Trust Over IP Foundation
OpenClimate Network and
the Digital Trust Marketplace

British Columbia and
OpenEarth Foundation
Climate Accounting Pilot

Martin Wainstein

openearth.org

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OpenEarth
Our planet, first

A DIGITALLY INTEGRATED GLOBAL CLIMATE ACCOUNTING SYSTEM

Framing the climate aspects of the 'Digital Trust Marketplace' within a holistic framework is needed to ensure positive network effects, feedback loops and win-win scenarios among the different stakeholders. Hosting multiple climate accounting mechanisms connected through shared protocols, allows contractual automation in the link between finance and climate value flow based on agreed physical parameter of the Earth system (eg. 1.5oC warming).
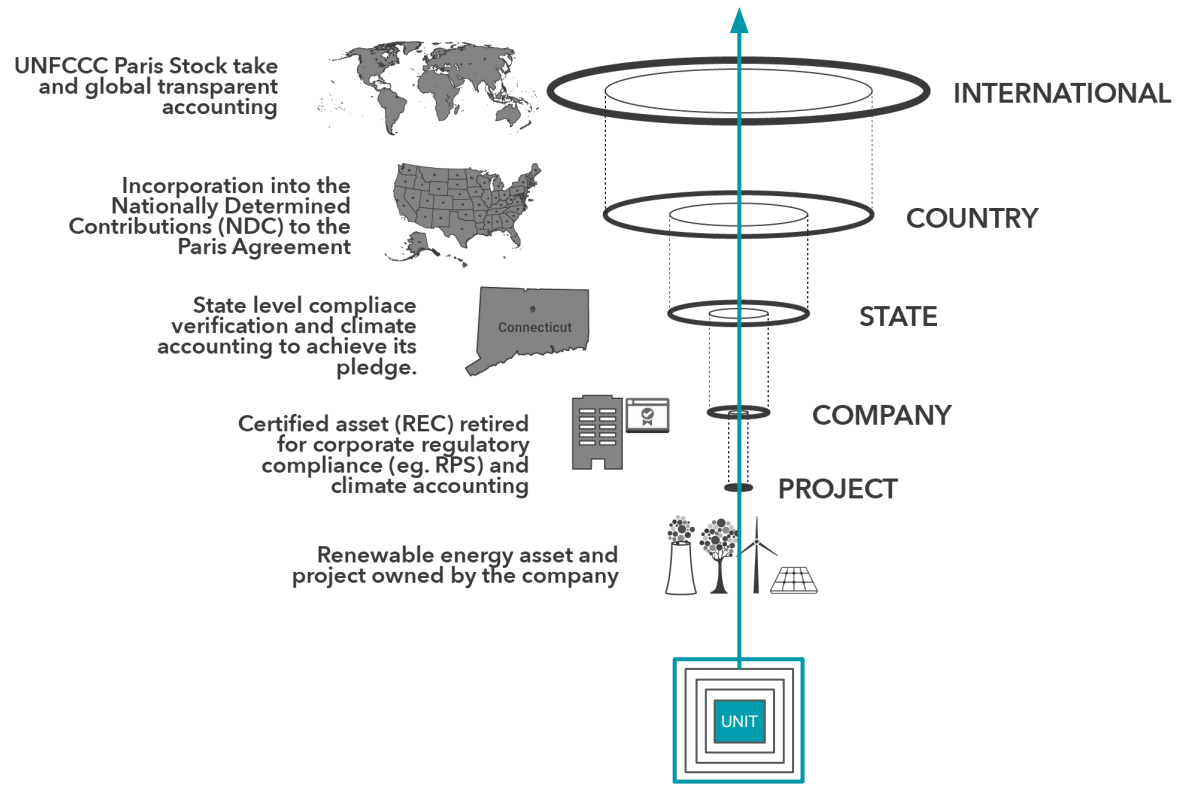
This meta-diagram presents the framework for multi-domain integration of climate records and ledgers in the open climate project
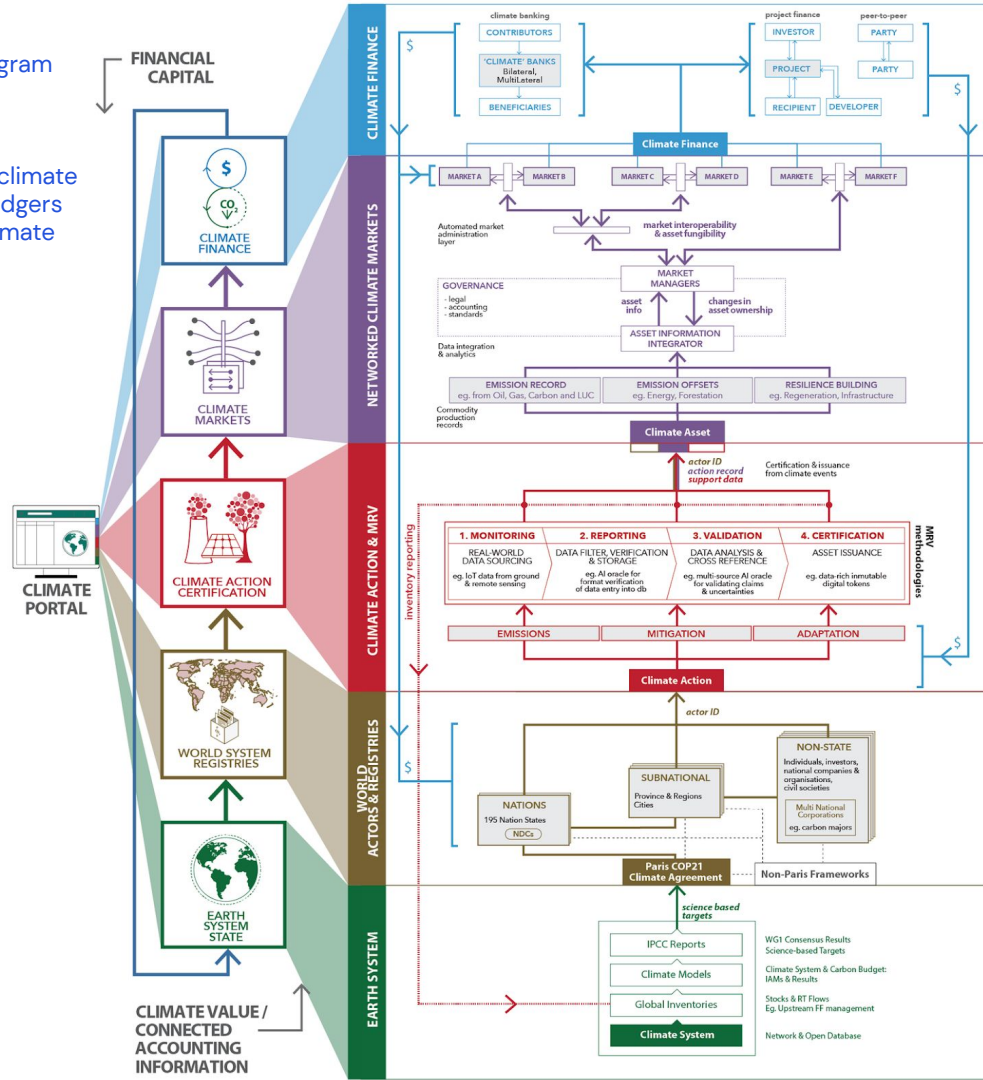
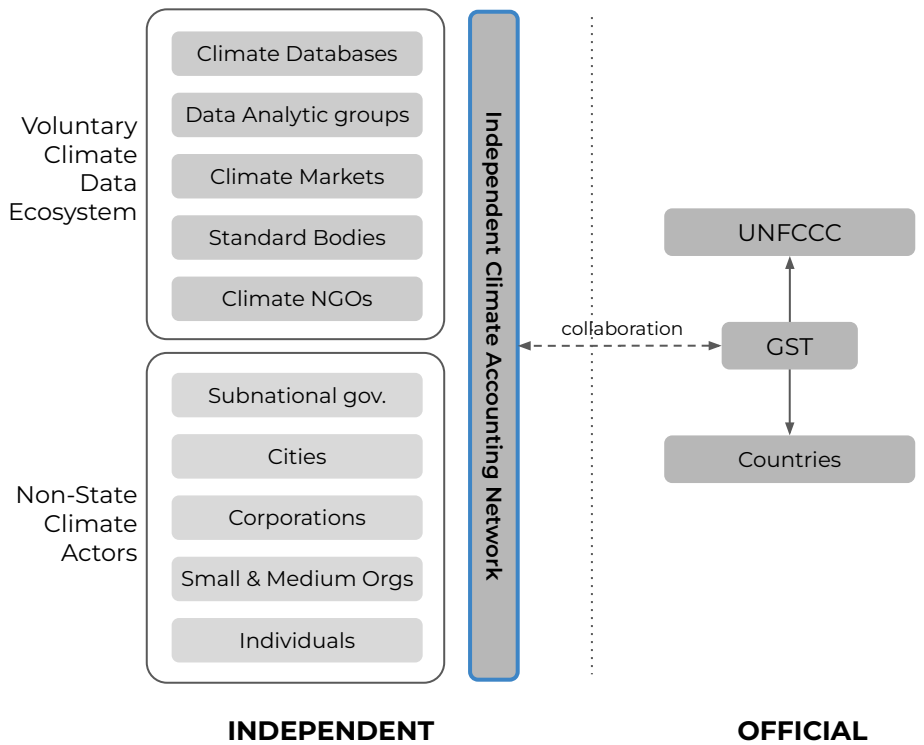**DESIGNING THE INFRASTRUCTURE FOR A CLIMATE INTERNET**

