



Addressing Climate Change and Global Health: Baselining Greenhouse Gas Emissions in the USAID Global Health Supply Chain

Chris Steuer, ICF

Overview

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- Port-to-Port Analysis
 - Data Collection and Cleansing
 - Metrics and Calculations
 - Assumptions and Proxies
- Broader Value Chain
 - Regional Distribution Centers
 - Manufacturing
- Opportunities for Mitigation

— Background and Context

Background: USAID Climate Strategy

USAID established a target to reduce its operational greenhouse gas (GHG) emissions by 65 percent by FY 2030 from a FY 2008 baseline and to be net-zero by 2050.

- Also working to reduce global supply chain carbon footprint.



Photos: USAID, USAID Energy, Badre Bahaj/WFP Malawi

GHG Accounting: Emission Scopes and Source Categories

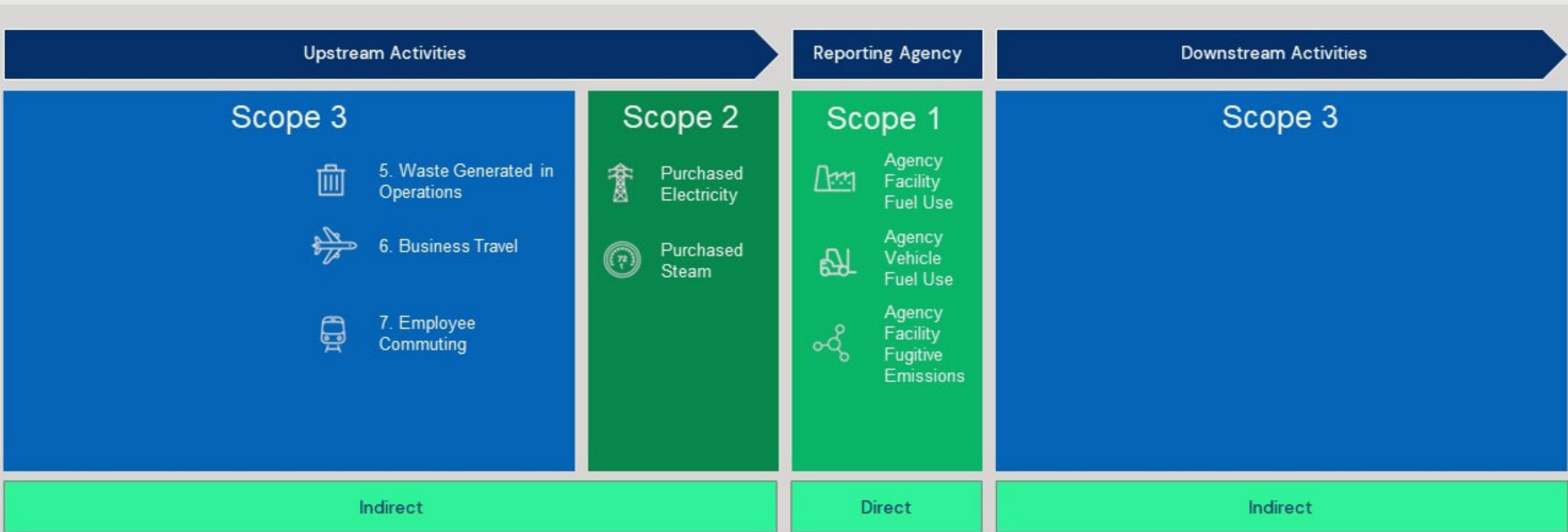
GHG emission inventories account for GHG emissions from different emission sources organized into three scopes



Source: ICF 2023. Adapted from the GHG Protocol Corporate Accounting and Reporting Standard. <https://ghgprotocol.org/corporate-standard>

Federal Agency GHG Accounting

Historically federal agencies have focused on Scope 1 and 2 emissions and a limited group of Scope 3 sources.



