<h1 style="text-align:center">Submission to SBSTA on Article 6.2</h1>

Views on options for implementing the infrastructure requirements referred to in chapter VI of the annex (recording and tracking)

The Carbon Markets and Innovation unit of the World Bank Group welcomes the opportunity to make a submission to the SBSTA in response to the call for views on options for implementing the infrastructure requirements referred to in chapter VI of the annex (recording and tracking) of the Article 6.2 of the Paris Agreement.

International carbon markets under the Paris Agreement are significantly different from those under the Kyoto Protocol. While there were a limited number of crediting mechanisms under the Kyoto Protocol, Article 6.2 of the Paris Agreement can facilitate a variety of mechanisms reflecting to a larger extent the diversity of country NDC targets and how countries plan to achieve these through voluntary approaches. While providing for diversity of approaches and mechanism will promote innovation, these could bring challenges with ensuring transparency and harmonization of approaches that countries adopt. To ensure that countries' climate actions through NDCs contribute to the global goals, transparently monitoring and reporting countries' climate activities is key, and for that, countries' access to a robust infrastructure system will be important. Development in information technology in recent years permits this to be done transparently, efficiently and cost effectively.

Heterogeneity and role of a decentralized information technology system: Article 6.2, para 29 specifies that each participating party shall have, or have access to, a registry for the purpose of tracking all carbon market transaction related activities. Hence, at the domestic level, country's access to a registry to track information related to the use and transfer of mitigation outcomes (MOs) and internationally transferred mitigation outcomes (ITMOs) is essential. Various options are available in implementing such registry to reflect the country needs and capacities. For example, ranging from a simple excel spreadsheet to a full-fledged registry that has transaction functionality, countries can develop their own national registry, or participate in a regional registry, make use of registries managed by independent standards, or the UNFCCC's international registry. A hybrid approach is also conceivable in which a country has its own registry and also allows issuance of MOs in independent standards' registries. Availability and adoption of different configurations mean that it could lead to heterogeneous carbon markets, which may have differences in governance rules and operate under different technological systems. In order to ensure inter-operability, robust tracking, avoidance of double counting, and environmental integrity of transfers, there is a need for a decentralized information technology system in which different registries are linked, thereby enhancing transparency and trust among market participants and enabling tracking of MOs across jurisdictions. The World Bank's Climate Warehouse was launched with the vision to become a public good meta-data repository that reflects the data and transactions from all registries, using a standardized data model and common reporting mechanism. This standardized approach enables comparison of carbon units of differing quality, avoidance of double-counting, and enhanced visibility into the corresponding adjustment procedures and lifecycle of carbon units.

Simple, flexible, and open source MRV and registry systems at country level: While countries have multiple options to consider in deciding the appropriate infrastructure that supports their participation in carbon markets, it is essential that the systems and configurations reflect the needs of the countries (e.g., the number of projects, transaction volume, expected cost, etc.), their capacities, and sustainability of operation of such systems. Open-source software MRV and registry systems, such as the one developed

by the World Bank's Partnership for Market Readiness/ Partnership for Market Implementation and deployed in Jordan and Sri Lanka, one by countries like Costa Rica[1], and notable private market players such as IHS Markit, Global Environmental Markets deserve attention as they aim to deliver these systems. Establishment of common functional and technical specifications that are aligned with various reporting requirements under Article 6.2 and others including Articles 4, 9 and 13 is paramount. In addition to the registry that tracks information at the unit level, countries should also have a centralized database or MRV system at the national level to be able to meet the reporting requirements specified in chapter IV of the Article 6.2 annex and to track how countries are doing with their NDCs in different sectors of the economy. Such system records and archives national-, sectoral-, or project-level information on GHG emissions, mitigation activities, and various support provided or received.

Role of digital technologies to support MRV and connecting registries: Conventional MRV under the Kyoto Protocol was costly and time-consuming, impacting the liquidity of carbon markets. These MRV processes continue today, and rely on manual collection of project data, recording of this data in hard copy or unsecured electronic worksheets, and verification of this same information during the on-site inspections by 3rd party auditors. To ensure well-functioning, liquid carbon markets under the Paris Agreement, there needs to be a concerted move towards reducing the cost and time needed to certify emission reductions.

Emerging digital technologies can provide a solution to enhance transparency of carbon markets and reduce transaction costs. Integrating disparate registry systems using blockchain technology enables different types of registries to be linked with ease and creates auditable and immutable data of any changes made on units in the linked registry, enabling tracking and reducing double counting risks. Recent technological developments and innovations have opened the door to the use of AI, machine learning, satellite imagery, blockchain, smart sensors, internet of things, cloud computing, and drones in MRV systems, to automate data collection, recording, and processing for reporting and verification, referred to as a digital MRV system. To facilitate adoption of these emerging technologies, GHG methodologies should be made compatible and different standard setting bodies should be encouraged to adopt and accelerate the methodology development process.

Support end-to-end digital ecosystem for carbon market: Digital MRV systems are the first step in the end-to-end digitalization of the carbon market infrastructure. Starting with automated MRV of emission reduction projects and greenhouse gas inventories, linking these systems to carbon market registries for streamlined reporting, and interconnecting these registries to one another to track transactions makes up the envisioned digital carbon market infrastructure. The World Bank is simulating this interconnection of digital MRV systems and carbon market registries through the Climate Warehouse initiative to demonstrate how these systems can share information. Detailed information can be shared upon request.

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[1] http://www.sinamecc.go.cr/acerca-de