Climate Warehouse

A global public meta data layer for the carbon markets

Deep Dive, July, 2022

WORLD BANK GROUP

Overview of CW

- Context-setting
- Value Proposition and Ecosystem
- Public Good Data Layer
- Testing and Simulation Activities
- Prototype Architecture

Testing Scope and Process

- Objectives
- Scope of Work & Testing Strategy
- IT and Time Requirements
- Feedback & Next Steps
- Lessons Learned

Governance and Timeline

- Consultations Process and Results
- Interim Structure and Model
- Next Steps

Annex: Prototype at a glance

Agenda

June, 2022

WORLD BANK GROUP   Climate Warehouse

2

Context-setting

- **Individual commitments through nationally determined contributions (NDCs).** The Paris Agreement introduced a bottom-up approach for addressing climate change.

- **Decentralized cooperative approaches to achieve their NDCs.** This is expected to lead to heterogeneous climate markets, which may have differences in governance rules and operate under different technological systems.

- **Climate Warehouse:** a decentralized information technology approach to connect climate markets systems.

Report by Taskforce on Scaling Voluntary Carbon Markets (TSVCM)
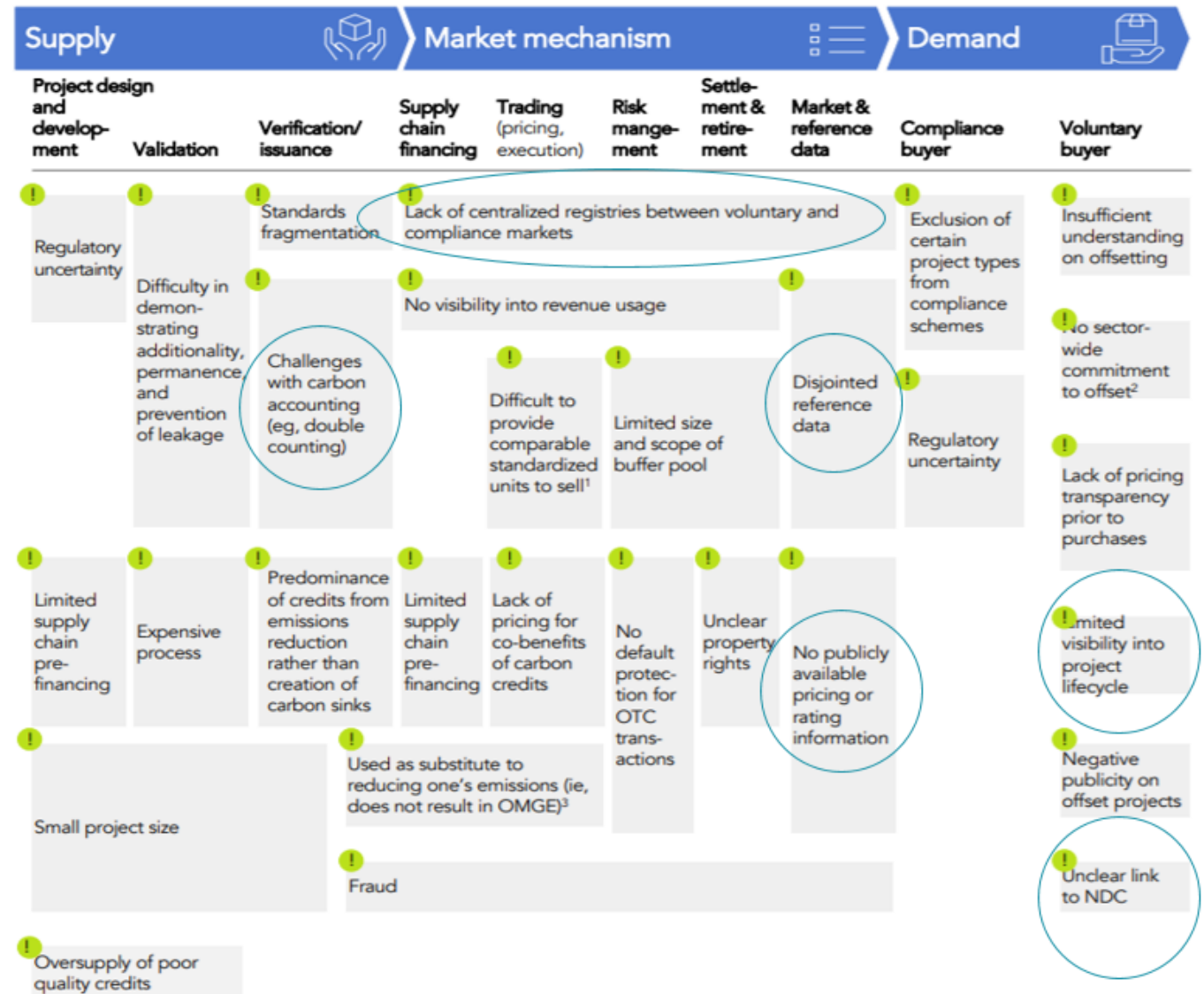
Source: Adams, Tim. Winters, Bill. Nazareth, Annette and Mark Carney *Taskforce on Scaling Voluntary Carbon Markets Phase 1 Final Report: January 2021*, TSVCM, pg. 45

What is the value proposition?
A decentralized IT approach to connect climate markets

Climate Warehouse

An open-shared meta data layer

1 A common data taxonomy that enables reconciliation of data from registries. It facilitates a peer-to-peer connection among decentralized registries with the aim to link, aggregate and harmonize the underlying data

2 Provide visibility into corresponding adjustment procedures and the lifecycle of carbon offsets from issuances to retirement, which will safeguard against double counting and ease reporting requirements.

3 Surface publicly-available information on MOs and record status changes to provide information on how MOs are used.

4 Enhance transparency and trust among market participants and enable tracking of MOs and reduce double counting risk. The Climate Warehouse would not hold assets or directly facilitate.
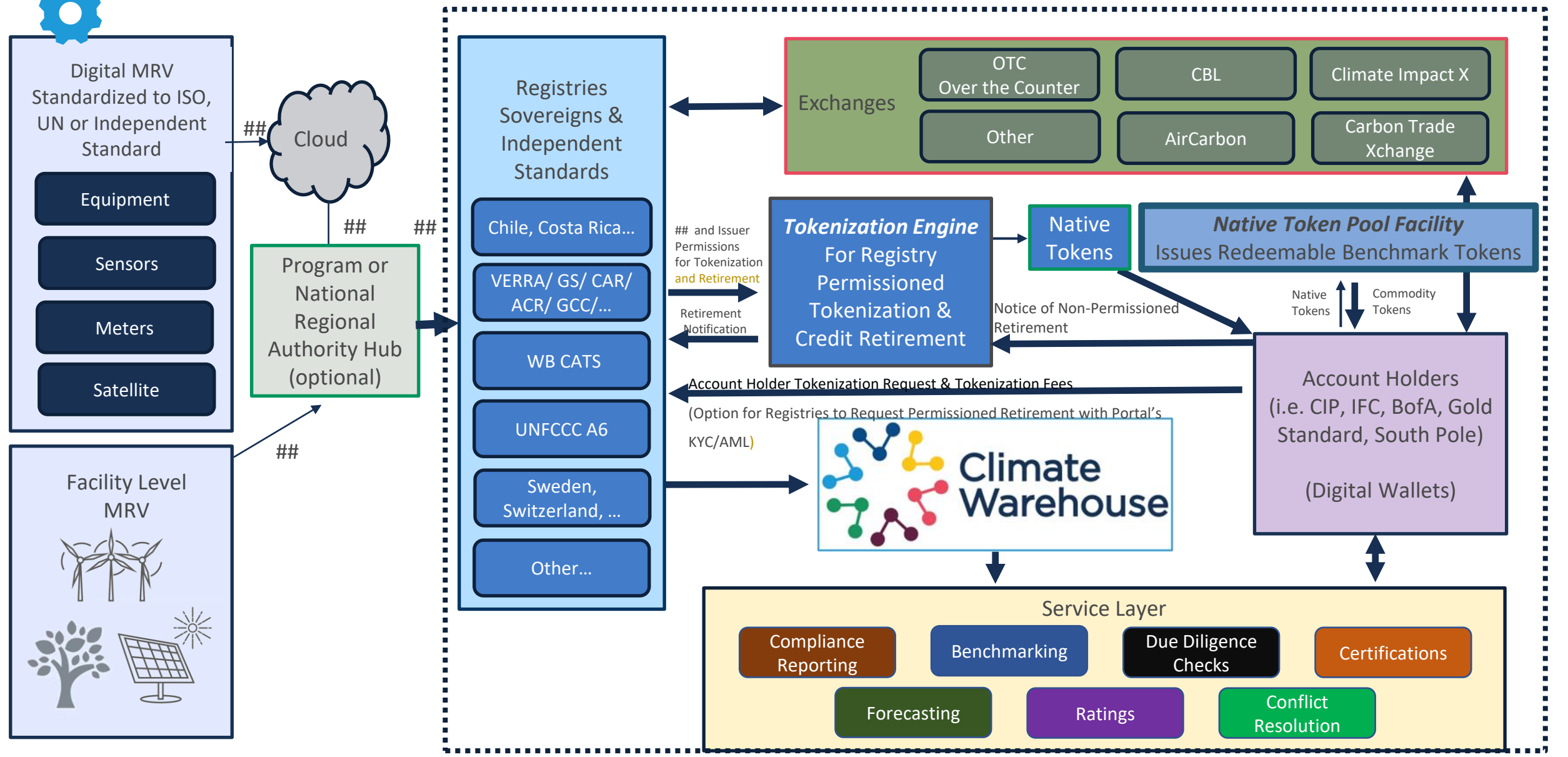
WORLD BANK GROUP   Climate Warehouse