Source: ICF 2023. Adapted from the Federal Agency Greenhouse Gas Accounting and Reporting Guidance.
https://www.sustainability.gov/pdfs/federal_ghg%20accounting_reporting-guidance.pdf

Supply Chain GHG Emissions

Scope 3



1. Purchased Goods and Services



2. Capital Goods



3. Fuel- and Energy-Related Activities



4. Upstream Transportation and Distribution



- 2021 CDP Report, Transparency to Transformation: A Chain Reaction
- Surveyed 154 organizations involved in the CDP Supply Chain Program, representing \$4.3 trillion in annual procurement spend
- **Found that supply chain emissions are on average 11.4 times greater than operational (Scope 1 and 2) emissions**

Source: https://cdn.cdp.net/cdp-production/cms/reports/documents/000/005/554/original/CDP_SC_Report_2020.pdf?1614160765

Executive Order 14057, Supply Chain Sustainability

Executive Order 14057: Catalyzing Clean Energy Industries and Jobs through Federal Sustainability:

- Section 301: Federal Supply Chain Sustainability. Federal supply chains should a Government and economy that services all Americans by...reducing greenhouse gas emissions and building resilience to climate change. Consistent with applicable law, agencies shall pursue procurement strategies to reduce contractor emissions and embodied emissions in products acquired or used in Federal projects.

Source: <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/>



Disclosure of GHG Emissions and Climate-Related Financial Risk

November 2022 proposed amendment to the Federal Acquisition Regulation (FAR) would require certain suppliers of the US Federal Government to publicly disclose their GHG information, climate-related financial risks, and set science-based emission reduction targets.

Federal Contractor Type	Annual Federal Contract Obligation	Proposed Rule Requirements
Major Contractors	>\$50 million	<ul style="list-style-type: none">Contractors must disclose emissions from Scopes 1 and 2 and relevant Scope 3 categories from the previous fiscal year in alignment with the GHG Protocol Corporate Accounting and Reporting Standard through CDP.Contractors must address climate risks in alignment with the recommendations of TCFD.Contractors must validate their emissions reductions targets with the Science Based Targets Initiative (SBTi).
Significant Contractors	>\$7.5 million - \$50 million	<ul style="list-style-type: none">Contractors must disclose emissions from Scopes 1 and 2 from the previous fiscal year in alignment with the GHG Protocol Corporate Accounting and Reporting Standard through CDP.
Other Contractors	<\$7.5 million	<ul style="list-style-type: none">No requirements.

— Port-to-Port (P2P) Analysis

P2P Analysis

- Account for transportation-related GHG emissions associated with USAID Global Health shipments from USAID custody to in-country port-of-entry.
- Air, land, and sea shipments.
- Falls within Scope 3 Category 4: Upstream Transportation and Distribution
 - Outbound transportation and distribution services that are purchased by the reporting entity.

Scope 3



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— Data Collection and Cleansing

Data Collection Methodology

- **Shipments:** USAID GH made shipments by air, land, and sea in 2019
- **Shipment weight:** Total shipment weight exceeded 43,000 tonnes
- **Shipment volume:** Available for sea shipments
- **Route Information:** Over 700 unique shipment routes with origin and destination locations.
- Refrigerated or Non-refrigerated



Source: [USAID flickr](#). Available under Creative Commons, BY-NC 2.0

Methodology Selection



The Corporate Value Chain (Scope 3) Accounting and Reporting Standard provides three methods to account for transportation-related emissions—fuel based, distance-based, and spend-based.

Minimum Boundary	Upstream Type	Calculation Methods
Scope 1 and 2 emissions of purchased products.	Transportation <ul style="list-style-type: none">• Air transport• Rail transport• Road transport• Marine transport	Fuel-Based Method: Determine the amount of fuel consumed. Distance-Based Method: Determine the mass, distance, and mode of each shipment. Spend-Based Method: Determine amount of money spent on each mode of business travel.
	Distribution	Site-Specific Method: Site-specific fuel, electricity, and fugitive emissions data. Average-Data Method: Estimate emissions for each distribution activity, based on average data.

