2024 Project Gigaton Accounting Methodology

This methodology may be used to help estimate cumulative emissions avoided, sequestered, or reduced, as well as land and ocean spatial area associated with supplier sustainability efforts for the purposes of reporting to Walmart's Project Gigaton initiative in 2024. Walmart may revise its methodology in subsequent years to reflect new science and other identified improvement opportunities.

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Use of this Methodology is at Your Own Risk

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Contents

1 Introduction

Walmart has set a goal to work with its suppliers and customers to avoid 1 billion metric tons – a gigaton - of scope 3 greenhouse gas emissions in the global value chain and, along with the Walmart Foundation, to protect, restore, or more sustainably manage 50 million acres of land and 1 million square miles of ocean by 2030. Through Project Gigaton, participating suppliers set their own emissions reduction and nature protection/restoration/sustainable management goals and report progress annually.

Walmart's largest potential impact on greenhouse emissions is to engage suppliers and other value chain stakeholders to lower their greenhouse gas impact. Similarly, Walmart's largest potential impact to combat the rapid loss of nature is through engaging its suppliers and other value chain stakeholders to protect, more sustainably manage or restore natural landscapes within their own or their suppliers' value chains. These land- and ocean-based value chain interventions can also help reduce greenhouse gas emissions.

The Gigaton goal is the scope 3 component of **Walmart's science-based target (SBT) as approved in 2016, which also includes reducing our absolute scope 1 and scope 2 emissions by 35% by 2025 and 65% by 2030 from a 2015 base year.** This SBT is in alignment with the 2015 Paris Climate Agreement and global effort to limit planetary temperature rise to <2 °C; it has been approved as a SBT by the Science-Based Targets Initiative, a coalition of leading climate NGOs (Carbon Disclosure Project (CDP), World Resources Institute (WRI), World Wildlife Fund (WWF), United Nations Global Compact (UNGC)).

2 Methodology context

This methodology may be used to calculate: 1) cumulative emissions avoided, sequestered or reduced and reported by Walmart suppliers throughout the global value chain for the purposes tracking progress toward the Gigaton goal and 2) spatial area of land and ocean that has been protected, restored, or more sustainably managed by suppliers for purposes of tracking toward to the nature goal. This document establishes the relevant reporting year's definitions for the metric and each of its "pillars" or components, as well as the calculation methodology, including boundaries, timing, and data sources.

3 Metric definition

This methodology focuses on Project Gigaton's key metrics, CO_2e emissions reduced, sequestered, or avoided and spatial area of land and ocean that are protected, restored, or more sustainably managed.

Project Gigaton suppliers set their own goals and report annually at a project level. Their submissions are organized into six primary program pillars, which encompass many major types of emission reduction and nature restoration/protection activities. A seventh pillar, Enterprise Level, acts as a catchall for goals and emissions that don't fall into the six primary pillars.

- Energy
- Waste
- Packaging
- Nature
- Transport
- Product Use and Design
- Enterprise Level

Walmart has determined specific calculation methodologies for each pillar, which this document describes in detail in the *Reporting to Project Gigaton* section.

Walmart calculates progress toward the Gigaton goal by summing the project-level greenhouse gas emission reductions submitted by suppliers towards all pillars each year. Walmart then sums annual totals to arrive at a cumulative total toward the one billion metric ton goal. To calculate supplier contribution to the nature goal, Walmart sums the spatial area of land and ocean reported by suppliers in the nature pillar. This metric is not cumulative over time, so in order to meet the goal of 50 million acres and 1 million square miles, Walmart must achieve those goals in the year 2030.

Project-level avoided, sequestered, and absolute emissions reductions self-reported by suppliers to Project Gigaton will be counted toward Project Gigaton equally.

- Absolute emissions reductions occur when the impact of an emissions reduction activity results in a reduction of overall greenhouse gases regardless of economic growth. From an organization's perspective, an absolute reduction occurs when the total emissions within the defined accounting boundary are proven to be lower year-over-year.
- Avoided emissions are emissions that did not occur when compared to a business as usual or baseline scenario because a specific action was taken, or an intervention occurred. From an organization's perspective, an avoided emission occurs when the total emissions within the defined accounting boundary are not proven to be lower year-over-year; organizations can still have emissions reductions at a project-level in this scenario provided sufficient evidence has been collected.
- Sequestered emissions reductions occur when emissions are removed from the atmosphere and stored elsewhere, e.g., through GHG storage in soil or forests. For an organization's perspective, a sequestered emission reduction occurs when an asset within the defined accounting boundary removes atmospheric greenhouse gases.

Walmart's approach for calculating progress toward its Gigaton goal does not follow the guidelines set forth in the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Standard. The primary points of departure from the Standard are Walmart's use of *avoided* emissions and reductions beyond Walmart's value chain to calculate progress toward the Gigaton goal.

Walmart recognizes the important difference between avoided, sequestered, and absolute emissions reductions. We're committed to inspiring broad action across many industries and issues, which we hope will inspire changes that contribute to both avoided, sequestered, and absolute emissions reductions.

3.1 Units and conversions

The 1 Gigaton target is equivalent to 1,000,000,000 metric tons (MT) of CO_2 equivalents (CO_2e), also known as greenhouse gases (GHGs). When using conversion factors to translate a supplier's activity level metrics into GHG impact, Walmart uses reputable sources for conversion factors and maintains documentation of the conversion factors and their sources in this document. Where this methodology uses "emissions factors" generally refers to avoided or absolute reductions in emissions as a result of the activities being reported.

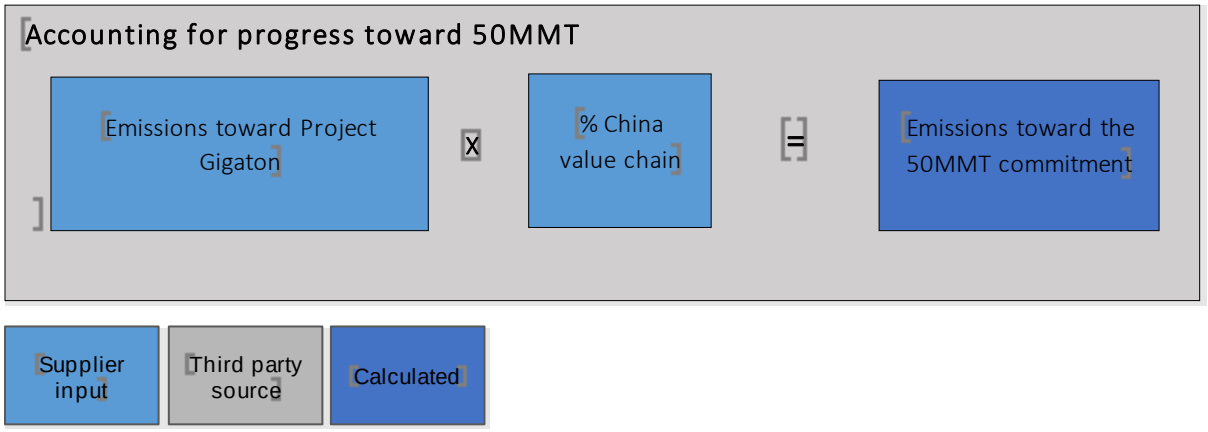
As part of Walmart's regenerative land and ocean commitment, this document includes conversion factors and corresponding sources/documentation to translate suppliers' activity level metrics into spatial area of land (acres) and ocean (square miles) protected, restored, or sustainably managed. Where this methodology uses "spatial factors" generally refers to the area of protected, restored, or sustainably managed land or ocean as a result of the activities being reported.

3.2 50MMT China value chain commitment

In March 2018 at the Tsinghua Forum in Beijing, Walmart announced sustainability commitments for China. Specifically,

- **Through Project Gigaton, Walmart commits to working with suppliers to reduce at least 50 million metric tons (MMT) of C02e by 2030 in the value chain in China.**

China's 50MMT value chain commitment is included in, not additional to, Walmart's one gigaton commitment. To measure progress against this goal, Walmart will ask suppliers to estimate the percentage of reported emissions that are related to the Chinese value chain ("% China value chain") during the annual reporting process, which is defined as all production and consumption within China; "consumption within China" is further defined as any product sold to Chinese consumers regardless of the country of production or source of the raw materials (i.e. if consumers in China purchase products produced abroad which have an associated emissions reduction story, this counts). The only variation to this guidance relates to *Question PU.1*. and *Question PU.2*. These methodologies calculate emissions avoided during the *use* phase of the product lifecycle and thus only improved products sold inside China count toward this target, regardless of the country where the product was produced (i.e., an efficient lightbulb produced in China, but sold in the United States would not count; an efficient lightbulb produced in China or elsewhere and sold in China would count).



4 Reporting elements

4.1 Scope and boundaries

The Project Gigaton metric covers emissions that occur in Walmart's scope 3 value chain and beyond and does not include Walmart's scope 1 and 2 emissions associated with operations under Walmart's control. Walmart's Tier 1 (direct) suppliers participating in Project Gigaton are encouraged to report reductions associated with their own Scope 1, 2, and/or 3 emissions to Project Gigaton:

- **Scope 1, "Direct Emissions,"** represent emissions from the combustion of fuels and other sources that occur directly on site (e.g., refrigerants, livestock) and mobile emissions sources
- **Scope 2, "Indirect Emissions,"** represent emissions that occur off-site to produce electricity or steam purchased for use at corporate locations
- **Scope 3, "Indirect Emissions,"** include upstream activities such as production of goods and services purchased by the company, as well as downstream activities such as consumer use and disposal of products sold by the company

Suppliers may choose what portion (up to 100%) of their emissions reductions and land/ocean restoration/protection initiatives to report toward Project Gigaton (e.g., global emissions, sales-based, allocated, etc.). **Direct suppliers of Walmart can report all reductions and spatial area restored/protected that occur across the supplier's organization, regardless of the percentage of the supplier's operations or products that are directly sold or attributable to Walmart.** Although only direct suppliers to Walmart are able to participate in Project Gigaton, overlapping supply chains and business-to-business relationships between suppliers mean that there is potential for double counting. Rules established in this methodology have been designed to address some double counting areas of concern both through reporting design (e.g., prevent a supplier from double reporting the same activity within or between pillars) and calculation-level discount factors and conservative estimations (e.g., 20-year timeframe for deforestation avoided emissions).

4.2 Geography

Walmart suppliers from anywhere in the world can participate in Project Gigaton and report emissions reductions from projects implemented anywhere in the world. Walmart began Project Gigaton by focusing primarily on **engaging suppliers to Walmart U.S. and has formally expanded this focus to include suppliers to China (including export suppliers), Mexico, Central America, Walmart Sourcing, Chile, and Canada**.

4.3 Timing

Once each year during the Project Gigaton reporting cycle, Walmart will calculate the additional progress toward the Project Gigaton goal and will ask suppliers to log into their Project Gigaton Account and report the emissions reduced, avoided, or sequestered and spatial area of land and ocean protected, restored, or sustainably managed. The first annual reporting cycle for Project Gigaton was held in fall 2017 and continues annually every fall (typically, September through November).

- During a given reporting cycle, suppliers may report up to two years of data, split into separate 12-month submissions. Over the course of Project Gigaton, no supplier should submit more than 15 years' worth of data.
    - Suppliers reporting during the 2017 reporting cycle, the first year of data collection, were only permitted to submit 12 months of data.
    - The earliest reporting period acceptable for inclusion is from July 1, 2015, through June 30, 2016. The latest reporting period acceptable for inclusion is July 1, 2030, through June 30, 2031.
    - For suppliers reporting to the 2023 reporting cycle, the earliest possible reporting period will shift to July 1, 2020, through June 30, 2021; each 'earliest possible' reporting period will shift accordingly for each future reporting cycle thereafter. This is intended to encourage continuous progress and delivery of more current results to Project Gigaton.
- Whenever a supplier reports to Project Gigaton, it is best practice to use as a reporting period the latest or most recent 12-month period for which it has data available. This may be based on the calendar year, the company's fiscal year, or another convenient 12-month period.
    - Suppliers will specify the starting and ending dates of the reporting period they choose to use. The reporting system accepts date ranges between 360 and 370 days to account for differences in accounting years by company.
    - Each subsequent year's data should use the same reporting period as the initial reporting year to avoid gaps or overlap with the prior year's submissions. The reporting system will not allow for data submissions that overlap by more than 60 days with a previous submission.

- For suppliers new to Walmart, emissions reductions or spatial area restored/protected that took place prior to becoming a Walmart supplier cannot be reported.
- Amendments to previously reported data will be handled on a case-by-case basis. To submit a request to amend data, suppliers should reach out to corpsu@wal-mart.com.

4.3.1 Temporal allocation of data

The Project Gigaton reporting cycle corresponds to the year in which suppliers report the data to Walmart, not necessarily the time that the avoided emissions or land/ocean restoration/protection occurred. The *Timing* section explains the allowable supplier report dates per reporting cycle. While most data calculated as part of Project Gigaton reflects the emissions reduced or avoided and spatial area restored or protected during the dates in which the supplier reports the initiative, there is some variation in the temporal allocation of emissions across the pillars. Thus, the figure reported in any given Project Gigaton reporting cycle, or individual supplier report, at least partially contains future emissions reductions and spatial area restoration/protection resulting from current investment and initiatives. For example:

1. Energy Pillar counts emissions saved over the lifetime of some activities in the year in which the supplier reported the activity to Project Gigaton (e.g., capital investments that will continue to save energy over the life of the upgrade). Hence, suppliers can only report a capital energy investment in the reporting period that it was implemented.
2. Nature Pillar deforestation conversion factors include a 20-year legacy emissions denominator; restoration emissions are counted in the year of investment from the participating supplier.
3. Product Pillar counts estimated emissions saved over the lifetime of a product the year in which the supplier sold the unit.

Additional guidance is included in the calculation approach for each pillar.

4.4 Data review

Data submitted to Walmart during the Project Gigaton reporting cycle undergoes a review process designed to help identify outliers and check for inconsistencies in the submission that could lead to an inaccurate calculation. Walmart will remove data identified as inaccurate or incomplete through this process. Walmart may decide whether to contact suppliers to clarify the submission on a case-by-case basis. However, final responsibility lies with our suppliers to report accurate data and flag cases where amendments to previously reported data is needed.

4.5 Review of methodologies

Walmart has established a review process to support continual improvement of the methodologies to account for avoided emissions from Project Gigaton and spatial area for the nature goal. Led by a steering committee comprised of representatives from CDP, Environmental Defense Fund, and World Wildlife Fund. These changes could include creating new calculations or expanding existing calculation methodologies as well as updating emissions factors and other conversions. Any changes made are reflected in this Accounting Methodology.

5 Reporting to Project Gigaton

Walmart prefers that suppliers report all their emissions reductions activities through disclosure to CDP and share these results publicly and with Walmart through CDP Supply Chain. However, Walmart has provided multiple pathways for reporting emissions reductions to Project Gigaton. Suppliers can report emissions reductions to Project Gigaton through either or both the CDP Climate Change Questionnaire

(CDP) and/or Project Gigaton Account (PGA). It is up to the supplier not to repeat activities entered into CDP and the PGA. Suppliers must report spatial area restored/protected using PGA.

5.1 Reporting using a CDP Questionnaire

5.1.1 CDP Climate Change Questionnaire

5.1.1.1.1 CDP Climate Change Questionnaire. Background and definitions

Each year CDP sends out the CDP Climate Change Questionnaire on behalf of Walmart to select suppliers through the CDP Supply Chain program. Suppliers who complete the annual CDP Climate Change Questionnaire in response to Walmart's Supply Chain request by the scoring deadline, can use their CDP data in Project Gigaton. CDP data is pre-loaded into a supplier's Project Gigaton Account and available to view during the Project Gigaton reporting cycle.

CDP's Climate Change questionnaire covers a range of topics including governance, target-setting, communications, climate risks and opportunities and GHG accounting. Specific to Project Gigaton, Walmart utilizes supplier responses to the following question:

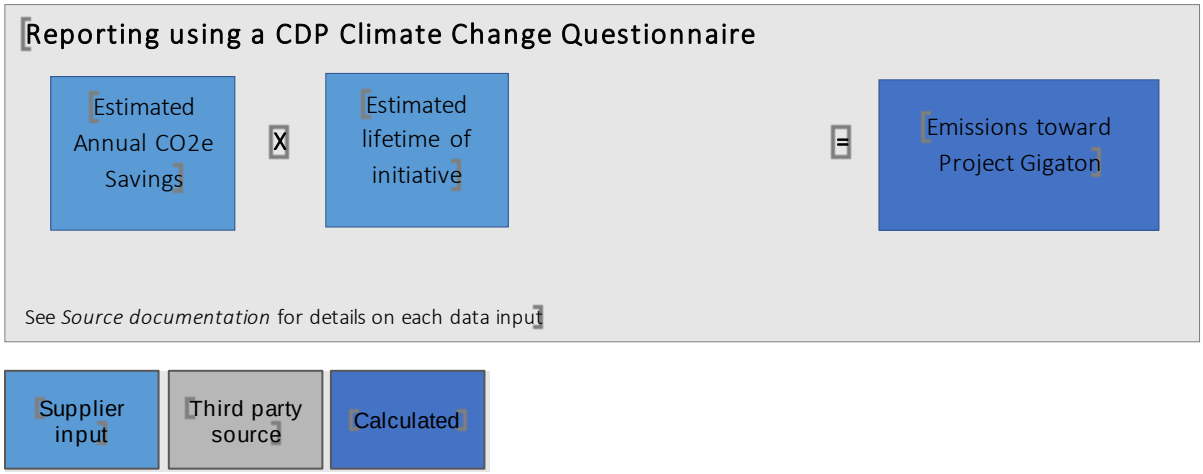
CC4.3b – Emissions Reduction Activities implemented in the reporting year (including activity type and description of activity, estimated annual CO_2e savings, scope, estimated lifetime of the project, and comment).

Each emissions reduction activity is mapped by CDP and added to the appropriate Project Gigaton pillar based on the activity type and description provided in the CDP response (See *CDP questionnaire table: CDP reporting and Project Gigaton pillar mapping*).

Projects with an 'estimated lifetime' greater than one year (as reported by the supplier) will be multiplied by the lifetime reported and counted in the year in which the supplier reported the activity to Project Gigaton according to the Temporal treatment specified below. The lower threshold of each date range is used when multiplying the annual CO_2e savings. Activities marked as <1 year, 1-2 years or "ongoing" are only counted for one year. The maximum "estimated lifetime" multiplier is the number of reporting years left in Project Gigaton (2017-2031). For example, if a supplier reports an activity with a lifetime of 21-30 years to Project Gigaton in 2018, the maximum multiplier is 14 years (not 20 years). Walmart may review and remove a temporal allocation greater than one year. Suppliers should only report a project once and not over multiple years to avoid double counting.

The supplier can elect not to use all the emissions reduction activities reported through CDP to Project Gigaton and instead indicate which CDP activities it would like counted toward Project Gigaton. This option is available in a supplier's Project Gigaton account during the annual Project Gigaton reporting cycle.

5.1.1.2 CDP Climate Change Questionnaire. Calculation



5.1.1.2.1 CDP Climate Change Questionnaire. Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	Suppliers may also report emissions via their PGA, but should not repeat activities.
Estimated Annual CO_2e Savings*	Supplier's CDP Climate Change Questionnaire question CC4.3b	Metric tons CO_2e	CC4.3b is equivalent to CC3.3b in the 2017 and prior years' CDP Climate Change Questionnaire
Description of activity*	Supplier's CDP Climate Change Questionnaire question CC4.3b	Selected from dropdown	See *CDP questionnaire table: CDP reporting and Project Gigaton pillar mapping* in *CDP Climate Change Questionnaire* section for list of all activity types and description of activity dropdown options, and mapping to relevant Project Gigaton pillar
Activity type*	Supplier's CDP Climate Change Questionnaire question CC4.3b		
Estimated lifetime of the initiative*	Supplier's CDP Climate Change Questionnaire question CC4.3b	Selected from dropdown	See *CDP questionnaire table: CDP reporting and Project Gigaton pillar mapping* in *CDP Climate Change Questionnaire* section for rules surrounding application of lifetime multiplier. Possible dropdown selections: • <1 year • 1-2 years • 3-5 years • 6-10 years • 11-15 years • 16-20 years

Model inputs **required field*	Source	Units	Notes
			• 21-30 years • >30 years • Ongoing The lower threshold of each date range is used when multiplying the annual CO_2e savings. Activities marked as <1 year, 1-2 years or "ongoing" are only counted for one year. The maximum "estimated lifetime" multiplier is the number of reporting years left in Project Gigaton (2017-2031). For example, if a supplier reports an activity with a lifetime of 21-30 years to Project Gigaton in 2020, the maximum multiplier is 12 years (not 20 years). Suppliers should only report a project once and not over multiple years to avoid double counting.
Comment	Supplier's CDP Climate Change Questionnaire question CC4.3b	Free text	1500 characters maximum
Scope*	Supplier's CDP Climate Change Questionnaire question CC4.3b	Selected from dropdown	Possible dropdown selections: • Scope 1 • Scope 2 (location-based) • Scope 2 (market-based) • Scope 3
% contribution	Supplier input	%	This value is assumed to be 100% unless modified by the supplier during the Project Gigaton reporting cycle. The supplier can elect not to use all of the emissions reduction activities reported through CDP to Project Gigaton and instead indicate which CDP activities, and proportion of emissions, it would like counted toward Project Gigaton. If a supplier has provided permission for Walmart to use their data to report to Project Gigaton and does not log-into their Project Gigaton Account during the Project Gigaton reporting cycle to modify the contribution, data from the most recently available CDP

Model inputs *required field	Source	Units	Notes
			reporting year will be included at 100% toward that year's Project Gigaton reporting cycle.

