Corporate GHG Inventory Methodology

Note that this document is descriptive of v6.0.0 of the Planet FWD calculation engine.

A. Description of Company and Inventory Boundaries **Each inventory will specify**

B. General Methodology

B.1 Standards

This greenhouse gas inventory is guided by the following international standards: GHG Protocol Corporate Standard and the GHG Protocol Corporate Value Chain (Scope 3) Standard. The report follows all methodology and reporting requirements of these standards with the exception of separate reporting of emissions from different GHG sources and the reporting of biogenic emissions. This information is available upon request, but it is not reported automatically due to limited relevance for the entity's business purposes and increased reporting burden.

B.2 GHG Emissions Equivalency and Global Warming Potentials

The greenhouse gas (GHG) emissions calculated in this study are reported as kg CO2e and include the seven greenhouse gasses covered by the Kyoto Protocol – carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6) and nitrogen trifluoride (NF3) . Global warming potentials for greenhouse gasses are based on the 100 year global warming potentials from the IPCC Sixth Assessment Report (AR6) (Global Warming Potential Values).

B.3 Primary and Secondary Data

Planet FWD uses a combination of primary and secondary to complete GHG inventories. Primary data is used whenever practicable.

B.4 Financial Activity Data EEIO Methodology

For financial activity data, Planet FWD uses emissions factors from our environmentally extended input-output life-cycle inventory (EEIOLCI) database, which includes both US EPA's US EEIO data set and Exiobase 3.5.9. Our implementation enhances the USEEIO model to include inflation, using inflation rates from US BEA: Price Indexes, Gross Domestic Purchases. The system boundary is cradle-to-gate, as defined by the USEPA. No adjustments are made to Exiobase data, since the underlying data is annualized.

Activity data is provided by the company and inflation-adjusted for the reporting period.

Data Quality: EEIO data is used to provide a complete picture of the company's GHG emissions. It provides very good completeness and reliability. It also offers very good geographical representativeness for US operations and fair geographical representativeness for non-US operations. It offers good temporal representativeness and poor technological representativeness. This approach aligns with the GHG Protocol and all major GHG accounting frameworks, but can make it challenging to track decarbonization efforts within the supply chain. For significant emissions activities, data quality and actionability can be improved by collecting primary activity data.

B.5 Allocation Methodology

Planet FWD uses an attributional approach for carbon accounting, as laid out within ISO 14067 and the GHG Protocol. The attributional approach calculates the carbon impact of the individual components of the product, such as individual ingredients and packaging materials, which are then compiled to develop the final emissions value for the overall product.

Planet FWD carbon assessments allocate resource use and emissions between co-products by using mass-weighted economic value or a biophysical measure (such as mass, energy or nutrition content) as

appropriate. Mass-weighted economic value has proven to be the most reliable method of allocation in many real-world scenarios, particularly for product systems that produce highly dissimilar co-products.

Recycling is modeled using the "recycled content" method which allocates the costs and benefits of recycling to the input side of product systems; the system boundaries are drawn such that the system that produces the recyclable waste is responsible up to the point of delivering the waste to a recycling facility, and then any subsequent transport, processing and use of that material is included within other systems that use the material in some form.

B.6 Avoiding Double Counting

Any areas where double counting could be a problem include but are not limited to instances where data is provided for the same activity in two different instances. This can happen when hybrid methodologies are used and, such as with purchased goods or services. In these cases, all the data must be provided in one data type and swapped for the other data type where applicable.

C. Scopes 1 & 2 Methodology

C.1 Scope 1 emissions

Scope 1 emissions are calculated with purchased quantities of commercial fuels using published emissions factors. Fuel emissions factors are derived from the US EPA GHG Emission Factors Hub and the USLCI database. To estimate the amount of physical volume of fuel based on energy consumption (such as in MJ), we apply higher heating values (HHV) for fuels used for stationary combustion and lower heating values (LHV) for fuels used in mobile combustion.). HHV is typically used for stationary fuels because stationary systems, like power plants, can recover the latent heat from condensing water vapor, making the total energy content relevant. In contrast, LHV is used for mobile fuels, such as those for vehicles and ships, because mobile systems cannot recover this energy due to practical constraints like weight, space, and rapid exhaust expulsion.

C.2 Scope 2 emissions

Scope 2 emissions are calculated using location-based and market-based emissions factors. If supplier-specific data is available to enhance market-based emissions factors, this data is reported in place of default market-based emissions factors.