KEY FEATURE:

1. NESTED CLIMATE ACCOUNTING
IN A SPATIAL WEB

UNFCCC Paris Stock take and global transparent accounting

INTERNATIONAL

Incorporation into the Nationally Determined Contributions (NDC) to the Paris Agreement

COUNTRY

State level compliace verification and climate accounting to achieve its pledge.

Connecticut

STATE

Certified asset (REC) retired for corporate regulatory compliance (eg. RPS) and climate accounting

COMPANY

PROJECT

Renewable energy asset and project owned by the company

UNIT

Capture the collective climate efforts, integrating **PUBLIC** (National and Subnational) and **PRIVATE** entities while preventing **double counting**.

Integrating climate accounting from non-state actors to support an independent exercise for the Paris Agreement's Global Stocktake

Learn more:
wiki.climatedata.network/

Voluntary Climate Data Ecosystem

- Climate Databases
- Data Analytic groups
- Climate Markets
- Standard Bodies
- Climate NGOs

Non-State Climate Actors

- Subnational gov.
- Cities
- Corporations
- Small & Medium Orgs
- Individuals

Independent Climate Accounting Network

collaboration

UNFCCC

GST

Countries

INDEPENDENT

OFFICIAL

SUPPLY CHAINS
CLIMATE + ESG FRAMEWORK

The development of GHG Profiles for Mining Corporations using Verifiable Credential, should consider the full scope of the supply chain and integrated into an ESG framework.
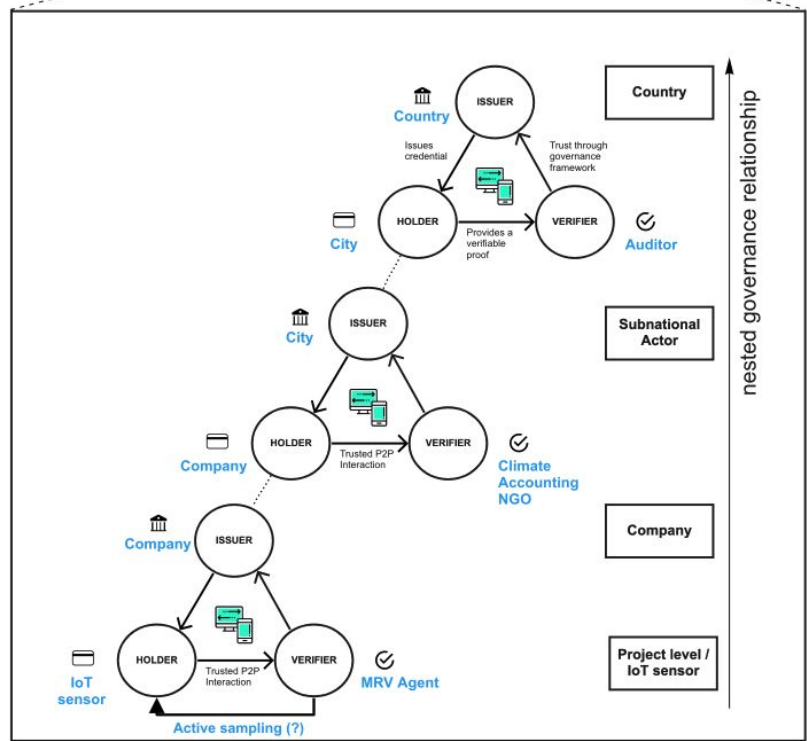
Whilst ESG data is relevant for investors, regulators and end–users will need to also have transparency over the climate data.
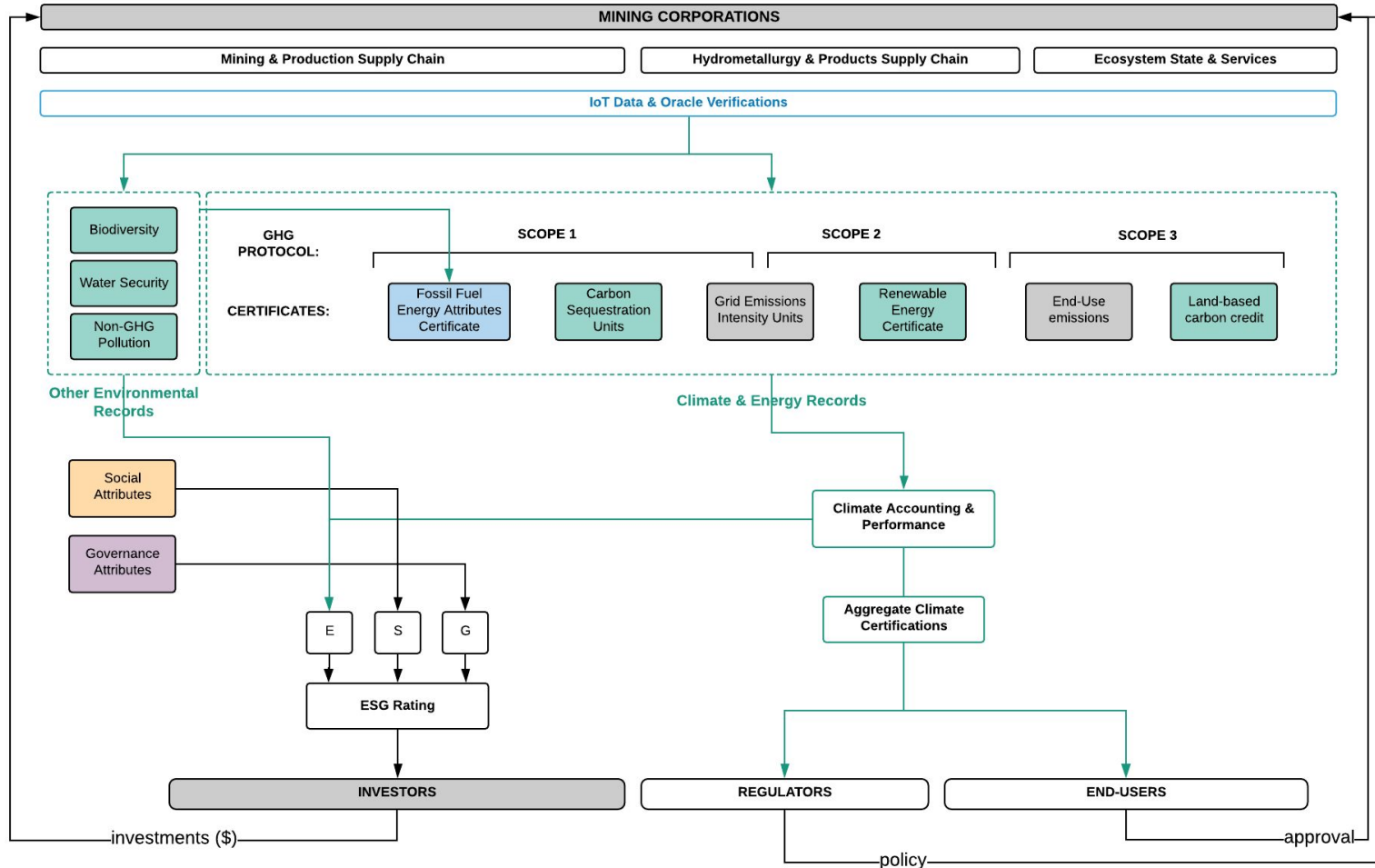
Applying Hyperledger's Decentralized Identifiers and Verifiable Credentials to climate action
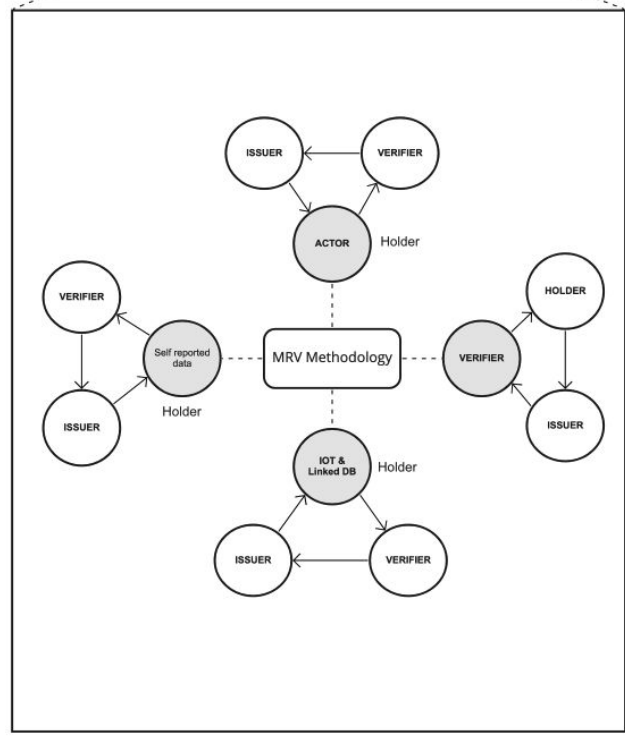
From:
Schletz et al 2022,
Nested Climate Accounting for our atmospheric commons. Frontiers in Blockchain

Nested Accounting & Network
Umbrella term for "rolling up" data from the local level into higher aggregation levels (e.g. regional, national, international, global)

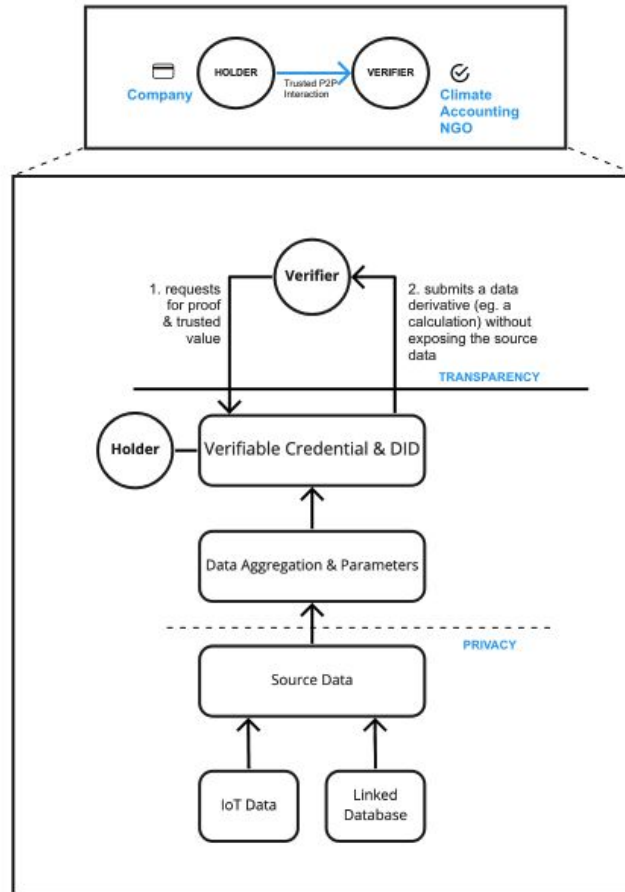**Digital MRV**
Process of digitizing methodologies, standards, and operationalize it for verification and reporting

