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Africa > INTERVIEW: World Bank to launch metadata project to clean up carbon market's information problem

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Senior members of the Washington-headquartered multilateral financial institution outlined to Carbon Pulse its vision for the so-called 'Climate Warehouse' with the main objective of facilitating peer-to-peer connection among decentralised registries, country registries, and independent standard registries.

The starting point for the project was Article 13 of the UN Paris Agreement that stipulates monitoring, reporting, and verification (MRV) mechanisms need to move towards a national system, Chandra Shekhar Sinha, lead financial specialist at the World Bank, told Carbon Pulse in an exclusive interview.

"Individual projects or programmes need to move towards digitalising their MRV, as well as the process of reporting to the UNFCCC, to the carbon markets, to the national regulators," he said.

“This will be greatly facilitated by these individual monitoring systems being connected to a centralised database which is directly linked to each registry of mitigation activities.”

The Climate Warehouse’s ultimate aim is to become a global metadata layer that hosts standardised information uploaded from all connected registries around the world.

THE PROBLEM

The problem with carbon markets at present, and particularly on the voluntary side, is that information is widely distributed across multiple different jurisdictions that has led to a fragmentation, according to Sinha.

“The key challenge was that the Paris Agreement put in place a decentralised framework where sovereigns would make commitments and then policies to implement those commitments that are contained in the nationally determined contributions.”

“The issue is that everything is allowed and there are no constraints with regard to the kind of contributions countries can make. As a result, there is a lack of consistency or standardisation in the information that is presented or the place where it is provided,” he added.

The fragmentation of data then creates a lack of trust in what is happening in the market that can deter buyers. Scrutiny over the quality of carbon credits has increased in recent years, as concerns over additionality, permanence, and the risk of double counting have mounted.

Emerging initiatives are due to publish provisional guidance by the year-end that aim to clean up practices in the voluntary carbon market, such as those by the **IC-VCM** (<https://carbon-pulse.com/160248/>) for the supply side, and those by the **VCMi** (<https://carbon-pulse.com/164760/>) on the buyer side.

However, these represent guidelines for best action rather than providing infrastructure to increase the quality of available information.

“Based on large consultations with buyers and other stakeholders, we see some uncertainty on how Article 6 can affect their portfolio, the project design development, and diversification at the issuance level,” said Gemma Torras Vives, who works for the World Bank on the carbon markets and innovation team.

Large companies, who have increasingly committed to net zero pledges over the past year, have been the main driver behind **soaring demand** (<https://carbon-pulse.com/165121/>) for carbon credits, but many remain unclear on the value of offsetting a tonne of carbon with **wide price divergence** (<https://carbon-pulse.com/164907/>) across the VCM.

“Corporates mentioned the fragmentation across standards and a lack of centralised registries between voluntary and compliance markets. It is difficult to provide comparable standards units or joint reference data and no available publicly-available data on ratings information for example,” Torras Vives said.

“Then at the demand level, there is a lack of pricing transparency, limited visibility of the project lifecycle, and an unclear link of credits to the NDCs,” she added.

HOW IT WORKS

The World Bank’s proposed solution to these challenges will work by standardising data uploaded by the various different registries on a country and local level, as well as from those belonging to independent standards, and then aggregating the information and hosting it for free for the public in Climate Warehouse in a way that easily compared and understood.

To achieve this goal, the infrastructure will have two components that make up the so-called primary data layer that mainly serves the end users such as registries and those wishing to upload core data.

The first represents what will be the metadata layer itself that hosts information from the transfers of all registries using a standardised data model or common taxonomy.

The second component of the infrastructure will be secured on the Chia blockchain that enables the information to be public with decentralised governance, designed to support inclusiveness in the market.

This layer will also contain a secure record of transactions to ensure the traceability of data.

Once all data is uploaded and the digital infrastructure is fully operationalised, there will be a process of data harmonisation following the Climate Warehouse's public launch targeted for mid-October, with API linkages set up to enable automatic synchronisation of data from registries to the Warehouse.

