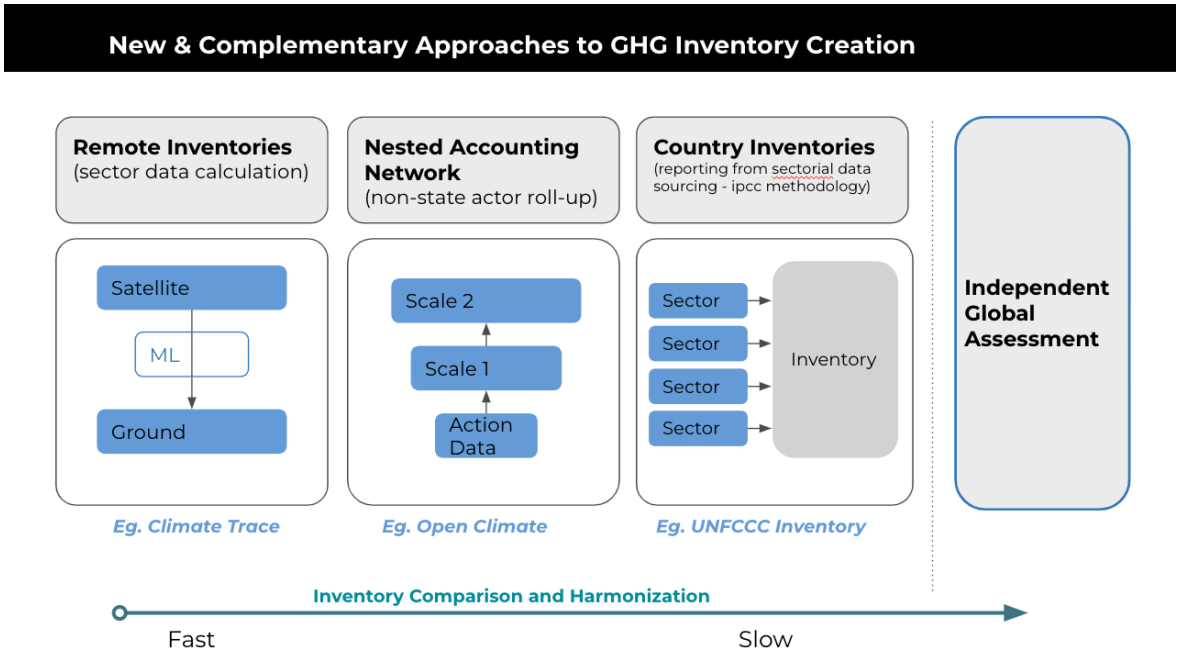
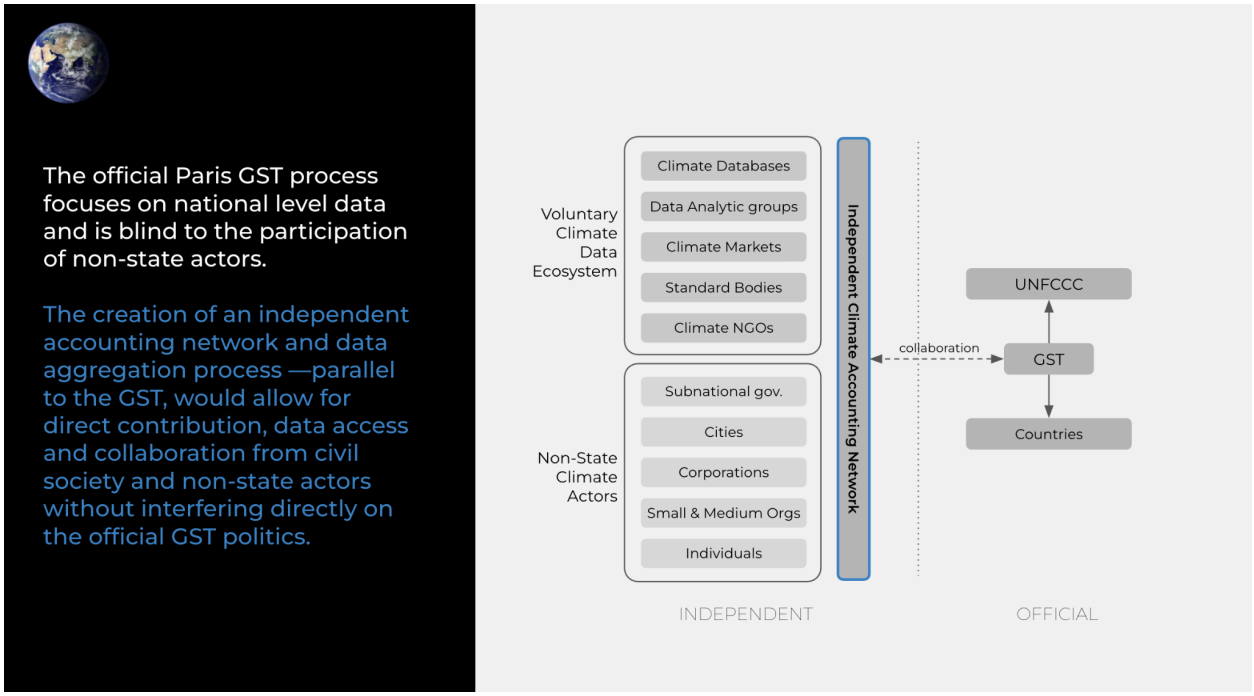
Annex information for GST submission by CAD2.0