DID trust connections between nested jurisdiction

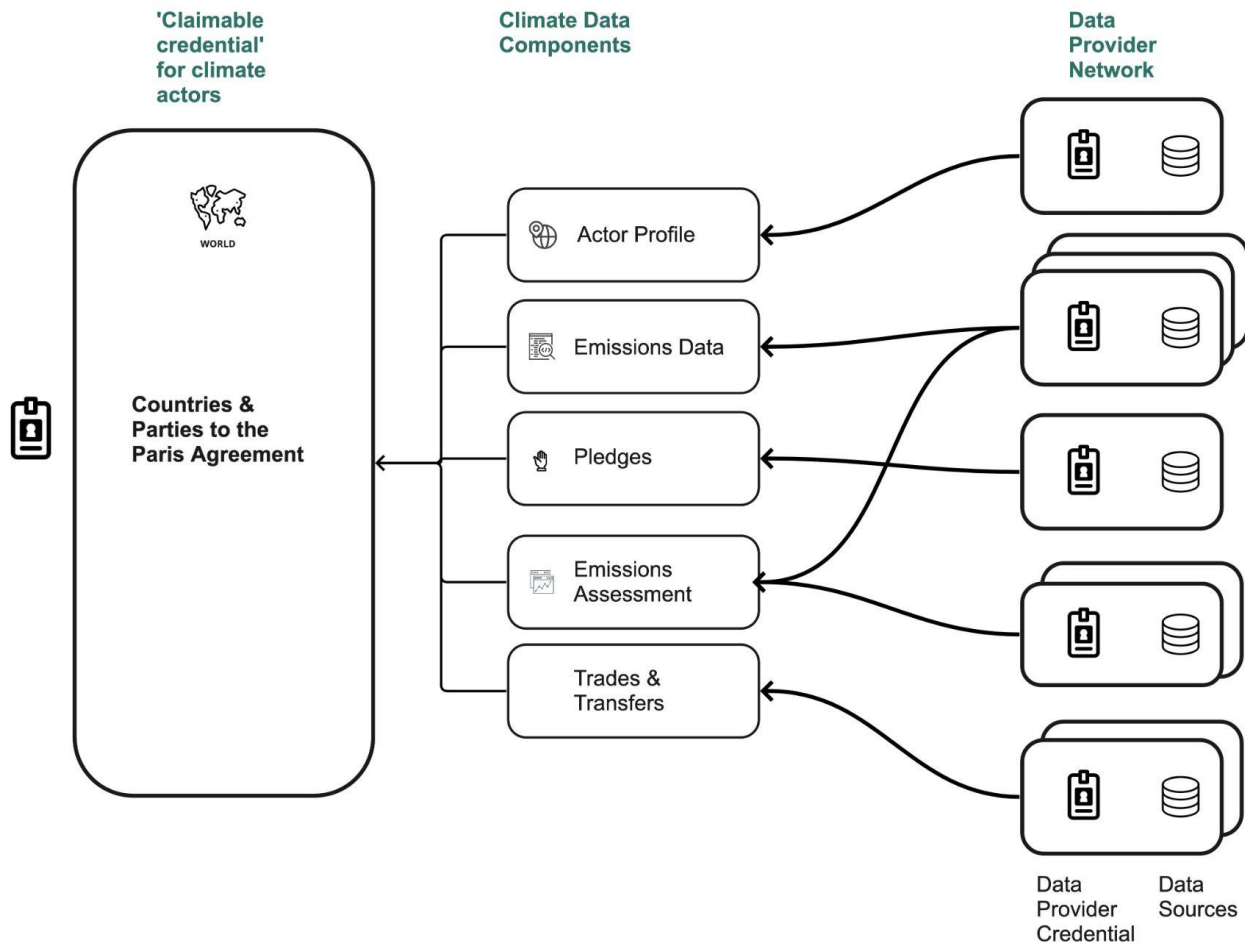Decentralized trust web amongst network actors through verifiable credentials & DIDs

Transparency alongside privacy
with the Zero Knowledge Proof from Verifiable Credentials

Verifiable credential procedure providing trusted transparency alongside privacy

From:
Schletz et al 2022,
Nested Climate Accounting for our atmospheric commons. Frontiers in Blockchain

CLIMATE DATA PROVIDER NETWORK AND CLAIMABLE CREDENTIALS

'Claimable credential' for climate actors

Climate Data Components

Data Provider Network

WORLD

Countries & Parties to the Paris Agreement

Actor Profile

Emissions Data

Pledges

Emissions Assessment

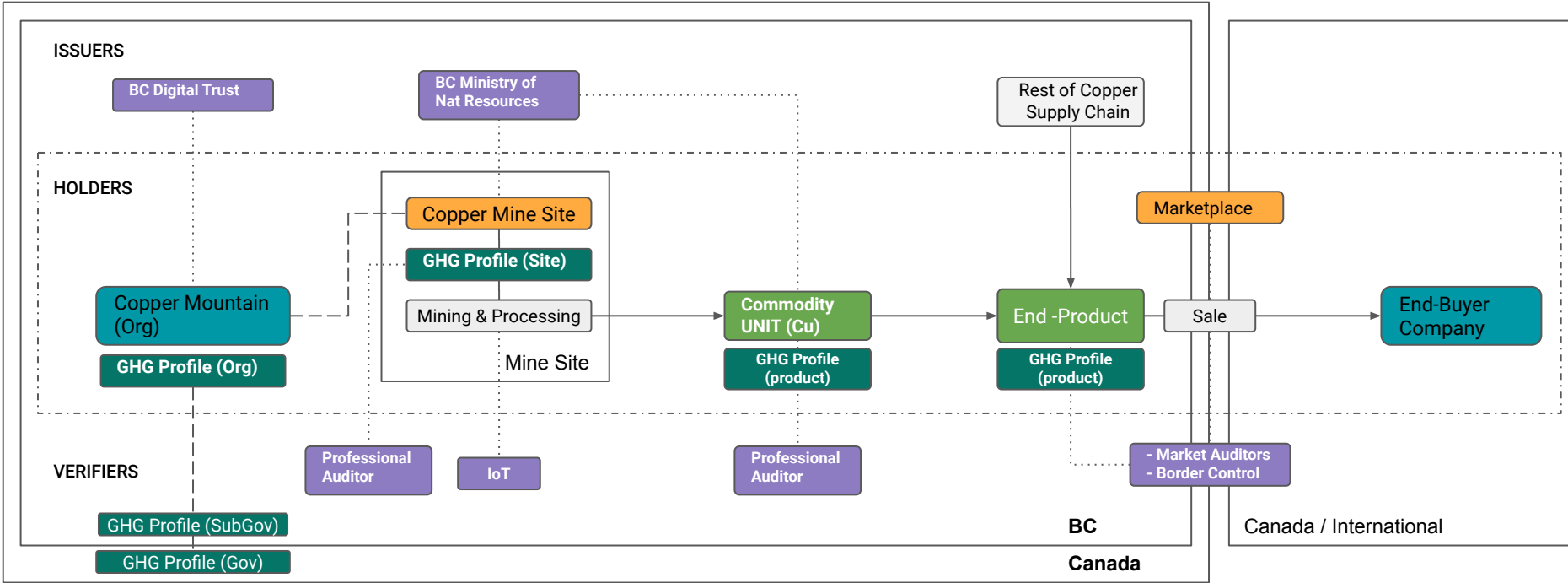Trades & Transfers

Data Provider Credential

Data Sources

Need TOIP community help to define this technical solution architecture!