"The more registries that are connected, the more confidence you have about the information in the market, what are the projects, how can you avoid double counting," Sinha told Carbon Pulse.

"Were an entity to register a project with Verra and Gold Standard, if the two registries don't talk to each other and share their data as is currently the case, then you as a private buyer have to do due diligence to ensure you avoid confusing information," he added.

"As the information flow is always through the registry and therefore you know the Climate Warehouse reflects the most recent information in the source registry which contains information on the carbon assets," he said.

In theory, this means that each time a credit is issued or retired, irrespective of any transactions between these two processes, the data on the Climate Warehouse will be automatically updated when it is done so by the registry responsible.

Transactions, exchanges, and issuances do not occur in the Warehouse itself, but rather outside at exchange or registry level. The data at this point is then synchronised with that held in the Warehouse after registries have integrated via API calls.

Alternatively, if countries do not have a registry themselves or insufficient IT capacity, then they can use the core registry function that is built into the Climate Warehouse.

The World Bank hopes this will aid all countries irrespective of size or development level to increase the visibility of their climate activities, and also view mitigation outcomes (MOs) of others, that can be purchased against their NDCs or for other purposes.

As for independent standards, the Climate Warehouse wants to ease the burden on monitoring external systems for due diligence processes because of the ease of aggregating information together.

Overall, the desired result is that the market will have information across all connected registries available in a consistent format that can then be used for market credibility checks and balances.

SECOND LAYER

Once this primary data layer has been created, populated, and the data harmonised, the World Bank said that it aims to build a secondary so-called service layer.

This will enable market players to host a node in the Warehouse and provide their own services such as forecasting, credit ratings, and other secondary services.

The market demand has soared for new firms popping up to offer such services such as ratings agencies BeZero and Sylvera, as well as voluntary carbon price analysis and data companies such Allied Offsets and Trove Research.

“We hope [adding this secondary layer] both reduces the fragmentation in the market but also helps it to develop and evolve,” said Torras Vives.

ROLLOUT

Rolling the Warehouse out will take some time and there are likely to be some challenges, Torras Vives told Carbon Pulse, particularly highlighting the need to upgrade IT systems to accommodate the technology, such as ensuring compatibility with the Chia blockchain.

“Registries will need to make changes to their own legacy systems to be able to integrate and fully upload the data to the Warehouse,” she said.

It is not particularly complex to do this, Torras Vives continued, but registries will still need to conduct their own security clearances and ensure process systems and data software are compatible, requiring the copying of a blockchain node across to their own machines.

For this process, around 100 gigabytes of physical storage space will be required on host machines. The World Bank estimated the technical onboarding could take as long as 11 hours in a document published this year.

While the third and final simulation phase, due to end by the end of the month, has been “smooth”, getting the Warehouse installed across all IT systems is “a big step from a business and policy perspective”, Torras Vives told Carbon Pulse.

THE FIRST YEAR

When asked what success in the first year would represent, Sinha affirmed that a strong uptake from registries, fully-connected through API linkages with real-time updating of information on the Climate Warehouse, would mean the project has enjoyed an excellent first twelve months.

“Based on the current market structure, if we have Verra and Gold Standard, we will have brought 80% of the market. If we add Climate Action Reserve, ACR, ART TREES and GCC, we will have 95% of the market, and if we then also include the JCM [Japan’s Joint Crediting Mechanism] we probably creep a few percentages point higher.”

“So if we aim for around 10 sovereign national registries to be connected within the first year plus the standards mentioned, that for us is unqualified success from my point of view,” he said.

Torras Vives also stressed the need for a wide uptake across the world to ensure regional representation.

“As well as the main standards, having countries representing all the regions would be extremely valuable while ensuring a diversified representation connected to the Warehouse,” she said.

“In addition, having public and private sector market players from the service layer providing some intelligence and forecasting services would be optimal,” she added, referencing the development of secondary service layer.

BUSINESS MODEL

The Climate Warehouse will initially be free to use and access, with donors and external partners fully financing the project for the first two years.