Shipping Distances

Shipment dataset included origin-destination information for each shipment, but did not include travel distances.

Shipment Mode	Distance Calculations
Air	Applied the U.S. Department of Transportation (DOT) Statistics Inter-Airport Distance database to estimate flight distances by airport code for over 9,500 flights. ¹
Sea	Estimated shipping distance using Shipping Distance Calculator. ²
Land	Estimated shipping distance using Google Maps. ³

Sources:

1 - <https://www.transtats.bts.gov/Distance.aspx>

2 - <http://www.shiptraffic.net/2001/05/sea-distances-calculator.html>

3 - <https://www.google.com/maps>

Data Cleansing and Considerations

Shipment Mode	Distance Calculations
Air	<ul style="list-style-type: none">• DOT dataset accounted for 75% of flights.• Remaining flights included 395 unique flight paths. Of which 55 accounted for 80% of remaining shipment weight. Estimated distance using air miles calculator.• Applied average distance by product type to remaining flights.
Sea	<ul style="list-style-type: none">• Identified 728 unique sea shipment routes.• 273 accounted for 97% of shipped product weight.• Remainder were estimated using average shipping distance by product weight.
Land	<ul style="list-style-type: none">• Approximately 200 shipments occurred over land.• 100% of shipping distances calculated using Google Maps.

— Metrics and Calculations

Air Freight Methodology

- Applied UK Department for Business, Energy & Industrial Strategy emission factors (kg GHG/tonne-km) to flights by flight length.
- 95% of flights were long-haul flights.

Length	KgCO ₂ /Tonne-Km	KgCH ₄ /Tonne-Km	KgN ₂ O/Tonne-Km	KgCO _{2e} /Tonne-Km
Short Flights (<460 Kms)	2.35236	0.00188	0.02226	2.3765
Medium Flights (≥460 & <3,700 Kms)	1.20568	0.00008	0.01141	1.21717
Long Flights (≥3,700 Kms)	0.53358	0.00004	0.00505	0.53867

Source: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021>



Source: [USAID flickr](#). Available under Creative Commons, BY-NC 2.0

Sea Freight Methodology

- Aligned shipment routes with trade lane emission factors provided in BSR's 2019 Global Container Shipping Trade Lane Emission Factors report.

Trade Lanes	2019 TTW CO ₂ Emission Factors (g CO ₂ per TEU Km)	
	Dry	Reefer
Asia to-from Africa	47.1	84.3
Asia to-from Mediterranean/Black Sea	31.8	66.2
Asia to-from Middle East/India	35.5	70.2
Asia to-from North America East Coast/Gulf	37.9	67.7
Asia to-from North America West Coast	42.2	73.3
Asia to-from North Europe	26.7	58.7

Source: <https://www.bsr.org/files/clean-cargo/BSR-Clean-Cargo-Emissions-Report-2020.pdf>



Land Freight Methodology

- Applied UK Department for Business, Energy & Industrial Strategy emission factors (kg GHG/tonne-km) for heavy goods vehicles.

Activity	Type	% Laden	KgCO ₂ /Tonne-Km	KgCH ₄ /Tonne-Km	KgN ₂ O/Tonne-Km	KgCO ₂ e/Tonne-Km
HGV	All HGVs	Average	0.10580	0.00002	0.00167	0.10749
HGV Refrigerated	All HGVs	Average	0.12419	0.00002	0.00167	0.12588

Source: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021>



Source: [USAID flickr](#). Available under Creative Commons, BY-NC 2.0

— Assumptions and Proxies

Assumptions and Proxies

Fuel Data

- Preferred methodologies for estimating transport GHG emissions rely on fuel use.
- Used distance-based methods since fuel data were unavailable.

Distances

- Actual distance traveled was unavailable.
- Distance estimates are based on origin-destination information and average travel distances.