Climate Warehouse in the Data Ecosystem
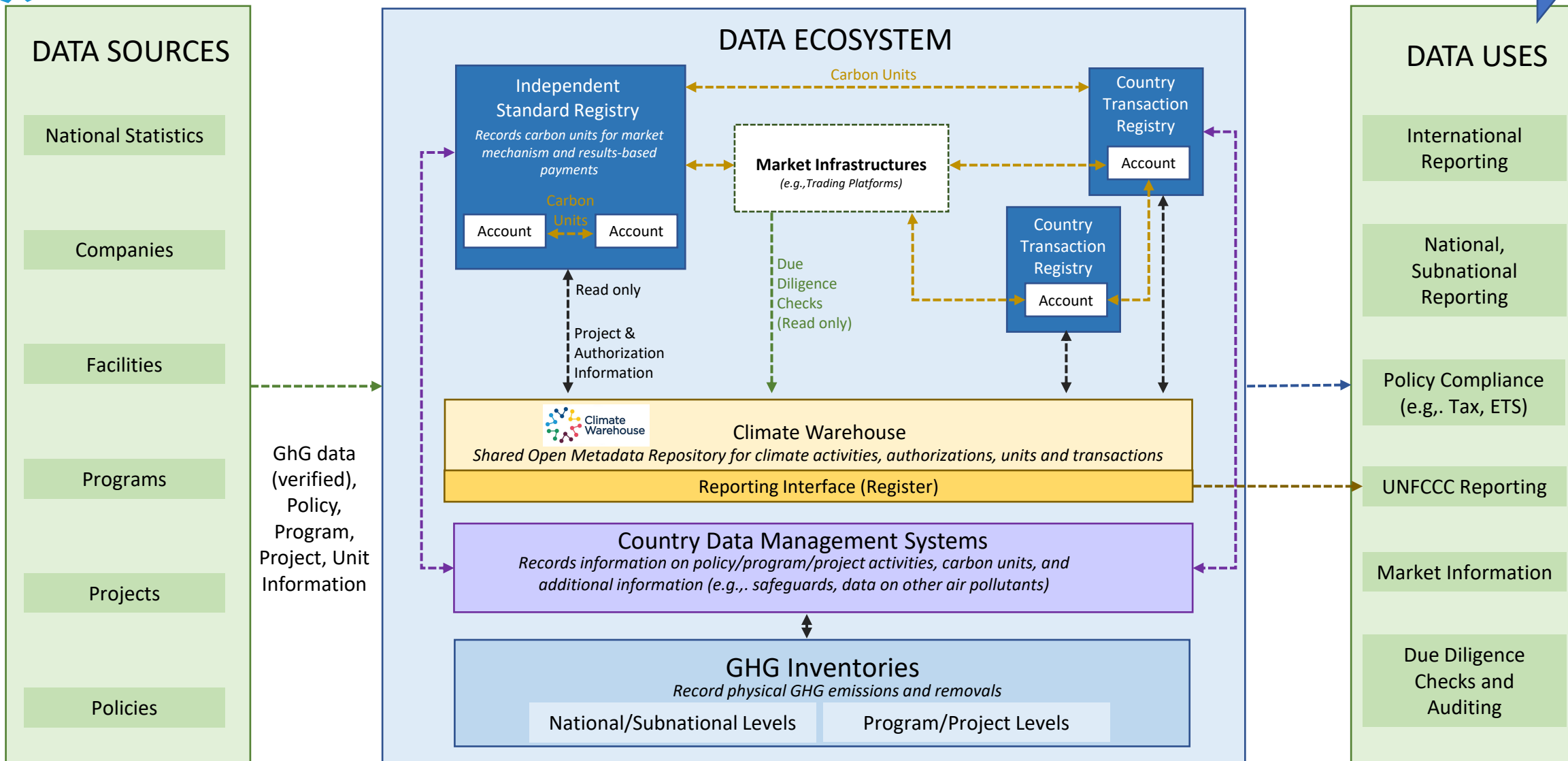
End-to-End Digital Ecosystem for Carbon Markets

Climate Warehouse in the Data Ecosystem

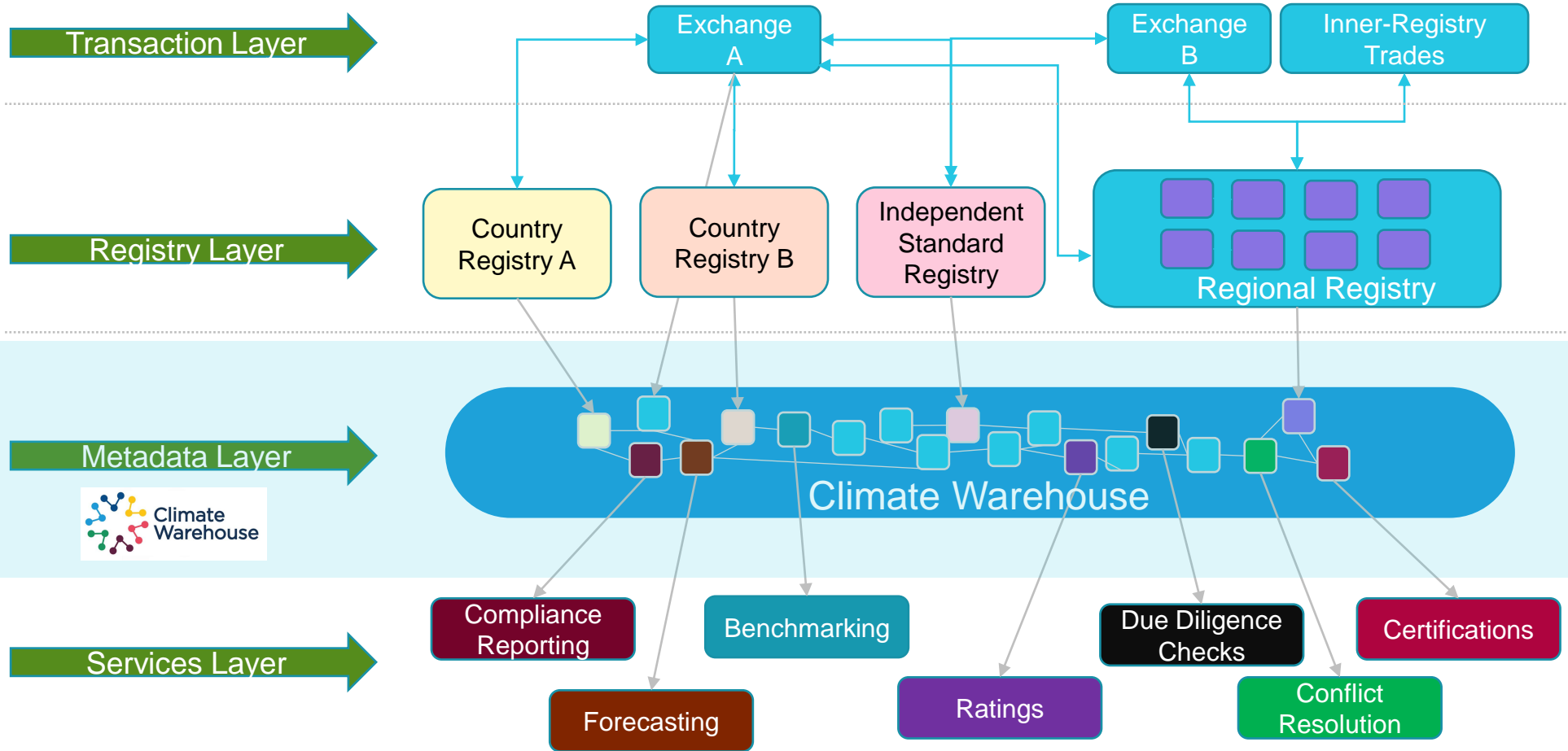MEASURE/CALCULATION — AGGREGATION AND ACCOUNTING — REPORTING, COMMUNICATION & ANALYSIS