C.3 Data sources

Primary energy use and GHG emissions per unit of electricity supplied through the grid are calculated using activity data, consisting of fuel and power plant mixes for various grid regions (both US and international), as well as transmission losses and other details from EPA eGRID Database and IEA Data and Statistics.

D. Scope 3 Methodology

D.1 Scope 3 General Methodology

D1.1 Optional Scope 3 boundaries

Reported emissions for scope 3 categories include the minimum boundary as described in the GHG Protocol Corporate Value Chain Standard. This inventory treats optional boundaries as follows:

Example: Each inventory will specify

- Included: 3.11 Optional emissions from indirect use-phase emissions of sold products (i.e. energy use)
- Assumed included: 3.5 Optional emissions from transportation of waste generated in operations, as part of financial activity data for waste management services

- Excluded: 3.7 Optional emissions from employee teleworking
- Excluded: Optional life cycle emissions associated with manufacturing vehicles or infrastructure for Scopes 3.4, 3.6, 3.8, 3.9, 3.13, 3.14
- Excluded: 3.10

If optional boundaries are included, they will be specified in the report.

D1.2 Transport Methodology

Transport is calculated using Google maps API for road transport distances between US (except Hawaii), Canada and Mexico. For all other transport legs, it is assumed there is ocean transport. The distance is found using Planet FWDs transport engine that calculates the most probable ocean path between the two countries' most populous ports. It is assumed there is 1000 km of road transport before each port. If one or both countries are landlocked, the most populous port of the nearest country with a port is used for ocean transport. In these cases, an additional 1000 km of road transport is added for the landlocked country.

Transportation emissions factors are well-to-wheel, including upstream well-to-tank emissions as well as direct combustion emissions from vehicle operations. For air transport, a radiative forcing factor of 2.7 is typically used to account for the higher global warming potential from emissions released at higher altitudes.

D.3 Scope 3 Methodology by category

D.3.1 Purchased Goods & Services

Ingredients and Packaging - Material Acquisition and Pre-processing

- Definition: Embodied emissions of raw materials and inputs to production and packaging, including secondary packaging for distribution where applicable and Inbound transportation of raw materials.
- Data Sources and Methodology:
    - When primary data is available with amounts of materials purchased, the following methodology is used:
        - Planet FWD's Database Methodology for development of the emissions factors used is available separately.
        - Activity data (materials, material mass, origin location, and other characteristics) are provided by product producers (the company)
        - Transportation of materials to the production site are calculated using the methodology outlined in section D1.2 Transport Methodology.
        - Where indicated, soil carbon change as a result of land-use practices are included in the inventory results following GHG Protocol Agriculture Guidance and IPCC Guidelines (2019 Refinement) Tier 1 calculation methodology.
    - If primary data is not available, EEIO methodology is used as described in section B.4
    - When a co-manufacturer is used, it is assumed that the purchased goods and services attributable to the company are considered in the Scope 3 inventory of the purchasing company because this can be a major source of emissions.
- Data Quality:
    - For all materials, such as ingredients and packaging, we use the closest match in our database. Data quality can be improved by collected supplier-specific data for significant materials

Other Purchased Goods & Services

- Definition: Other purchased goods outside of ingredients and materials that are required to run the Company such as but not limited to vehicles and office supplies. Includes any services rendered by the Company during the reporting period, such as but not limited to accounting or legal services.
- Data Sources, Methodology, Quality: EEIO methodology is used as described in section B.4

D.3.2 Capital Goods

- Definition: The production and transportation of capital goods purchased during the reporting period.
- Data Sources, Methodology, Quality: EEIO methodology is used as described in section B.4

D.3.3 Fuel & Energy Related Activities

- Definition: Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting Company in the reporting year, not already accounted for in scope 1 or scope 2.
- Data Sources and Methodology: Primary data provided for Scope 1 and 2 emissions are used to calculate the upstream portion of these activities using US LCI data.