OpenClimate, CAD2.0 and the Digitally-enabled Independent Global Stocktake (DIGS) exercise

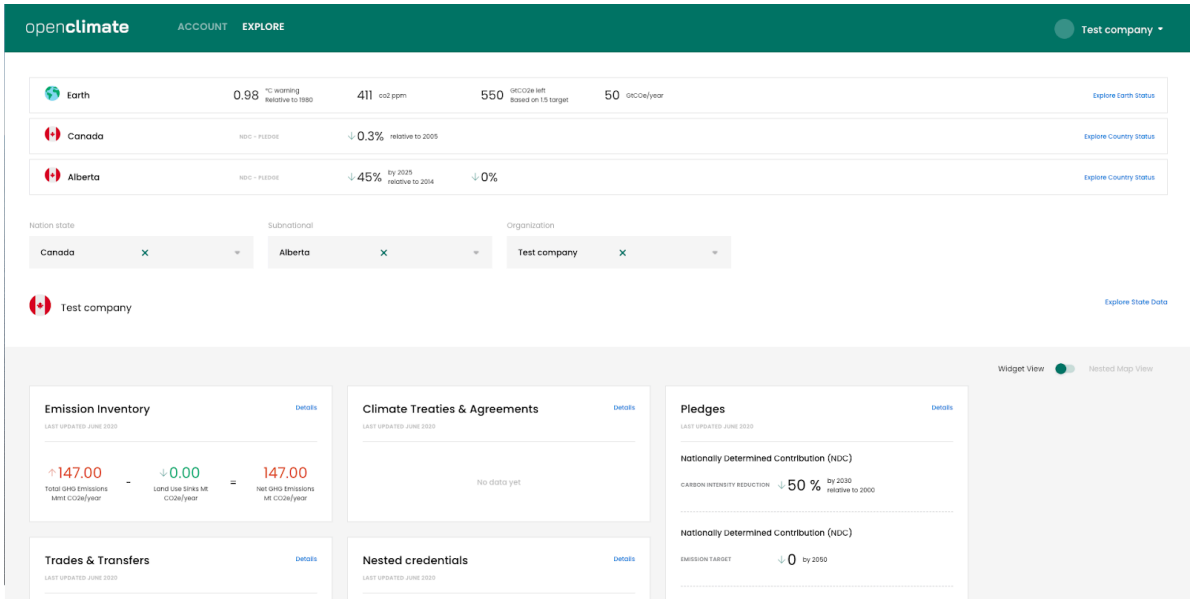
The OpenEarth Foundation and the DataDriven Lab have been collaborating for several years on the use of new technologies for improving accounting and accountability of non-party stakeholders and how to best incorporate these into inventories. The most important application is specifically to improve the speed and resolution of establishing a GST for the Paris Agreement. For this, the work entails comparing and harmonizing data from three distinct methodologies for creating ghg inventories in order to achieve maximum coverage towards a common global assessment. Below are the three mechanisms for inventory creation identified and for which the [OpenClimate network] is building infrastructure to reconcile.