POC CREDENTIAL MAPPING

Copper Mining -
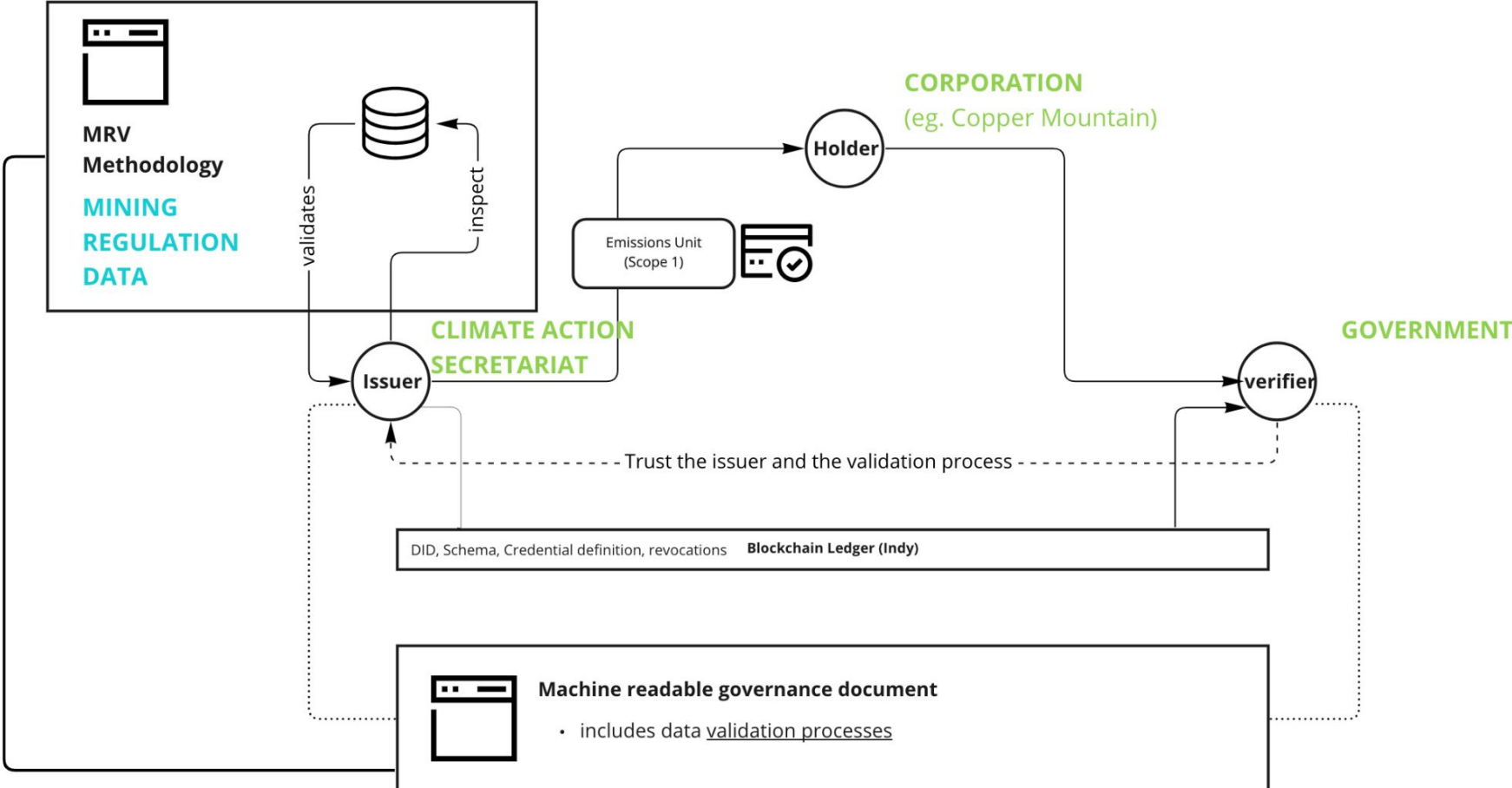Digital Trust & Climate/ESG Profile

This system diagram intends to clarify scope and further outline complementary approaches for how credentials under the Trust Over Ip specifications can be applied to nested climate accounting. The below diagram also follows the mechanism by which Open Climate has been using the semantics on the hyperspace transfer protocol (hstp) for establishing spatial contracts.

ISSUERS

- BC Digital Trust
- BC Ministry of Nat Resources
- Rest of Copper Supply Chain

HOLDERS

- Copper Mine Site
  - GHG Profile (Site)
  - Mining & Processing
  - Mine Site
- Copper Mountain (Org)
  - GHG Profile (Org)
- Commodity UNIT (Cu)
  - GHG Profile (product)
- Marketplace
- End -Product
  - GHG Profile (product)
- Sale
- End-Buyer Company

VERIFIERS

- Professional Auditor
- IoT
- Professional Auditor
- Market Auditors / Border Control
- GHG Profile (SubGov)
- GHG Profile (Gov)

BC

Canada

Canada / International

LEGEND & TOIP CREDENTIALS:

| USER | AUTHORITY | ASSET \| PROJECT | Activity Type | DIGITAL ASSET \| Climate | D.ASSET \| Commodity | CONTRACT | DOMAIN |

MRV Methodology

MINING REGULATION DATA

validates

inspect

CLIMATE ACTION SECRETARIAT

Issuer

CORPORATION
(eg. Copper Mountain)

Holder

Emissions Unit (Scope 1)

