfers of credits from voluntary standards to the accounting guidelines under Article 6. Furthermore, these credits could be credited upon host country approval for corresponding adjustment and cancellation by the private actor buyer. Finally, credits on the voluntary market could be reframed as "sponsoring" national mitigation policies, no longer representing the ownership of a certain amount of emission reduction but a contribution to a governmental policy target (ICROA, 2017 and Gold Standard, 2018c).

### *Contribution to overall mitigation*

Article 6.4d states that the centralized mechanism shall aim "to deliver an overall mitigation in global emissions" (UNFCCC, 2015). This could be operationalized either by automatic cancellation of a certain share of units at the moment of issuance or transfer or by discounting rules. Discounted units could then not be used against the NDC target of any Party. If implemented, the share of ITMOs/credits discounted would have to be determined and potential differentiations and exemptions be introduced in light of the specific circumstances of different parties. In the current negotiations, discounting or cancellation of credits is a highly contentious topic. Fully bracketed in the SBSTA texts (2018a, b), cancellation of units for overall mitigation would be purely voluntary. Delivering overall mitigation is also being linked in this version to measures that would increase NDC ambition of host Parties, such as conservative baselines, default emission factors or other measures to raise ambition. Host Party ambition and overall mitigation, that would not be accounted for by a Party are however, two different concepts that are currently being mixed (COP Presidency, 2018b).

Accelerated results-based climate finance leading to large credit cancelation could increase overall mitigation impacts, even in the absence of a stringent rule-setting in this context. Moreover, shorter crediting periods as mentioned above may also have an overall mitigation contribution, in particular if crediting supports "phasing-in" more sustainable technologies for a very limited period time, as pioneered by the Nitric Acid Climate Action Group[8].

### 4.4. Monitoring, Reporting and Verification (MRV)

MRV is expected to build upon the vast experiences of the CDM and JI. Standardization of baselines has already begun in the CDM. Further standardization of MRV could be achieved by aiming a more comprehensive shifts towards a sectoral aggregation level. This means that MRV could be conducted at sectoral rather than activity level. However, this would likely lead to a significantly higher complexity and efforts for government actors, who may have capacity constraints. A major deviation from these mechanisms would be to allow for the issuance and trading of credits expressed in metrics other than $tCO_2eq$, such as, for example, renewable energy certificates. While this could facilitate participation of certain Parties having NDCs relying mostly on the scaling up of renewable energy production, allowing for the use of different metric would significantly complicate accounting and preserving environmental integrity and would therefore be highly problematic.

### 4.5. Sustainable Development contributions

The promotion of SD is likely to play a greater role in the new generation of UNFCCC market-based mechanisms but will fall short of becoming mandatory due to the fact that SD is widely regarded as a national prerogative. One option is to build on the experiences made with the CDM SD-tool and the current initiatives in the voluntary markets (see Section 3.5), ideally leading to the possibility to monetize SD benefits, as currently attempted by some initiatives.

### 4.6. Linkages with other carbon pricing instruments

If the Article 6 market-based mechanisms expand their scope to crediting for sector- or economy-wide policy instruments, the emission reduction contribution of a domestic ETS – i.e. the difference between the baseline and the cap - could be translated into international credits. This could be further enhanced by linking emission trading systems and thus generating a regional pool of credits. One concrete example would be the Carbon Pricing in the Americas Initiative, assembling federal and state-level governments willing to develop domestic carbon pricing instruments, that could potentially be linked after the harmonization of MRV requirements in the context of Article 6.2 (CPLC, 2018).

[8] http://www.nitricacidaction.org/

Additionality for crediting of carbon pricing instruments could be tested on the basis of the price levels, assuming lobbying against a carbon price of a certain level and an opposition that is only to overcome by recycling revenues (for example, 5€/t$CO_2$eq for developed and 10€ for industrialized countries). The linkage of ETS should furthermore be restricted to schemes not affected by over-allocation of credits to certain industry branches (Michaelowa and Butzengeiger, 2017). Further applications could be on considering crediting for phasing out fossil fuel subsidies or blending crediting with other policy instruments such as renewable energy feed-in tariffs or competitive auctions (IISD et al. 2016).

## 5. Key commonalities and differences among all schemes

The table below presents key commonalities and differences as well as alternative implementation approaches summarizing the two previous sections.