5.2 Reporting through the Project Gigaton Account (PGA)

All suppliers can report in Project Gigaton using their Project Gigaton Account (suppliers may also review and submit the data submitted through CDP in their PGA). The PGA allows the supplier to report to any or all of the pillars of Project Gigaton during the annual Project Gigaton reporting cycle.

If a supplier chooses to report completed emission reduction activities directly to Walmart through the PGA, there are two options for doing so:

- Report aggregate greenhouse gas emissions reductions in CO_2e and activity description; this option is detailed in *Reporting aggregate emissions* section.

  OR
- Report using the Project Gigaton Calculators; report the relevant activity metrics requested by the pathways within each of the six program pillars (e.g., tons of certified paper, kWh of energy saved, etc.) and allow Walmart to estimate the associated emissions reductions according to the methodologies detailed in the *Pillars within Project Gigaton* section.

Suppliers reporting projects that restore/protect land/ocean area must report these activities using the Project Gigaton Calculators, as there is not currently on option to report aggregate spatial area restored/protected.

Note that the scope of Project Gigaton extends beyond Walmart's value chain, so suppliers may include projects they are pursuing across their organization, regardless of the percentage of the supplier's operations or products that are directly sold or attributable to Walmart.

5.2.1 Reporting aggregate emissions

5.2.1.1.1 Project Gigaton Account (PGA). Background and definitions

This reporting option is for suppliers who have already calculated the metric tons of CO_2e emission savings associated with their efforts, or their efforts don't fit neatly within the Project Gigaton Calculators outlined in the *Pillars within Project Gigaton* section. The last question within each pillar and the only question within in the Enterprise Level pillar allows respondents to report on aggregate emissions already calculated, or not covered in elsewhere. Currently, the aggregate emissions questions within each pillar only apply to emissions reductions and not spatial area restored/protected. Suppliers must report projects that restore/protect land/ocean area using other questions within the Project Gigaton Calculators.

A 20% discount will be applied to any data reported through this pathway. Here's why: Walmart strongly prefers that suppliers publicly report their emissions reductions annually through the CDP Climate Change Questionnaire using credible, third-party assessed methodologies; CDP data can then be used to report to Project Gigaton. This discount factor is intended to address the uncertainty and lack of transparency into the methodology used to calculate your results.

5.2.1.1.2 Project Gigaton Account (PGA). Calculator

1 **Do you have other activities you'd like to report and know how many metric tons CO2e you saved?**

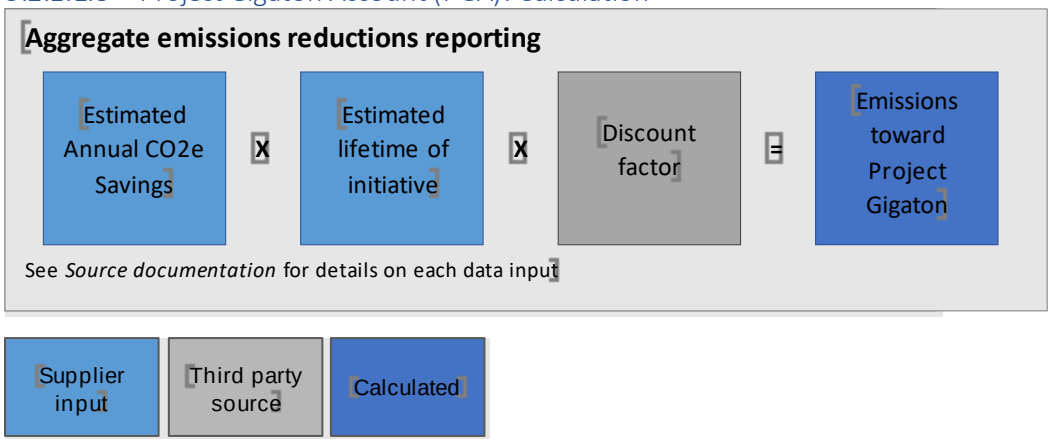
In the reporting year, we have saved ..... metric tons of CO2e emissions through ..... activities. A description of the changes we made to reduce emissions is as follows: ..... .

We implemented this change for ..... % of our ..... and the estimated lifetime of the initiative is ..... .

A description of the calculation approach or protocol used to calculate the metric tons of CO2e reported is as follows: .....

.These numbers ..... third-party validated. The name of the third-party validator used is: .....

5.2.1.1.3 Project Gigaton Account (PGA). Calculation



5.2.1.1.4 Project Gigaton Account (PGA). Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	Suppliers may also report emissions via other pathways but should not repeat activities.
Estimated Annual CO_2e Savings*	Supplier input	Metric tons CO_2e	Aggregated amount of estimated savings from other activities not included in other pillars
Activity type*	Supplier input	Selected from dropdown	• Agriculture methane capture – Fugitive emissions reductions • Agriculture N_2O reductions – Fugitive emissions reductions • Landfill methane capture – Fugitive emissions reductions • Oil/natural gas methane leak capture/prevention – Fugitive emissions reductions

Model inputs **required field*	Source	Units	Notes
			• Refrigerant leakage reduction – Fugitive emissions reductions • Other, please specify – Fugitive emissions reductions • Other, please specify
Description of activity	Supplier input	Free text	Supplier description of the emissions reduction activity they are reporting on. Does not impact the calculation.
Implementation percentage*	Supplier input	0-100%	Percentage of Scope that the emissions reduction activity covers. Does not impact the calculation.
Estimated lifetime of the initiative*	Supplier input	Selected from dropdown	Possible dropdown selections: • <1 year • 1-2 years • 3-5 years • 6-10 years • 11-15 years • 16-20 years • 21-30 years • >30 years The lower threshold of each date range is used when multiplying the annual CO_2e savings. Activities marked as <1 year, 1-2 years or "ongoing" are only counted for one year. The maximum "estimated lifetime" multiplier is the number of reporting years left in Project Gigaton (2017-2031). For example, if a supplier reports an activity with a lifetime of 21-30 years to Project Gigaton in 2018, the maximum multiplier is 14 years (not 20 years). Suppliers should only report a project once and not over multiple years to avoid double counting.
Description of calculation approach	Supplier input	Free text	Supplier description of the calculation methodology used to produce the annual CO_2e savings reported. Does not impact the calculation.

Model inputs **required field*	Source	Units	Notes
Third-party validation*	Supplier input	Selected from dropdown	Selection of whether the reported supplier data has been third-party validated. Possible dropdown selections: • "are" (yes to third-party validation) • "are not" (no to third-party validation)
Third-party validator	Supplier input	Free text	Supplier provides name of third-party validator used. Data collected *only* if selection for Third-party validation is "are" (i.e. yes).
Scope*	Supplier input	Selected from dropdown	Possible dropdown selections: • Non-owned supply chain • Owned operations, • Product use phase (i.e. customer use or end of life) Does not impact the calculation.
Discount factor	Third-party source	Numerical value	0.8 A 20% discount (i.e., 0.8 multiplier) is applied to all data submitted through this pathway. See explanation under the *Data component definition* heading of this section.

6 Pillars within Project Gigaton

This section provides an overview for how each of the Project Gigaton questions calculates avoided, sequestered, and absolute emissions reductions, by pillar.

6.1 Energy

6.1.1 Energy pillar background

Energy related emissions can be addressed through two main types of activities: by reducing energy demand through optimization and efficiency and by transitioning to low-carbon energy sources (e.g., wind, solar). Project Gigaton allows suppliers to report activity-specific reductions achieved through both approaches and can result in reductions in a supplier's Scope 1, 2 and/or 3 emissions.

The Energy Pillar generally includes activities relating to energy efficiency, low-carbon energy (further defined below) and some non-energy fugitive emissions such as those from refrigerants. Note: Product design activities that result in emissions reductions during product use are included in the Product Use and Design pillar, waste recovery activities in the Waste pillar, and anaerobic digestion for manure management in the Nature pillar. Suppliers cannot report the same emissions reductions in more than one pillar, and thus, in some cases suppliers must use their judgment to report an initiative in the most appropriate pillar (e.g., supplier could choose to report poultry barn efficiency in either the Energy or Nature pillar).

6.1.2 Energy pillar questions

6.1.2.1 *Question E.1: Have you purchased or invested in low-carbon or renewable energy?*

6.1.2.1.1 Question E.1 Background and definitions

According to CDP guidance, "low-carbon energy" is considered to be any type of energy that will have no direct emissions and of which the indirect emissions are considered as negligible, considering the life cycle of the given technology. Project Gigaton allows reporting of low-carbon power technologies such as biomass, biogas, fuel cells, geothermal, hydro, solar hot water, solar PV, solar CPV, nuclear, and wind. Natural gas, combined cycle gas turbine and combined heat and power cogeneration are not considered low-carbon energy for the purposes of Project Gigaton, despite being less carbon intensive than other means of electricity production, like coal.

If a supplier invests in a new low-carbon energy system (e.g., solar PV panels) with their own capital, and connects it directly to their operations, then they would report the estimated annual emission reduction and operational lifetime of this system. If the company enters into a multi-year contract to receive power and the associated renewable energy or carbon credits (or similar applicable market instrument) generated from a low-carbon energy system either onsite or offsite from its facility it should report the avoided emissions from this project in the reporting year along with the remaining length of term left in the contract. For these market-based transactions the supplier will need to report the annual avoided emissions each year from these projects even if it is from a multi-year contract. In cases where the supplier purchases renewable energy annually without a multi-year agreement, for example in the case of unbundled renewable energy credits (RECs) (or Energy Attribute Credits (EACs) for international markets), the supplier should report the associated avoided emissions every year that RECs/EACs are purchased. When reporting renewable energy, suppliers should ensure that they have retained the appropriate rights to that renewable energy (e.g., RECs/EACs are retained or retired on behalf of the reporting company) and they have not been resold (to avoid double counting of the same renewable energy source).

In the first year a supplier responds to Project Gigaton, they can report preexisting installations and contracts for purchases, but the reported lifetime of the initiative should be prorated to reflect the

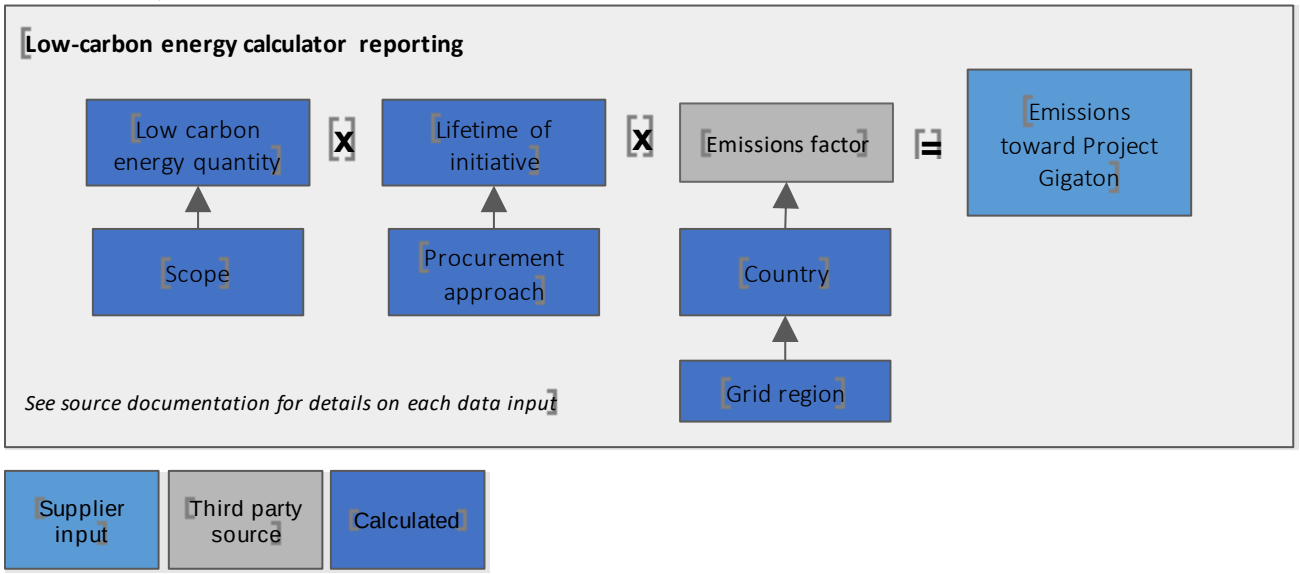
number of years remaining at the time of reporting, not the number of years from when the installation was established. As stated above, the purchased energy, even if under a multi-year contract must be re-reported each year based on the amount received during the reporting period.

6.1.2.1.2 Question E.1 Calculator

1 **Have you purchased or invested in low-carbon or renewable energy?**

In the reporting year we completed the ..... one or more ..... projects in our ..... . The actual generation of power from these projects is located in ..... , grid region (Optional) ..... , and is expected to provide ..... kilowatt-hours of electricity annually for .....

6.1.2.1.3 Question E.1 Calculation



6.1.2.1.4 Question E.1 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of energy quantity, lifetime, procurement method, location, etc. Projects of the same activity type and location should be grouped together; similar projects occurring in different regions should be entered as separate initiatives.
Low-carbon energy quantity*	Supplier input	Kilowatt hours (kWh)	*Annual* consumption and/or purchase of low carbon energy.
Low-carbon energy source type*	Supplier input	Select from dropdown	Possible dropdown selections: • Biomass • Biogas

Model inputs **required field*	Source	Units	Notes
			• Fuel cells • Geothermal • Hydro • Solar hot water • Solar PV • Solar CPV • Nuclear • Wind Selection does not impact calculation.
Scope*	Supplier input	Select from dropdown	Possible dropdown selections: • Own operations (Scope 1 and Scope 2) • Supply chain or grid (Scope 3)
Lifetime of initiative*	Supplier input	Select from dropdown	Possible dropdown selections: • <1 year • 1-2 years • 3-5 years • 6-10 years • 11-15 years • 16-20 years • 21-30 years • >30 years • Ongoing The lower threshold of each date range is used when multiplying the annual CO_2e savings. Activities marked as <1 year, 1-2 years or "ongoing" are only counted for one year. If Procurement Approach is "Installation", the emissions are multiplied out by lifetime. "Purchase" should be reported annually and should not be multiplied (lifetime value defaults to 1). The maximum "estimated lifetime" multiplier is the number of reporting years left in Project Gigaton (2017-2031). For example, if a supplier reports an activity with a lifetime of 21-30 years to Project Gigaton in 2018, the maximum multiplier is 14 years (not 20 years).

Model inputs **required field*	Source	Units	Notes
			Suppliers should only report a project once and not over multiple years to avoid double counting.
Procurement approach*	Supplier input	Select from dropdown	Possible dropdown selections: • installation of • procurement from
Country*	Supplier input	Select from dropdown	See *Energy pillar table. Electricity emissions factors by country* in *Question E.1 Emission factors section* for list of all dropdown options. Grid region is only collected if the United States or China is selected as a Country. See *Energy pillar table. Electricity emissions factors by US grid region (total output)* and *Energy pillar table. Electricity emissions factors by China grid region* in *Question E.1 Emission factors section* for list of all dropdown options.
Grid region	Supplier input	Select from dropdown	
Emissions factor	IEA and EPA	Metric tons CO_2e per kWh of electricity	If only country is provided, IEA emissions factors are used. If U.S. grid region is provided, eGRID emissions factors are used. If China province is provided, World Resources Institute GHG Protocol emission factors are used. See *Question E.1 Emission factors* for list of all emissions factors.

6.1.2.1.5 Question E.1 Emission factors

Energy pillar table. Electricity emissions factors by country

Country	Metric tons CO_2e/kWh
Algeria	0.0005345
Angola	0.0003865
Argentina	0.0003842
Armenia	0.0001635
Australia	0.0007548
Austria	0.0001638

Country	Metric tons CO_2e/kWh
Azerbaijan	0.0004873
Bahrain	0.0007175
Bangladesh	0.0005672
Belarus	0.0003870
Belgium	0.0002258
Benin	0.0006752
Plurinational State of Bolivia	0.0003953
Bosnia and Herzegovina	0.0009009
Botswana	0.0012856
Brazil	0.0001566
Brunei Darussalam	0.0005664
Bulgaria	0.0004978
Cambodia	0.0005689
Cameroon	0.0001712
Canada	0.0001512
Chile	0.0004383
People's Republic of China	0.0006567
Colombia	0.0002003
Republic of the Congo	0.0002739
Democratic Republic of the Congo	0.0000013
Costa Rica	0.0000066
Cote d'Ivoire	0.0004352
Croatia	0.0002327
Cuba	0.0007705
Curacao/Netherlands Antilles	0.0006891
Cyprus	0.0006491
Czech Republic	0.0005212
Denmark	0.0001742
Dominican Republic	0.0005993
Ecuador	0.0003351
Egypt	0.0004724
El Salvador	0.0002654
Eritrea	0.0008594
Estonia	0.0010255
Ethiopia	0.0000003
Finland	0.0001068
France	0.0000463
Former Yugoslav Republic of Macedonia	0.0006920
Gabon	0.0004115
Georgia	0.0001177

Country	Metric tons CO_2e/kWh
Germany	0.0004501
Ghana	0.0002851
Gibraltar	0.0007625
Greece	0.0005843
Guatemala	0.0004256
Haiti	0.0009105
Honduras	0.0003859
Hong Kong (China)	0.0007344
Hungary	0.0002740
Iceland	0.0000002
India	0.0007713
Indonesia	0.0007326
Islamic Republic of Iran	0.0005510
Iraq	0.0011407
Ireland	0.0004176
Israel	0.0006072
Italy	0.0003424
Jamaica	0.0006441
Japan	0.0005401
Jordan	0.0005882
Kazakhstan	0.0004157
Kenya	0.0001135
Korea	0.0005264
Democratic People's Republic of Korea	0.0002626
Kosovo	0.0010533
Kuwait	0.0006247
Kyrgyzstan	0.0000925
Latvia	0.0001453
Lebanon	0.0007020
Libya	0.0006595
Lithuania	0.0001857
Luxembourg	0.0002812
Malaysia	0.0006870
Malta	0.0006517
Mauritius	0.0007978
Mexico	0.0004596
Republic of Moldova	0.0004966
Mongolia	0.0012493
Montenegro	0.0005177
Morocco	0.0007017

Country	Metric tons CO_2e/kWh
Mozambique	0.0000647
Myanmar	0.0003044
Namibia	0.0000253
Nepal	0.0000000
Netherlands	0.0004888
Nicaragua	0.0003581
Niger	0.0009881
Nigeria	0.0004129
Norway	0.0000087
New Zealand	0.0001241
Oman	0.0005091
Pakistan	0.0004105
Panama	0.0003129
Paraguay	0.0000001
Peru	0.0002443
Philippines	0.0006143
Poland	0.0007302
Portugal	0.0003465
Qatar	0.0004863
Romania	0.0003401
Russian Federation	0.0003950
Saudi Arabia	0.0007262
Senegal	0.0006165
Serbia	0.0007572
Singapore	0.0004351
Slovak Republic	0.0001689
Slovenia	0.0002646
South Africa	0.0009903
Spain	0.0002929
Sri Lanka	0.0005137
South Sudan	0.0008552
Sudan	0.0003029
Suriname	0.0003960
Sweden	0.0000108
Switzerland	0.0000242
Syrian Arab Republic	0.0006238
Chinese Taipei	0.0005832
Tajikistan	0.0000076
United Republic of Tanzania	0.0004397
Thailand	0.0005108

Country	Metric tons CO_2e/kWh
Togo	0.0002371
Trinidad and Tobago	0.0005839
Tunisia	0.0004686
Turkey	0.0004411
Turkmenistan	0.0008928
United Arab Emirates	0.0005679
United Kingdom	0.0003487
Ukraine	0.0004073
Uruguay	0.0000514
United States	0.0004556
Uzbekistan	0.0005508
Bolivarian Republic of Venezuela	0.0002823
Viet Nam	0.0004798
Yemen	0.0007339
Zambia	0.0000214
Zimbabwe	0.0007342

Besides the US and China, emissions can only be calculated based on country selection (as opposed to at a region or grid level).

Source: Country electricity emission factors are based on IEA data from the Emissions Factors (2017 edition) © OECD/IEA 2017, License: www.iea.org/t&c; as modified by Walmart Inc.

Energy pillar table. Electricity emissions factors by US grid region (total output)

U.S. eGrid Subregion Name	Total Output Emission Factors (metric tons CO_2e/kWh)
ASCC Alaska Grid	0.000421721
ASCC Miscellaneous	0.000309856
WECC Southwest	0.000399103
WECC California	0.000258769
ERCOT All	0.000520746
FRCC All	0.000490228
HICC Miscellaneous	0.000429791
HICC Oahu	0.000676019
MRO East	0.000760462
MRO West	0.000623964
NPCC New England	0.000261614
WECC Northwest	0.000414322
NPCC NYC/Westchester	0.000302518
NPCC Long Island	0.000546272
NPCC Upstate NY	0.000166759
RFC East	0.000378512
RFC Michigan	0.00069972

RFC West	0.000630887
WECC Rockies	0.000793524
SPP North	0.000719606
SPP South	0.000673494
SERC Mississippi Valley	0.000465892
SERC Midwest	0.000810028
SERC South	0.000521964
SERC Tennessee Valley	0.000610271
SERC Virginia/Carolina	0.000391353

According to the EPA Center for Corporate Climate Leadership, total output emission factors can be used to estimate greenhouse gas emissions from carbon footprint accounting.

Source: U.S. Subregion total output electricity emission factors source: EPA eGrid2016, February 2018. Accessed from the EPA Center for Corporate Climate Leadership Emission Factors Hub (Table 6 of GHG Emission Factors Hub, March 2018).