DATA SOURCES

- National Statistics
- Companies
- Facilities
- Programs
- Projects
- Policies

GhG data (verified), Policy, Program, Project, Unit Information

DATA ECOSYSTEM

Independent Standard Registry
Records carbon units for market mechanism and results-based payments

Carbon Units

| Account | Account |

Read only

Project & Authorization Information

Market Infrastructures
(e.g.,Trading Platforms)

Carbon Units

Country Transaction Registry
Account

Country Transaction Registry
Account

Due Diligence Checks (Read only)

Climate Warehouse
Shared Open Metadata Repository for climate activities, authorizations, units and transactions

Reporting Interface (Register)

Country Data Management Systems
Records information on policy/program/project activities, carbon units, and additional information (e.g.,. safeguards, data on other air pollutants)

GHG Inventories
Record physical GHG emissions and removals

| National/Subnational Levels | Program/Project Levels |

DATA USES

- International Reporting
- National, Subnational Reporting
- Policy Compliance (e.g,. Tax, ETS)
- UNFCCC Reporting
- Market Information
- Due Diligence Checks and Auditing
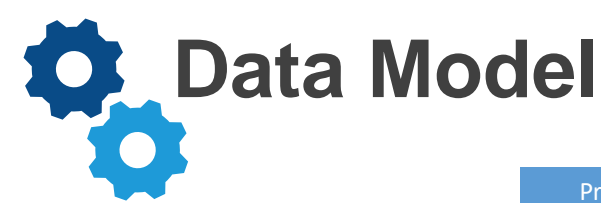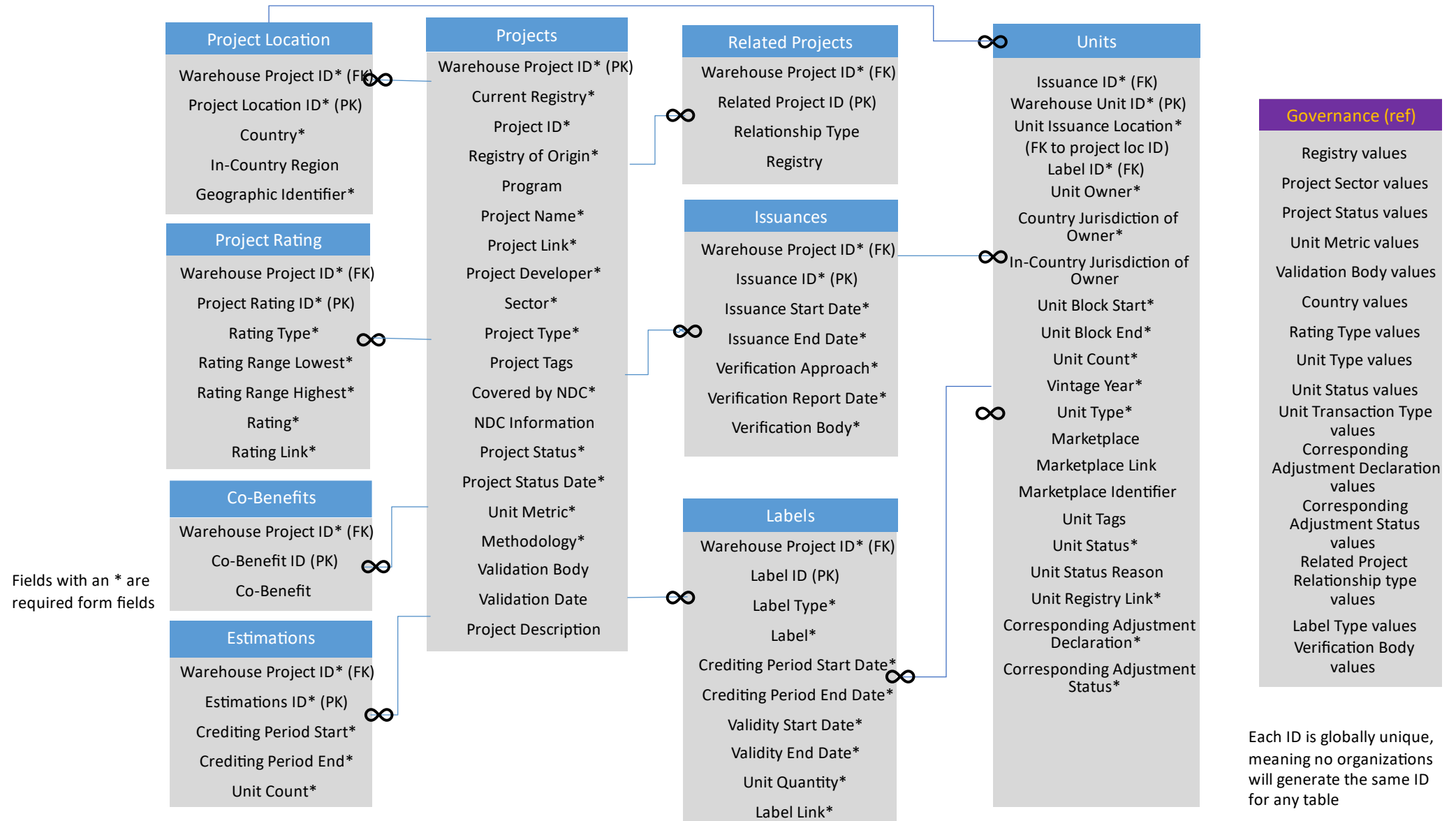
WORLD BANK GROUP · Climate Warehouse

8

Building a public good data layer

- Designed as an open shared infrastructure layer

- Common taxonomy of data facilitates communication between entities

- Registry service providers and countries share data to the Warehouse

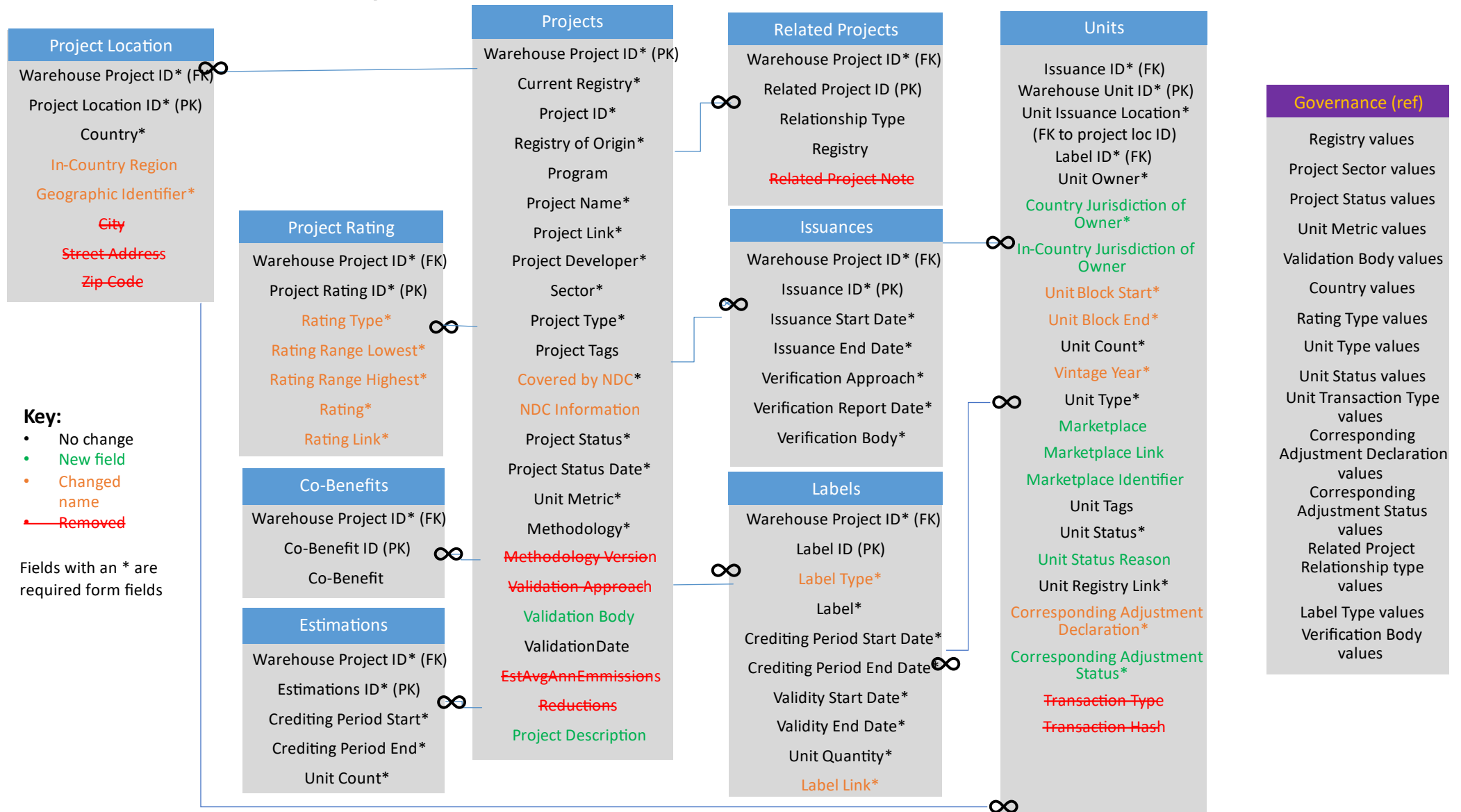- Public and private sector market players can host a node and build out the service layer