**Table 7: Overview of key commonalities and differences among crediting schemes**

| Design elements | Commonalities | Differences | Alternatives |
|---|---|---|---|
| **Governance and accounting** | - Most schemes have a dedicated governance body, e.g. the CDM EB, supervising the activity cycle<br>- Most schemes have a dedicated GHG registry | - Schemes have different levels of governance: international, national and sub-national<br>- Schemes have different nature of governance: public and private. Mixed governance is not found. | - Common overarching governance for centralized mechanism and bilateral cooperation<br>- Mixed governing body with public and private actors<br>- Tendering of registry operations to private actors subject to specifications |
| **Scope and eligibility** | - Most schemes allow for both projects and PoAs following the CDM<br>- Most schemes define clear crediting periods<br>- Most schemes define eligible host countries / jurisdictions<br>- Most schemes have some explicit project type exclusions (particularly nuclear)<br>- There is an increasing trend to ban high-GWP industrial gases (HFC, $N_2O$)<br>- Existing schemes currently do not consider negative emissions technologies, such as biofuels with CCS | - Schemes differ in the length of crediting periods, which may also be differentiated by project type (from 5 to 100 years)<br>- Schemes differ in their geographical eligibility (from global to national)<br>- Schemes differ in their negative lists (e.g. nuclear, forestry, industrial gases, etc.) | - Upscaled crediting approaches for sector- and economy-wide policy instruments<br>- Aligning crediting periods with NDC implementation cycles<br>- Restricting eligible activities to sectors with particular NDC characteristics (inside/outside; conditional/unconditional)<br>- Restrict eligible activities to particularly sustainable technologies<br>- Special access for LDCs and SIDS<br>- Allowing for crediting of mitigation co-benefits of adaptation actions |
| **Environmental integrity** | - Most schemes set clear requirements in terms of MRV<br>- Most schemes require some form of additionality demonstration<br>- Most schemes address the double-counting issues through unique serial numbers of carbon credits | - Some schemes define baselines project-by-project, some offer standardized baselines, some offer both<br>- Approaches to additionality demonstration differ: project-by-project with different levels of stringency and positive lists<br>- Some schemes offer net mitigation through conservative baselines and limited crediting periods | - Dynamic baseline approaches<br>- Ambitious baseline setting in the context of NDCs<br>- Requiring LEDS for long-term persistence of mitigation<br>- Corresponding adjustments, also for voluntary standards<br>- Discounting/automatic cancellation of credits for overall mitigation |
| **MRV** | - Methodologies are often developed in a bottom-up manner and accepted by a governing body | - Schemes differ with regards to reporting frequency and the requirement to make the reports public | - Top-down methodology development/standardization<br>- Verifier allocation by governing entity, common fee schedule |

| Design elements | Commonalities | Differences | Alternatives |
|---|---|---|---|
| | - Monitoring approaches are typically defined in a methodology | - Schemes vary in their approaches to verification: some do not require it, some are verified by a public entity, some by accredited auditors | - Allow for alternative metrics in ITMOs |
| **Sustainable development** | - Most schemes mention SD in their general principles but their implementation in practice varies greatly | - Schemes differ in the level of emphasis which is put on SD in practice: some schemes mandate the demonstration of SD benefits<br>- Some schemes offer concrete tools and metrics to measure SD contributions<br>- Schemes differ in the way they provide safeguards against negative impacts, some do not have safeguards | - Quantifying SD benefits for sale on voluntary markets |
| **Link with other policies** | - Most mechanisms are linked in some way with compliance or voluntary markets or other policies | - Mechanisms vary in the way their carbon credits can be used: offsets in ETS, against carbon taxes and other policies, such as result-based finance | - Linking of domestic carbon pricing instruments at the regional level through Article 6.2 |

*Source: authors' compilation*

## 6. Conclusions and key lessons for Article 6 of the Paris Agreement

With the run-up to COP25, 2019 will become a crucial year for the negotiations on Article 6. Highly contentious issues surrounding baselines, overall mitigation, corresponding adjustments and taxation for adaptation purposes will have to be resolved. Furthermore, several issues that so far have not been addressed will need to be negotiated, such as "further safeguards and limits" and the special circumstances for LDCs and SIDS. In the quest for landing zones and bridging proposals in negotiations, it is important to ensure that the lessons that have been learned in implementing crediting schemes around the globe will not be ignored.

While international compliance crediting schemes such as the CDM have had hard times recently, other crediting schemes are spreading around the world at multiple levels, and developing countries engage in them not only as sellers but also as buyers. Domestic crediting schemes however, follow a "parochial" approach, limiting access mostly to domestic units. The proliferation of different systems ensures that carbon pricing policies spread around the world, but the lack of harmonization limits their effectiveness. This fragmentation could also lead to a major challenge in ensuring comparable and transparent NDC accounting that comprises transferred ITMOs. The review of commonalities and differences among crediting schemes and their relevance for Article 6 leads to the following conclusions:

- While **governance** on Article 6.4 will likely be centralized at the international level, Article 6.2 governance will be subject to minimal international oversight. Different arrangements from purely public to public and private mixed systems are possible and depend on the agreements between the participating Parties. Furthermore, under Article 6.2 there will likely be a co-existence of national registries and the international registry of the Secretariat.

