

Carbon Dew: Direct Greenhouse Gas Exchange Measurements for Equitable Worldwide Emissions Trading

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Background/Objectives: A combination of engineered, natural and societal solutions are envisioned to avert the most drastic consequences of climate change, connected via a greenhouse gas (GHG) economy and government policies (e.g., net-zero incentives, compensations etc.). Measurement, Reporting and Verification (MRV) of GHG reduced or removed from the atmosphere are central to ensuring that revenue streams develop in proportion to true climate benefits. However, current MRV limitations (e.g., cost, robustness, interoperability, scalability, multi-year latency, etc.) curtail our ability to approach climate solutions in a well-informed and consistent manner. This can be addressed by creating an MRV underlying asset that is directly and frequently measured, uniformly derived, universally applicable to the engineered and natural solutions, and near-real time traceable in space.

Approach/Activities: Technology transfer of the latest, most direct GHG quantification methods from academic climate science to GHG MRV and markets provides a promising avenue to create the underlying asset: [Next-generation information reconstruction](#) is applied to existing regional, continental and global networks of direct GHG flux measurements to achieve unmatched statistical power, interpretability and process insight. This will generate an orders-of-magnitude improved stream of directly-measured emission and sequestration rates for robustly anchoring GHG remote sensing products and models. The resulting underlying asset directly represents the financial security, here physical GHG emission and sequestration. Thus, they can be used to assess the value of financial derivatives, such as GHG certificates based on discipline-specific protocols, according to reliability, storage duration and other factors.

Results/Lessons Learned: This approach will result in decameter-resolution maps of GHG emission and sequestration per unit of time, locked in a secure vessel such as a blockchain to prevent tampering, deleting, or modifying. Access via mobile Apps and APIs will enable public awareness, GHG certificate intercomparisons, development of regulatory and financial products, tools, and commercial services and national policies. Paths to monetization include licensing to credit originators, offset buyers and marketplaces, through connecting pixel-scale GHG exchange to regulatory practice for a range of GHG certificate protocols, industries, stakeholders and management practices. With this conceptual outline, we invite all types of stakeholders to join Carbon Dew: the Community of Practice for fair and equitable climate solutions anchored by direct atmospheric measurements (www.carbondew.org).