Energy pillar table. Electricity emissions factors by China grid region

China Region	metric tons CO_2e/kWh
Beijing	0.001123
Tianjin	0.001123
Hebei	0.001123
Shanxi	0.001123
Inner Mongolia	0.001123
Liaoning	0.001172
Jilin	0.001172
Heilongjiang	0.001172
Shanghai	0.000827
Jiangsu	0.000827
Zhejiang	0.000827
Anhui	0.000827
Fujian	0.000827
Jiangxi	0.000689
Shandong	0.001123
Henan	0.000689
Hubei	0.000689
Hunan	0.000689
Guangdong	0.00066
Guangxi	0.00066
Hainan	0.000775
Chongqing	0.000689
Sichuan	0.000689
Guizhou	0.00066
Yunnan	0.00066

China Region	metric tons CO_2e/kWh
Shaanxi	0.000853
Gansu	0.000853
Qinghai	0.000853
Ningxia	0.000853
Xinjiang	0.000853

Source: The World Resources Institute ©2017, Energy Factors for Cross-sector Tools (March 2017)

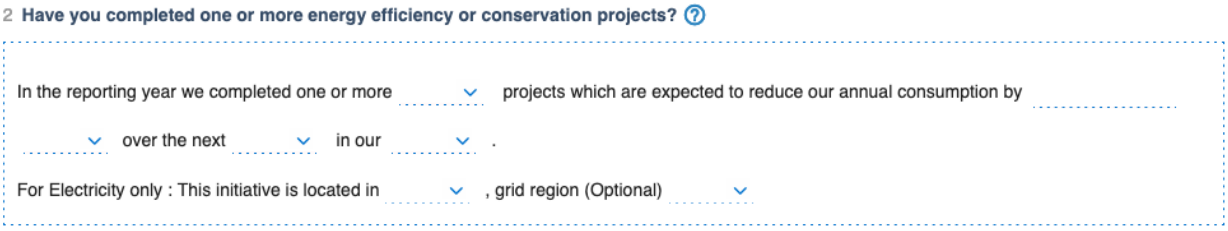
Original source: GHG Protocol - A Calculation Tool for GHG Emissions from Fuel Use (2011) (available in Chinese only). The emission factors are calculated using data from the China Energy Statistics Yearbooks, IPCC, and China Key Energy Users Energy Use Reporting System.

6.1.2.2 *Question E.2: Have you completed one or more energy efficiency or conservation projects?*

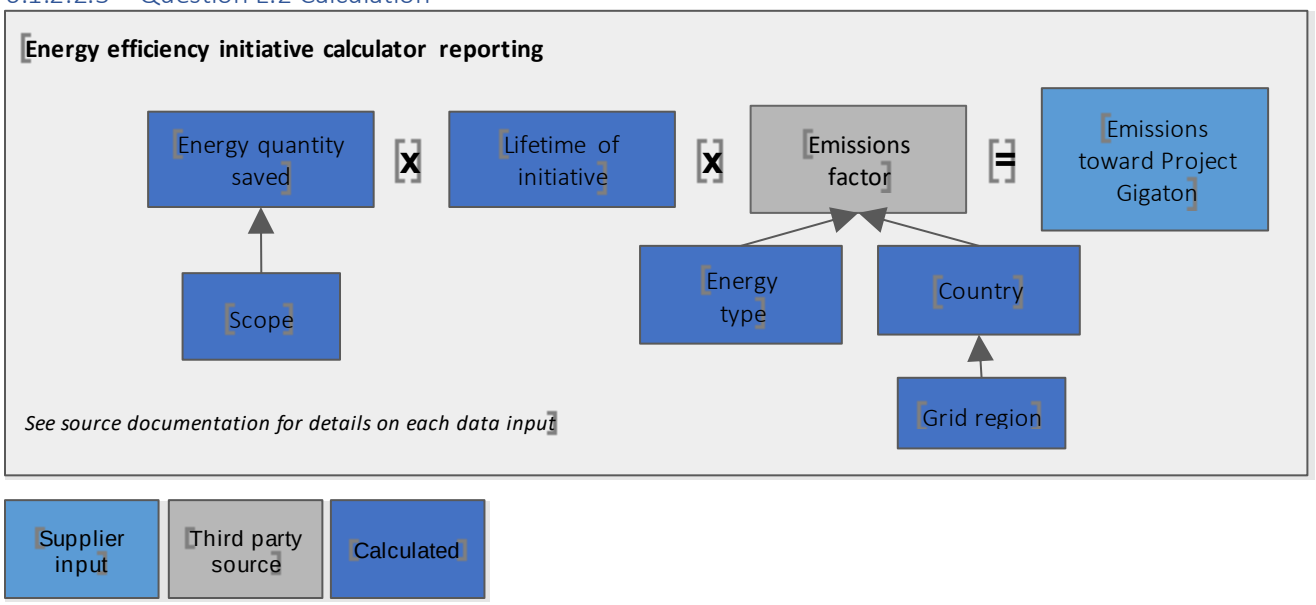
6.1.2.2.1 Question E.2 Background and definitions

The calculator estimates emissions reduced or avoided from many different energy efficiency and conservation initiative types and several types of energy sources ranging from electricity to stationary and transport fuels. You will need to know a few things about your project including the location of the initiative, the type of energy source being saved (e.g., gasoline), the amount of that energy type saved annually (e.g., gallons) and expected lifetime of the projects. Projects of the same activity type can be grouped together; similar projects reducing grid electricity demand in different regions, however, should be entered as separate initiatives. Grid region is only collected if the United States or China is selected and is an optional field. The reduction in annual consumption can be estimated based on measurement, engineering estimates or specifications as compared to baseline conditions. The following diagram and tables provide more detail on this calculator for estimating your avoided emissions.

6.1.2.2.2 Question E.2 Calculator



6.1.2.2.3 Question E.2 Calculation



6.1.2.2.4 Question E.2 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of energy quantity, lifetime, location, etc. Projects of the same activity type should be grouped together; similar projects reducing grid electricity demand in different regions, however, should be entered as separate initiatives
Activity type*	Supplier input	Select from dropdown	This is the type of energy efficiency activity that best describes the project. Possible dropdown selections: • insulation • maintenance program • building controls • HVAC • lighting • motors and drives • combined heat and power • heat recovery • cooling technology

Model inputs **required field*	Source	Units	Notes
			• refrigeration • process optimization • fuel switch • compressed air • combined heat and power • wastewater treatment • water reuse • reuse of steam • machine replacement • distribution • other, please specify Selection does not impact calculation.
Energy quantity saved*	Supplier input	Numerical value	*Annual* consumption of energy reduced by this initiative. This can be a measured or based on engineering estimates or specifications as compared to current conditions
Energy type*	Supplier input	Select from dropdown	See *Energy pillar table. Gas and fuel emission factors by energy type* in *Question E.2 Emission factors section* for list of all dropdown options
Scope*	Supplier input	Select from dropdown	Possible dropdown selections: • Own operations (Scope 1 and Scope 2) • Supply chain (Scope 3)
Lifetime of initiative*	Supplier input	Select from dropdown	Possible dropdown selections: • <1 year • 1-2 years • 3-5 years • 6-10 years • 11-15 years • 16-20 years • 21-30 years • >30 years • Ongoing

Model inputs **required field*	Source	Units	Notes
			The lower threshold of each date range is used when multiplying the annual CO_2e savings. Activities marked as <1 year, 1-2 years or "ongoing" are only counted for one year. The maximum "estimated lifetime" multiplier is the number of reporting years left in Project Gigaton (2017-2031). For example, if a supplier reports an activity with a lifetime of 21-30 years to Project Gigaton in 2018, the maximum multiplier is 14 years (not 20 years). Note that most energy efficiency initiatives should have a lifetime of no more than 10 years.
Country*	Supplier input	Select from dropdown	See *Energy pillar table. Electricity emissions factors by country* for list of all dropdown options.
Grid region	Supplier input	Select from dropdown	Grid region is only collected if the United States or China is selected as a Country. See *Energy pillar table. Electricity emissions factors by US grid region (non-baseload)* and *Energy pillar table. Electricity emissions factors by China grid region* for list of all dropdown options. Grid region is only collected if the United States or China is selected as a Country; grid region is an optional field (if not utilized, use country level factors) See *Question E.2 Emission factors* for list of all dropdown options
Emissions factor	IEA and EPA	Metric tons CO_2e per unit energy	If only country is provided, IEA emissions factors are used

Model inputs *required field	Source	Units	Notes
			If U.S. grid region is provided, eGRID emissions factors are used If China province is provided, World Resources Institute GHG Protocol emission factors are used Stationary and mobile fuel combustion emission factors were sourced from the EPA Center for Corporate Climate Leadership Emission Factors Hub See *Question E.2 Emission factors* for list of all emission factors

6.1.2.2.5 Question E.2 Emission factors

See *Energy pillar table. Electricity emissions factors by country* and *Energy pillar table. Electricity emissions factors by China grid region* for list of all country and regional emission factors

Energy pillar table. Electricity emissions factors by US grid region (non-baseload)

eGrid subregion name	CO_2 Factor (non-baseload) metric tons CO_2/kWh
AKGD (ASCC Alaska Grid)	0.00062042
AKMS (ASCC Miscellaneous)	0.00069572
AZNM (WECC Southwest)	0.00062813
CAMX (WECC California)	0.00042769
ERCT (ERCOT All)	0.00063630
FRCC (FRCC All)	0.00053909
HIMS (HICC Miscellaneous)	0.00069400
HIOA (HICC Oahu)	0.00074276
MROE (MRO East)	0.00078930
MROW (MRO West)	0.00082644
NEWE (NPCC New England)	0.00044230
NWPP (WECC Northwest)	0.00069168
NYCW (NPCC NYC/Westchester)	0.00048158
NYLI (NPCC Long Island)	0.00060727
NYUP (NPCC Upstate NY)	0.00046185
RFCE (RFC East)	0.00065063
RFCM (RFC Michigan)	0.00081923
RFCW (RFC West)	0.00087743
RMPA (WECC Rockies)	0.00076580
SPNO (SPP North)	0.00090301

eGrid subregion name	CO_2 Factor (non-baseload) metric tons CO_2/kWh
SPSO (SPP South)	0.00075410
SRMV (SERC Mississippi Valley)	0.00053796
SRMW (SERC Midwest)	0.00088686
SRSO (SERC South)	0.00065930
SRTV (SERC Tennessee Valley)	0.00079714
SRVC (SERC Virginia/Carolina)	0.00064510

According to the EPA Center for Corporate Climate Leadership, annual non-baseload output emission factors can be used to estimate greenhouse gas emissions reduction from reductions in electricity use.

Source: U.S. Subregion non-baseload electricity emission factors source: EPA eGrid2016, February 2018. Accessed from the EPA Center for Corporate Climate Leadership Emission Factors Hub (Table 6 of GHG Emission Factors Hub, March 2018).

Energy pillar table. Gas and fuel emission factors by energy type

Energy type	Unit	Emissions Factor (metric tons CO_2e per unit)
natural gas	mmBtu	0.05306
blast furnace gas	mmBtu	0.27432
coke oven gas	mmBtu	0.04685
fuel gas	mmBtu	0.059
propane (gas)	mmBtu	0.06146
Aviation gasoline	Gallon	0.00831
Kerosene	Gallon	0.01015
Liquified Petroleum Gases (LPG)	Gallon	0.00568
Motor gasoline	Gallon	0.00878
Propane (liquid)	Gallon	0.00572
Crude oil	Gallon	0.010324
Motor diesel fuel	Gallon	0.01021
Liquified Natural Gas (LNG)	Gallon	0.0045
Electricity	Kilowatt-hour (kWh)	Varies by location (refer to other tables)

Source: U.S. EPA Center for Corporate Climate Leadership GHG Emission Factors Hub

6.1.2.3 *Question E.3: Do you use the Resource Efficiency Deployment Engine (RedE) to track your factory energy efficiency projects?*

6.1.2.3.1 Question E.3 Background and definitions

McKinsey & Company's Resource Efficiency Deployment Engine (RedE) was built into the Walmart Sustainability Portal and is available to Walmart Sourcing suppliers under the name "Renewable Energy and Efficiency Program" (REE).

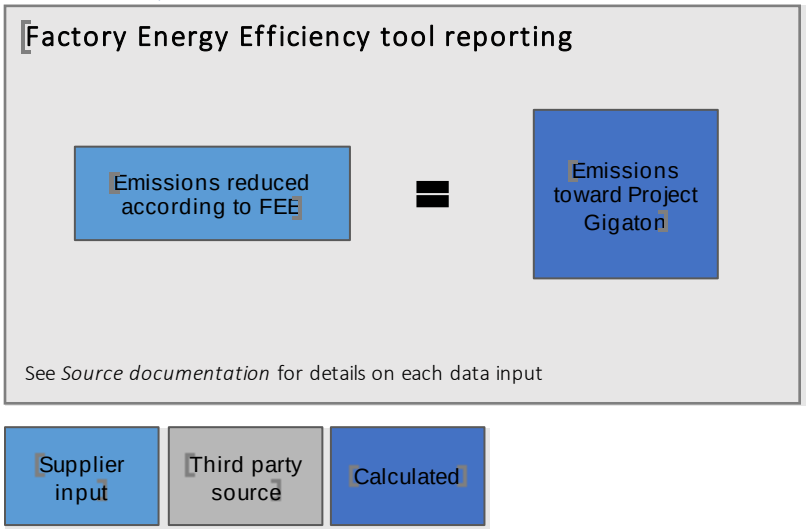
Through the Walmart Renewable Energy and Efficiency Program (REE) tool, we are working with our suppliers to promote energy efficiency in factories in the global supply chain. A summary of any emissions reductions achieved is provided by the tool and can be entered toward Project Gigaton.

6.1.2.3.2 Question E.3 Calculator

3 **Do you use the Resource Efficiency Deployment Engine (RedE) to track your factory energy efficiency projects?**

Using the RedE tool, I've calculated my factory energy efficiency emissions reductions to be _____ metric tons CO2e during the reporting period.

6.1.2.3.3 Question E.3 Calculation



6.1.2.3.4 Question E.3 Source documentation

Model inputs *required field	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	
Emissions reduced according to FEE*	Supplier input	Metric tons CO_2e	The FEE tool provides an emissions reduction figure as a result of activities tracked using the tool. Suppliers may enter this value to report to Project Gigaton.

6.1.2.4 *Question E.4: Do you have other energy activities you'd like to report and know how many metric tons CO_2e you saved?*

More information available in the *Reporting aggregate emissions* section.

6.2 Nature

6.2.1 Nature pillar background

The Nature Pillar within the Project Gigaton platform will estimate emission reductions and spatial contribution towards Walmart and the Walmart Foundation's nature goal to protect, restore, or more sustainably manage 50M acres of land and 1M square miles of ocean by 2030. While all acres of land and square miles of ocean are counted towards this goal, it is our ambition to progress from basic to better and to best for as many as many acres and square miles as possible by the conclusion of the goal. To understand how your responses will fit into this continuous improvement framework, see Nature pillar table: Mapping of certifications and practices to Basic, Better, Best framework for the commodities that are included.

Nature pillar table: Mapping of certifications and practices to Basic, Better, Best framework

	Commodities	Basic	Better	Best
FORESTS	Coffee/Cocoa	Fair Trade	Rainforest Alliance	Credible Place-based, Jurisdictional Approach + Investments in Restoration, Conservation
	Palm Oil	RSPO (mass balanced), Rainforest Alliance, ISCC, ISPO	RSPO (segregated supply & identity preserved), CSPO	
	Pulp/Paper	PEFC, SFI	FSC	
AGRICULTURE	Cotton	Organic cotton standards, Fair Trade, Cotton USA, US Cotton Trust Protocol, Better Cotton Initiative (BCI)		
	Soy	Cefetra Responsible Soy*, Proterra Standard*	Roundtable on Responsible Soy (RTRS)	
	Beef, Corn/Maize, Wheat, & Rice	1+ nature positive practice linked to 2+ nature positive outcomes**	2+ nature positive practices linked to 4+ nature positive outcomes	
	Produce	IPM certifications: Bee Better Certified, LEAF Marque, Equitable Food Initiative	IPM certifications: Rainforest Alliance, Sustainable Food Group Sustainability Standard, USDA Organic, or basic IPM certification with 1+ practice linked to 2+ outcomes indicators	

	Commodities	Basic	Better	Best
SEAFOOD	Wild-Caught Seafood	Global Sustainable Seafood Initiative (GSSI) recognized certification OR active participation in FIP with definitive, ambition goals, measurable metrics, and timebound milestones	MSC	
	Farmed Seafood	Global GAP, Participation in AIP with definitive, ambition goals, measurable metrics, and timebound milestones	ASC, BAP	

Nature pillar table: Nature pillar key definitions

TERM	DEFINITION	SOURCE
Coastal area	The interfacial region between the inland and oceans such as wetlands and mangroves. For the purposes of this methodology, they will be counted towards the land target.	FAO Definition
Land	A delineable area of the earth's terrestrial surface, encompassing all attributes of the biosphere immediately above or below this surface including those of the near-surface climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marches and swamps), the near-surface sedimentary layers and associated groundwater reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activities.	United Nations 1994 Definition referenced by FAO and IPCC
Ocean	Body of saltwater covering 71% of Earth's surface. The low-water line along the coast as marked on large-scale charts officially recognized by the coastal State.	UN Convention of Law of the Sea
Restore	The process of assisting the recovery of an ecosystem, and its associated conservation values, that has been degraded, damaged, or destroyed.	Accountability Framework
Sustainable management	Support more regenerative practices for productive land/seascapes.	Aligned with UN SDG 15

TERM	DEFINITION	SOURCE
Protection	Set aside natural landscapes and/or seascapes that are formally protected and/or under community-led resource management to maintain ecological integrity and function.	Walmart's internal definition
Additionality	Additive protection and/or restoration activities that would not have otherwise occurred in the absence of these activities.	Walmart's internal definition
Permanence	Protection and/or restoration benefits that are reasonably irreversible	Walmart's internal definition

6.2.2 Nature pillar calculation methods

The following sections outline the methods used to calculate the avoided or sequestered greenhouse gas emissions and the spatial conversions associated with the Nature Pillar questions.

6.2.2.1 *Avoided emissions methodology*

The assumption used to calculate the avoided emissions for reducing deforestation pressures is that if Walmart sources "deforestation-free" commodities, the footprint is lower than the conventional land use change (LUC) footprint. Avoided emissions are therefore given by commodity after one year being deforestation-free. This is reflected as the "avoided emission LUC emission factor". Commodities do not automatically retain deforestation-free status after the initial deforestation-free year nor do they accumulate/aggregate credits year to year. Instead, a security factor ensures that the action the supplier takes is continuously implemented over the span of 20 years and the full credit is therefore evenly distributed across 20 years of action. This approach rewards long-term action without overestimating the impact reduction during the first year and aligns with the IPCC legacy emission factor.

Avoided emissions are only counted when a supplier provides documentation or proof that they sourced verified deforestation-free commodities. This verification can be provided through a certification number or remote sensing analysis (e.g., GFW Pro analysis).

The approach used to calculate the "avoided deforestation" emission factors for all of Walmart's commodities is described by the following equation:

Conventional LUC EF/ security factor * proof factor = Avoided Emissions LUC EF (kg CO_2eq / kg of commodity sourced)

Whereas:

- Conventional LUC EF = LUC per crop and country (in kg CO_2eq / kg commodity)
- Security factor = set to 20 years, represents deforestation-free credits allocation
- Proof factor = factor that indicates level of proof from suppliers. The methodology distinguishes between:
    - 0% auto-declared, no proof / documentation
    - 50% auto-declared, with remote sensing desktop analysis (no certification)
    - 100% certified or reviewed by 3rd party aerial monitoring tool (includes both certification and aerial monitoring tools)

The proof factor definitions are:

- *Auto-declared, no proof / documentation*: The supplier makes a claim that they bought verified deforestation-free commodities but has no documentation (e.g., verification tool documentation, etc.) to back up this claim.
- *Auto-declared, using remote sensed analysis:* The supplier makes a claim that they bought deforestation-free commodities and has documentation (e.g., GFW Pro analysis) to back up this claim.
- Certified or 3rd party reviewed/aerial monitoring subscription: The supplier bought third-party certified commodities or verified deforestation-free commodities that a 3rd party reviewed and has documentation verifying this claim with the supplier.

6.2.2.2 *Spatial Conversion Methodology*

A spatial conversion factor is applied to calculate the spatial contribution towards Walmart's nature aspirations: to protect, restore, or more sustainably manage 50M acres of land and 1M square miles of ocean by 2030. See the *Nature pillar table: Spatial conversion factors* for the full list of factors.

For practice-based questions with area units, (i.e., acres, sq. miles) a spatial conversion factor of 1 is applied. For questions reporting in MT of commodity, a spatial conversion factor in MT/acre is used. These conversion factors were obtained through the following:

For ag commodities, a 5-year average from 2015-2019 was used to determine yields. Data from the US was pulled from USDA NASS survey data, converted to pounds, and then converted to pounds per acre using total harvested acres. For non-US conversion factors, FAOSTAT data was used for the same time period. Both sources were converted to MT/acre to determine the final conversion factor. This year the calculator assumes each crop entered was grown on a different acre, which may be an overestimate for crops sourced from acres in rotations. This consideration will be addressed in future versions of the spatial conversions.

For beef, it is assumed the volume sold at Walmart represents a fraction (38%) of the total weight of a cow at slaughter and of that percentage on average 50% of the weight is gained on pasture. This weight is then compared to a weighted average of stocking rates in wet and dry regions of the US to determine an average MT of beef/acre conversion factor. Global numbers are still being developed, so in the current calculator the US number is used as a proxy. These numbers will continue to be refined.