“One backer has approved funding but we are going through the process of getting a legal agreement in place,” Sinha confirmed.

“That should cover a large proportion of the cost we expect over the first two years. Not all of it, but a large portion.”

A document produced earlier in the year estimated the Climate Warehouse’s IT and governance costs in a range between \$935,000-1.54 million per year.

“By the time of the launch, we should have the funding requirements tied up and therefore allow the participants to focus on testing the Climate Warehouse for its best use, and in that period we can also begin to define the business model,” he added.

The future business model is likely to evolve around the secondary service layer, with users perhaps charged for access to additional data or in some sort of participation with the registries and the exchanges, though this will be determined by the governing body once appointed, Sinha said.

The standardised data uploaded by registries and intended for public use is expected to remain free.

BUILDING THE WAREHOUSE

The data layers will represent just one element of the Climate Warehouse that the World Bank seeks to operationalise first, with further projects such as enhanced registry capabilities and native digital token issuance to also be built into the infrastructure.

The so-called enhanced registry, which has been developed for testing with Jordan and Sri Lanka, and is part of the World Bank’s offering under its Partnership for Market Implementation programme, has the capability of linking to the MRV system.

“The enhanced registry is much more sophisticated data with the ability to have digital linkages and so on. Depending on the level of sophistication and the scale at which projects are to be approved and tracked, one or the other registries would be more suitable,” Sinha said.

A basic registry offering will be built-in and connected to the Warehouse at its launch.

“Many Climate Warehouse [simulation] participants have been testing the core registry functionality as it helps to understand how the data model is displayed,” said Torras Vives.

“Participants can test a number of scenarios, such as creating projects and issuing units, auditing data uploaded by other registries and checking the changes secured on-chain, as well as subscribing or unsubscribing to other registries’ data, which enables them to monitor the registries they choose to follow,” she added.

In addition, the World Bank is working in partnership with the European Bank for Reconstruction and Development (EBRD) and United Nations Development Programme (UNDP) and others on creating a broader digital market ecosystem, trying to build in native token issuance, or digital asset processes, to the Climate Warehouse.

Further details on this project are expected to emerge later this year.

TIMELINE

The current testing phase will finalise at the end of July, and then the World Bank will consolidate feedback and lessons learned and produce a final report as well as onboarding package for registries to integrate to the operational Climate Warehouse.

Prior to this, International Emissions Trading Association (IETA), Singapore, and the World Bank had conducted a six-month consultation process from Sep. 2021 to March 2022 to help define the governance and financial aspects relating to the implementation of the Warehouse, across a group of over 70 countries and entities.

Participants in the consultation included oil majors BP and Shell, the UK and Japanese governments, Verra and the Gold Standard, several of the main voluntary carbon market exchanges, tech firm Microsoft, developer South Pole, and global banks such as UBS.

Following this, testing was carried out with various stakeholders.

“During the testing process, we have gathered positive feedback on how the Warehouse is providing value to the current market fragmentation and the main counterparts of five independent standards and key country registries are already testing with a number of different areas of the Warehouse,” Torras Vives said.

From now until October, IETA, the government of Singapore and the World Bank are jointly overseeing the creation of an Interim Council of around 10 members to serve a two-year term as recommended during the public consultation held earlier this year.

This public-private governing body will oversee the operationalisation of the Climate Warehouse. A Technical Committee and User Forum will be formed to advise the Council.

Before October, IETA will also establish a separate legal entity in Singapore to administer and operate the Climate Warehouse. The World Bank and Singapore government are continuing to provide support in this inception phase.

“The Climate Warehouse is expected to launch to the public in mid-October. By this time, we hope to have the legal entity set up, Interim Council established, and the functional IT infrastructure fully transferred to the new organisation,” Torras Vives confirmed to Carbon Pulse.

“By the end of the year, we aim to hold the first meetings of the new governance body, secure commitments from the first carbon crediting programmes to provide data and put in place further contracting work to accelerate this,” she added.

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