D.3.4 Upstream Transportation & Distribution

- Definition: Transportation and distribution of products purchased by the Company in the reporting year between a company's tier 1 suppliers and its own operations as well as between facilities in the Company's own operation (in vehicles and facilities not owned or controlled by the Company). Any embodied emissions associated with manufacturing the vehicles are also excluded.
- Data Sources, Methodology, Quality:
    - EEIO methodology is used as described in section B.4. In many cases when the spend data for a purchased good or service cannot be dissociated with the upstream transport costs, we assume the cost for upstream transport are included in the cost of that good and therefore in these cases the emissions for upstream transport are reported together with the associated purchased goods and services in 3.1.
    - If primary data is available based on total distance and mode of transportation used to distribute goods is provided, that is used. For cold transport, transport emissions are increased due to an increase in fuel use to power refrigeration units, as well as direct leakage of refrigerants. Leakage rates from refrigerated transport are highly variable and poorly documented, because they are largely under the regulated volume, so there is some uncertainty associated with this estimation, though ranges are within the indicated guidance from GHGP (see Table 2). Unless specific details are provided, the refrigerant used in refrigerated transport is assumed to be R404A, and GWP is calculated accordingly.

D.3.5 Waste Generated in Operations

- Definition: Disposal and treatment of waste generated in the Company's operations in the reporting year. This consists of waste and waste water treatment. Transportation of waste is included when data is provided to support calculation. When primary data is not available, default waste management rates and methods are used from the EPA Sustainable Materials Management Report.
- Data Sources, Methodology, Quality:
    - EEIO methodology is used as described in section B.4 when spend data is provided for waste management.
    - If primary data is available (quantity of waste and disposal method), waste-type specific method is used as defined in the GHGP, and if the company cannot differentiate between waste streams, the average-data method is used.

D.3.6 Business Travel

- Definition: Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company).
- Data Sources, Methodology, Quality:
    - When using primary data, business travel is calculated using total miles traveled across each mode of transportation by all full-time employees. Vehicle types and their emissions factors are derived from US Transportation Energy Data Book: Edition 38.1—2020, US EPA and the US LCI Database.

D.3.7 Employee Commuting

- Definition: Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).
- Data Sources and Methodology:
    - **Employee commuting** is calculated using # of employees commuting, commuting days in a year, assumed commute distances, assumed vehicle types, and emissions factors from US Transportation Energy Data Book: Edition 38.1—2020, US EPA and the US LCI Database..
        - Assumptions: Specific assumptions for the company are documented earlier in this report.
    - **Employee telecommuting** is optional, and only included by request.
- Data quality: Data is currently based on broad assumptions about employee commuting. Data quality could be improved with more detailed employee surveys.

D.3.8 Upstream Leased Assets

- Definition: Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 – reported by lessee.
- Data Sources, Methodology, Quality:
    - Based on type of lease agreement the emissions will be reported as it is presented in Categorizing GHG Emissions Associated with Leased Assets with the minimum boundary being Scope 1 and 2 emissions collected.
    - Primary data is used for scope 1 and 2 emissions, as described in section C. However, if primary data is not available, an estimation of emissions by using unit processes from the CarbonScope LCI database.
    - The Planet FWD database provides a number of unit processes to model commonly used food processing and cooking methods and are composed of the average energy demand of the machinery/equipment required to perform each process. Production methods in the LCAs are modeled using one or more of these unit processes as building blocks in conjunction with the appropriate electric grid for the processing location.
    - Energy sources used in these production methods include electricity from the local grid (assumed to be the US average grid) and other fuels. The emissions factors for these energy sources are based on data from IEA for international energy demand and USEPA data (available at USLCI) for domestic grid emissions footprints. An emissions factor of zero is assumed for the portion of energy that is attributable to renewable energy sources.

D.3.9 Downstream Transportation and Distribution

- Definition: Transportation and distribution of products sold by the Company in the reporting year between the Company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company).
- Data Sources, Methodology, Quality:
    - EEIO methodology is used as described in section B.4.
    - If primary data based on total distance and mode of transportation used to distribute goods is provided, that is used for any transport related activities. For cold transport, transport emissions are increased due to an increase in fuel use to power refrigeration units, as well as direct leakage of refrigerants. Leakage rates from refrigerated transport are highly variable and poorly documented, because they are largely under the regulated volume, so there is some uncertainty associated with this estimation, though ranges are within the indicated guidance from GHGP (see Table 2). Unless specific details are provided, the refrigerant used in refrigerated transport is assumed to be R404A, and GWP is calculated accordingly.