For pulp and paper, average 5-year yields pulled from FAO, USDA, Arets 2012, and Natural Resource Canada were used to determine spatial conversion factors.

6.2.3 Nature pillar questions

6.2.3.1 *Question NAT.1: Have you supported land or ocean protection?*

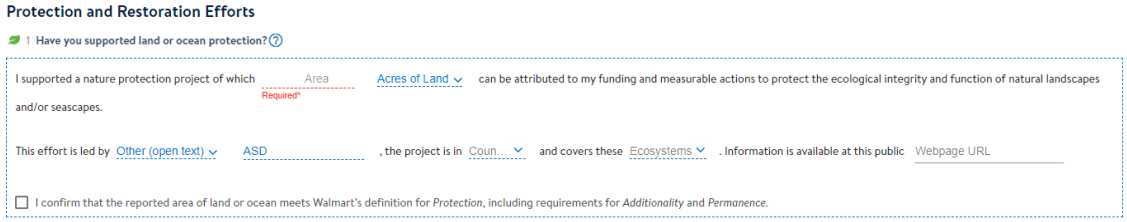
6.2.3.1.1 Question NAT.1 Background and definitions

This question covers both land and ocean protection efforts implemented by suppliers. Protection is defined as setting aside natural landscapes and/or seascapes that are formally protected and/or under community-led resource management to maintain ecological integrity and function. The data captured through this question will be used to calculate direct acres and square miles that can be counted towards Walmart's Nature goal. At present we are unable to calculate the carbon emission avoided using this calculator.

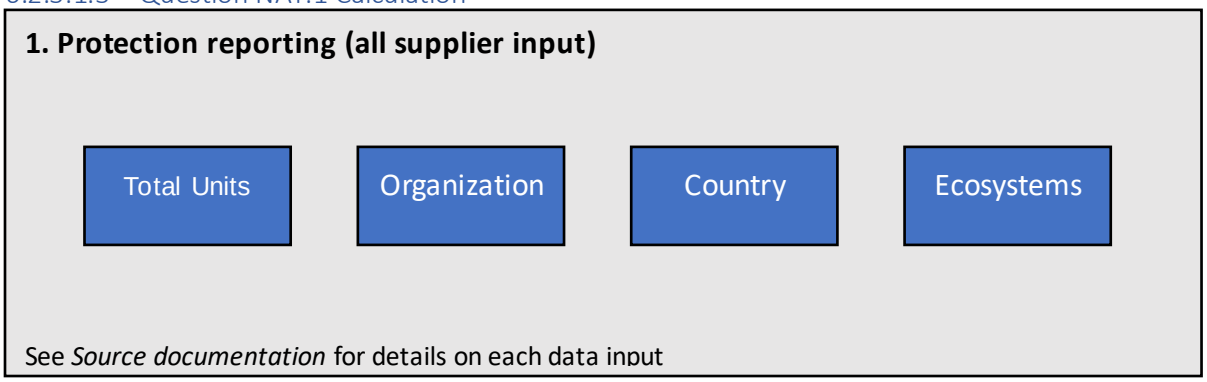
Suppliers are to report only their company's share of the project based on funding or other attributable actions. In most cases this will not be the entire project area. The reported area of land or ocean must

meet Walmart's definition for protection, including requirements for additionality and permanence (see *Nature Pillar Key Definitions* table).

6.2.3.1.2 Question NAT.1 Calculator



6.2.3.1.3 Question NAT.1 Calculation



6.2.3.1.4 Question NAT.1 Source documentation

Model inputs **required field*	Source	Units	Notes
Total units*	Supplier input	Acres, Sq miles	Refers to the land or ocean spatial areas protected
Organization*	Supplier input	Select from dropdown or open text option	Organization options include: • American Forests • Conservation International • Environmental Defense Fund (EDF) • The Nature Conservancy • World Wildlife Fund • Other (open text)
Country*	Supplier input	Select from dropdown	Select from a list of all countries
Ecosystems	Supplier input	Select all applicable from dropdown	Ecosystem options include: • Tropical Rainforest Ecosystem • Temperate Forest Ecosystems

Model inputs *required field	Source	Units	Notes
			• Subarctic Forest Ecosystem (Taiga) • Grassland Ecosystem • Tundra Ecosystem • Desert Ecosystem • Freshwater Ecosystem • Marine Ecosystem

6.2.3.2 *Question NAT.2: Have you supported a natural landscape and/or seascape restoration project?*

6.2.3.2.1 Question NAT.2 Background and definitions

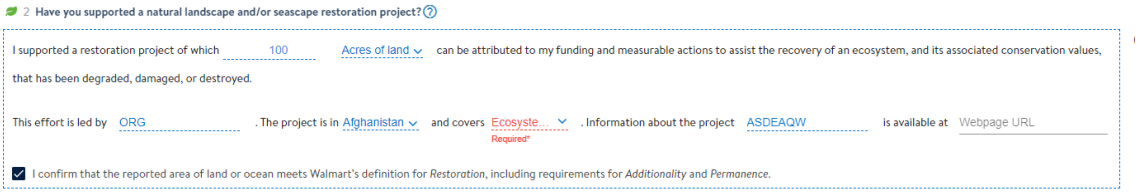
This question covers natural landscape and seascape restoration projects implemented by suppliers. The data captured through this question will be used to capture direct acres and square miles that can be counted towards Walmart's Nature goal. At present we are unable to calculate the carbon emission avoided using this calculator. The reported area of land or ocean must meet the following restoration project criteria as well as Walmart's requirements for additionality and permanence (see *Nature Pillar Key Definitions*).

6.2.3.2.1.1 Restoration project criteria:

- *Landscape context*: Restoration projects should be embedded within a larger landscape context, including socio-economic and ecological considerations at the broader scale, rather than just project focused. This approach will optimize conservation and development goals.
- *Social integrity*: Local stakeholders are actively engaged in decision making, collaboration and implementation (free, prior, and informed consent process followed). Livelihoods secured at a landscape scale.
- *Ecological integrity*: Project has net positive climate and biodiversity benefits and maintains or enhances any high conservation values. Native species are used unless otherwise justified and invasive species and genetically modified organisms are not used. Restoration projects in boreal forests are excluded due to uncertainty as to whether the albedo effect (reducing the reflectivity of the Earth's surface) due to restoration in these regions counteracts the climate benefits of sequestration.[1]
- *Relevance:* To encourage landscape scale-insetting, projects should be prioritized that focus on key sourcing geographies in supplier's supply chains. Projects should have a quantified carbon benefit per hectare.
- *Strong Project Management*: Monitoring and evaluation, learning and adaptation of the project throughout its implementation is central to effective project management that will ensure permanence of carbon benefits, broader ecosystem services enhancement and co-benefit sharing with communities. This includes addressing land tenure rights and allocation of sufficient funds for long-term monitoring and evaluation of the project.

[1] Bright, R. M., Zhao, K. G., Jackson, R. B. & Cherubini, F. Quantifying surface albedo and other direct biogeophysical climate forcings of forestry activities. *Global Change Biology* **21**, 3246-3266, doi:10.1111/gcb.12951 (2015)

6.2.3.2.2 Question NAT.2 Calculator



6.2.3.2.3 Question NAT.2 Calculation

2. Restoration reporting

Total Units | Organization (free text) | Country | Ecosystems | Project

See *Source documentation* for details on each data input

6.2.3.2.4 Question NAT.2 Source documentation

Model inputs **required field*	Source	Units	Notes
Total units*	Supplier input	Acres, Sq miles	Refers to the land or ocean spatial areas protected
Organization*	Supplier input	Open text	Name of the organization leading the project
Country*	Supplier input	Select from dropdown	Select from a list of all countries
Ecosystems*	Supplier input	Select from dropdown	Ecosystem options include: • Tropical Rainforest Ecosystem • Temperate Forest Ecosystems • Subarctic Forest Ecosystem (Taiga) • Grassland Ecosystem • Tundra Ecosystem • Desert Ecosystem • Freshwater Ecosystem • Marine Ecosystem
Project*	Supplier input	Open text	Name of the project

6.2.3.3 *Question NAT.3: Are you participating in a place-based initiative?*

6.2.3.3.1 Question NAT.3 Background and definitions

Suppliers should not report the same acres or square miles to this question that they have reported to any other question, to avoid double counting.

6.2.3.3.1.1 Place-based Initiatives

Place-based initiatives bring together diverse stakeholders in productive landscapes and seascapes to identify shared goals, strategies, and resources to achieve sustainability at large geographic scales, like a state, province, or eco-region. These strategies may include pre-competitive actions like mapping high-conservation value areas across an entire jurisdiction or delivering capacity and incentives to farmers to use more productive and sustainable practices. Landscape, jurisdictional approaches, and jurisdictional REDD+ programs are all types of place-based initiatives that share this common DNA, and they touch down in dozens of places around the world that need teamwork to succeed. Walmart seeks to connect suppliers with place-based initiatives that show potential to deliver positive nature impacts at the landscape and seascape levels. More information about place-based initiatives is available on the Walmart Sustainability Hub.

Credible place-based initiatives must be on a path to contain elements in each box in the table below, which are informed by assorted NGO feedback. The criteria below are primarily applicable to terrestrial place-based projects. Specific criteria for marine projects are still under development.

Nature pillar table: Core criteria for place-based Initiatives

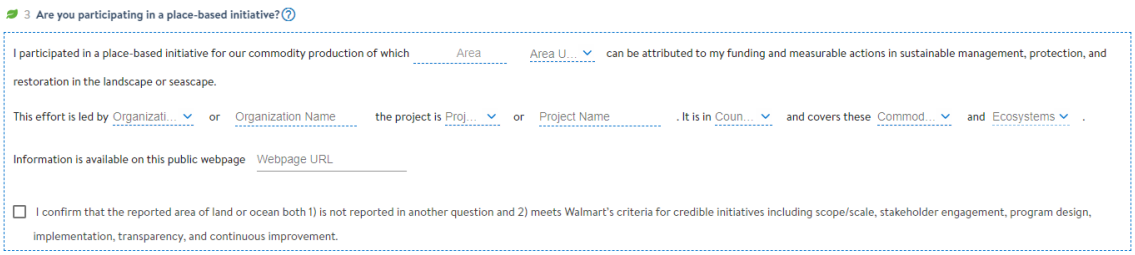
Dimension	Criteria
SCOPE & SCALE	• Sustainability and production- based goals are clearly stated and relevant to the landscape/seascape in which the program is being implemented. • The program is of meaningful scale to drive improvements at the landscape/seascape- level.
STAKEHOLDER ENGAGEMENT	• A representative, multi- stakeholder body is developed transparently and leads the program design and implementation. • Relevant levels of government are engaged in developing and implementing the approach/program.
PROGRAM DESIGN	• A clearly defined action plan is developed that lays out steps to meet program milestones and outcomes. • Meaningful, relevant metrics and KPIs are defined to enable assessments of progress towards targets and milestones. • Effective data governance systems and protocols are implemented to credibly gather, store, analyze, and use data.

Dimension	Criteria
IMPLEMENTATION	• A baseline assessment is performed at the outset of the program against which improvements and performance claims will be measured. • Jurisdiction resources are identified as an input to the development of action plans and mapped for the entire landscape/seascape. • Appropriately sized incentives are included for participating producers that are commensurate to opportunity costs of conversion, where applicable.
TRANSPARENCY	• There is transparency in the structure, commitments, agreements, financing, and actions of the initiative and this information is publicly accessible. • Stakeholders communicate performance progress relative to the defined baseline or target and share factual statements of specific performance levels. • Data sources are available in an accessible format to enable third parties to verify and derive insights about metrics performance.
CONTINUOUS IMPROVEMENT	• A framework is established to enable the jurisdictional or place-based approach to continuously improve processes and impacts.

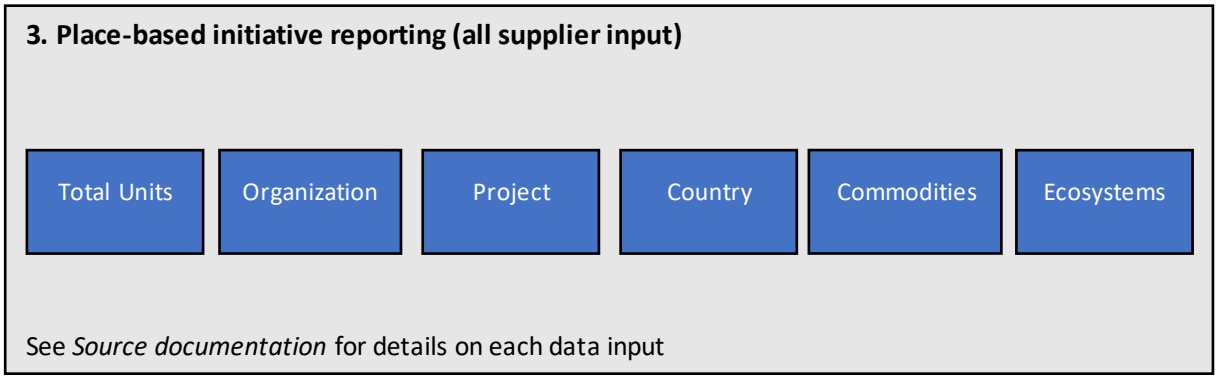
6.2.3.3.1.2 Place-based Initiative Projects

The projects represented in the drop-down list for this question come from the Walmart Nature Map. These projects have been vetted for alignment with landscape, seascape, or jurisdictional strategies and may provide opportunities to drive protection, sustainable management and/or restoration at meaningful scales. To help provide an initial list of some of these projects, Walmart worked with leading environmental non-profits and asked them to submit jurisdictional and place-based initiatives that they believe are on a path to credibility, as defined by the core criteria developed with leading environmental nonprofits. This project list is not exhaustive, and Walmart is not endorsing them, but rather providing visibility for consideration. Suppliers participating in a place-based project that is not on this list, can type the project name in the free text option for this question and are encouraged to submit an intake form to have their project added to Walmart's Nature Map.

6.2.3.3.2 Question NAT.3 Calculator



6.2.3.3.3 Question NAT.3 Calculation



6.2.3.3.4 Question NAT.3 Source documentation

Model inputs *required field	Source	Units	Notes
Total units*	Supplier input	Acres, Sq miles	Refers to the land or ocean spatial areas protected
Organization*	Supplier input	Select from dropdown or open text option	All organizations who contributed to projects or input the name of the organization.
Project*	Supplier input	Select from dropdown or open text option	All projects in the Walmart Nature Map or input the name of the project.
Country*	Supplier input	Select from dropdown	Select from a list of all countries.
Commodities*	Supplier input	Select all applicable from dropdown	Select from a list of commodities.
Ecosystems	Supplier input	Select all applicable from dropdown	Ecosystem options include: • Tropical Rainforest Ecosystem • Temperate Forest Ecosystems • Subarctic Forest Ecosystem (Taiga) • Grassland Ecosystem • Tundra Ecosystem • Desert Ecosystem • Freshwater Ecosystem • Marine Ecosystem

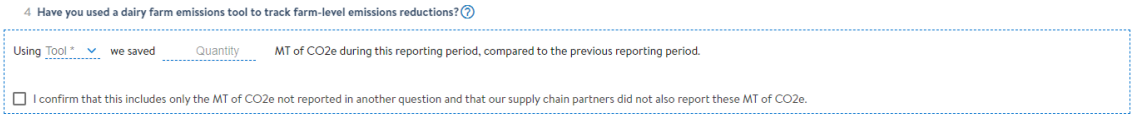
6.2.3.4 *Question NAT.4: Have you used a dairy farm emissions tool to track farm-level emissions reductions?*

6.2.3.4.1 Question NAT.4 Background and definitions

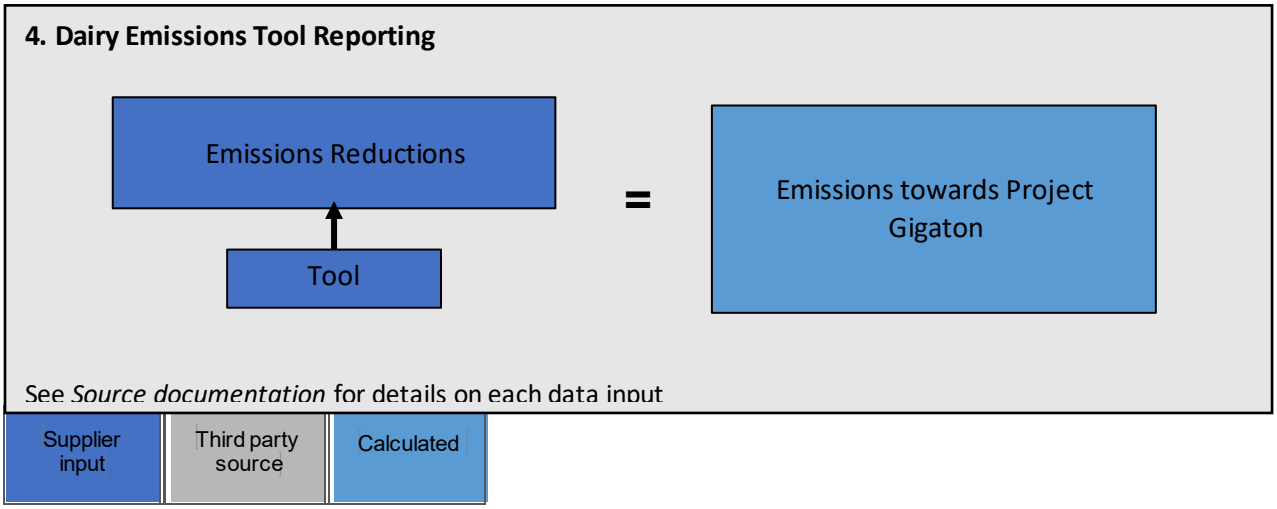
This question covers dairy emissions reductions tracked at the farm level. Dairy farm emissions tools capture emissions reductions resulting from programs implemented on dairy farms. Suppliers can use Cool Farm Tool or National FARM Program Environmental Stewardship Module (FARM ES) to report emissions reductions for this question.

If suppliers report energy, manure management, or other improvements via the FARM ES tool or Cool Farm Tool they should not report those same reductions in other questions. Similarly, supply chain partners should not be reporting the same emissions reductions that are reported in this question, to prevent double counting.

6.2.3.4.2 Question NAT.4 Calculator



6.2.3.4.3 Question NAT.4 Calculation



6.2.3.4.4 Question NAT.4 Source documentation

Model inputs **required field*	Source	Units	Notes
Tool*	Supplier input	Selected from dropdown	Select from Cool Farm Tool or Farm ES Tool
Emissions reductions*	Supplier input	Metric tons CO_2e	CO_2e is an output fir both the Cool Farm Tool and Farm ES, and should be reported in metric tons.
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Emissions reductions reported from the tool are the emissions counted towards project gigaton.

6.2.3.5 *Question NAT.5: Have there been improvement in manure management system(s) for farms in your supply chain?*

6.2.3.5.1 Question NAT.5 Background and definitions

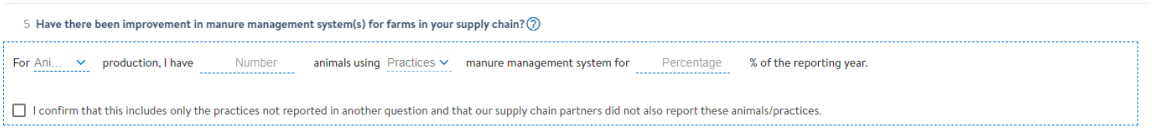
This question captures emissions reductions resulting from implementing enhanced manure management systems on US farms involved in cattle (beef and dairy), swine (pork), and poultry (meat and eggs) production. Note that there are not emission factors for all combinations of answers, so some emissions may not be calculated.

There are eleven manure management systems currently considered under Project Gigaton:

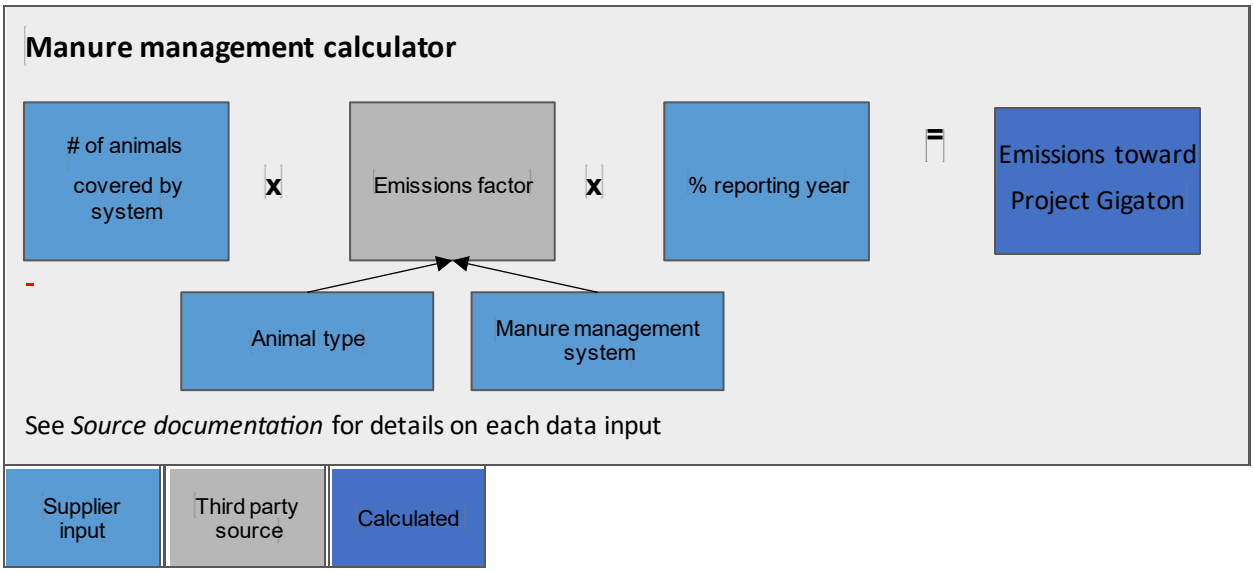
1. Composting (in-vessel or static)
2. Composting (natural aeration)
3. Composting (intensive with forced aeration)
4. Dry lot
5. Liquid/slurry storage with natural or induced crust
6. Liquid/slurry storage without crust
7. Pit storage below animals, less than 1 month
8. Aerobic treatment
9. Daily spread
10. Covered anaerobic lagoon
11. Anaerobic Digester

Suppliers completing this data component should not submit data through Question 4 (Cool Farm Tool and Farm ES Tool) due to the potential of double counting some activities. Multiple lines of data may be entered for this question. Suppliers report management scenarios the year they were implemented and again in the years that follow. Emissions factors are currently only available for the US and thus suppliers should only report manure management activities for farms in the US.