Transaction Layer

Registry Layer

Metadata Layer

Services Layer

Exchange A

Exchange B

Inner-Registry Trades

Country Registry A

Country Registry B

Independent Standard Registry

Regional Registry

Climate Warehouse

Compliance Reporting

Benchmarking

Due Diligence Checks

Certifications

Forecasting

Ratings

Conflict Resolution

WORLD BANK GROUP

Climate Warehouse

Data Model

Project Location
- Warehouse Project ID* (FK)
- Project Location ID* (PK)
- Country*
- In-Country Region
- Geographic Identifier*

Project Rating
- Warehouse Project ID* (FK)
- Project Rating ID* (PK)
- Rating Type*
- Rating Range Lowest*
- Rating Range Highest*
- Rating*
- Rating Link*

Co-Benefits
- Warehouse Project ID* (FK)
- Co-Benefit ID (PK)
- Co-Benefit

Fields with an * are required form fields

Estimations
- Warehouse Project ID* (FK)
- Estimations ID* (PK)
- Crediting Period Start*
- Crediting Period End*
- Unit Count*

Projects
- Warehouse Project ID* (PK)
- Current Registry*
- Project ID*
- Registry of Origin*
- Program
- Project Name*
- Project Link*
- Project Developer*
- Sector*
- Project Type*
- Project Tags
- Covered by NDC*
- NDC Information
- Project Status*
- Project Status Date*
- Unit Metric*
- Methodology*
- Validation Body
- Validation Date
- Project Description

Related Projects
- Warehouse Project ID* (FK)
- Related Project ID (PK)
- Relationship Type
- Registry

Issuances
- Warehouse Project ID* (FK)
- Issuance ID* (PK)
- Issuance Start Date*
- Issuance End Date*
- Verification Approach*
- Verification Report Date*
- Verification Body*

Labels
- Warehouse Project ID* (FK)
- Label ID (PK)
- Label Type*
- Label*
- Crediting Period Start Date*
- Crediting Period End Date*
- Validity Start Date*
- Validity End Date*
- Unit Quantity*
- Label Link*

Units
- Issuance ID* (FK)
- Warehouse Unit ID* (PK)
- Unit Issuance Location* (FK to project loc ID)
- Label ID* (FK)
- Unit Owner*
- Country Jurisdiction of Owner*
- In-Country Jurisdiction of Owner
- Unit Block Start*
- Unit Block End*
- Unit Count*
- Vintage Year*
- Unit Type*
- Marketplace
- Marketplace Link
- Marketplace Identifier
- Unit Tags
- Unit Status*
- Unit Status Reason
- Unit Registry Link*
- Corresponding Adjustment Declaration*
- Corresponding Adjustment Status*

Governance (ref)
- Registry values
- Project Sector values
- Project Status values
- Unit Metric values
- Validation Body values
- Country values
- Rating Type values
- Unit Type values
- Unit Status values
- Unit Transaction Type values
- Corresponding Adjustment Declaration values
- Corresponding Adjustment Status values
- Related Project Relationship type values
- Label Type values
- Verification Body values

Each ID is globally unique, meaning no organizations will generate the same ID for any table

WORLD BANK GROUP   Climate Warehouse

Data Model – Key Updates

Project Location
- Warehouse Project ID* (FK)
- Project Location ID* (PK)
- Country*
- In-Country Region
- Geographic Identifier*
- City
- Street Address
- Zip Code

Project Rating
- Warehouse Project ID* (FK)
- Project Rating ID* (PK)
- Rating Type*
- Rating Range Lowest*
- Rating Range Highest*
- Rating*
- Rating Link*

Key:
- No change
- New field
- Changed name
- Removed

Fields with an * are required form fields

Co-Benefits
- Warehouse Project ID* (FK)
- Co-Benefit ID (PK)
- Co-Benefit

Estimations
- Warehouse Project ID* (FK)
- Estimations ID* (PK)
- Crediting Period Start*
- Crediting Period End*
- Unit Count*

Projects
- Warehouse Project ID* (PK)
- Current Registry*
- Project ID*
- Registry of Origin*
- Program
- Project Name*
- Project Link*
- Project Developer*
- Sector*
- Project Type*
- Project Tags
- Covered by NDC*
- NDC Information
- Project Status*
- Project Status Date*
- Unit Metric*
- Methodology*
- Methodology Version
- Validation Approach
- Validation Body
- ValidationDate
- EstAvgAnnEmmissions Reductions
- Project Description

Related Projects
- Warehouse Project ID* (FK)
- Related Project ID (PK)
- Relationship Type
- Registry
- Related Project Note

Issuances
- Warehouse Project ID* (FK)
- Issuance ID* (PK)
- Issuance Start Date*
- Issuance End Date*
- Verification Approach*
- Verification Report Date*
- Verification Body*

Labels
- Warehouse Project ID* (FK)
- Label ID (PK)
- Label Type*
- Label*
- Crediting Period Start Date*
- Crediting Period End Date*
- Validity Start Date*
- Validity End Date*
- Unit Quantity*
- Label Link*

Units
- Issuance ID* (FK)
- Warehouse Unit ID* (PK)
- Unit Issuance Location* (FK to project loc ID)
- Label ID* (FK)
- Unit Owner*
- Country Jurisdiction of Owner*
- In-Country Jurisdiction of Owner
- Unit Block Start*
- Unit Block End*
- Unit Count*
- Vintage Year*
- Unit Type*
- Marketplace
- Marketplace Link
- Marketplace Identifier
- Unit Tags
- Unit Status*
- Unit Status Reason
- Unit Registry Link*
- Corresponding Adjustment Declaration*
- Corresponding Adjustment Status*
- Transaction Type
- Transaction Hash

Governance (ref)
- Registry values
- Project Sector values
- Project Status values
- Unit Metric values
- Validation Body values
- Country values
- Rating Type values
- Unit Type values
- Unit Status values
- Unit Transaction Type values
- Corresponding Adjustment Declaration values
- Corresponding Adjustment Status values
- Related Project Relationship type values
- Label Type values
- Verification Body values

Overview of Testing and Simulation Activities

Timeline

August 2019

November 2019

January 2022

July 2022

Phase I

Phase II

Phase III

Product development, Stakeholder participation and Governance model

Results of Simulation II

WAREHOUSE DATA LAYER BLOCKCHAIN

CLIMATE WAREHOUSE GOVERNANCE CONSULTATIONS

Observer Node

Climate Warehouse Auxiliary App

IETA, WB, Singapore NCCS
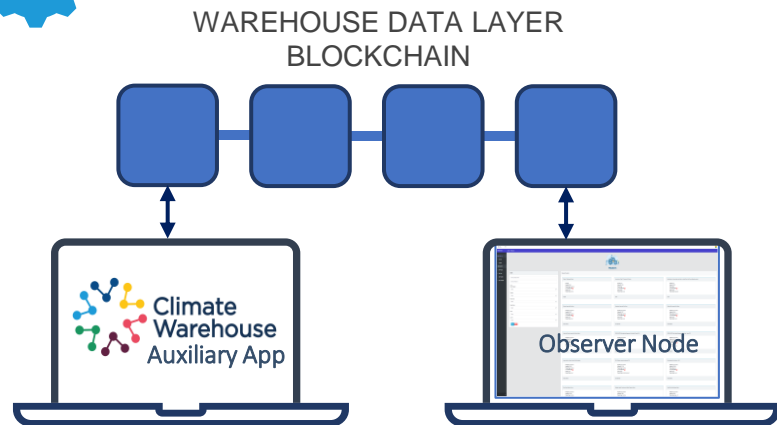
15 "registry" Nodes:

Chile
Costa Rica
Japan
Mexico
Singapore
Switzerland

American Carbon Registry
Climate Action Reserve
Global Carbon Council
Gold Standard Foundation
Verra

Kengen
Energy Efficiency Services
Limited (EESL)
EcoRegistry
Global Green Growth Institute

Observer Node Access:

Over 15 organizations:

UNFCCC
MDBs
Academics
Country Ministries
Industry Partners

Governance Consultation with private, public and non-profit ecosystem partners:

Goals:

Determine the appropriate governance and operating model for the Climate Warehouse as a public good.