D.3.10 Processing of Sold Products

- Definition: Emissions from processing of sold intermediate products by third parties (e.g.,manufacturers) subsequent to sale by the reporting company. Intermediate products are products that require further processing, transformation, or inclusion in another product before use (see box 5.3), and therefore result in emissions from processing subsequent to sale by the reporting company and before use by the end consumer.
- Data Sources and Methodology

    - The Planet FWD LCI database provides a number of unit processes to model commonly used food processing and cooking methods and are composed of the average energy demand of the machinery/equipment required to perform each process. Production methods in the LCAs are modeled using one or more of these unit processes as building blocks in conjunction with the appropriate electric grid for the processing location.
    - Energy sources used in these production methods include electricity from the local grid (assumed to be the US average grid) and other fuels. The emissions factors for these energy sources are based on data from IEA for international energy demand and USEPA data (available at USLCI) for domestic grid emissions footprints. An emissions factor of zero is assumed for the portion of energy that is attributable to renewable energy sources.
    - Non-product material outflows are described in section B.7. When non-product material outflow (waste) data is not available from the user a default of 5% is used, which is an average value for pre-consumer food loss as found by NRDC .
- Data Quality: If primary data is provided by the customer on any processing energy use, that is used over secondary data from the methods described above. For unit processes, we use the closest match to our database and if an entry is not available in our database, we create that entry based on LCI standards & methodology.

D.3.11 Use of Sold Products

- Definition: Consumer use of goods and services that are required to provide utility of the sold product. This includes energy use of appliances and other equipment needed to provide utility of the goods and excludes emissions from the manufacturing of these appliances and equipment.
- Data Sources and Methodology
    - Energy usage of sold products over their expected lifetime are modeled based on *product use instructions, energy demand of appliances, US household appliance distribution, and energy usage emissions factors, however if direct energy consumption is provided, that is preferred.*
    - Energy usage is calculated for *sold products*, however if unavailable units produced in the reporting year is used as a proxy.
    - *Product use instructions* (e.g. cooking time, water volumes, refrigeration space) are provided by the product producers (the company). Primary data for product use instructions are highly recommended. When primary data is not available, a reasonable approximation can be made on use instructions.
    - *Energy demand of appliances:* Appliances include ovens for baking/roasting, smaller convection ovens or toaster ovens, multiple methods for boiling water, microwaving, refrigeration, and more. The appliance type must match the stated use instructions and if that does not exist, a new appliance is added to our database. Data are collected from various sources, including Energy Star, the US EPA, and peer-reviewed journal articles (e.g. Oberasher et al., 2011; Hager & Morawicki, 2012).
    - *US appliance distribution:* Data from the EIA Residential Energy Consumption Survey to determine on average what proportion of the required appliance runs on what type of fuel: electricity, natural gas, propane, or other).
    - *Energy usage emissions factors:* The emissions factors for these energy sources are based on US EPA data (USLCI) for domestic grid emissions footprints and IEA for international energy usage. An emissions factor of zero is assumed for the portion of energy that is attributable to renewable energy sources.
- Data Quality: Data has good technological, temporal, and geographical representativeness, good completeness and fair reliability. Data quality is limited by lack of knowledge for specific appliance types, energy usage, and grid emissions for the subset of the population that uses the company's products, but is representative of overall US usage.

D.3.12 End-of-life Treatment of Sold Products

- Definition: Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life.
- Data Sources and Methodology:

  - Waste disposal of sold products are modeled based on physical quantities of units sold and the estimated waste disposal rates.
  - Waste disposal is calculated for *sold products*, however if unavailable units produced or purchased in the reporting year are used as a proxy.
  - End-of-life assumptions for primary packaging materials are based on documented consumer behavior in the relevant region.
  - As in Scope 3.5, when primary data is not available, default landfill, recycling, and composting rates of typical materials in the US are based on US EPA Sustainable Materials Management Data. International data are based on the World Bank What a Waste 2.0 study. Specific materials may be pulled from additional studies. Emissions factors for various end-of-life forms are from IPCC and EPA.
  - Food waste assumptions are from USDA ERS and NRDC.
  - Secondary packaging materials discarded during processing, distribution, and retail facilities are assumed to have landfill diversion rates of 80% at retail, in keeping with reporting from Walmart, Costco, Kroger, Target and other major retailers. Recyclable materials (paper and board, metals) are recycled at this rate, and any non-recyclable materials (soiled papers, etc.) are assumed to be sent to landfill.
- Data Quality: Data has good temporal, good geographical, and poor technological representativeness. In aggregate, the data has good completeness and reliability. Data quality is limited by lack of knowledge of behaviors and end-of-life processing for the subset of the population that uses the company's product, but is representative of overall US usage and would be difficult to improve. Data quality could be improved by surveying the company's consumers about their specific end-of-life behaviors.

