

CarbonCloud Supply Chain Data Sharing Protocol

Introduction

This document outlines the protocols and permissions governing data sharing within the CarbonCloud platform. It explains how data flows through supply chains, what information is visible to different parties, and how emissions data is structured and displayed.

Note: This is a living document, and the types of data propagated through the supply chain may evolve over time. However, our core commitment remains: no activity data that is not propagated through the supply chain will be visible to anyone unless explicitly specified in your product-level share settings within the CarbonCloud system.

Key Terminology

Before diving into the protocol details, it's important to understand these key terms:

- **Activity Data:** Operational information about your production processes, including energy usage, transportation details, and production methods. This is the input data you provide to the platform. Note that only specific categories of activity data (transportation and energy) are ever shared with direct customers, and no other activity data is shared.
- **Recipe Data:** Information about your product formulations, including ingredients and their quantities. This proprietary information is never shared with any other party.
- **Emissions Data:** Calculated carbon footprint measurements derived from activity data and secondary data. This data is propagated downstream in the supply chain.
- **FLAG (Forest, Land, and Agriculture):** A category of emissions specifically related to agricultural and land-use activities at the farm level.
- **Upstream/Downstream:** In supply chain terminology, "upstream" refers to suppliers who provide materials to you, while "downstream" refers to your customers who receive your products.
- **Propagated Data:** Calculated information (such as emissions data, land footprint, water footprint) that flows through the entire supply chain to downstream companies. Unlike activity data, propagated data is visible to all downstream companies, not just direct customers.
- **Farm-level specific data:** Detailed agricultural production information collected at the farm source, including crop information, resource usage (diesel, electricity, water), and agricultural inputs (fertilizers, pesticides, limestone). This specialized category of activity data provides the foundation for calculating agricultural emissions.

Supply Chain Data Sharing Principles

Invitation-Based Collaboration

CarbonCloud operates on an invitation-based model where companies can invite their suppliers to share product data to their supply chain analysis:

1. **Company A** (downstream) invites **Company B** (upstream supplier) to share product data
2. **Company B** adds their activity production data to the platform
3. This creates a direct relationship between the two organizations in the system

Data Sharing Rules

The core principles of our data sharing protocol are:

1. **Recipe data (ingredients and amounts) is NEVER shared with anyone**
2. You share data based on these rules:
 - You share activity data (distribution and energy) with customers for whom you have accepted invitations to share
 - You do NOT share any data with upstream suppliers you invite
 - You do NOT share any activity data with your customers' customers (two or more steps down the supply chain)

Example Scenario

Consider this typical supply chain: **Raw Material Supplier** → **Ingredient Processor** → **Product Manufacturer** → **Retailer**

Data Sharing Example:

- **Ingredient Processor** shares:
 - Activity data with **Product Manufacturer** (their direct customer)
 - **✗** DOES NOT share recipe data with anyone
 - **✗** DOES NOT share activity data with **Retailer** (two steps downstream)
 - **✗** DOES NOT share any data with **Raw Material Supplier** (upstream)
- **Raw Material Supplier** shares:
 - Activity data with **Ingredient Processor** (their direct customer)
 - **✗** DOES NOT share recipe data with anyone
 - **✗** DOES NOT share activity data with **Product Manufacturer** (two steps downstream)

Your recipe data is NEVER shared with anyone

Activity Data Shared

When you share data with another company, the following activity data elements become visible to them:

General Product Information

- Name of the product
- Location of the production

Transportation Details

- Mode of transport (Ship, Truck, Train)
- Distance of transport

Production Information

- Type(s) of energy used for production
- How much energy is used for production

Farm-Level Specific Data

Farm-level data collection differs from the rest of the supply chain and includes:

- Name of the crop
- Harvesting country
- Yield
- Diesel usage
- Electricity usage
- Fertilizer application
- Pesticide application
- Limestone application

Data Propagation

While activity data visibility is restricted, certain calculated information flows through the entire supply chain:

- Emissions calculations based on activity data are always propagated downstream
- Other quantitative metrics like farm land use (hectares) and farm water irrigation are also propagated in the same way
- All downstream companies can see these calculated values (but not the underlying activity data)
- This ensures accurate environmental impact accounting throughout the supply chain
- Upstream companies cannot see data or emissions from downstream processes

Footprint Data Structure

Emissions data shared downstream throughout the value chain of connected organisations is organized into high-level process categories:

Emission Data Categories

1. **Forest Land and Agriculture (FLAG):** All emissions and data from farm-level activities are presented in aggregate (kg CO₂e) and disaggregated per greenhouse gas (CO₂, CH₄, N₂O) and per FLAG category per greenhouse gas.
 - a. Land Use Change
 - b. Land Management CO₂
 - c. Land management non-CO₂
 - d. Carbon Removals
2. **Transportation:** All emissions caused by transportation after farm gate that are connected to any ingredients into the product throughout the supply chain
3. **Processing:** All emissions after farm gate that are caused by production of the product
4. **Packaging:** All emissions connected to producing the packaging and transportation of the packaging to the filling facility

Other Data Categories

Footprint data shared downstream throughout the value chain of connected organisations is organized into high-level process categories

5. **Land Footprint:** Land use footprint in m² farm land for the production of raw materials for the product
6. **Water Footprint:** Irrigation water footprint on farm for the production of raw materials for the product

Detailed FLAG Emissions Breakdown at Farm Gate

For producers at farm gate the FLAG emissions are presented with additional granularity as described here. Each sub-category is presented with emissions in CO₂e and per greenhouse gas CO₂, N₂O, and CH₄ as applicable.

7. **Land Use Change (LUC):** All emissions and data from farm-level activities
 - a. Deforestation
8. **Land Management non-CO₂**
 - a. Limestone and Urea application
 - b. Field bacteria - direct N₂O emissions
 - c. Off-field bacteria - indirect N₂O emissions
 - d. Farm machinery
 - e. Fertilizer production
 - f. Energy for irrigation
 - g. Pesticide production
 - h. Energy for drying
 - i. Rice field flooding (only for rice)
9. **Land Management CO₂**

- a. Farming on drained wetlands

10. Carbon Removal

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This granular breakdown allows downstream companies to understand the environmental impact of agricultural products in their supply chain without revealing sensitive upstream operational details.

Conclusion

CarbonCloud's supply chain data sharing protocol is designed to balance transparency with data privacy. By clearly defining what data is shared, with whom, and how it propagates through the supply chain, we enable comprehensive environmental impact analysis while protecting sensitive business information.

As we continue to enhance our platform, we remain committed to these core principles:

1. Your activity data remains under your control
2. Only propagated data is visible to companies without explicit sharing permission
3. Environmental impact metrics flow downstream to enable accurate sustainability reporting

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Classification: Public

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