Explore different funding models for the operations and maintenance of the infrastructure

High Level Outcomes of Phase II Testing of Prototype
- Feedback to further refine the data model and functions enough granularity to build a new Climate Warehouse for testing
- Demonstrated minimum functions needed for a simple registry through the Auxiliary Application
- Provided capacity building on registry functions and data elements that will be needed for ITMOs, tested out how these processes can be tracked through the warehouse
- Demonstrated the ability to trace and audit units that are traded between organizations using blockchain

Next Steps:
- Develop 3rd version of prototype with Chia blockchain Launch of phase III - testing and simulation of prototype
- Completion of Governance Consultations with IETA and the Government of Singapore (March 2022)

WORLD BANK GROUP

Climate Warehouse

Objectives of Simulation III

Prototype Development

- **Develop the 3rd version** of the prototype :
  - It is **open source** and **interoperable**
  - It is on a **public blockchain**
  - It has an **updated data model** and **functions** based on the lessons learned from Simulation II

- **Develop technical and functional documentation** for testing scenarios

- **Publish Observer Node** on theclimatewarehouse.org

Testing Activities

- **Outreach and engage with partners** of the Climate Warehouse

- **Onboard and create hosted environments** for participants for testing activities

- **Conduct sprint sessions** with participants to test the 3rd version of the prototype

Governance

- The **governance consultations on operational Climate Warehouse** with IETA and the Government of Singapore were completed in March

- Moving forward, the **Government of Singapore and the World Bank will be reaching out to governments** and other stakeholders to check their interests in funding the operational Climate Warehouse and joining the governance

WORLD BANK GROUP   Climate Warehouse

Prototype Architecture

The Climate Warehouse infrastructure has 2 layers: the CW data layer and the public blockchain layer

Climate Warehouse Data Layer…
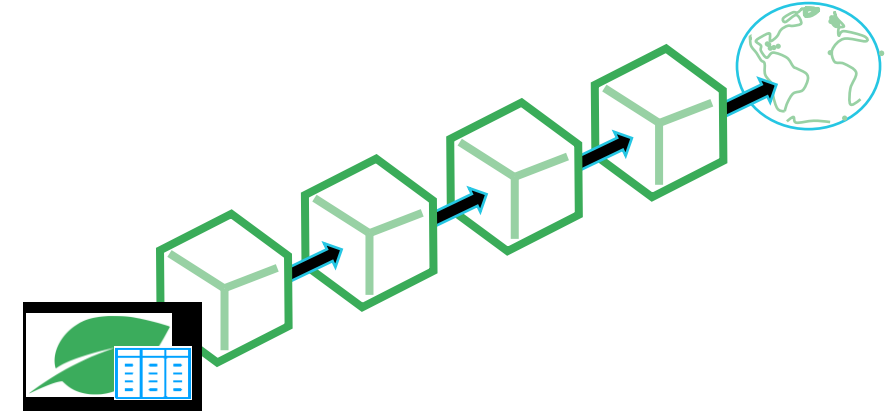
- Defines a common data model and taxonomy
- Reconcile data across registries
- Identify potential double counting
- Enable auditing and reporting

…Tested on a Public Blockchain Layer

- Transparent and Immutable Data
- Auditable
- Accessible and Inclusive
- Public and Transparent
- Open source
- Peer-to-peer governance

Prototype Architecture

The blockchain layer supports inclusiveness, accountability, transparency and integrity

Transparency

- *Fully auditable and secure record of transactions*

Accountability

- *Decentralized governance/peer-to-peer support*
- *Only registries can edit their own data, allowing countries to flexibly choose their approaches*
- *Follows the Article 6 bottom-up approach*
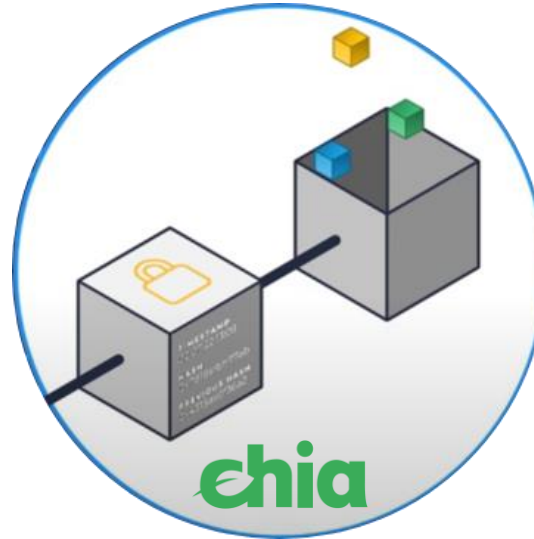
The Chia Blockchain Layer
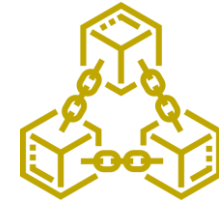
Integrity

- *Fully immutable and traceable*

Inclusiveness

- *Public, fully open source and permissionless*
- *Anyone in the network can access both the data layer and Chia Network blockchain node and add blocks*

The World Bank's collaborative partnership with Chia is non-exclusive. It is for open-sourced public good, bears no costs or intellectual property rights from the World Bank and promotes interoperability.

Prototype Architecture

There are three ways to integrate data into the Climate Warehouse: User Interface, API and Spreadsheet import/export

WAREHOUSE BLOCKCHAIN
chia

Dynamic Sync

User Interface
API
Spreadsheet

Data upload

SOURCE
REGISTRY

COUNTRY A

COUNTRY B
[NODE]

STANDARD A

STANDARD B
[NODE]

OBSERVER
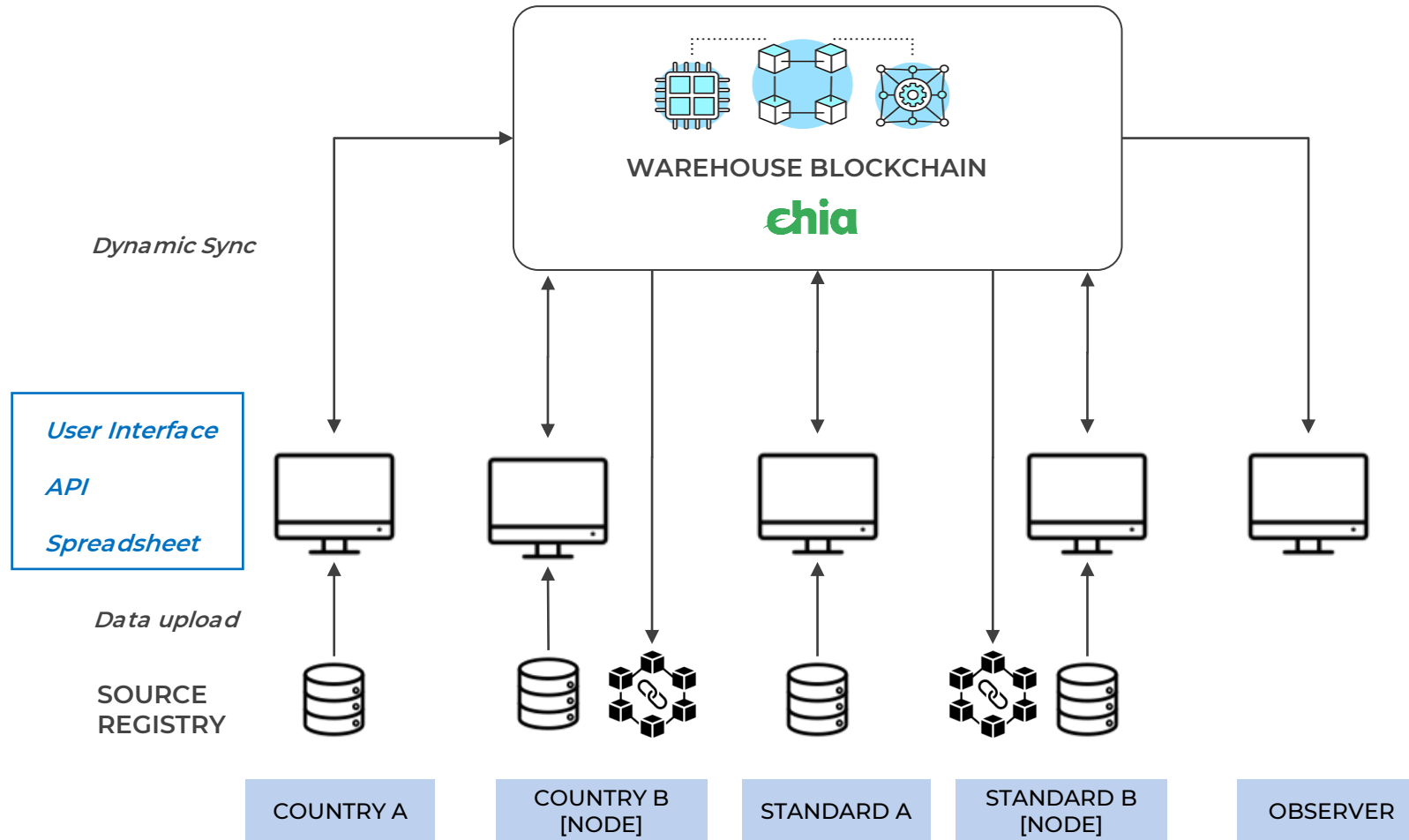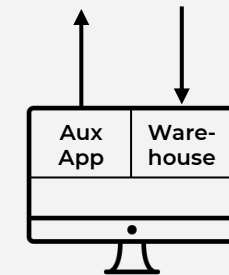
User Interface