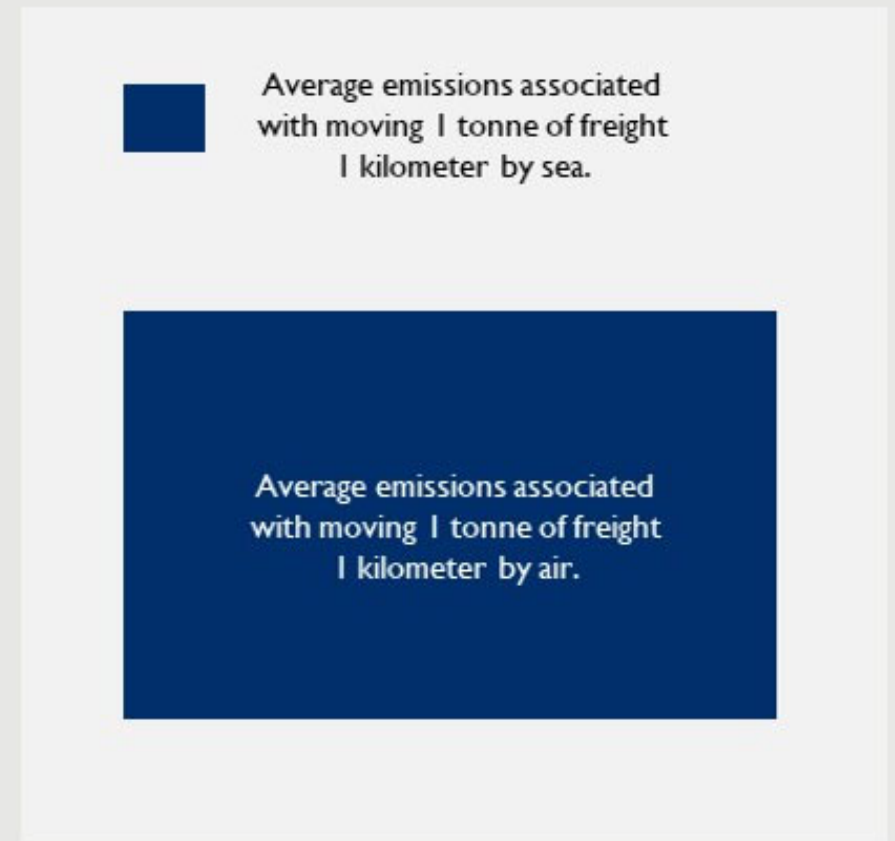
Emission Factors

- Emission factors are based on average emissions by mode and do not reflect the actual characteristics (e.g., combustion efficiency) of individual vessels, aircraft, or vehicles.

— Preliminary Findings

Preliminary Findings

- While activity-based (e.g., mass-distance) emission estimates have inherent uncertainties, the estimates can still provide valuable insights into the scale of shipping-related emission relative to other sources.
- Moving freight by air is significantly more emission intensive than moving freight by sea.
- Efforts such as those by the International Maritime Organization to collect vessel fuel consumption via the Global Integrated Shipping Information System may improve access to fuel consumption data.



Source: Illustrative based on [UK DEFRA](#) emission factors for long-haul freight flights (0.649 kgCO₂e/tonne.km) and container ships (0.016 kgCO₂e/tonne.km).

— Broader Value Chain

— Regional Distribution Centers

Category 4: Upstream Transportation and Distribution

- USAID GH is assessing Scope 1 and 2 emissions associated with warehousing products at Regional Distribution Centers (RDCs).
 - Belgium, Dubai, South Africa
- Obtain primary data (e.g., fuel and electricity consumption) directly from RDCs.
- Considering use of offsets and energy attribute certificates.
- Calculate emissions using Intergovernmental Panel on Climate Change (IPCC) and other publicly-available emission factors.
- Allocate emissions to USAID GH based on shared of warehouse space.



— Upstream Pharmaceutical Manufacturing

Category I: Purchased Goods and Services

- Emissions associated with the extraction, production and transportation of goods and services purchased or acquired by USAID.
- Engaging product suppliers to understand their efforts to account for GHGs and broader sustainability efforts.