6.2.3.5.2 Question NAT.5 Calculator



6.2.3.5.3 Question NAT.5 Calculation



6.2.3.5.4 Question NAT.5 Source documentation

Model inputs *required field	Source	Units	Notes
Animal type*	Supplier input from dropdown	Selected from dropdown	Type of animal production covered in system. Options include: • Beef cattle • Dairy cattle • Swine • Poultry (meat) • Poultry (eggs)
# of animals covered by system*	Supplier input	Numeric	Refers to the total average population of animals covered by the system during the year.
Manure management system*	Supplier input	Selected from dropdown	See Background and Definitions section for full list of dropdown options.
% reporting year*	Supplier input	%	% of the reporting year that the new manure management system was active. Calculated as follows: [# months active / 12] = % reporting year

Model inputs *required field	Source	Units	Notes
Emissions factor	Aggregated from sources including the EPA, California Air Resources Board, and FARM ES	Metric tons CO_2e/head/year	See *Nature pillar table: Manure management emission factors* in *Question NAT.5 Emission factors* section for full list of emissions factors.
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Calculation based on supplier input

6.2.3.5.5 Question NAT.5 Emission factors

Nature pillar table: Manure management emission factors

Animal Type	Manure management system	Metric tons CO_2e/head/year
cattle	composting (in-vessel or static)	1
cattle	composting (natural aeration)	1
cattle	composting (intensive with forced aeration)	1
cattle	dry lot	0.666
cattle	liquid/slurry storage with natural or induced crust	0.675
cattle	liquid/slurry storage without crust	0.802
cattle	pit storage below animals (less than 1 month)	1
cattle	aerobic treatment	1
cattle	daily spread	1
cattle	covered anaerobic lagoon	2
cattle	anaerobic digester	2
swine	iquid/slurry storage without crust	0.2
swine	liquid slurry storage with natural or induced crust	0.2
swine	dry lot	0.2
swine	composting (natural aeration)	0.2
swine	composting (in-vessel or static)	0.2
swine	composting (intensive with forced aeration)	0.2
swine	pit storage below animals (less than 1 month)	0.2
swine	aerobic treatment	0.2
swine	daily spread	0.2
swine	covered anaerobic lagoon	0.4
swine	anaerobic digestor	0.4

Source: EPA, California Air Resources Board, and FARM ES.

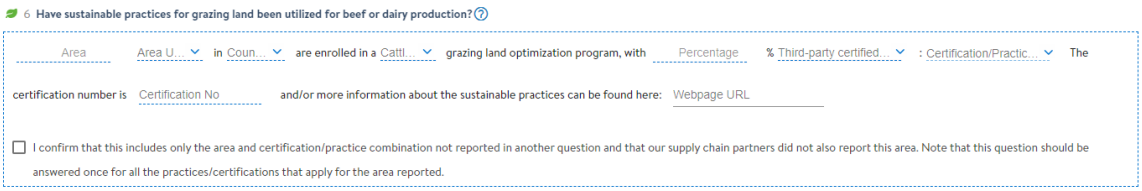
The estimated greenhouse gas equivalency is calculated in accordance with the methodology outlined by the Intergovernmental Panel on Climate Change (IPCC). Cattle emission factors are used for both beef and dairy.

6.2.3.6 *Question NAT.6: Have sustainable practices for grazing land been utilized for beef or dairy production?*

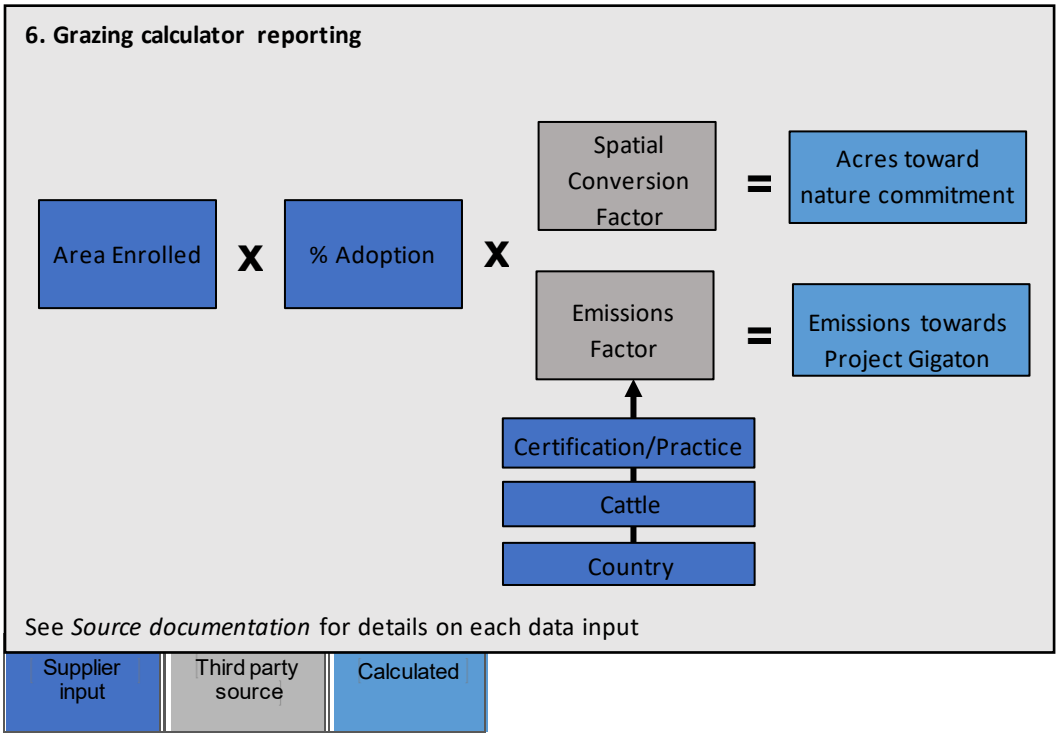
6.2.3.6.1 Question NAT.6 Background and definitions

This question captures emissions reductions resulting from grazing optimization programs for both beef and dairy cattle. Spatial equivalents are calculated based on supplier input and counted towards Walmart's Nature Goal. Practices and certifications related to livestock feed should be answered in another question. Note that there are no emission factors for all combinations of answers so emissions may not be calculated. Suppliers may enter multiple lines of data.

6.2.3.6.2 Question NAT.6 Calculator



6.2.3.6.3 Question NAT.6 Calculation



6.2.3.6.4 Question NAT.6 Source documentation

Model inputs **required field*	Source	Units	Notes
Area enrolled*	Supplier input	Acres	Number of acres enrolled in a grazing land optimization program.
Country	Supplier input	Select from dropdown	Select from a list of all countries.

Model inputs **required field*	Source	Units	Notes
Cattle	Supplier input	Select from dropdown	Suppliers select whether grazing optimization program was for beef or dairy cattle.
% Adoption*	Supplier input	%	Percent of acres with NRCS practices successfully implemented. Percentages are reported for area enrolled in grazing optimization programs in the reporting year. If % adoption of practices is unknown, supplier may reference and utilize default percentages as noted in *Nature pillar table: Grazing emission factors* in *Question NAT.6 Emission factors* section
Certified/Not Certified*	Supplier input	Selected from dropdown	Supplier indicates whether these sourced commodities were certified through one of the certification practices listed below or not certified but grown using one of the practices listed below.
Certification/Practice*	Supplier input	Select all applicable from dropdown	Certifications include: • Savory Land to Market Verified • Regenerative Organic Certified • Certified Regenerative by AGW • USDA Organic Certified (or global equivalent) • Fair Trade USA • Audubon Conservation Ranching Initiative • Canadian Roundtable for Sustainable Beef Certified • BeefCARE Practices include: • Converting marginal cropland to pasture • Fertilizer timing • Range planting or restoration • Riparian buffers (3% of production land available for adoption) • Managed/prescribed grazing • Manure fertilizer

Model inputs *required field	Source	Units	Notes
			• Silvopasture • Grassed waterways • Hedgerow plantings • Constructed wetlands • Implement water management plan • Fenced waterways, stabilized water-crossings
Emissions factor	Based on emission reduction coefficients from NRCS/Colorado State University's COMET-Planner	Metric tons CO_2e per acre	See *Nature pillar table: Grazing emission factors* in *Question NAT.6 Emission factors* section for full list of emissions factors.
Spatial Conversion Factor	Walmart Provided	Acres toward nature commitment per acres reported	Spatial Conversion Factor = 1
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Calculated based on supplier input.
Acres Toward Nature Commitment	Calculated value	Acres	Calculated based on supplier input.

6.2.3.6.5 Question NAT.6 Emission factors

Nature pillar table: Grazing emission factors

Practice type	Default percentage of total acres under grazing land optimization program (for reference only)	Emissions factor (metric tons CO_2e/acre)
Managed/prescribed grazing	10%	0.196
Riparian buffers (3% of production land available for adoption)	1%	1.220
Converting marginal cropland to pasture	10%	0.370
Range planting or restoration	30%	0.372
Silvopasture	1%	0.788
Fertilizer timing	20%	0.054
Manure fertilizer	10%	1.160

Source: NRCS/Colorado State University's COMET-Planner

Note that factors were calculated with the assumption that 80% of production occurred in dry production zones.

6.2.3.7 *Question NAT.7: Do you have information on how corn, wheat, or soy farmers in your U.S. supply chain are using fertilizer, cover crops, and tillage? If not, report to question 9.*

6.2.3.7.1 Question NAT.7 Background and definitions

The Cornell Soil Health & Nitrogen Fertilizer Optimization GHG Calculator calculates the net greenhouse gas reduction of cover crop management, reduced-till or no-till management for three commodity crops (corn, soybean, wheat) in the conterminous USA. The calculator accounts for (1) changes in soil carbon, (2) direct and indirect nitrous oxide emissions due to agricultural field management, (3) energy use of agricultural inputs (seeds, herbicide, N-fertilizer), (4) energy use from on-farm agricultural operations, and (5) indirect land use change. Soil health and N-fertilizer optimization practices included are defined below. Detailed information is included in the Soil Health Calculator full document which is available on the Walmart Sustainability Hub.

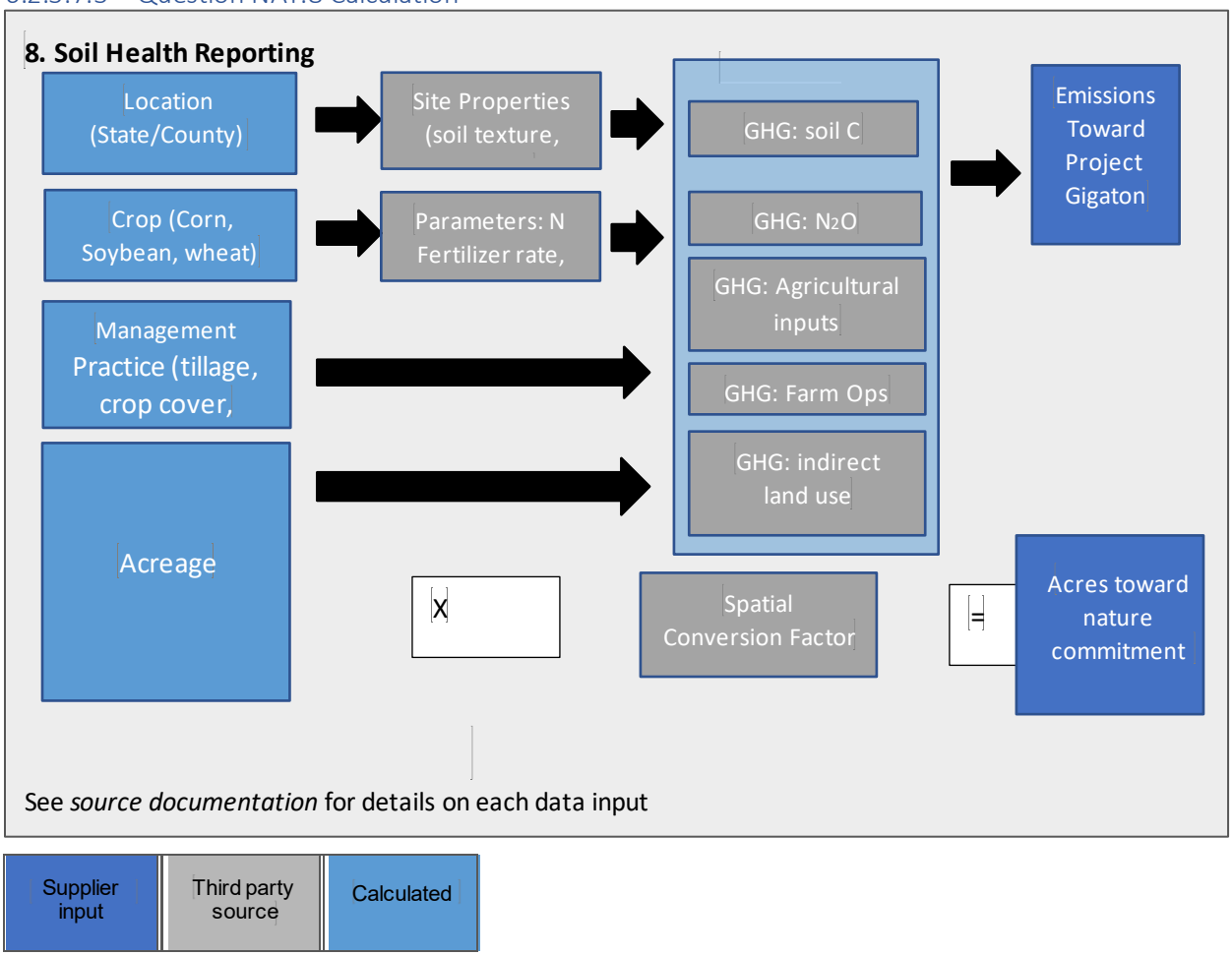
Nature pillar table: Key definitions for soil health practices

Practice	Definitions
Cover crops	The addition of a winter cover crop into the annual crop rotation, where previously there was a bare fallow period. Note that this methodology does not account for "double cropping" systems in which a harvested cash crop is introduced to replace a bare fallow season. Cover crops in dry climates are not supported in this methodology, due to potential for adverse impacts on yield and competition for available water. Suppliers can select either a legume or non-legume cover crop.
Conventional Tillage	For all crops, 0 – 15% of the soil surface is covered by residues between crop harvest and planting of the subsequent crop.
Reduced Tillage	For corn crops, 16 – 50% of the soil surface is covered by residues between crop harvest and planting of the subsequent crop. All other crops have 16-30% coverage.
No-Till	For corn crops, 51 – 100% of the soil surface is covered by residues between crop harvest and planting of the subsequent crop. All other crops have 31-100% coverage.
Model-based N optimization	Use of models (such as, for example, Adapt-N) to optimize fertilizer rates and timing.
Sensor / Variable Rate Technology (VRT) N optimization	Use of various techniques to optimize fertilizer rates (precision agriculture, optical sensors, in-field N rate tests).
Timing	Improved N fertilizer timing, such as switching from fall to spring application or from pre-plant to side from pre-plant to side-dress application.

Suppliers may enter multiple lines of data. Each unique combination of management, crop-rotation, climate, and soil-type should be reported as a separate entry.

6.2.3.7.2 Question NAT.7 Calculator

6.2.3.7.3 Question NAT.8 Calculation



6.2.3.7.4 Question NAT.7 Source documentation

Model inputs *required field	Source	Units	Notes
Location*	Supplier input	Selected from dropdown	All US states with the option to select county
Crop*	Supplier input	Selected from dropdown	Crop options include: • Corn • Soy • Wheat • Other (free text)
Food/Feed*	Supplier input	Selected from dropdown	Food/feed options include: • Food use • Beef cattle feed • Dairy cattle feed • Swine feed • Egg laying hen feed

Model inputs *required field	Source	Units	Notes
			• Chicken (meat) feed • Turkey feed • Farmed salmon feed • Farmed shrimp feed • Other feed
Acreage*	Supplier input	Acres/hectares	Number of acres crops were sourced from.
Management Practice*	Supplier input	Selected from dropdown	Cover crop options: • None • Legume • Non-legume Tillage options: • Conventional • Reduced-till • No-till Fertilizer practices (multi-select): • Model • VRT (variable rate technology) • Timing
Emission Factors	Developed in partnership with Cornell University	Metric tons CO_2e/ha	See Soil-Health Methodology document for a full list of emission factors and calculations.
Spatial Conversion Factor	Walmart Provided	Acres toward nature commitment per acre reported	Spatial Conversion Factor = 1
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Calculated based on supplier input.
Acres Toward Nature Commitment	Calculated value	Acres	Calculated based on supplier input.

6.2.3.8 *Question NAT.8: Have you sourced row crops grown using sustainable practices?*

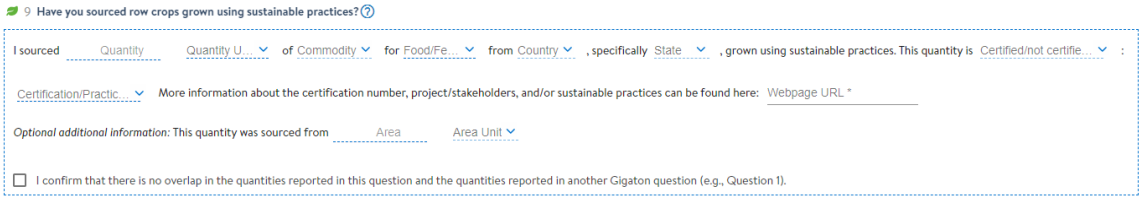
6.2.3.8.1 Question NAT.8 Background and definitions

This calculator has both a carbon and nature benefit, meaning the data captured through this question will be used to calculate both spatial equivalents and avoided greenhouse gas emissions. Avoided emissions are calculated for certified commodities. Note that there are no emission factors for all combinations of certified commodities so emissions may not be calculated.

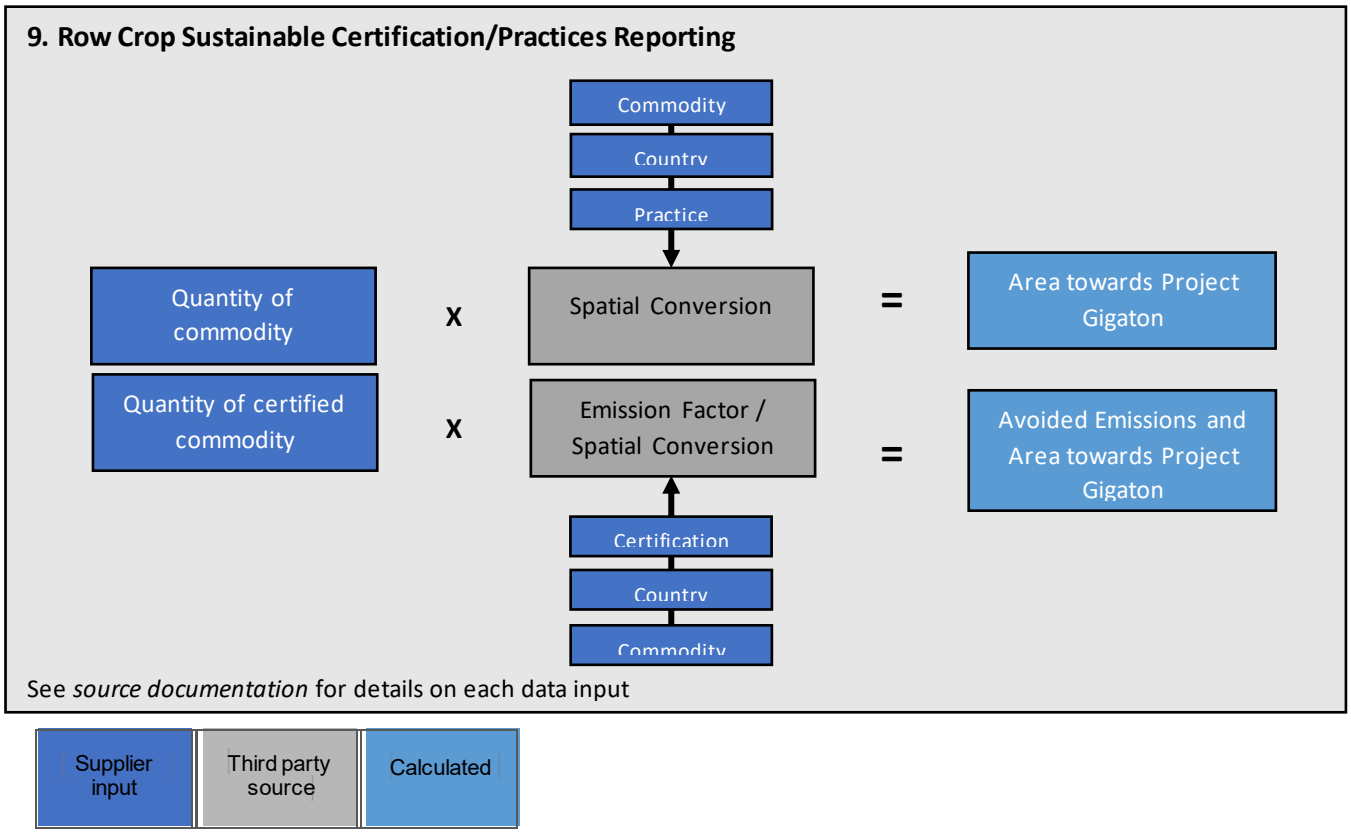
Spatial equivalents are captured for all commodities, both certified and grown using specified practices listed in the source documentation. Note that there are no spatial conversion factors for all combinations of answers so area may not be calculated. However, suppliers are encouraged to provide area in their answers.