- Most crediting schemes explicitly exclude certain technologies. Even if the Article 6 mechanisms have so far been designed as technology-neutral, **restricting the scope** to avoid crediting for activities inconsistent with a 1.5°C pathway and prevent "lock-in" effects of high-carbon technologies could be an option to enhance the ambition of climate action. Furthermore, it seems likely that crediting of activities outside the scope of NDCs, which poses certain risks to accounting and environmental integrity, will at least be restricted to certain circumstances and be time-limited.

- Defining specific **crediting periods** according to technologies and project types could enhance the stringency of the mechanisms, even if this approach has not been implemented yet. Furthermore, it is advisable to align crediting periods with NDC implementation and review cycles.

- The level of **ambition** of the host country is a crucial safeguard to ensure the environmental integrity of the mechanism. If there is "hot air" in the countries' commitments, i.e. if the NDC targets of the participating Parties are above BAU emissions, there is a moral hazard to credit non-additional or even fictitious emissions reductions as it happened in Ukraine and Russia under JI. Conversely, in case of ambitious NDC commitments, host Parties must install safeguards to not

jeopardize their own climate action commitments by selling ITMOs. Here, France's approach to JI projects may serve as an example.

- Some crediting schemes offer net mitigation of emissions through conservative baselines and limited crediting periods. In the Paris world, conservative baselines and limited crediting periods can be important safeguards to ensure ambition and host Party NDC achievement. The principle of **overall mitigation of emissions**, as to say, mitigation that will not be accounted for neither by buyer or seller country can be achieved through the retirement or automatic discounting of credits. In the current version of negotiation texts, this option would remain voluntary.

- While MRV approaches for credits expressed in $CO_2e$ are well established, allowing the trading of ITMOs expressed in other **metrics**, as it seems most likely to happen, will further complicate international markets and will require substantial follow-up work on the comparability of credits and their robust accounting.

- As we are witnessing with the developments in the CDM and private sector standards, **sustainable development contributions** in crediting schemes are becoming more relevant. This trend is currently neglected in the negotiating texts but is likely to gain importance through restrictions introduced by credit buyers.

- Domestic crediting mechanisms are mostly linked with compliance or voluntary markets or other policies, such as carbon taxes. Their credits can be used as offsets in ETS or to reduce carbon tax liability or in the context of results-based finance. **Linking the use of international markets to domestic policies** would allow to leverage private sector finance and raise ambition through the use of Article 6. It furthermore can effectively lower the costs of compliance in domestic carbon pricing policies, if properly designed. Safeguarding environmental integrity of the Article 6 mechanisms will be key to ensure they can be used in these contexts. Attaining an equilibrium between supply and demand of credits will be crucial to the stability of the market, as demonstrated by the collapse of the Kyoto mechanisms.

The EU will have an important role to play in particular with regard to creating the enabling environment for international mechanisms to succeed. However, it remains unclear whether Europe is willing and able to revive its role as an international leader of crediting schemes. After a long period of surplus in the EU both within the ETS, in sectors covered by the Effort Sharing Directive (ESD) and for more ambitious national government target levels, the likely failure of a number of member states to reach 2020 targets (Belgium, Finland, Germany, Ireland, Malta, Poland) leads to an implicit demand of hundreds of millions t $CO_{2eq}$ (EEA 2018). The ESD allows for several approaches to achieve flexibility in achieving national goals. Before 2020, the ESR allows achieving compliance both through domestic as well as international credits from the Kyoto Mechanisms. Both strands would now need to be mobilized in order to generate sufficient credit supply to comply with existing targets, which could trigger an initial revival of the crediting mechanisms.

For the post-2020 period, the increasing pressure to ratchet up the mitigation ambition of the EU's NDC – which is still not even in line with the 2°C target yet - could leader Member States to reconsider their position to only allow the use of domestic credits. For example, the use of international credits under Article 6 for both ETS and ESD sectors could be allowed as part of a substantial increase in the mitigation ambition of the EU NDC. In order to achieve this, piloting concrete approaches to Article 6 implementation by progressive European countries is crucial in order to generate the necessary experience that helps to ensure the integrity and legitimacy of crediting mechanisms. This could start with bilateral cooperation focusing on the upscaling of PoAs with high SD co-benefits and embedding policy crediting in the context of NDC implementation strategies. Another approach could be to develop domestic crediting schemes in ESD sectors that build on the experience with JI and GIS. All of these approaches, however, should be designed with a view to progressively adopt Article 6 rules as they evolve in order to enable transparent NDC accounting and supporting the implementation of the Paris Agreement rulebook.

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