GOVERNMENT

verifier

Trust the issuer and the validation process

DID, Schema, Credential definition, revocations   **Blockchain Ledger (Indy)**

Machine readable governance document

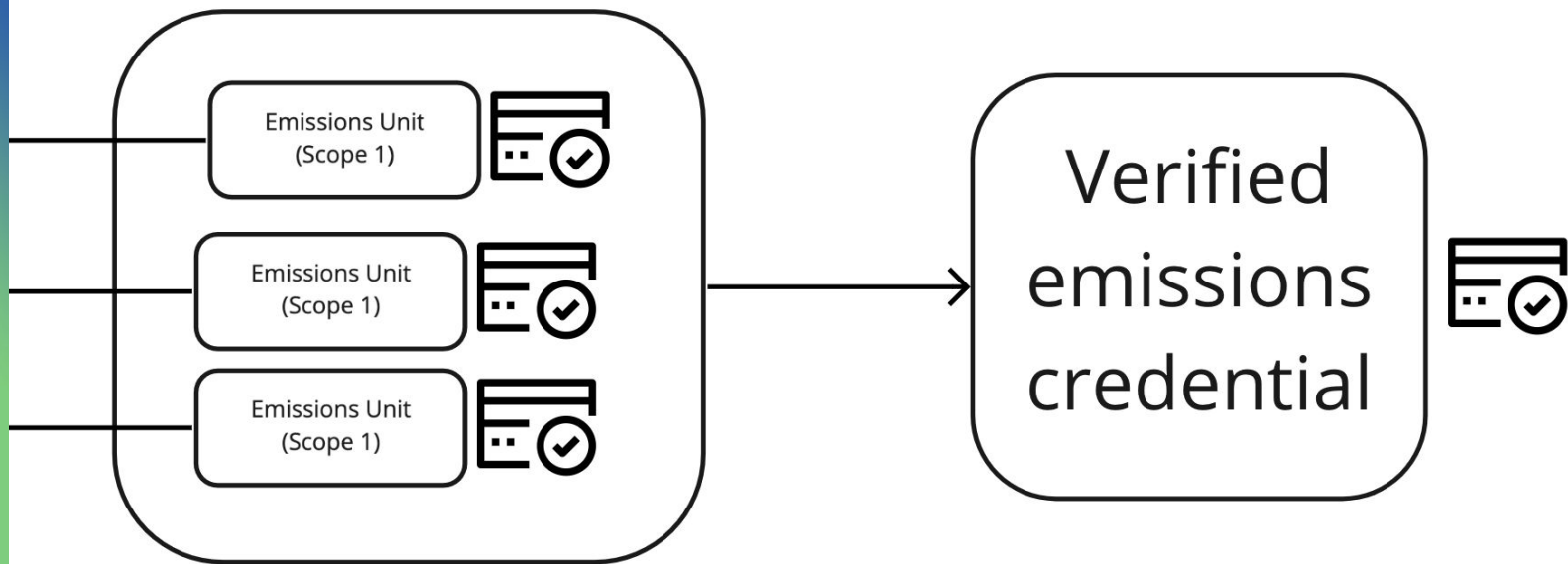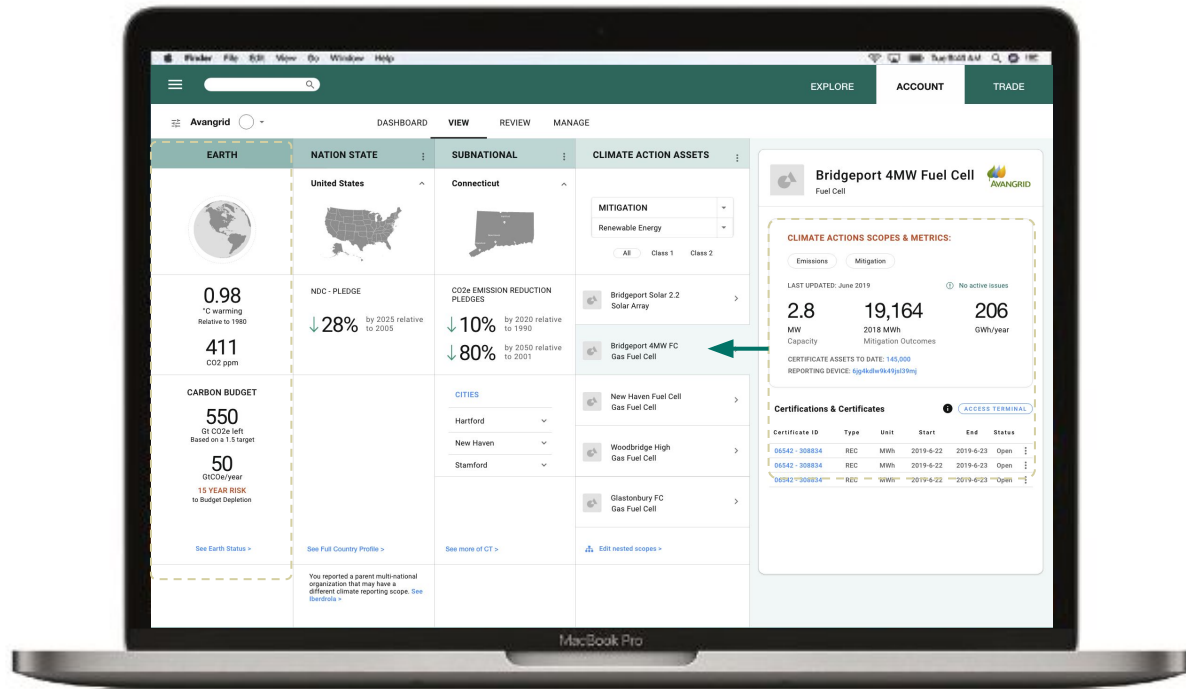• includes data validation processes

CLIMATE DATA VALIDATION #2,3

CORPORATION SELF-ISSUER
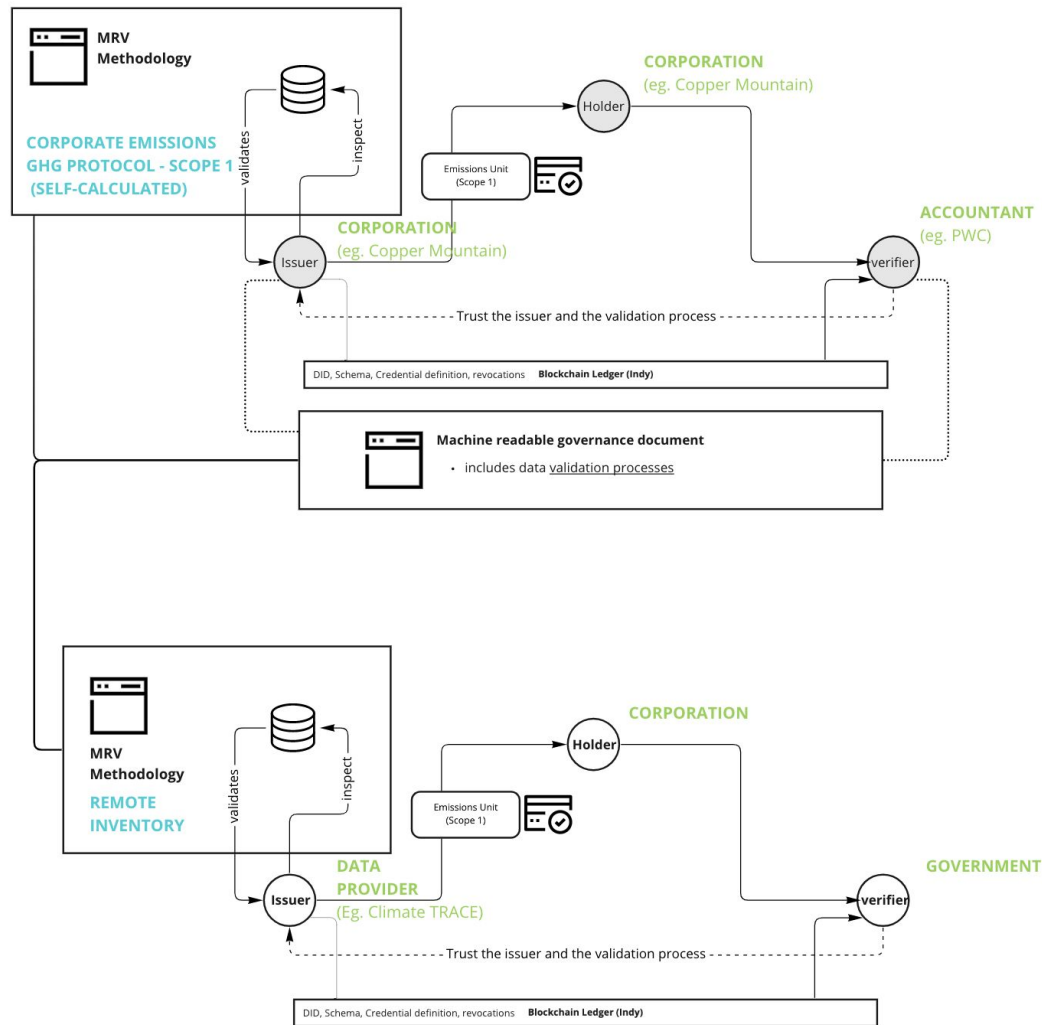
INDEPENDENT VALIDATOR (SATELLITE + ML)