Suppliers may enter multiple combinations of acre, location, crop, and certification/practices, but the same combination of crop and location should not be reported twice; thus suppliers should aggregate data from different farms with the same crop and location and report as a single entry. Please do not report certifications or practices for commodities that have already been reported in other questions to avoid double counting.

6.2.3.8.2 Question NAT.8 Calculator



6.2.3.8.3 Question NAT.8 Calculation



6.2.3.8.4 Question NAT.8 Source documentation

Model inputs **required field*	Source	Units	Notes
Quantity*	Supplier input	MT, acres, or hectares	Refers to total production or area of specified commodity
Commodity*	Supplier input	Selected from dropdown	Commodities include: • Barley • Cotton • Corn/maize • Oats • Rice • Soy • Sugar beets • Wheat
Food/Feed*	Supplier input	Selected from dropdown	Food/Feed options include: • Food • Beef cattle feed • Dairy cattle feed • Swine feed • Egg laying hen feed • Chicken (meat) feed • Turkey feed • Farmed salmon feed • Farmed shrimp feed • Other feed
Country*	Supplier input	Selected from dropdown	Select from a list of all countries.
State	Supplier input	Selected from dropdown	Option to select any US state or Canadian Province.
Certified/Not Certified*	Supplier input	Selected from dropdown	Supplier indicates whether these sourced commodities were certified through one of the certification practices listed below or not certified but grown using one of the practices listed below.
Certification*	Supplier input	Selected from dropdown	Certification options include: • Fair Trade USA • Fairtrade International • Regenerative Organic Certification • USDA Organic or equivalent • Better Cotton Initiative • Cotton USA

Model inputs **required field*	Source	Units	Notes
			• Organic Cotton Certification • Cefetra Responsible Soy • International Sustainability and Carbon Certification ISSC • ProTerra • Round Table on Responsible Soy RTRS - Mass Balance
Practice*	USDA and in conjunction with our partners	Select all applicable from dropdown	Practice Options include: • Precision agriculture and/or nitrogen fertilizer modeling to optimize yield • Mid- to late-season application informed by nitrogen-loss monitoring using real-time weather data • Optical sensors with nutrient use efficiency improvement lower than 20% or unknown • Nutrient/Soil management based on soil mapping • High efficiency/sub-surface drip fertigation • Working with an agronomist to evaluate and improve nutrient use efficiency • Combination of tools, programs, or farmer surveys with sufficient data showing nutrient use efficiency improvement of 10-20% • Overall rate recommendations optimized using real-time weather data • Use of a nitrification inhibitor • Optical sensors showing nutrient use efficiency improvement of more than 20% • Combination of tools, programs, or farmer surveys with sufficient data showing nutrient use efficiency improvement of more than 20% • No-till • Agricultural conservation easement • conservation tillage

Model inputs *required field*	Source	Units	Notes
			• integrated pest management • pollinator habitat development • implement water management plan • hedgerow plantings • riparian corridor/forest restoration • grassed waterways • constructed wetlands • use of approved chemicals only • Cover crops with nitrogen fixing crops • Crop rotation with nitrogen fixing crops • 4R nutrient management • maintaining field margins • edge of field management
Emissions factors	Developed using USDA model for Greenhouse Gas Emissions	Metric tons CO_2e per acre per year	Emission factors are currently only available for some crop, location, and certification/practices. See *Nature pillar table: Avoided emission factors* in *Question NAT.10 Emission factors* section for full list of emissions factors.
Spatial Conversion Factor	Walmart Provided	MT commodity /acre	Spatial Conversion Factor = 1 when acreage is provided. See *Nature pillar table: Spatial conversion factors* for full list of emissions factors.
Avoided Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Calculated based on supplier input
Area Toward Project Gigaton	Calculated value	Acres	Total area counted toward Project Gigaton nature commitment using spatial conversion factors.

6.2.3.8.5 Question NAT.8 Emission and spatial conversion factors

Nature pillar table: Avoided emission factors

Commodity	Geography	Validation Mechanism	Avoided Emission Factor (ton CO_2e/ton commodity)
COCOA	Angola	Rainforest Alliance	1.37
COCOA	Angola	Fair Trade International	1.37
COCOA	Angola	GFW Pro	0.685
COCOA	Brazil	Rainforest Alliance	0.44
COCOA	Brazil	Fair Trade International	0.44
COCOA	Brazil	GFW Pro	0.22
COCOA	Cameroon	Rainforest Alliance	1.52
COCOA	Cameroon	Fair Trade International	1.52
COCOA	Cameroon	GFW Pro	0.76
COCOA	Cote d'Ivoire	Rainforest Alliance	0.66
COCOA	Cote d'Ivoire	Fair Trade International	0.66
COCOA	Cote d'Ivoire	GFW Pro	0.33
COCOA	Ghana	Rainforest Alliance	0.77
COCOA	Ghana	Fair Trade International	0.77
COCOA	Ghana	GFW Pro	0.385
COCOA	Indonesia	Rainforest Alliance	3.12
COCOA	Indonesia	Fair Trade International	3.12
COCOA	Indonesia	GFW Pro	1.560
COCOA	Madagascar	Rainforest Alliance	0.57
COCOA	Madagascar	Fair Trade International	0.57
COCOA	Madagascar	GFW Pro	0.285
COCOA	Malaysia	Rainforest Alliance	6.64
COCOA	Malaysia	Fair Trade International	6.64
COCOA	Malaysia	GFW Pro	3.320
COCOA	Nigeria	Rainforest Alliance	1.33
COCOA	Nigeria	Fair Trade International	1.33
COCOA	Nigeria	GFW Pro	0.665
COCOA	Papua New Guinea	Rainforest Alliance	7
COCOA	Papua New Guinea	Fair Trade International	7
COCOA	Papua New Guinea	GFW Pro	3.500
COCOA	Peru	Rainforest Alliance	0.68
COCOA	Peru	Fair Trade International	0.68
COCOA	Peru	GFW Pro	0.340
COCOA	Sierra Leone	Rainforest Alliance	0.2
COCOA	Sierra Leone	Fair Trade International	0.2
COCOA	Sierra Leone	GFW Pro	0.100
COCOA	Venezuela	Rainforest Alliance	1.03
COCOA	Venezuela	Fair Trade International	1.03
COCOA	Venezuela	GFW Pro	0.515
COFFEE	Brazil	Fair Trade International	0.07
COFFEE	Brazil	Rainforest Alliance	0.07
COFFEE	Brazil	GFW Pro	0.035

Commodity	Geography	Validation Mechanism	Avoided Emission Factor (ton CO_2e/ton commodity)
COFFEE	Colombia	Fair Trade International	0.33
COFFEE	Colombia	Rainforest Alliance	0.33
COFFEE	Colombia	GFW Pro	0.165
COFFEE	Indonesia	Fair Trade International	1.7
COFFEE	Indonesia	Rainforest Alliance	1.7
COFFEE	Indonesia	GFW Pro	0.85
COFFEE	Malaysia	Fair Trade International	0.31
COFFEE	Malaysia	Rainforest Alliance	0.31
COFFEE	Malaysia	GFW Pro	0.155
COFFEE	Peru	Fair Trade International	0.54
COFFEE	Peru	Rainforest Alliance	0.54
COFFEE	Peru	GFW Pro	0.27
COFFEE	Uganda	Fair Trade International	0.47
COFFEE	Uganda	Rainforest Alliance	0.47
COFFEE	Uganda	GFW Pro	0.235
MAIZE/CORN	Argentina	GFW Pro	0.025
MAIZE/CORN	Brazil	GFW Pro	0.05
MAIZE/CORN	China	GFW Pro	0.002
MAIZE/CORN	Russia	GFW Pro	0.025
MAIZE/CORN	South Africa	GFW Pro	0.004
MAIZE/CORN	Ukraine	GFW Pro	0.0015
MAIZE/CORN	USA	GFW Pro	0.002
COTTON	Brazil	GFW Pro	0.35
COTTON	Cameroon	GFW Pro	1.66
COTTON	Central African Republic	GFW Pro	4.89
COTTON	China	GFW Pro	0.005
COTTON	India	GFW Pro	0.005
COTTON	Nigeria	GFW Pro	1.28
COTTON	USA	GFW Pro	0.03
COTTON	Vietnam	GFW Pro	0.12
PALM	Cameroon	RSPO	0.024
PALM	Cameroon	Rainforest Alliance	0.024
PALM	Cameroon	International Sustainability and Carbon Certification (ISCC)	0.024
PALM	Cameroon	GFW Pro	0.012
PALM	Colombia	RSPO	0.01
PALM	Colombia	Rainforest Alliance	0.01
PALM	Colombia	International Sustainability and Carbon Certification (ISCC)	0.01
PALM	Colombia	GFW Pro	0.005
PALM	Democratic Republic of Congo	RSPO	0.03

Commodity	Geography	Validation Mechanism	Avoided Emission Factor (ton CO_2e/ton commodity)
PALM	Democratic Republic of Congo	Rainforest Alliance	0.03
PALM	Democratic Republic of Congo	International Sustainability and Carbon Certification (ISCC)	0.03
PALM	Democratic Republic of Congo	GFW Pro	0.015
PALM	Ecuador	RSPO	0.022
PALM	Ecuador	Rainforest Alliance	0.022
PALM	Ecuador	International Sustainability and Carbon Certification (ISCC)	0.022
PALM	Ecuador	GFW Pro	0.011
PALM	Guatemala	RSPO	0.02
PALM	Guatemala	Rainforest Alliance	0.02
PALM	Guatemala	International Sustainability and Carbon Certification (ISCC)	0.02
PALM	Guatemala	GFW Pro	0.01
PALM	Guinea	RSPO	0.008
PALM	Guinea	Rainforest Alliance	0.008
PALM	Guinea	International Sustainability and Carbon Certification (ISCC)	0.008
PALM	Guinea	GFW Pro	0.004
PALM	Indonesia	RSPO	0.06
PALM	Indonesia	Rainforest Alliance	0.06
PALM	Indonesia	International Sustainability and Carbon Certification (ISCC)	0.06
PALM	Indonesia	GFW Pro	0.03
PALM	Malaysia	RSPO	0.03
PALM	Malaysia	Rainforest Alliance	0.03
PALM	Malaysia	International Sustainability and Carbon Certification (ISCC)	0.03
PALM	Malaysia	GFW Pro	0.015
PALM	Nigeria	RSPO	0.03
PALM	Nigeria	Rainforest Alliance	0.03
PALM	Nigeria	International Sustainability and Carbon Certification (ISCC)	0.03
PALM	Nigeria	GFW Pro	0.015
PALM	Papua New Guinea	RSPO	0.15
PALM	Papua New Guinea	Rainforest Alliance	0.15
PALM	Papua New Guinea	International Sustainability and Carbon Certification (ISCC)	0.15
PALM	Papua New Guinea	GFW Pro	0.075
SOY	Global/All Countries	Round Table on Responsible Soy (RTRS)	0

Commodity	Geography	Validation Mechanism	Avoided Emission Factor (ton CO_2e/ton commodity)
SOY	Global/All Countries	ProTerra	0
SOY	Argentina	Round Table on Responsible Soy (RTRS)	0.05
SOY	Argentina	ProTerra	0.05
SOY	Argentina	GFW Pro	0.025
SOY	Bolivia	Round Table on Responsible Soy (RTRS)	0.39
SOY	Bolivia	ProTerra	0.39
SOY	Bolivia	GFW Pro	0.195
SOY	Brazil	Round Table on Responsible Soy (RTRS)	0.2
SOY	Brazil	ProTerra	0.2
SOY	Brazil	GFW Pro	0.1
SOY	Brazil	Cefetra Responsible Soy	0.2
SOY	Cambodia	Round Table on Responsible Soy (RTRS)	0.93
SOY	Cambodia	ProTerra	0.93
SOY	Cambodia	GFW Pro	0.465
SOY	Ecuador	Round Table on Responsible Soy (RTRS)	1.85
SOY	Ecuador	ProTerra	1.85
SOY	Ecuador	GFW Pro	0.925
SOY	Gabon	Round Table on Responsible Soy (RTRS)	0.0011
SOY	Gabon	ProTerra	0.0011
SOY	Gabon	GFW Pro	0.00055
SOY	Paraguay	Round Table on Responsible Soy (RTRS)	0.35
SOY	Paraguay	ProTerra	0.35
SOY	Paraguay	GFW Pro	0.175
SOY	Uganda	Round Table on Responsible Soy (RTRS)	0.39
SOY	Uganda	ProTerra	0.39
SOY	Uganda	GFW Pro	0.195
SOY	Uruguay	Round Table on Responsible Soy (RTRS)	0.024
SOY	Uruguay	ProTerra	0.024
SOY	Uruguay	GFW Pro	0.012
SOY	Venezuela	Round Table on Responsible Soy (RTRS)	1.52
SOY	Venezuela	ProTerra	1.52
SOY	Venezuela	GFW Pro	0.76
WHEAT	Argentina	GFW Pro	0.085

Commodity	Geography	Validation Mechanism	Avoided Emission Factor (ton CO_2e/ton commodity)
WHEAT	Brazil	GFW Pro	0.21
WHEAT	Canada	GFW Pro	0.04
WHEAT	Russia	GFW Pro	0.04
WHEAT	USA	GFW Pro	0.01
BEEF (FEED)	Australia	GFW Pro	1.73
BEEF (FEED)	Brazil	Agrotools	1.77
BEEF (FEED)	Brazil	Terras	1.77
BEEF (FEED)	Brazil	Safe Trace	1.77
BEEF (FEED)	Brazil	SIMFaz	1.77
BEEF (FEED)	Canada	GFW Pro	0.865
BEEF (FEED)	France	GFW Pro	0.045
BEEF (FEED)	USA	GFW Pro	0.2
PULP & PAPER	Global/All Countries	FSC	0.1
PULP & PAPER	Anguilla	PEFC	0.1
PULP & PAPER	Belgium	PEFC	0.1
PULP & PAPER	Czech Republic	PEFC	0.1
PULP & PAPER	Denmark	PEFC	0.1
PULP & PAPER	Estonia	PEFC	0.1
PULP & PAPER	Germany	PEFC	0.1
PULP & PAPER	Hungary	PEFC	0.1
PULP & PAPER	Ireland	PEFC	0.1
PULP & PAPER	Latvia	PEFC	0.1
PULP & PAPER	Lithuania	PEFC	0.1
PULP & PAPER	Netherlands	PEFC	0.1
PULP & PAPER	Portugal	PEFC	0.1
PULP & PAPER	South Korea	PEFC	0.1
PULP & PAPER	Spain	PEFC	0.1
PULP & PAPER	Switzerland	PEFC	0.1
PULP & PAPER	United Kingdom	PEFC	0.1
TIMBER	Global/All Countries	FSC	0.1
TIMBER	Anguilla	PEFC	0.003
TIMBER	Belgium	PEFC	0.003
TIMBER	Czech Republic	PEFC	0.003
TIMBER	Denmark	PEFC	0.003
TIMBER	Estonia	PEFC	0.003
TIMBER	Germany	PEFC	0.003
TIMBER	Hungary	PEFC	0.003
TIMBER	Ireland	PEFC	0.003
TIMBER	Latvia	PEFC	0.003
TIMBER	Lithuania	PEFC	0.003
TIMBER	Netherlands	PEFC	0.003
TIMBER	Portugal	PEFC	0.003

Commodity	Geography	Validation Mechanism	Avoided Emission Factor (ton CO_2e/ton commodity)
TIMBER	South Korea	PEFC	0.003
TIMBER	Spain	PEFC	0.003
TIMBER	Switzerland	PEFC	0.003
TIMBER	United Kingdom	PEFC	0.003

Source: WWF

Refer to *Avoided emissions methodology* within the *Nature Pillar Calculation Methods* section for calculation details.

Nature pillar table: Spatial conversion factors

Commodity	Country	State	Spatial Conversion Factor (MT/acre)	Source
Beef	US	Average	0.23	Asem-Hiablie, et al (2017). Management characteristics of beef cattle production in the western US. ARPAS.; Asem-Hiablie, et al (2018). Management characteristics of beef cattle production in the eastern US. ARPAS.; Asem-Hiablie, et al (2016). Management characteristics of beef cattle production in the Northern Plains and Midwest regions of the US. ARPAS.; Asem-Hiablie, et al (2015). Management characteristics of cow-calf, stocker, and finishing operations in Kansas, Oklahoma, and Texas. ARPAS.
Beef	Brazil		0.23	
Beef	Argentina		0.23	
Beef	Paraguay		0.23	
Beef	Colombia		0.23	
Corn	Global		2.32	FAO
Corn	Brazil		2.14	FAO
Corn	China		2.46	FAO
Corn	US	Average	4.39	USDA NASS
Corn	US	Illinois	4.9	USDA NASS
Corn	US	Indiana	4.37	USDA NASS
Corn	US	Iowa	5.04	USDA NASS
Corn	US	Minnesota	4.73	USDA NASS
Corn	US	Nebraska	4.66	USDA NASS
Cotton	Global		0.87	FAO
Cotton	Brazil		1.63	FAO
Cotton	China		1.85	FAO
Cotton	India		0.53	FAO
Cotton	Turkey		1.96	FAO

Commodity	Country	State	Spatial Conversion Factor (MT/acre)	Source
Cotton	Pakistan		0.79	FAO
Cotton	US	Average	0.94	USDA NASS for lint cotton, which was then converted to seed cotton using a 41% lint percentage conversion (sources: Cotton.org; UTexas Extension)
Cotton	US	Texas	0.78	
Cotton	US	Georgia	0.97	
Cotton	US	Mississippi	1.22	
Cotton	US	Arkansas	1.26	
Cotton	US	Alabama	1.00	
Rice	Global		3.10	FAO
Rice	China		4.69	FAO
Rice	India		2.6	FAO
Rice	Pakistan		2.54	FAO
Rice	Thailand		2.01	FAO
Rice	US	Average	3.8	USDA NASS
Rice	US	Arkansas	3.72	USDA NASS
Rice	US	California	4.39	USDA NASS
Rice	US	Louisiana	3.44	USDA NASS
Rice	US	Missouri	3.68	USDA NASS
Rice	US	Mississippi	3.69	USDA NASS
Rice	US	Texas	3.76	USDA NASS
Soy	Global		1.12	FAO
Soy	Brazil		1.29	FAO
Soy	China		0.75	FAO
Soy	Thailand		0.65	FAO
Soy	US	Average	1.35	USDA NASS
Soy	US	Illinois	1.58	USDA NASS
Soy	US	Indiana	1.47	USDA NASS
Soy	US	Iowa	1.55	USDA NASS
Soy	US	Minnesota	1.32	USDA NASS
Soy	US	Nebraska	1.59	USDA NASS
Wheat	Global		1.4	FAO
Wheat	Brazil		1.05	FAO
Wheat	Canada		1.33	FAO
Wheat	China		2.21	FAO
Wheat	US	Avg	1.31	USDA NASS
Wheat	US	Kansas	1.26	USDA NASS
Wheat	US	Montana	1.01	USDA NASS
Wheat	US	North Dakota	1.23	USDA NASS
Wheat	US	Oklahoma	0.91	USDA NASS
Cocoa	Global		0.18	FAO
Cocoa	Cote d'Ivoire		0.19	FAO
Cocoa	Ghana		0.21	FAO
Cocoa	Indonesia		0.17	FAO
Coffee	Global		0.36	FAO
Coffee	Brazil		0.64	USDA FAS

Commodity	Country	State	Spatial Conversion Factor (MT/acre)	Source
Coffee	Colombia		0.4	USDA FAS
Coffee	Indonesia		0.23	USDA FAS
Coffee	Malaysia		1.25	FAO
Coffee	Peru		0.33	USDA FAS
Coffee	Central America		0.26	FAO
Palm Oil	Global		1.04	FAO
Palm Oil	Guatemala		1.77	FAO
Palm Oil	Indonesia		1.14	FAO
Palm Oil	Malaysia		1.57	FAO
Pulp & Paper/Timber	Canada		5.53	FAO, Natural Resource Canada
Pulp & Paper/Timber	US		7.51	FAO, USDA
Pulp & Paper/Timber	Global		4.45	Arets 2012
Farmed Shrimp	China		1.7879	Boyd et al 2021
Farmed Shrimp	Ecuador		1.4685	Boyd et al 2021
Farmed Shrimp	India		1.563	Boyd et al 2021
Farmed Shrimp	Indonesia		0.8333	Boyd et al 2021
Farmed Shrimp	Thailand		4.163	Boyd et al 2021
Farmed Shrimp	Vietnam		0.3854	Boyd et al 2021

Commodity	Country	State	Spatial Conversion Factor (MT/mi^2)	Source
Farmed Salmon	Chile		0.000149	Skontorp Hognes 2011
Wild-Caught Salmon	Russia (MSC, FIP)		2.6072	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Salmon	United States (MSC, AK RFM, FIP)		2.4989	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Salmon	Other (FIP)		2.6072	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Shrimp	Thailand (MSC, FIP)		14.3993	FAO, Certification and Ratings Collaborative, Sea Around Us

Commodity	Country	State	Spatial Conversion Factor (MT/mi^2)	Source
Wild-Caught Shrimp	Indonesia (MSC, FIP)		3.1212	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Shrimp	India (MSC, FIP)		8.4870	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Shrimp	Other (MSC)		0.8621	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Shrimp	Other (GULF RFM)		2.6715	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Shrimp	Other (MEL)		1.9022	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Shrimp	Other (FIP)		14.3993	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Tuna	IATTC (MSC, MEL, FIP)		0.0247	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Tuna	WCPFC (MSC, MEL, FIP)		0.0658	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Tuna	IOTC (MSC, MEL, FIP)		0.0492	FAO, Certification and Ratings Collaborative, Sea Around Us
Wild-Caught Tuna	ICCAT (MSC, MEL, FIP)		0.0156	FAO, Certification and Ratings Collaborative, Sea Around Us

Refer to *Spatial Conversion methodology* within the *Nature Pillar Calculation Methods* section for calculation details.