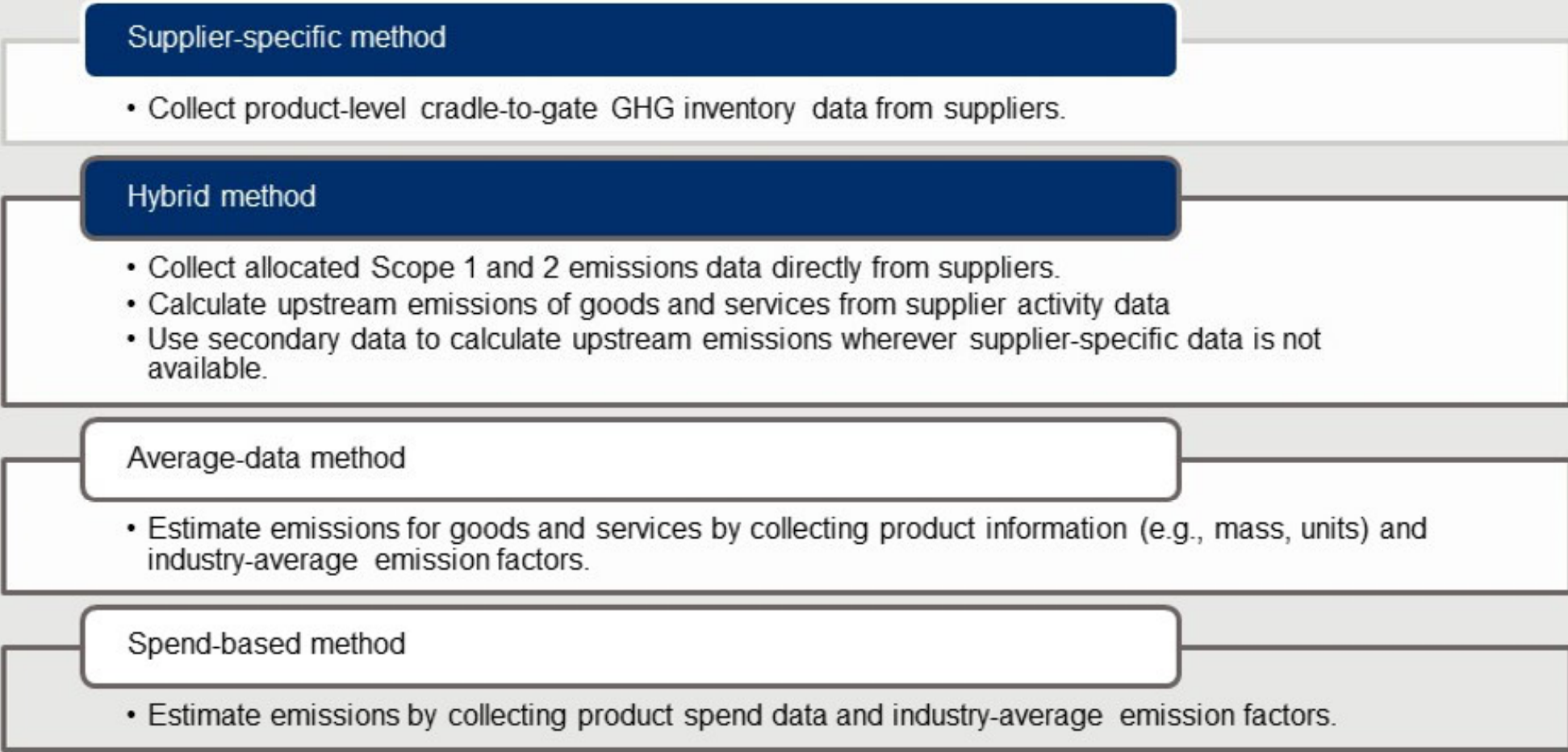
Primary and Secondary Data

Four methods are available to account for Scope 3 emissions from Category 1: Purchased Goods and Services: 1) supplier-specific, 2) hybrid, 3) average data, and 4) spend-based. These methods use either primary or secondary data.