In order to perform a Global Stocktake for Non-State Actors (NSA) and their pledges —an area where much accountability is also needed— a parallel exercise needs to be conducted as NSA should not be directly involved in the official UNFCCC GST process. We believe the creation of an Independent Climate Accounting Network can be established in order to create a Digitally Enabled Global Stocktake (DIGS). The below diagram explains how this parallel process could work and bring value and input directly to the official GST process.



The OpenClimate project specifically is building advances in digital trust and data infrastructure to cover all global emissions and mitigations and make them available for GST and independent GST exercises that can incorporate non-state actor actions with state level ones.



Inventory Approaches - Nested Climate Accounting

Nested climate accounting is a mechanism specifically designed to 'roll-up' emissions data from site and project specific level (eg. power plants, buildings, industry etc) into the jurisdiction it resides, i.e. subnational government, which in turns nests in the national jurisdiction. This is achieved by geo-tagging the data, the project's spatial domains and establishing the jurisdictional polygons as the boundary for inventories. By leveraging spatial web protocols and standards, emission and mitigation records can be queried by political jurisdictions and if embedded emissions or mitigations (eg. in produts or in carbon offsets) are traded across jurisdictions, then automatic corresponding adjustments are recorded at the spatial level.

This new methodology for inventory creation and non-state actor incorporation in official inventories, is designed to leverage Internet-of-Things (i.e. secure interoperable sensors), blockchain records, AI analytics and web3 spatial protocols. This paper published by Schletz et al. describes the core basis for Nested Accounting, while the OpenClimate whitepaper describes the overall vision and work being done to implement this at scale.

Climate TRACE remote inventory: independent and near real-time tracking of emissions

Remote inventories of greenhouse gas emissions have the potential to provide independent tracking of emissions in near real-time without major gaps in coverage. Remote inventories are produced using satellites or other remote methods along with machine learning to detect activity of emitters and to combine with capacity and emissions factors to estimate greenhouse gas emissions. This type of inventory can be especially useful in assessing commitments and actions by non-state actors.

By tracking emissions at their source, remote inventories can support flexible attribution and aggregation of emissions to geographies, jurisdictions, owners, and most other relevant entities including non-state actors. These rapid and independent emissions estimates can supplement and fill gaps in traditional inventories produced using self-reported emissions. In addition, remote inventories can support and enable an independent stocktake focused on non-state actors. The technology is available now to develop remote inventories with global coverage in near real-time.