6.2.3.9 *Question NAT.9: Have you sourced forest-risk commodities - Beef, Soy, Palm Oil, Pulp, Paper, Timber, Cocoa, Coffee - that have been verified or certified as deforestation and conversion free (DCF)?*

6.2.3.9.1 Question NAT.9 Background and definitions

This question covers deforestation of select forest-risk commodities recognized in the Walmart Forests Policy (i.e., Beef, Cocoa, Coffee, Palm, Pulp/Paper, Soy, Timber). This calculator has both a carbon and nature benefit, meaning the data captured through this question will be used to capture both spatial equivalents and avoided greenhouse gas emissions. Spatial equivalents are captured from commodities sourced using certifications, whereas commodities sourced through verification approaches do not have a spatial calculation. Both certified and verified sources of commodities have avoided emissions calculations.

Acceptable certifications include explicit criteria for deforestation-free and conversion-free (DCF) production and include chain of custody systems (e.g., segregated and identity preserved) for traceability to point of origin (farm, plantation, etc.). Acceptable verifications approaches use credible geospatial monitoring that can effectively assess whether deforestation and/or conversion has occurred on the supplying production unit (e.g., farm or concession) and are appropriately calibrated for geographic and commodity contexts.

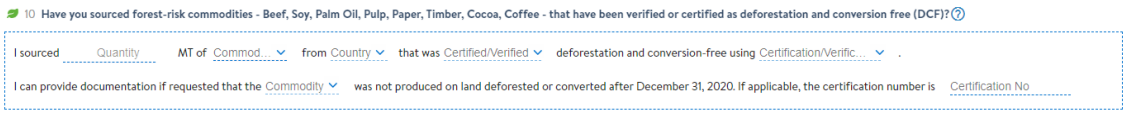
Not all geographic sources have significant forest risk. All countries, certifications, and verifications associated with each commodity are listed in the *Nature pillar table: Forest-risk commodities,* below. Any country, certification, or verification not listed in this question can be answered in other questions.

Nature pillar table: Forest-risk commodities

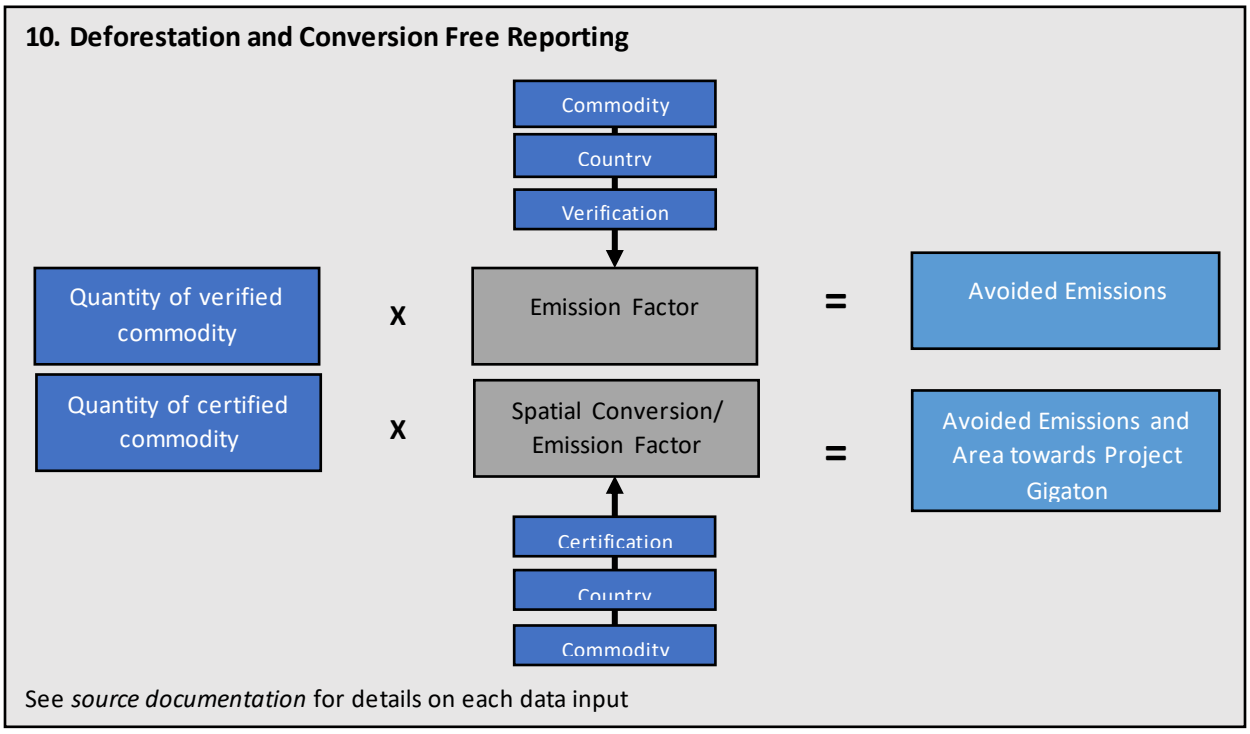
Commodity	Country	Certifications	Verifications
Beef	Australia, Brazil, Canada, France, United States	None	Brazil - Agrotools, Safe Trace, SIMFaz, Terras All other countries – GFW Pro
Cocoa	Angola, Brazil, Cameroon, Cote dIvoire, Ghana, Indonesia, Madagascar, Malaysia, Nigeria, Papua New Guinea, Peru, Sierra Leone, Venezuela	Rainforest Alliance – Segregated or Identity Preserved	GFW Pro
Coffee	Brazil, Colombia, Indonesia, Malaysia, Peru Uganda,	Rainforest Alliance – Segregated or Identity Preserved	GFW Pro
Palm	Cameroon, Colombia, Democratic Republic of Congo, Ecuador, Guatemala, Guinea, Indonesia, Malaysia, Nigeria, Papua New Guinea	Rainforest Alliance – Segregated or Identity Preserved, RSPO - Segregated or Identity Preserved	GFW Pro
Pulp & Paper	Global	FSC	GFW Pro
Soy	Argentina, Bolivia, Brazil, Cambodia, China, Ecuador, Gabon, Paraguay, Thailand, Uruguay, United States, Venezuela	Round Table on Responsible Soy (RTRS) - Segregated	GFW Pro
Timber	Global	FSC	GFW Pro

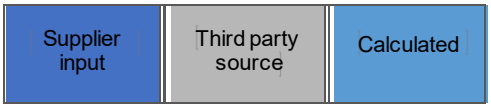
Suppliers may enter multiple combinations of acre, location, crop, and certification/practices, but the same combination of crop and location should not be reported twice; thus suppliers should aggregate data from different farms with the same crop and location and report as a single entry. Please do not report certifications or practices for commodities that have already been reported in other questions to avoid double counting.

6.2.3.9.2 Question NAT.9 Calculator



6.2.3.9.3 Question NAT.9 Calculation





6.2.3.9.4 Question NAT.9 Source documentation

Model inputs **required field*	Source	Units	Notes
Quantity*	Supplier input	MT	Refers to total production or area of certified commodity
Commodity*	Supplier input	Selected from dropdown	Refer to *Nature pillar table. Forest-Risk commodities* in *Question NAT.10 Background and definitions* section
Country*	Supplier input	Selected from dropdown	Country options depend on the commodity selected. Refer to *Nature pillar table. Forest-Risk commodities* in *Question NAT.10 Background and definitions*

Model inputs *required field	Source	Units	Notes
Certified/Verified*	Supplier input	Selected from dropdown	Supplier indicates whether these commodities were either certified or verified using one of the practices listed in *Nature pillar table. Forest-Risk commodities* in *Question NAT.10 Background and definitions* section
Certification	Supplier input	Selected from dropdown	Certification options depend on the commodity selected. Refer to *Nature pillar table. Forest-Risk commodities* in *Question NAT.10 Background and definitions* section
Verification	USDA and in conjunction with our partners	Select all applicable from dropdown	Verification options depend on the commodity selected. Refer to *Nature pillar table. Forest-Risk commodities* in *Question NAT.10 Background and definitions* section
Emissions factors	Developed using USDA model for Greenhouse Gas Emissions	MT CO_2e per MT Commodity	See *Nature pillar table: Avoided emission factors* in *Question NAT.9 Emission and spatial conversion factors* for full list of emissions factors.
Spatial Conversion Factor	Walmart Provided	MT commodity /acre	Acres using a verification approach are not counted towards the project gigaton nature commitment. See *Nature pillar table: Spatial conversion factors* in *Question NAT.9 Emission and spatial conversion factors* for full list of emissions factors.
Avoided Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Calculated based on supplier input
Area Toward Project Gigaton	Calculated value	Acres	Total area counted toward project gigaton nature commitment using spatial conversion factors.

6.2.3.9.5 Question NAT.9 Emission factors

See *Nature pillar table: Avoided emission factors* and *Spatial conversion factors* in *Question NAT.9 Emission and spatial conversion factors* section.

6.2.3.10 *Question NAT.10: Have you sourced other commodities produced with sustainable practices?*

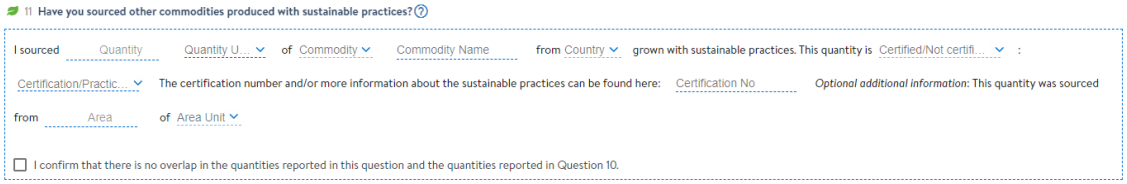
6.2.3.10.1 Question NAT.10 Background and definitions

This calculator has both a carbon and nature benefit, meaning the data captured through this question may be used to calculate both spatial equivalents and avoided greenhouse gas emissions depending on the inputs. Spatial equivalents are captured for all commodities, both certified and grown using specified practices listed in the source documentation. Avoided greenhouse gas emissions are calculated for some certified commodities. Note that there are no conversion factors for all combinations of answers so the emissions and/or area may not be calculated.

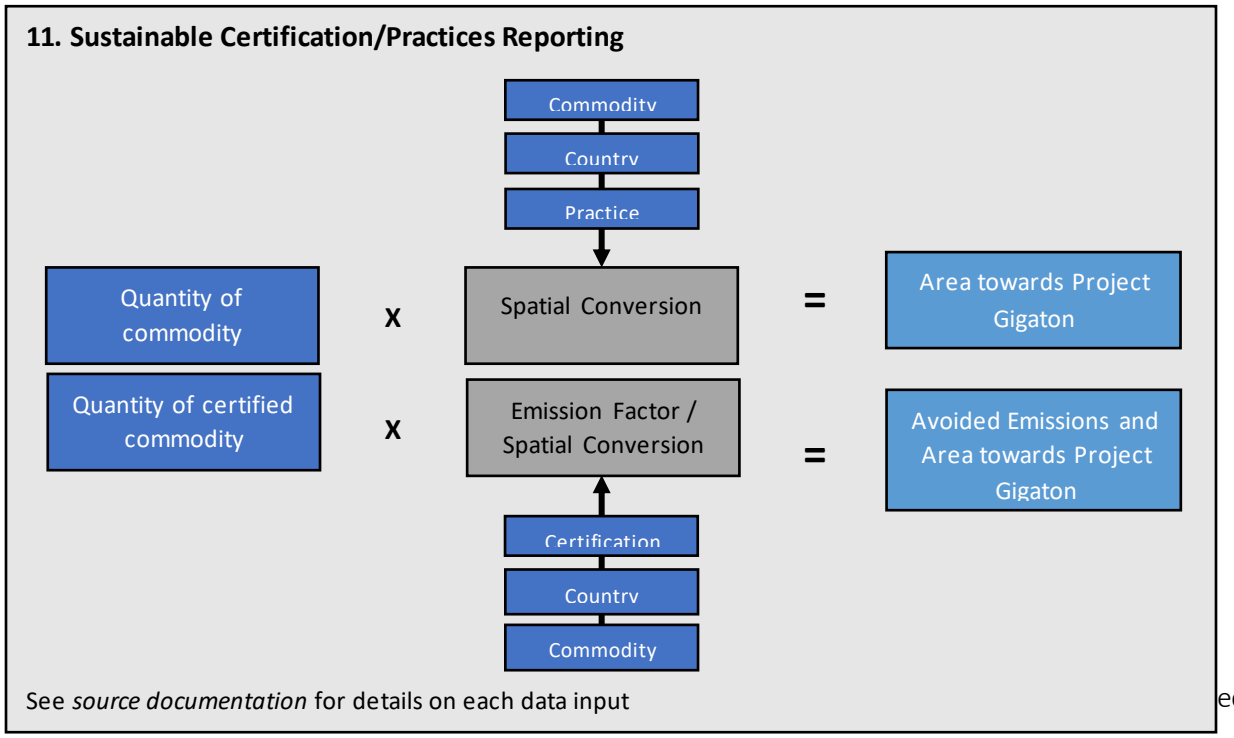
This question is specific to annual or perennial produce, nuts, sugar cane, tree crops or tea. Row crops (e.g., barley, corn, cotton, oats, rice, soy, sugar beets, and wheat) and livestock are NOT included in this question. Refer to the other questions for these other commodities.

Suppliers may enter multiple combinations of acre, location, crop, and certification/practices, but the same combination of crop and location should not be reported twice; thus suppliers should aggregate data from different farms with the same crop and location and report as a single entry. Please do not report certifications or practices for commodities that have already been reported in other questions to avoid double counting.

6.2.3.10.2 Question NAT.10 Calculator



6.2.3.10.3 Question NAT.10 Calculation



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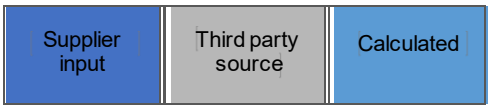


6.2.3.10.4 Question NAT.10 Source documentation

Model inputs *required field*	Source	Units	Notes
Quantity	Supplier input	MT, acres, or hectares	Refers to total production or area of specified commodity
Commodity	Supplier input	Selected from dropdown or free text	Commodities include: • Almonds • Apples • Bananas • Blueberries • Cocoa • Coffee • Grapes • Lettuce • Oranges • Palm • Peanuts • Pineapple • Potatoes • Pulp/Paper • Rubber • Strawberries • Sugar cane • Tea • Timber • Tomatoes • Other, please specify
Country	Supplier input	Select from dropdown	Select from a list of all countries
Certified/Not Certified	Supplier input	Select from dropdown	Supplier indicates whether these commodities were either certified or not certified but grown using known practices

Model inputs **required field*	Source	Units	Notes
Certification	Supplier input	Select from dropdown	Certification options vary based on the selected commodity, but include the following: • Bonsucro • Fair Trade USA • Fairtrade International • FSC • Global Organic Latex Standard GOLS • Indonesian Sustainable Palm Oil ISPO • International Sustainability and Carbon Certification ISCC • PEFC • Rainforest Alliance - Mass Balance • Regenerative Organic Certification • Regenerative Organic Certification • RSPO - Mass Balance • SFI • USDA Organic or equivalent
Practices	Supplier input	Select all applicable from dropdown	Practice options include: • 4R nutrient management • Alley cropping/intercropping • Conservation cover • Cover crops or crop residue management • Edge of field management (e.g., border planting, live fences, hedgerows, windbreaks, vegetative barriers) • Integrated pest management • Mulching • Not produced on recently converted land areas • Pollinator habitat development • Riparian corridor or streamside management zone

Model inputs *required field	Source	Units	Notes
			• Terracing and/or contour plantings • Water or irrigation management plan
Emissions factor	Developed using USDA model for Greenhouse Gas Emissions	MT CO_2e per MT commodity	See *Nature pillar table: Avoided emission factors* in *Question NAT.9 Emission factors* for full list of emissions factors.
Spatial Conversion	Based on commodity/country combination	MT commodity/acre	Spatial conversion = 1 for practice-based responses See *Nature pillar table: Spatial conversion factors* in *Question NAT.9 Emission factors* for full list of emissions factors for certified acres.
Avoided Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Calculated based on supplier input
Area Toward Project Gigaton	Calculated value	Acres	Total area counted toward project gigaton nature commitment using spatial conversion factors.

6.2.3.11 *Question NAT.11: Do you have other nature activities you'd like to report, and know how many metric tons CO_2e you saved?*

More information available in the *Reporting aggregate emissions* section.

6.3 Waste

6.3.1 Waste pillar background

Food, product and material waste is associated with significant amounts of greenhouse gas emissions. Diversion and reduction of waste can avoid greenhouse emissions that would otherwise have been emitted to create virgin material or from landfills.

Project Gigaton allows suppliers to report activity-specific reductions achieved in a supplier's operations (e.g., company waste-to-landfill) and/or supply chain (e.g., farms, factories, etc.) through food and general waste reduction and diversion activities such as recovery of materials and energy through prevention, donation, recycling, composting, anaerobic digestion, and incineration.

Additionally, the pillar accounts for food waste reduction at customer level as a result of implementing standardized date labeling.

6.3.2 Waste pillar questions

6.3.2.1 *Question W.1: Do you want to use Walmart's emissions calculator to calculate emission reductions from waste diversion or reduction from non-organic waste sources?*

6.3.2.2 *Question W.2: Do you want to use Walmart's emissions calculator to calculate emission reductions from diversion or reduction of organic wastes including food waste?*

6.3.2.2.1 Question W.1 and W.2 Background and definitions

This reporting pathway is for suppliers that do not calculate reductions using the EPA WARM tool and helps calculate the greenhouse gas impact of waste diversion and management practices in both a supplier's operations (e.g., company waste-to-landfill) and/or supply chain (e.g., farms, factories, etc.). Parts of this methodology differ from the EPA WARM tool.

6.3.2.2.1.1 Differences between the EPA WARM model and Project Gigaton waste diversion calculation

In the WARM model, greenhouse gas savings are calculated by comparing the emissions associated with managing materials under an alternative scenario (e.g., donation, recycling) with the emissions associated with the user's baseline scenario (e.g., landfilling, combustion), as opposed to simply multiplying the quantity of materials managed by an emission factor. For example, the greenhouse savings of recycling one (1) short ton of aluminum cans instead of landfilling them would be calculated as follows:

(1 short ton × -9.11 $MTCO_2E$/short ton) - (1 short ton × 0.02 $MTCO_2E$/short ton) = -9.13 $MTCO_2E$

In the waste diversion calculator, Walmart is simply multiplying the quantity of materials managed by the final management scenario's emission factor (which is more conservative) because it does not include the difference in management options.

To avoid double counting of the same activities, Walmart only allows suppliers to respond to questions W.1 and W.2 OR W.3.

6.3.2.2.1.2 Definition of waste management practices

According to EPA WARM guidance:

- Source Reduction – refers to practices that reduce the amount of materials entering the waste stream, including changes in the design, manufacture, purchase or use of materials.

- Recycling – the separation and collection of wastes, their subsequent transformation or remanufacture into usable or marketable products or materials, and the purchase of products made from recyclable materials.
- Composting – aerobic microbial decomposition that transforms organic substrates into a stable, humus-like material.
- Anaerobic Digestion – a biological process in which microorganisms break down organic material in the absence of oxygen. While breaking down this matter, the microorganisms release biogas and leave behind digested solids referred to as a digestate.
- Animal Feed – Direct feeding of food throwaways to livestock (swine, dairy, big cats, fish, etc.).
- Combustion – the burning of municipal solid waste at a waste-to-energy facility that results in emissions of CO_2 and N_2O.

In addition to the waste management practices listed in the EPA WARM model, the waste diversion calculator also includes "sent to animal feed", which is defined as the direct feeding of food throwaways to livestock (swine, dairy, big cats, fish, etc.).

6.3.2.2.2 Question W.1 and W.2 Calculators

1 **Do you want to use Walmart's emissions calculator to calculate emission reductions from waste diversion or reduction from non-organic waste sources?** Yes

Please submit your data in METRIC TONS using the tabs below for your operations and/or supply chain.