Organizations should seek to increase primary data

Primary Data*
Data provided directly by suppliers related to specific activities (e.g., emissions, fuel consumption) in the reporting company's value chain.

Secondary Data
Financial data, units, mass, or other proxy data on purchases or other industry average data (e.g., published datasets, industry association data)



Source: GHG Protocol: Technical Guidance for Calculating Scope 3 Emissions

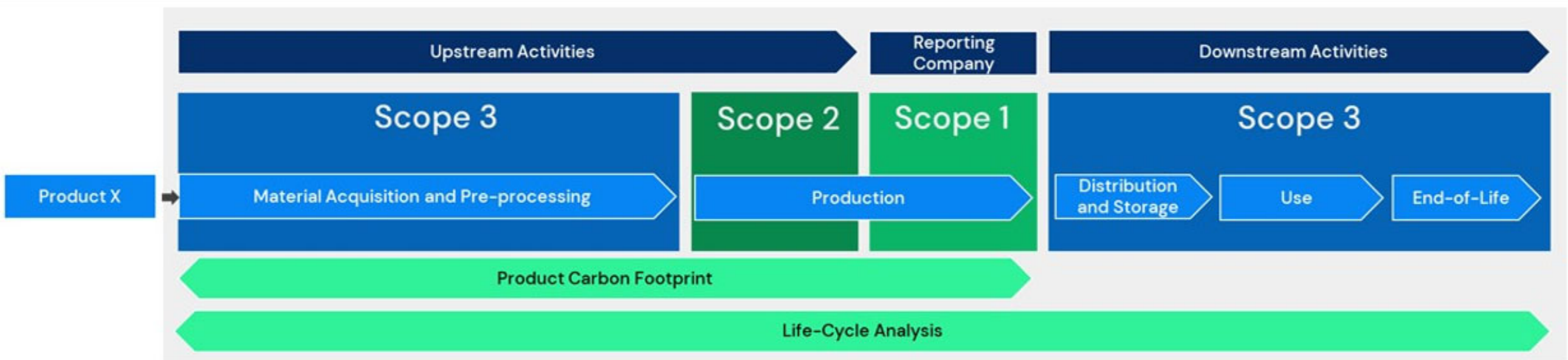
The European Union's Corporate Sustainability Reporting Directive (CSRD) requires companies to disclose the percentage of primary data used to calculate scope 3 emissions.

GHGs from the Supplier's Perspective

- A product carbon footprint (PCF) considers cradle-to-gate emissions associated with material acquisition and pre-processing, production, distribution and storage, product use, and end-of-life.
- A life-cycle GHG analysis (LCA) considers the full life-cycle (cradle-to-grave) GHGs of a product including material acquisition and pre-processing, production, distribution and storage, product use, and end-of-life.
- Steps included within LCAs and PCFs map to emission source categories within each scope of a corporate GHG emission inventory.

Illustration of a product's (Product X) life-cycle GHGs attributed to scopes within a supplier's GHG inventory.

Adapted by ICF from the Product Life-Cycle Accounting and Reporting Standard, Figure 1.



— Opportunities for Mitigation

Opportunities for Mitigation

- Category 1: Purchased Goods and Services
 - Continue to increase visibility into GHG emissions across the value chain
 - Encourage operational improvements (e.g., energy efficiency > electrification > renewable energy)
 - Understand regional regulatory context
 - European Union, Corporate Sustainability Reporting Directive (CSRD)
 - India, Business Responsibility and Sustainability Report (BRSR)
 - United States, SEC Proposed on the Enhancement and Standardization of Climate-Related Disclosures
- Category 4: Upstream Transportation and Distribution
 - Shipping by sea rather than air where operationally viable.
 - Reduce freight weight (e.g., reduced packaging) and encourage low-carbon alternatives
 - Continue to move toward collecting primary data from vessels

— Questions