The Warehouse web application has two main interfaces with the blockchain. One is the Auxiliary App, which helps *Integrated Participants* manage their data sync and entry point into the Warehouse. The other is a tab that showcases the data in the warehouse blockchain. *Node Participants* hold a full copy of the blockchain via direct integration. *Observer participants* view the Warehouse data via an Auxiliary App made available by the WBG.

WORLD BANK GROUP   Climate Warehouse

18

Prototype Architecture

The Climate Warehouse has 2 key functions: the Warehouse View and the Auxiliary Application

Warehouse View provides high-level views on project & unit-level data, audit history and conflicts

Project Level:
- View Project detail information
- Sort and filter projects

Unit Level:
- View Unit detail information
- Sort and filter unit serial number blocks
- View status change history of unit blocks
- View transfer history of unit blocks moving between connected registries

Audit:
- Audit registry data by organization

Conflicts:
- View and sort conflicts log, providing a demonstration of how double counting risks among connected registries can be identified.

The Auxiliary App mimics registry functions, allowing participants to add/update project & unit-level data during testing

Project Level:
- Add and update project details, their lifecycle status
- Add high level rating information
- Link related projects together
- Add labeling information including support for letters of authorization

Unit Level:
- Add issuances and status the lifecycle of unit blocks
- Assign labeling information to unit blocks
- Break unit blocks into smaller blocks for transferring and statusing
- Sell and transfer unit blocks to other registry systems
- Change unit ownership
- Copy unit information into from transferred units into local registry

Testing Scope and Process

Goal and Scope of Work

Goal

Simulate how **participant registry systems can integrate** with the Climate Warehouse, upload data, and synchronize real-time changes to information

Scope of Work

- Define **minimum standards for participation and technical infrastructure**

- Test and enhance the **data model and fields**

- Explore whether and how **public blockchain technology** meets the Warehouse requirements and allows for functions to **identify double counting and change MOs information in real-time**

- Test and enhance the user interface **(Auxiliary App)**

- Gather **feedback** and provide **capacity building support** and understand potential barriers to participation that need to be overcome in an operational phase

- Prepare a **summary report**, including climate change and technology findings and recommendations based on the collected feedback

Testing Activities

Phase I

Phase II

Phase III

Phase IV

Group 1 (Internal Testing)	Group 2	Group 3	Feedback Consolidation and Documentation

• WB CMI
• WB CATS
	• Sweden
	• Switzerland
	• Chile
	• Japan
	• Singapore
	
	• Gold Standard
	• VERRA
	• CAR
	• ACR
	• GCC
		• Rwanda
		• Bhutan
		• Senegal
		• Peru
		• IHS Market
		
		• Uganda
		• Eco-registry Colombia
		• Bangladesh
		• Panama
			• **Capture feedback in 5 tools:**
			   • Feedback notes
			   • Test scripts
			   • Action items tracker
			   • Feedback survey
			   • Participant profiles
			• **Produce documentation:**
			   • Simulation III Final Report
			   • Transition Plan
			   • Onboarding Operational Climate Warehouse Package

Observers: • IETA • Open Earth Foundation	**Observers**: • Spain • UNFCCC • EBRD	**Observers:** • Climate Ledger Initiative • Climate Impact X • Climate Chain Coalition • Temasek • AirCarbon • CBL	
March - April 2022	April – May 2022	May – July 2022	July - August 2022

**These groupings may be subject to change due to availability and preferences of participants

Testing Strategy

March- April	**Phase I**	
	Internal testing	
April-July	**Phase II**	
	External testing	
	Phase III	
	External testing	
July-August	**Phase IV**	
	Wrap-up and feedback consolidation	
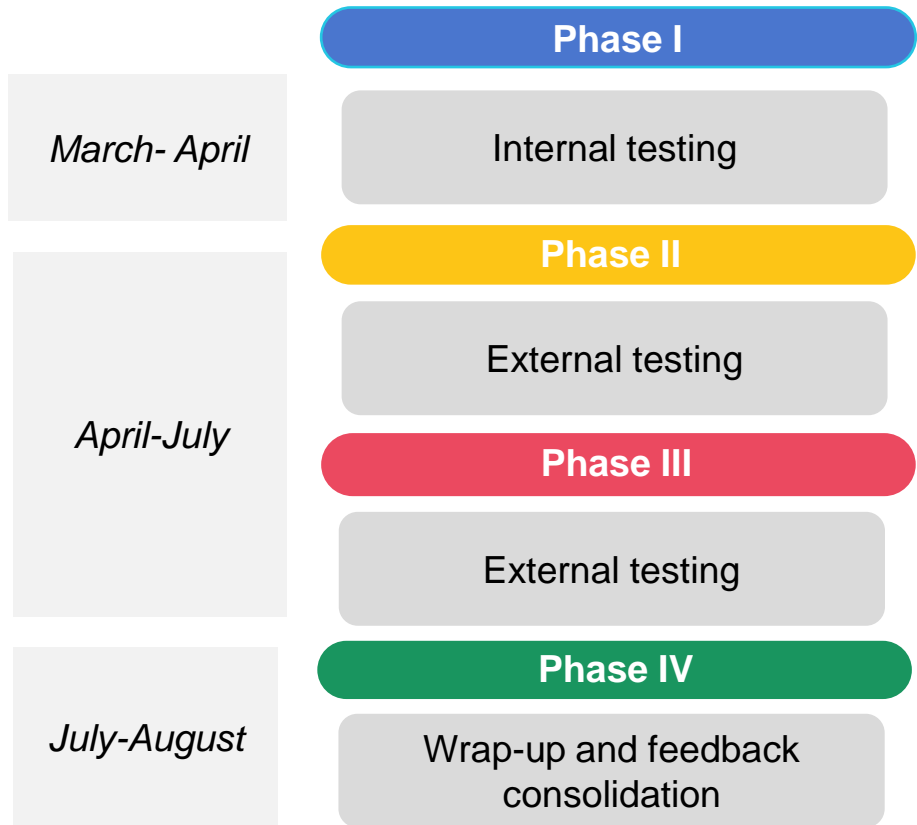
Pre-testing activities

1. *Communication Blast*

2. *Kick-off Meeting and demo*

3. *Onboarding and environment set-up Meeting*

Testing activities

1. *Testing Office Hours/E-mail check-ins*

2. *Test booklet completion**

3. *Feedback forms by scenario*

Post-testing activities

1. *Final feedback form*

2. *Informal feedback meeting*

WORLD BANK GROUP   Climate Warehouse

Testing Areas – Who Should Test By Functional Area

1

Installation – Testing that is solely focused on installing and running the prerequisite software to run the Climate Warehouse

Tester Profile – Person who would be managing the software in the production state. This person wants to know how to properly install and maintain the Climate Warehouse software

Importance – Allows the person managing the software in the future to be confident in what is needed from an infrastructure perspective and how to manage new releases of Climate Warehouse software

2

User Interface (UI) – Testing that is centered around entering, manipulating, or viewing data within the Climate Warehouse UI

Tester Profile – Anyone who is curious about what the Climate Warehouse displays, or anyone who will be replicating data in the Climate Warehouse using the UI. We recommend most participants test this area.