Climate TRACE

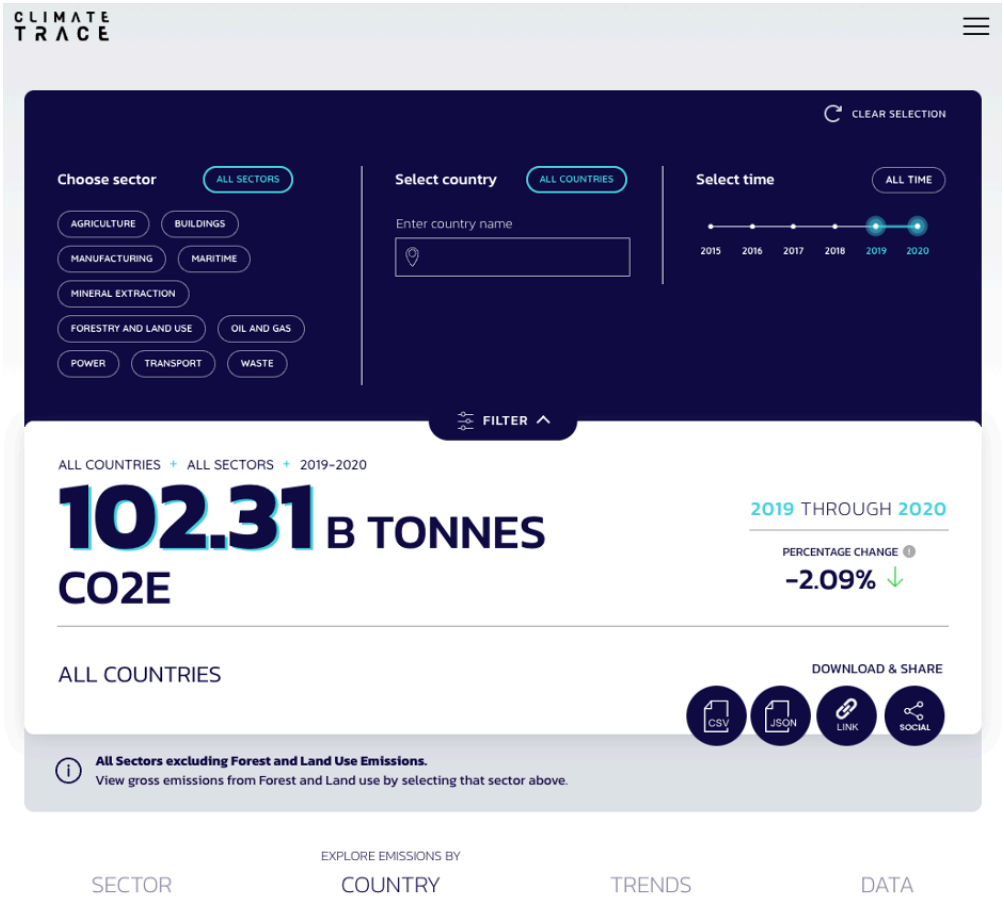
Climate TRACE has produced an example of a remote GHG emissions inventory and made results available in late 2021 at climatrace.org. The inventory covers most sectors and includes data for all countries through 2020, with emissions estimates for 2021 available by June 2022. Further development is planned and by the end of 2022 Climate TRACE should be producing emissions estimates quickly for all countries and approaching coverage of all sectors. Also under development during 2022 are tools and approaches for attribution of emissions to non-state actors including provisional governments and some private entities.

Results from Climate TRACE show that it is possible to produce a remote inventory and provide estimates that can fill gaps in existing inventories. Key gaps that have been filled by this remote inventory include:

- emissions estimates for non-Annex I countries which are reported infrequently.
- emissions estimates for Annex I countries since 2019 (last inventory year available at time of writing).

The Climate TRACE inventory at climatetrace.org will be updated routinely, including data from individual emitters in some sectors (such as power plants, factories, or ships) and small areas for sectors such as land use, fires, and vehicle emissions. Below is an example of Climate TRACE's emissions inventory:

Example of Climate TRACE inventory estimates for high emitting countries:



CLIMATE TRACE

	COUNTRY	EMISSIONS EST.	PERCENTAGE CHANGE	EMISSIONS / CAPITA	GLOBAL
1	China	27.26 BT of CO2e	-0.02%	18.94 (+30.7%)	26.65%
2	USA	12.71 BT of CO2e	-5.39%	38.41 (+65.8%)	12.43%
3	India	7.49 BT of CO2e	-1.48%	5.43 (-58.6%)	7.32%
4	Russia	4.93 BT of CO2e	-2.43%	33.77 (+61.1%)	4.82%
5	Indonesia	2.86 BT of CO2e	-1.52%	10.47 (-20.3%)	2.80%
6	Japan	2.67 BT of CO2e	-1.68%	21.12 (+37.8%)	2.61%
7	Brazil	2.47 BT of CO2e	-0.32%	11.60 (-11.7%)	2.41%

Example of Climate TRACE inventory estimates for some countries lacking recent data:

CLIMATE TRACE

	COUNTRY	EMISSIONS EST.	PERCENTAGE CHANGE	EMISSIONS / CAPITA	GLOBAL
151	North Macedonia	0.06 BT of CO2e	-2.89%	29.48 (-24.4%)	0.02%
152	Namibia	0.06 BT of CO2e	+4.23%	NO DATA	0.02%
153	Antigua and Barbuda	0.06 BT of CO2e	+22.57%	596.85 (+93.5%)	0.02%
154	Burundi	0.06 BT of CO2e	+4.00%	4.75 (-87.8%)	0.02%
155	Rwanda	0.06 BT of CO2e	+1.14%	4.29 (-89.0%)	0.02%
156	Sierra Leone	0.05 BT of CO2e	+11.01%	6.78 (-82.6%)	0.02%
157	Albania	0.05 BT of CO2e	-0.66%	18.64 (-52.2%)	0.02%