D.3.13 Downstream Leased Assets

- Definition: Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 – reported by lessor.
- Data Sources and Methodology:
  - Based on the type of lease agreement the emissions will be reported as it is presented in Categorizing GHG Emissions Associated with Leased Assets with the minimum boundary being Scope 1 and 2 emissions collected.
  - Primary data is used for scope 1 and 2 emissions, as described in section C. However, if primary data is not available, an estimation of emissions by using unit processes from the CarbonScope LCI database.
  - The Planet FWD database provides a number of unit processes to model commonly used food processing and cooking methods and are composed of the average energy demand of the machinery/equipment required to perform each process. Production methods in the LCAs are modeled using one or more of these unit processes as building blocks in conjunction with the appropriate electric grid for the processing location.
  - Energy sources used in these production methods include electricity from the local grid (assumed to be the US average grid) and other fuels. The emissions factors for these energy sources are based on data from IEA for international energy demand and USEPA data (available at USLCI) for domestic grid emissions footprints. An emissions factor of zero is assumed for the portion of energy that is attributable to renewable energy sources.

D.3.14 Franchises

- Definition: Operation of franchises in the reporting year, not included in scope 1 and scope 2 – reported by franchisor.
- Data Sources and Methodology:
  - For each franchise, the minimum scope is to assess their Scope 1 & 2 emissions as described in Section C.

D.3.15 Investments

- Definition: Operation of investments (including equity investments, debt investments and project finance) in the reporting year, not included in scope 1 or scope 2.

- Data Sources and Methodology:
    - For each investment, the minimum scope is to assess their Scope 1 & 2 emissions as described in Section C and should include the Scope 3 emissions of the investment when it's sizable in proportion to the Scope 1 & 2 emissions. Scope 3 emissions should be measured as described in Section D.
    - For equity investments, the emissions should be reported in this section if the company does not have control over the investment per the consolidation approach described in A2.
    - For debt investments & project finance, the emissions should always be reported in this section.

E. Emissions Reduction/Scenario Planning Methodology

E.1 Emissions Reduction Opportunity Methodology

Emissions Reductions (ERs) are identified on a *model* basis and then scaled up for every instance of use of that model within an overall Corporate Inventory. Because of this, emissions reductions can only be surfaced when using physical activity data, not spend-based accounting. There are several categories of emissions reductions opportunities that are identified for models in the PlanetFWD database - Swaps, Material Interventions, Packaging Interventions, or Transport Interventions. Swaps include replacing the purchase of one item with another that is identified as a reasonable exchange. Material Interventions include any intervention to the production (including component materials, production methods, energy use, waste management, etc.) or the purchased good. Packaging interventions relate to interventions in the primary packaging of those products, eg. using PCR content, lightweighting packaging, adjusting format to bulk, and more. Transport interventions are related to the upstream transportation of those products to the purchaser.

ERs are computed and assigned to the underlying models that are used throughout an inventory. These are stored in a consistently updated database of decarbonization opportunities that are then cross referenced for any instance of use in inventories that include emissions reduction analysis.

E.2 Scenario Planning Tool Methodology

The Scenario Planning tool builds on the Emissions Reduction Opportunities tool by allowing users to plan for the implementation of identified ER opps at various degrees of completion and over longer time scales. When ER opps are identified and selected as part of the Scenario Planning Tool, interdependence and mutual exclusion cannot always be accounted for. For example, if a Material Intervention that results in less overall materials being used and a lighterweight final product is selected **and** a Packaging Intervention which looks at purchasing in bulk formats to reduce the amount of primary packaging is selected, there is a chance that these two interventions may not be compatible, and the total emissions reductions achieved may be less than what the model identified. There is also a chance, though, that there are some synergies and that these two interventions **can** both be accomplished, and in fact that in doing so, additional system benefits are seen in other areas, and the calculated emissions in future years are actually more than what was identified. Because of the degree of complexity of various supply chains and the fact that the scenario planning tool is designed to help people identify the most meaningful opportunities to pursue in order to meet their goals, this is considered to be a reasonable approach.

F. Citations

Sources for modeling processes that contribute more than 5% of the total emissions are available upon request.

Questions? Contact us at:
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