Importance – The Climate Warehouse UI is the visual representation of the power of the Climate Warehouse. It is imperative that the UI works well for everyone involved with the Climate Warehouse.

3

API – Testing the Climate Warehouse API endpoints to understand how they are structured with the intent to integrate own registry with CW APIs

Tester Profile – Technically sophisticated registries that intend to integrate with the Climate Warehouse to automatically update Climate Warehouse based on registry transactions.

Importance – Understanding the API endpoints will allow testers to think about how they build the automated integration between their registry and the Climate Warehouse.

4

Mirrored Database – Testing the ability to perform SQL queries using a traditional MySQL database

Tester Profile – Any person who has previous SQL experience and is comfortable performing database functions to manipulate data in a specific manner

Importance – Testing the mirrored database will allow users to understand how they can use traditional tools to create dashboards (like for double counting) while still using the decentralized blockchain

5

Excel Import/Export – Testing the excel upload/download features

Tester Profile – Any registry personnel that will have the data expertise to update the Climate Warehouse using data file uploads.

Importance – This testing area is important for registries that choose to integrate using file transfer instead of using the API or Auxiliary App.

WORLD BANK GROUP   Climate Warehouse

24

IT Requirements - Deployment Type

1. Local Installation

Install the open-source software required to run the Climate Warehouse on a physical computer your organization owns.

Use this option if you have security permissions to install software on your device and have at least 75gb of spare diskspace.

2. Cloud – Chia AWS Workspace

Chia Network, Inc. will spin up a blank AWS workspace which users will connect to using a browser or the AWS workspace app.

Use this option if your local machine security permissions are strict, but you still want to install the Climate Warehouse software and/or test the Climate Warehouse APIs.

3. Cloud – Chia Hosted Instance

Chia Network, Inc. will host a cloud instance with pre-installed Climate Warehouse software. Users will access the Climate Warehouse by using credentials given by Chia Network, Inc.

Use this option to quickly be able to test the Climate Warehouse UI without needing to install on your own machines.

4. Cloud – Own Organizational Cloud

Your own organization will spin up a new cloud VM and will be responsible for installing the Climate Warehouse software on that VM.

Use this option if your organization is comfortable creating new cloud resources to use for testing. World Bank/Chia team will help with the software installation process.

Time Requirements

The below details the minimum time commitments for each test scenario. Testers are encouraged to test beyond the scenarios to ensure robustness of the application.

Test Scenario	Scenario Description	Time Commitment
Install Climate Warehouse	Install the necessary software to run Climate Warehouse on a local machine	2-4 hours; requires call with testing support team
Access Climate Warehouse	Access a cloud instance of Climate Warehouse with pre-installed software	5-10 minutes
Create Organization	Create your organization within the Climate Warehouse	5-10 minutes
Create Project(s)	Create projects within the Climate Warehouse, either through manual entry, excel upload, or API calls	30-120 minutes
Create Unit(s)	Create units associated to specific projects through manual entry, excel upload, or API calls	30-120 minutes
Report on Climate Warehouse Data	Generate reports using Climate Warehouse data by either downloading a static excel file, or by accessing a mirrored database	10-60 minutes
Unit lifecycle	Simulate the unit lifecycle by issuing, splitting, transferring, and eventually retiring the unit	30-90 minutes
Subscribe to other Organizations	Subscribe/unsubscribe to other organizations that are participating in the Climate Warehouse	5-15 minutes
Track audit history	Use the audit function within the Climate Warehouse to see audit history for selected organizations	10-30 minutes
Total		**~4-11.5 hours**

WORLD BANK GROUP · Climate Warehouse

Overall Timing of Phase II

- These dates are movable, and simulation activities can start earlier for users if they set up their auxiliary App more quickly

- The feedback from simulation will inform the specifications for an operational system.

Activity	Dates
Set up	
Environment set-up	Week 1
Testing	
Test Booklet Completion	Week 2
	Week 3
Feedback collection	Week 4

*These days may be subject to change depending on the availability and preference of participants

Your Feedback

- During this testing activities, we will gather **feedback** to continue refining the 3rd version of the prototype as well as inform the simulation activities

Running and using the CW	Data model and fields	User interface

Running and using the CW
- Accessing the hosted instance or installing it locally
- Creation of organization
- Creation of projects and units
- Review organizations and projects

Data model and fields
- Feedback on the data dictionary
- Is there any missing data you would need?
- Can you follow the asset development lifecycle/issuance of retirement?

User interface
- Is the user interface providing enough clarity?
- How can the user interface improve?

Next Steps
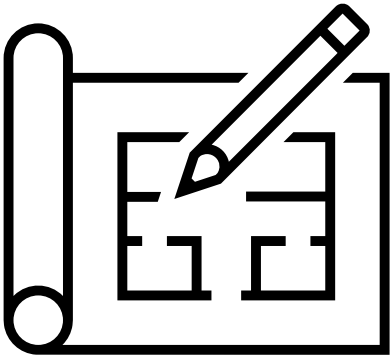
1. Organizations to **nominate** participants (both IT/business roles) for the testing process

2. Select **deployment type** (slide 20) and **areas of testing** (slide 19)

3. Participants will receive **onboarding packages**:
   ➢ Instructions to login in the Chia/WB node
   ➢ Test scripts by scenario
   ➢ Data Dictionary
   ➢ Technical Guide
   ➢ Onboarding PPT on Climate Warehouse

[The CW team can organize before or after an onboarding meeting and demo upon request]

4. The CW team will organize a **joint testing session**

5. The team will provide **on-going support** to users
   • E-mail check-ins
   • Office hours

6. The team will collect **on-going feedback** from users

Lessons Learned

Insights by Climate Warehouse Stakeholder Entities: Benefits

Stakeholder type	Benefits
Governments	• Increases visibility and credibility of a country's climate activities • View MOs to potentially purchase • Promotes new project activity • Can increase market participation of private sector • Can provide an aggregate view of projects within their jurisdiction, ability to identify duplicative projects • Increases accountability
Independent Standards	• Reduces burden on monitoring external systems for due diligence processes because of the ease of aggregating information together • Facilitates trust and transparency between systems
UNFCCC	• Aggregate reporting
Exchanges	• Decreases market fragmentation and eases integration • Promotes standardization and asset integrity • Adds information security to the data needed from registries for transactions • Increases volume of standard asset types
Project Developers	• Building trust in the accounting of MOs will enable transparency and trade, benefiting project developers
Verification Bodies	• Access to aggregated information, ability to audit transactions and changes to data
Buyers and Traders	• Aggregated trustworthy data to search through. Easier access to project developer information

WORLD BANK GROUP

Climate Warehouse

Initial insights from simulation III testing

Simulation III scope

Sim III **pushes participants to envision an interconnected ecosystem**, beyond their own standalone system

Data added to the Climate Warehouse must be able to **bridge process flows across participants**

Participants must validate the Climate Warehouse's level of **data granularity, status information and units transfer methodology**

Benefits & Feedback

Benefits

- Increased transparency and data sharing
- Addressing double counting risks across registries
- Identifying a common data model
- Interaction with experts across registries
- Ability to access information outside of their own systems

Feedback

- Difficulty defining minimum standards needed to link registries
- IT complexity, upgrades to existing systems, building integration
- Ability to connect regional registry systems
- Multiple groups within the same organization will need to coordinate and play a role

3 types of experts are needed

Policy Setter

- Provides policies, guidelines, strategy for implementing, projections on future impacts on the inner workings of the organization
- Needs to understand how the data will be used internally and by partners in the future, what changes need to occur for this to happen, and what is possible due to technology advances.

Registry Administrator

- Create procedures for implementing policies
- Needs to understand how workflows will change in the future, implications for their technology tools and the data that needs to be available and captured.

IT Support

- Ensure data structure and registry functions are fit for purpose
- Needs to understand direction of policies, field definitions to figure out equivalencies for integration.