CREDENTIAL-OF-CREDENTIALS FOR TRIPLE VERIFIED DATA

Open Earth | Climate

open

requires login

TABS:

EXPLORE

informs

ACCOUNT
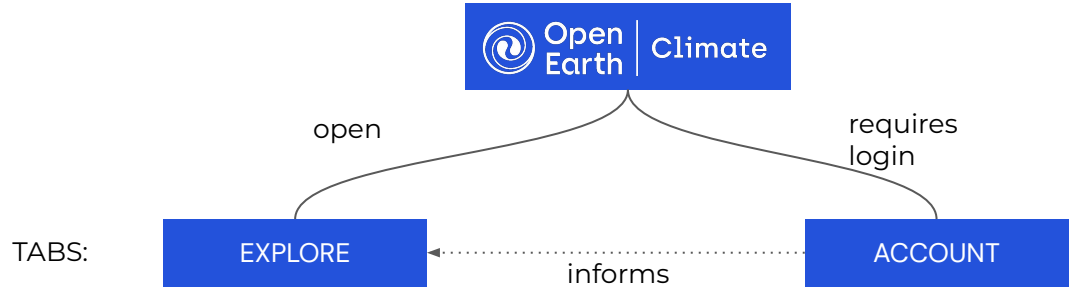
Allows the exploration of verified open climate data of state and non-state actors (eg. pledge, emissions and mitigation). Multi-source verification and consensus by compiling different 'signed' datasets and creating a homogenized value.

Allows climate accounting officials of non-state actors to compile their data from their trusted sources, tracking emissions and mitigations, define disclosure settings and 'roll-up' their data to the corresponding jurisdictions (thus informing the explore section).

Primary users:
- General public
- Climate Researchers
- Policy makers

Primary users:
- Sustainability officers
- Data managers
- Compliance officers
- ESG officers

Type to search

Log In

🌍 Earth	0.98	°C warning Relative to 1980	411	CO2 ppm	550	GtCO2e left Based on 1.5 target	50	GtCOe/year	**15 YEARS RISK** to Budget Depletion

Explore Earth Data

State Option

Nation State 🔘 Multinationals (MNC)

Nation State

Canada ✕ ▼

Subnational

No items selected ▼

Organization

No items selected ▼

🇨🇦 **Canada**

Explore State Data

Emission Inventory ⓘ

Details

LAST UPDATED JUNE 2020

763.44
Total GHG Emissions
Mmt CO2e/year

−

12.9
Land Use Sinks
Mt CO2e/year

=

750.54
Net GHG Emissions
Mt CO2e/year

Climate treaties & Agreement ⓘ

Details

LAST UPDATED JUNE 2020

UNFCCC Paris Agreement

STATUS: SIGNED & RATIFIED

See Country Dashboard ❯

Credentials

Details

LAST UPDATED JUNE 2019

Certificate ID	Type	Unit	Status
06542-308834	Emission	CO2e	Inventory
06542-308834	Emission	CO2e	Inventory

Pledges

Details

LAST UPDATED JUNE 2020

Nationally Determined Contribution (NDC)

GHG EMISSIONS ↓**30%** by 2030 relative
to 2005

Trades & Transfers

Details

LAST UPDATED JUNE 2020

Type ⌄

From	To	Type
Copper Mountain	Mitsubishi	Copper

Type to search

Log In

🌍 Earth	0.98	°C warning Relative to 1980	411	CO2 ppm	550	GtCO2e left Based on 1.5 target	50	GtCOe/year	**15 YEARS RISK** to Budget Depletion	Explore Earth Data

Earth 0.98 °C warning Relative to 1980 | 411 CO2 ppm | 550 GtCO2e left Based on 1.5 target | 50 GtCOe/year | **15 YEARS RISK** to Budget Depletion | Explore Earth Data

🍁 **Canada** NDC - PLEDGE ↓30% by 2030 relative to 2005 Explore Country Data

British Columbia CO2E EMISSION REDUCTION PLEDGES ↓40% by 2030 relative to 2007 ↓60% by 2040 relative to 2007 Explore State Data

State Option

Nation State ⬤ Multinationals (MNC)

Nation State

Canada ✕ ▼

Subnational

British Columbia ✕ ▼

Organization

Copper Mountain ✕ ▼

Copper Mountain Canada, British Columbia, Vancouver   Explore State Data

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Emission Inventory ⓘ
LAST UPDATED JUNE 2020

350 − **100** = **250**

Total GHG Emissions mKt CO2e/year | Land Use Sinks Kt CO2e/year | Net GHG Emissions Kt CO2e/year

Details

Climate treaties & Agreement ⓘ
LAST UPDATED JUNE 2020

UNFCCC Paris Agreement

STATUS: SIGNED & RATIFIED

See Country Dashboard ›

Details

Credentials
LAST UPDATED JUNE 2019

Certificate ID	Type	Unit	Status
06542-308834	Emission	CO2e	Inventory
06542-308834	Emission	CO2e	Inventory

Details

Pledges
LAST UPDATED JUNE 2020

Details

Trades & Transfers
LAST UPDATED JUNE 2020

Details

Type to search

0.98

°C warning
Relative to 1980

411

CO2 ppm

550

GtCO2e left
Based on 1.5 target

50

GtCOe/year

15 YEARS RISK
to Budget Depletion

Earth

See Earth Status
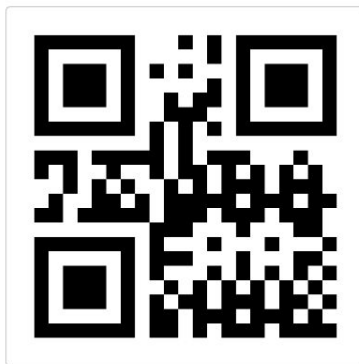
State Option

Nation State   Multinationals (MNC)

Nation State

No items sel

Organization

No items selected

Log In With Credential

Scan QR code with your credential wallet

No credential? Register   Log In with password

Type to search

Copper Mountain ▾

Dashboard   Climate actions   Sites   Pledges   Reports

Climate actions

LAST UPDATED JUNE 2019

Details

↑ **350**
Emissions
Kt CO2e/year

—

↓ **100**
Mitigations
Kt CO2e/year

=

250
Net Emissions
Kt CO2e/year

5 sites

LAST UPDATED JUNE 2019

Copper Mine 1   British Columbia, Canada
Copper Mine 2   British Columbia, Canada
Eva Project   Queensland, Australia
Cameron Project   Queensland, Australia
Project 5   Queensland, Australia

Exlpore all site 👁

2
Copper Mine 1
Copper Mine 2
Eva Project
Cameron Project
Project 5
3

Climate accountability

LAST UPDATED JUNE 2019

Details

Traceability of climate actions
Through verifiable MRV methods and linked devices

10%
63%
27%

● Direct tracking & Verification

Your pledges

LAST UPDATED JUNE 2019

Details

Voluntary

CARBON INTENSITY   ↓ **0** tCO2/tCUeq   by 2035

Voluntary

CARBON INTENSITY   ↓ **50%**   by 2025 relative to 2018

+ Add new

Reports

LATEST REPORTS YOU CREATED

Details

Type ▾

○ Lorem ipsum dolor sit amet
  Lorem ipsum dolor sit amet

○ Lorem ipsum dolor sit amet
  Lorem ipsum dolor sit amet

○ Lorem ipsum dolor sit amet
  Lorem ipsum dolor sit amet

○ Lorem ipsum dolor sit amet
  Lorem ipsum dolor sit amet

Dashboard   **Climate actions**   Sites   Pledges   Reports   Trades & Transfers

Summary view 🔘 Grid view

	Scope 1	Scope 2	Scope 3
	Fuel combustion, company vehicles, fugitive emissions	Purchased electricity, heat and steam	Purchased goods and services, business travel, commuting, etc.