WORLD BANK GROUP

Climate Warehouse

Climate Warehouse Governance

- Consultations process and results

- Interim structure and model

- Next steps

Governance and Finance consultation
September 2021 – March 2022

70+
Entities involved

- Governments
- Independent standards
- Exchanges
- Traders
- Project developers
- Private sector
- Financial institutions
- Technology providers
- NGOs
- Think tanks
- Law firms
- Multilateral development banks

- Observer: UNFCCC

5
Governance models reviewed

- Western Climate Initiative, Inc (WCI, Inc.)
- Integrity Council for Voluntary Carbon Markets (IC-VCM)
- EU-Swiss ETS link
- Joint Crediting Mechanism (JCM)
- British Standards Institution (BSI) & Enterprise Singapore (ES)

6
Focus groups conducted

- 4 on governance (46 entities)
- 2 on finance (45 entities)

+ polls and surveys for participant feedback throughout

WORLD BANK GROUP · Climate Warehouse

Learnings and working recommendations

Identified priority missions

1. Bring transparency to the market:
   - mitigation outcomes
   - carbon credit lifecycle
   - corresponding adjustments

2. Reduce risk of double counting

3. Enable carbon market services built on comprehensive, real-time data

Recommendations

- Deliver **unified data reporting specifications** for all carbon crediting programmes, potentially as an (inter)national standard

- Encourage **wide programme participation** in the public blockchain to track unit data

- **Efficient, yet consultative governance**: collaboration between governments, VCM standards, and carbon market participants

- Use **grants** to enable a public good service first and aim for **eventual financial sustainability**

WORLD BANK GROUP

Climate Warehouse

Proposed governance model

```
                    ┌─────────────────────────────────┐
                    │    Council (~10 members)         │
                    │   Leads strategy/policy mandate  │
                    └─────────────────────────────────┘
   ┌──────────────┐
   │ Secretariat  │
   └──────────────┘
```

Council (~10 members)

Leads strategy/policy mandate

Secretariat

Technical committee

- Data specification development
- Collaboration with IT providers

User committee

- Community consultation forum
- Council recruitment
- Open to registered and approved Warehouse community participants
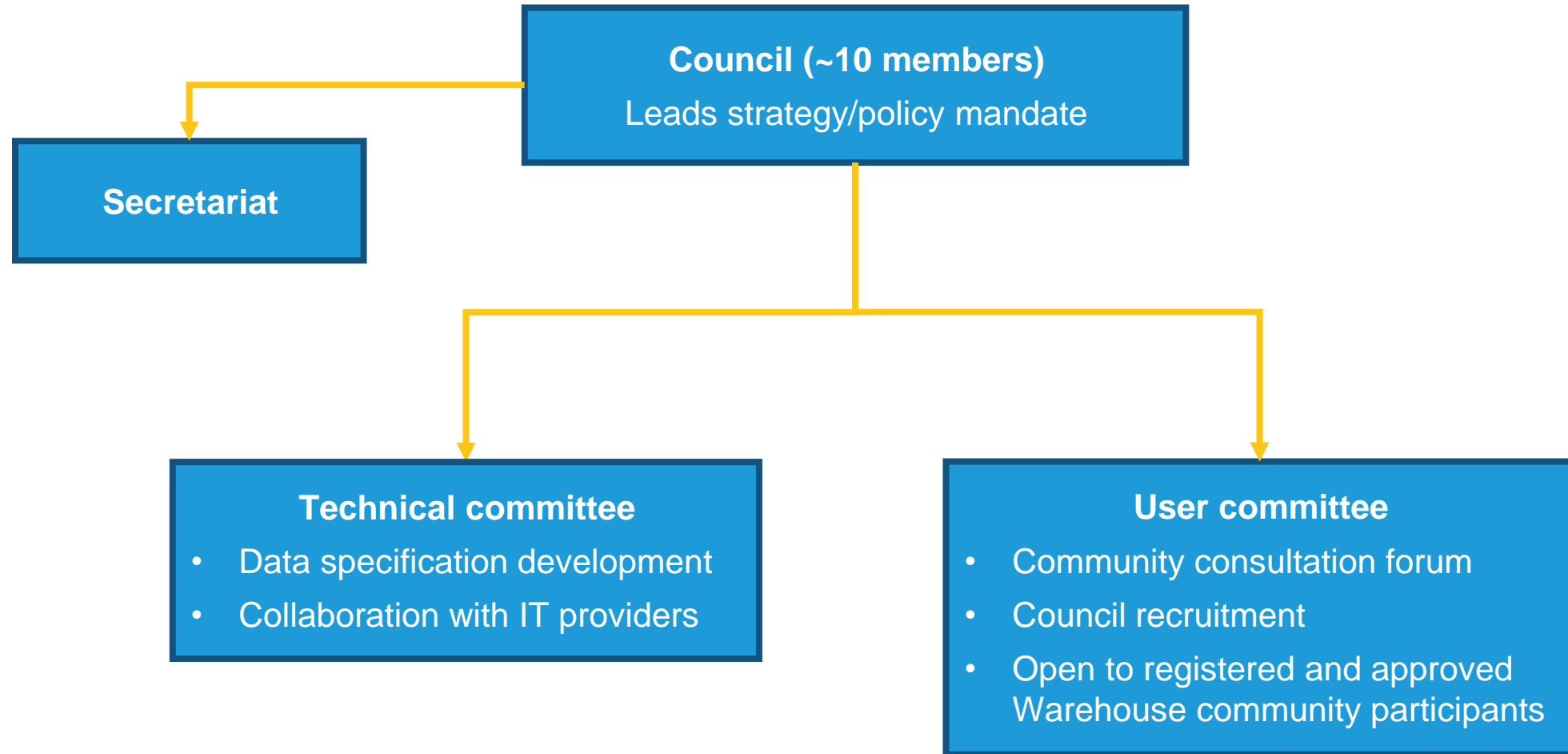
Next steps

2022 "inception phase" work program

Q1 2022

Governance & finance recommendations delivered

Q2 2022

World Bank Testing & Simulation III

Q4 2022

Version 1 of the operational software developed

Q4 2022

First meetings of the Interim Council & Committees

Interim Secretariat starts work

Jan
Apr
Jul
Oct
Dec

Q2-Q3 2022

Fundraising

Data provider engagement

Formation of the Interim Council

Entity formation & recruitment

COP27

Official launch

Prototype Wireframes

The Public Observer Node is live!
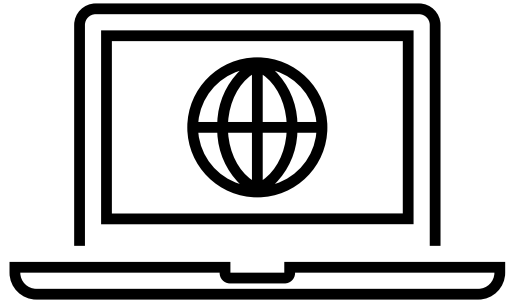
The **Public Observer Node** aims to facilitate the understanding of necessary registry functions and data requirements for tracking transactions of units and demonstrate how the information is tracked through the Climate Warehouse. It currently shows sample data to illustrate how project and unit related information will surface in the Climate Warehouse once participants upload their data.

Wireframes – Climate Warehouse

Wireframes - Auxiliary App

Wireframes – Audit Function

Climate Warehouse

Connect

WAREHOUSE

Projects List

Units List

Audit

DEMO Registry ⌄	Sort ascending ⊙↑	<	1	2	3	>	Org UID: b8c11f2b10d710706241e66cc

	Table	Timestamp	Type	Root Hash
🔍	project	2022-03-17 13:29:14	INSERT	0xbff3a5cfb201c2a875f4332069d1b92757f0d8fb5d20
🔍	unit	2022-03-13 15:43:43	INSERT	0xf3b2e0e53be99b178e9bc4c5abea3e7e6f1917ee478

WORLD BANK GROUP

Climate Warehouse

Technical guide at a glance

TECHNICAL GUIDE

TABLE OF CONTENT

WORLD BANK GROUP

WORLD BANK GROUP Climate Warehouse

Additional Content:

- Climate Warehouse website: http://www.theclimatewarehouse.org

Simulation I	Simulation II	Simulation III
• Summary Report • Video	• Summary Report: *To be released soon* • Demo Session	• Public Observer Node • Video: *To be released soon*

- Knowledge Base: https://www.theclimatewarehouse.org/knowledge

For further information:

- Website: http://www.theclimatewarehouse.org
- Video: https://www.youtube.com/watch?v=cXwTV2bAnvI

Contacts:

Gemma Torras Vives, IT Officer, Carbon Markets and Innovation, gtorrasvives@worldbank.org

Chandra Shekhar Sinha, Adviser, Climate Change Group, csinha@worldbank.org

Thank you