Emissions
↑ **350**
MtCO2e/year

200 MtCO2e/year

Signed by
British Columbia
MAY 25 2019 ✓ Verified by PwC

100 MtCO2e/year   Add

25 Signed by
    Cleartrace
    JUNE 01 2019 ✓ Verified by PwC

30 Signed by
    Cleartrace
    MAY 01 2019 ✓ Verified by PwC

+See 4 more (45 MtCO2e)

50 MtCO2e/year   Add

8 Signed by
   Aerials.is
   JUNE 01 2019 ✓ Verified by PwC

9 Signed by
   Aerials.is
   MAY 01 2019 ✓ Verified by PwC

+See 4 more (33 MtCO2e)

Offsets
↓ **100**
MtCO2e/year

50 MtCO2e/year

20 Signed by
    British Columbia
    JUNE 01 2019 ✓ Verified by PwC

30 Signed by
    British Columbia
    MAY 01 2019 ✓ Verified by PwC
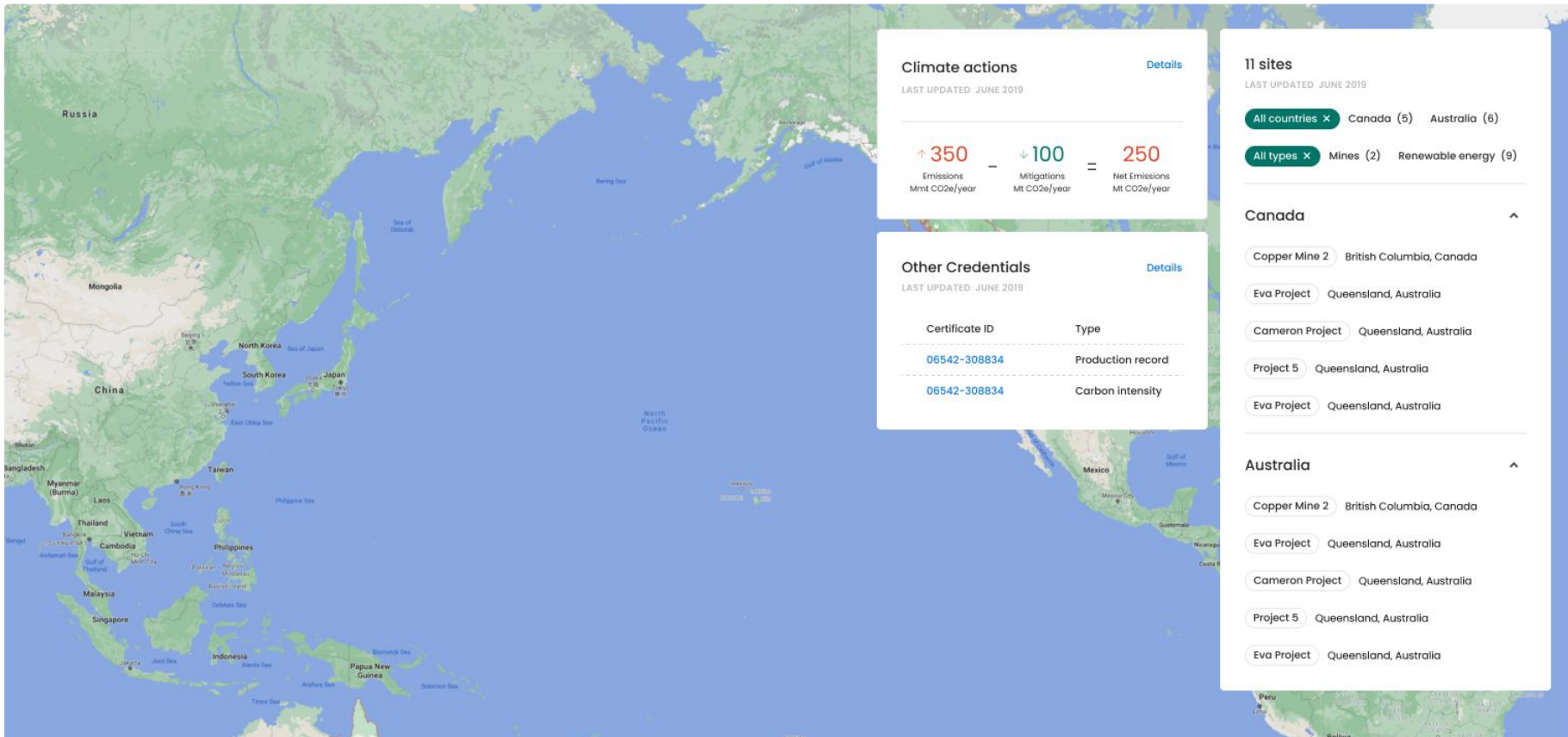
Add Offset

50 MtCO2e/year   Add

8 Signed by
   Patch.io
   JUNE 01 2019 ✓ Verified by PwC

9 Signed by
   Patch.io
   MAY 01 2019 ✓ Verified by PwC

Dashboard   Climate actions   Sites   Pledges   Reports   Trades & Transfers

Climate actions   Details
LAST UPDATED JUNE 2019

↑ 350   ↓ 100   = 250
Emissions   Mitigations   Net Emissions
Mmt CO2e/year Mt CO2e/year   Mt CO2e/year

—   =

Other Credentials   Details
LAST UPDATED JUNE 2019

Certificate ID	Type
06542-308834	Production record
06542-308834	Carbon intensity

11 sites
LAST UPDATED JUNE 2019

All countries ✕   Canada (5)   Australia (6)

All types ✕   Mines (2)   Renewable energy (9)

Canada   ⌃

Copper Mine 2   British Columbia, Canada

Eva Project   Queensland, Australia

Cameron Project   Queensland, Australia

Project 5   Queensland, Australia

Eva Project   Queensland, Australia

Australia   ⌃

Copper Mine 2   British Columbia, Canada

Eva Project   Queensland, Australia

Cameron Project   Queensland, Australia

Project 5   Queensland, Australia

Eva Project   Queensland, Australia

Why participate in OpenClimate?

1. **Private - Public** integration and digital trust interface:
   - Roll-up accounting for inventory
   - Preparedness for accounting and policy requirements (eg. data driven subsidies and taxes)
   - Market approvals

2. Differentiated **commodities** (B2B interactions)
3. Climate accounting **integration** (scope 1, 2 3 and offsets)
4. **Paris** Agreement Independent Global StockTake

Open Earth

Our planet, first

info@openearth.org
www.openearth.org

We are a research and deployment nonprofit developing open digital infrastructure with emerging technology and radical collaboration tools to scale transformative Earth–systems solutions.