Your operations | Your supply chain

Material	Management Practice		
	Source Reduced	Recycled	Total Saved MTCO2E
Mixed Plastics			0.0
Mixed Electronics	NA		0.0
Mixed Paper			0.0
Corrugated Containers			0.0
Mixed Metals			0.0
Glass			0.0
Tires			0.0
Mixed Recyclables	NA		0.0

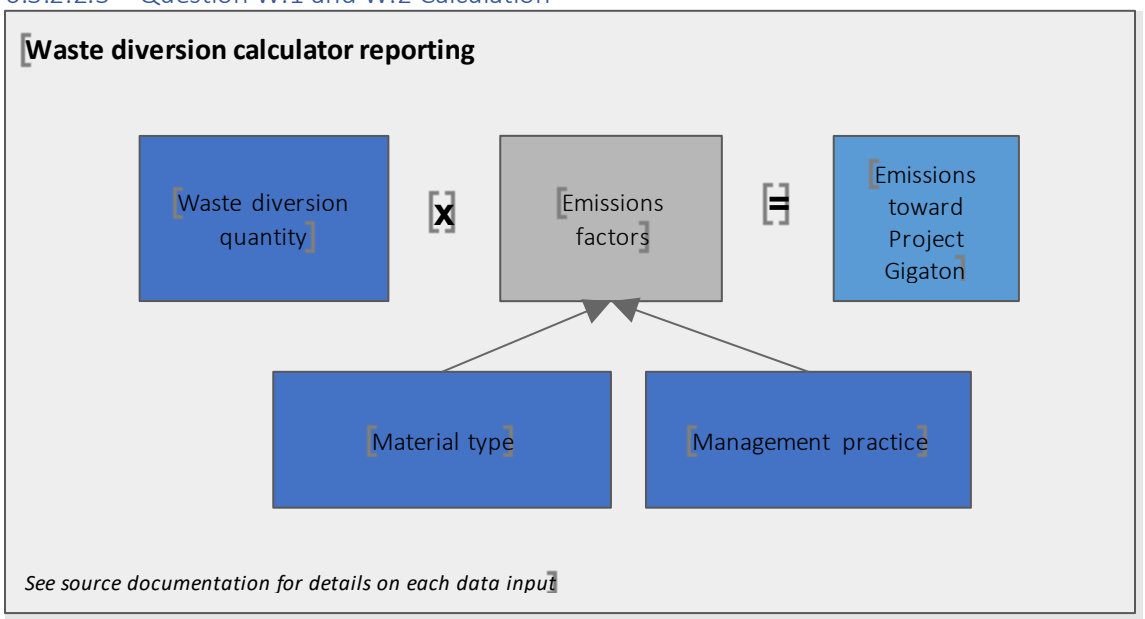
2 **Do you want to use Walmart's emissions calculator to calculate emission reductions from diversion or reduction of organic wastes including food waste?** Yes

Please submit your data in METRIC TONS using the tabs below for your operations and/or supply chain.

Your operations | Your supply chain

Material	Management Practice				
	Compost	Anaerobic Digestion	Animal feed	Source Reduced	Total Saved MTCO2E
Food Waste					0.0
Food Waste (non-meat)					0.0
Food Waste (meat)					0.0
Non-Food Waste Organic			NA	NA	0.0

6.3.2.2.3 Question W.1 and W.2 Calculation



6.3.2.2.4 Question W.1 and W.2 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	To avoid double counting, Walmart only allows suppliers to report data through waste pillar *Questions W.1 and W.2* or through *Question W.3* Suppliers may complete this question twice, once for each "Scope".
Scope*	Supplier input	Selected from dropdown	Dropdown options should include: • Operations • Supply chain
Waste diversion quantity*	Supplier input	Metric tons	Suppliers may enter multiple combinations of waste diversion quantity, material type, and management practice
Material type*	Supplier input	Selected from dropdown	See *Question W.1 and W.2 Emission factors* section for list of all dropdown options
Management practice*	Supplier input	Selected from dropdown	See *Question W.1 and W.2 Emission factors* section for list of all dropdown options

Model inputs *required field	Source	Units	Notes
Emissions factors	EPA WARM Tool v15	$MTCO_2e/MT$	See *Question W.1 and W.2 Emission factors* section for list of all emission factors

6.3.2.2.5 Question W.1 and W.2 Emission factors

All emissions factor units are metric ton CO_2e/metric of material and are from the EPA WARM tool (unless otherwise noted).

For food, suppliers may submit data at the category level (non-meat, meat). Data for food not harvested/plowed in, food sent to sewer/wastewater treatment, and food landfilled and combusted is not part of this pathway.

To generate the emission factors for "sent to animal feed" for food, the waste diversion emissions calculator utilizes EPA's donation modeling guidance which provides different emission factors per food category. Electronics have also been included as a commonly donated item and an emission factor has been assigned using EPA's reuse guidance.

Waste pillar table. General and food waste emission factors

Material	Management practice (MT CO_2e / MT)				
	Source Reduced	Recycled	Composted	Anaerobically Digested	Animal feed
Mixed plastics	2.07	1.02	NA	NA	NA
Mixed electronics	NA	0.87	NA	NA	NA
Mixed paper	6.70	3.91	NA	NA	NA
Corrugated containers	6.15	3.46	NA	NA	NA
Mixed metals	4.02	4.39	NA	NA	NA
Glass	0.59	0.30	NA	NA	NA
Tires	4.74	0.41	NA	NA	NA
Mixed recyclables	NA	3.15	NA	NA	NA
Food waste	4.03	NA	0.13	0.05	0.06
Non-meat food waste	0.84	NA	0.13	0.05	0.02
Meat food waste	16.65	NA	0.13	0.05	0.26
Non-food organics waste	NA	NA	0.06	0.10	NA

Source: EPA Waste Reduction Model (WARM) v15 November 2020

6.3.2.3 *Question W.3: Did you use the EPA's Waste Reduction Model (WARM) tool to calculate emission reductions from waste diversion or reduction?*

6.3.2.3.1 Question W.3 Background and definitions

This data component captures emissions reductions calculated using the Waste Reduction Model (WARM) tool that was created by the U.S. Environmental Protection Agency (EPA) to help solid waste planners and organizations estimate greenhouse gas (GHG) emission reductions from several different waste management practices. The EPA WARM tool provides an emissions reduction figure as result of activities tracked using the tool.

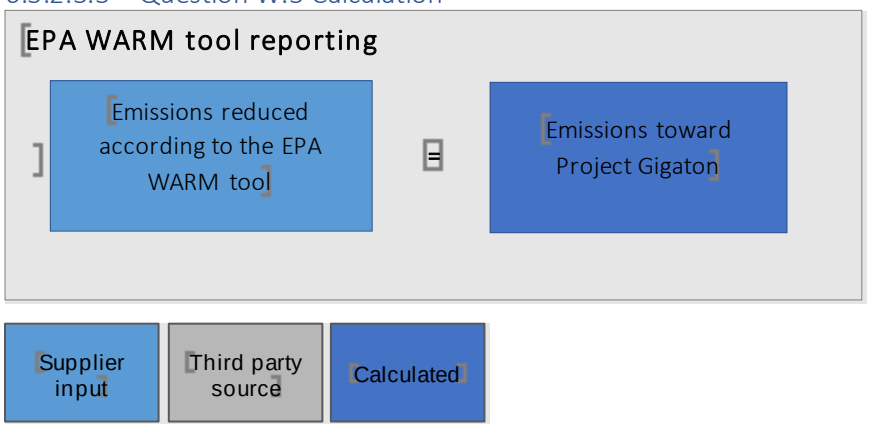
To avoid double counting of the same activities, Walmart only allows suppliers to respond to questions W.1 and W.2 OR W.3.

6.3.2.3.2 Question W.3 Calculator

3 **Did you use the EPA's Waste Reduction Model (WARM) tool to calculate emission reductions from waste diversion or reduction?**

Using the EPA WARM tool, I calculate saving _____ metric tons CO2e by managing materials through an alternative scenario in comparison with baseline scenario.

6.3.2.3.3 Question W.3 Calculation



6.3.2.3.4 Question W.3 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	To avoid double counting, Walmart only allows suppliers to report data through waste pillar *Questions W.1 and W.2* or through *Question W.3*
Emissions reduced according to the EPA WARM tool*	Supplier-provided	Metric tons CO_2e	The EPA WARM tool provides an emissions reduction figure as result of activities tracked using the tool. Suppliers may enter this value to report to Project Gigaton

6.3.2.4 *Question W.4: Have you sold food products with date labels updated to "Best if Used By" or "Use By"?*

6.3.2.4.1 Question W.4 Background and definition

Food waste reduction at customer level is an important component of the Waste pillar. This methodology was developed through collaboration between ReFED, WWF and Ohio State University, with support from the Ohio Agriculture Research and Development Center. The data pathway calculates greenhouse gas emissions reductions at the customer level that result from implementation of standardized date labeling. Transitioning to a standardized date labels ("Best if Used By" and "Use By") help eliminate confusion around expiration dates and reduce food waste at the consumer level.

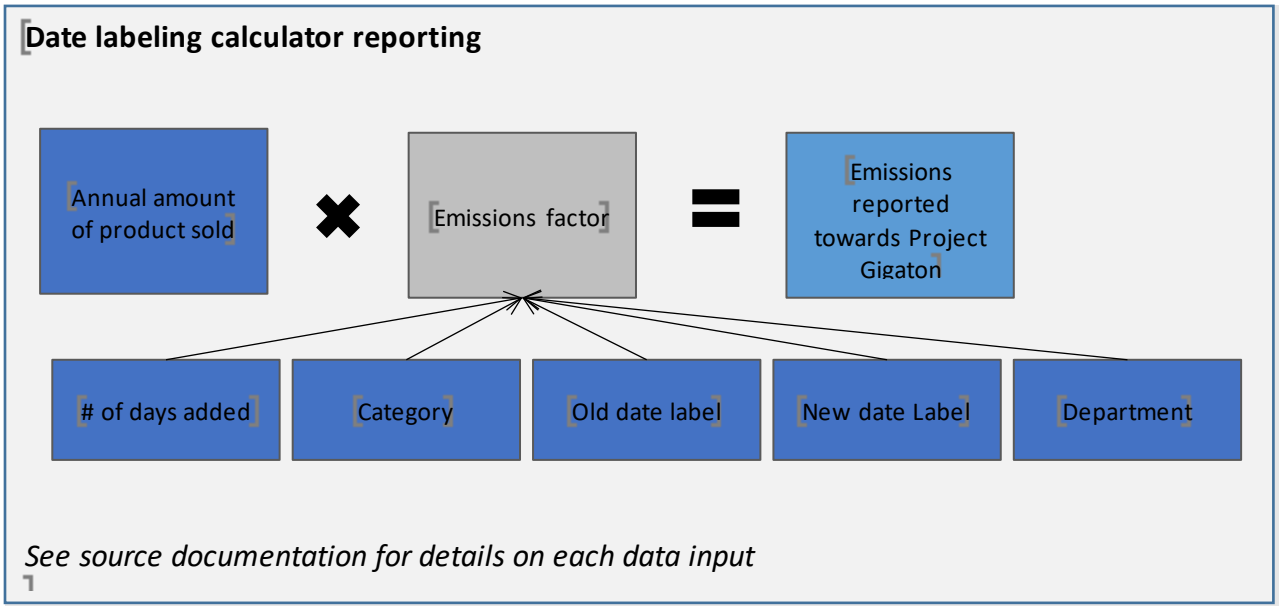
Suppliers may report for the greenhouse gas benefits of switching to standardized date labeling for products sold until the industry has transitioned 90% of all food products to "Best if Used By" and "Use By" label adoption, at which point this methodology will be removed as a reporting option.

6.3.2.4.2 Question W.4 Calculator

4 **Have you sold food products with date labels updated to "Best if Used By" or "Use By"?**

In the reporting year, we sold _____ metric tons of _____ products, specifically _____ . The date label printed on product's packaging changed from _____ to _____ and as a result _____ days were added to the package date.

6.3.2.4.3 Question W.4 Calculation



Supplier input | Third party source | Calculated

6.3.2.4.4 Question W.4 Source Documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	
Annual amount of product sold*	Supplier input	Metric tons	Supplier reported weight of products sold with standardized date labeling verbiage within date range; should *not* include packaging weight.
Department*	Supplier input	Selected from dropdown	Dropdown options: • Beverages • Breads & bakery • Dairy & eggs • Dry goods • Fresh meals & snacks

Model inputs **required field*	Source	Units	Notes
			• Fresh meat & seafood (inc. deli meats) • Fresh package produce • Frozen
Category*	Supplier input	Selected from dropdown	E.g., Yogurt, Packaged Cereals, etc. See *Question W.4 Emission factors* for more information
Old date label*	Supplier input	Selected from dropdown	Dropdown options: • Best before • Date only, no verbiage • Expires on • Sell by
New date label*	Supplier input	Selected from dropdown	Dropdown options: • Best if Used By • Use By
# of days added *	Supplier input	Selected from dropdown	Number of days added to package date selected from range: • 0 • 1 • 2 • 3+
Emissions factor	ReFED emissions factors	Metric tons CO_2e / pound	See *Question W.4 Emission factors* for more information

6.3.2.4.5 Question W.4 Emission factors

The date labeling methodology was developed in collaboration of Walmart, ReFED, WWF and Ohio State University, with support from the Ohio Agriculture Research and Development Center. The full methodology is known as the Complete Standardized Date Labeling Impact Framework Methodology: "Measuring the impact of standardized date labels on consumer food waste and resulting greenhouse gas emissions reduction".

The below table is an example of the dropdown selections and emissions factors driving the calculator; a complete list of all fields and combinations can be found in the ReFED Date Labeling Standardization Tool.

Waste pillar table. ReFED Date Labeling Standardization Tool example selections

Food Category	Food Subcategory	Previous Verbiage	Current Verbiage	# of Days Added for Dropdown	Emissions factor (metric tons CO_2e avoided per ton of food product sold with standardized labels)
Beverages	Coffee, tea & cocoa	BEST BEFORE	BEST IF USED BY	0	0.001
Breads & Bakery	Breads & bakery products	DATE ONLY, NO VERBIAGE	BEST IF USED BY	1	0.008
Dairy & Eggs	Butter, margarine & spreads	BEST BEFORE	USE BY	2	0.148
Dry Goods	Baking	EXPIRES ON	BEST IF USED BY	4-6	0.013
Fresh Meals & Snacks	Fresh meals & snacks (non-meat)	BEST BEFORE	USE BY	3+	0.032
Fresh Meat & Seafood (inc. Deli Meats)	Beef	BEST BEFORE	BEST IF USED BY	2	1.188
Fresh Packaged Produce	Cut fruit	DATE ONLY, NO VERBIAGE	BEST IF USED BY	1	0.004
Frozen	Frozen vegetables	BEST BEFORE	BEST IF USED BY	10+	0.002

The emissions factor used in this methodology is a consolidated factor calculated by ReFed and derived from lower-level factors, as explained below:

"Consolidated" Emissions Factor = *Food Waste Avoided Factor* x *MT*CO_2e *per Ton of Consumer Food Waste*

$$\text{Food Waste Avoided Factor} = \text{\% consumer waste} \times \text{\% consumer waste due to past date labels} \times \text{\% consumer waste reduction due to standardized date labeling}$$

Waste pillar table. Food waste avoided calculation parameters

Parameter	Definition	Source
Percent Consumer Waste	Percent consumer waste occurring in the home for each food type	USDA ERS Food Availability (Per Capita) Data System, October 2018.
Percent Consumer Waste Due to Past Date Labels	Percent consumer home waste due to labels that are past the package date	NRDC "Estimating Quantities and Types of Food Waste at the City Level", October 2017.
Percent Consumer Waste Reduced Due to Standardized Date Labeling	Percent of consumer waste reduced by transitioning to standardized date labels, accounting for original label verbiage and changes to label dates	Ohio State University Original Research (See Appendix C of Standardized Date Labeling Impact Framework Methodology)

MTCO_2e per Ton of Consumer Food Waste = *Source Emissions Reduction + Disposal Emission Reduction*

Waste pillar table. Consumer food waste calculation parameters

Parameter	Definition	Source
Source emissions reduction factor	Breakdown of consumer food waste by disposal type	U.S. EPA Waste Reduction Model (WARM), October 2018.
Disposal emissions reduction factor	GHG emissions associated with food product category production and disposal destination	U.S. EPA Waste Reduction Model (WARM), October 2018.

6.3.2.5 *Question W.5: Do you have other waste activities you'd like to report and know how many metric tons CO_2e you saved?*

More information available in the *Reporting aggregate emissions* section.

6.4 Packaging

6.4.1 Packaging pillar background

Packaging is critical to protecting, preserving, and promoting products, and those functions can be maintained while improvements are made to lower greenhouse gas emissions. Optimizing design, sourcing sustainably, and supporting recycling in packaging can reduce greenhouse gas emissions by reducing weight in transportation, increasing recycling rates, and lowering the greenhouse gas emissions intensity during the manufacture of packaging materials. Designers, manufacturers, and brands have a unique opportunity to help deliver more efficient and innovative packaging to shelf.

For the purpose of Project Gigaton, suppliers may report emissions reductions through a collection of approaches within a core packaging sustainability framework of sourcing sustainably, optimizing design, and supporting recycling:

Source sustainably:

1. Increasing usage of post-consumer recycled content
2. Using certified virgin fiber

Optimize design:

- Reducing material usage
- Increasing volumetric efficiency
- Substituting packaging materials

Support recycling:

- Investing in the Closed Loop Fund
- Making design-for-recyclability improvements

Additionally, suppliers may use the streamlined life cycle assessment tool COMPASS to estimate emissions reductions from any improvement to the packaging system not addressed by the pathways listed above.

6.4.2 Packaging pillar questions

6.4.2.1 *Question PK.1: Do you use the COMPASS LCA tool to calculate the emissions impact of packaging changes?*

6.4.2.1.1 Question PK.1 Background and definitions

Under this pathway, suppliers are able to report emissions reductions from any packaging change estimated using the COMPASS LCA tool. There are no geographic boundaries for data entered through this pathway.

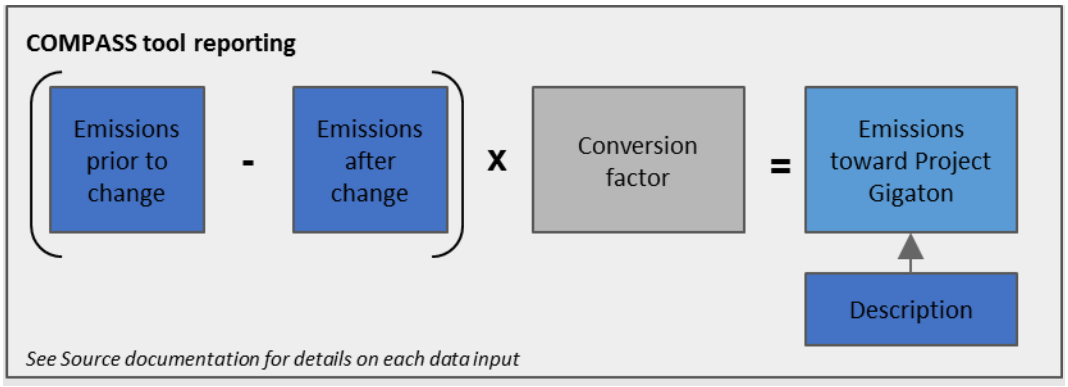
Kg CO_2e emissions per packaging system is an output from the COMPASS tool that can be used to report to Project Gigaton. Current emissions should be lower than baseline emissions. Note that in order to avoid double counting, suppliers should only answer one question for each key packaging change made.

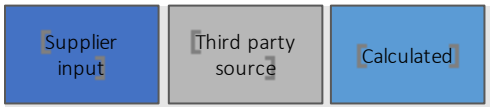
6.4.2.1.2 Question PK.1 Calculator

1 **Do you use the COMPASS LCA tool to calculate the emissions impact of packaging changes?**

My previous packaging system incurred _____ kg CO2e greenhouse gas emissions and my new packaging system incurs _____ kg CO2e greenhouse gas emissions.

6.4.2.1.3 Question PK.1 Calculation





6.4.2.1.4 Question PK.1 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	The COMPASS tool does not produce metric tons CO_2e as an output, hence the calculation using outputs provided through the tool Suppliers may enter multiple lines of data
Emissions prior to change*	Supplier input	kgCO_2e	Total emissions prior to change is an output from the COMPASS tool
Emissions after change*	Supplier input	kgCO_2e	Total emissions after change is an output from the COMPASS tool
Conversion factor	Third party source	Metric tons/kg	0.001 metric ton/kg

6.4.2.2 *Question PK.2: Have you used recycled content in your packaging?*

6.4.2.2.1 Question PK.2 Background and definitions

Using post-consumer recycled content (PCR) instead of virgin materials reduces upstream greenhouse gas emissions associated with material manufacturing. This data component captures emissions avoided from

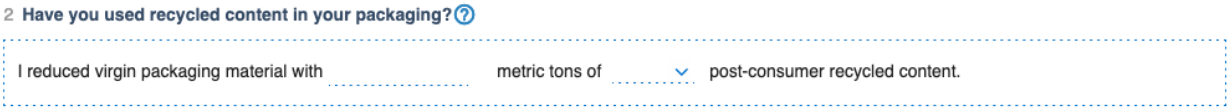
use of post-consumer recycled content in packaging, including recycled content in pulp- and paper-based packaging.

Post-consumer recycled content (PCR) refers to the amount of post-consumer recycled content contained in the package as defined by ISO 14021. The impact of converting the PCR material, so that it can be used as an input into a new package, is considered in this impact. The PCR material is incorporated into the production of the package and therefore reduces the virgin impact required to make the package. Use of recycled content in products should be reported to Questions PU.3 and PU.5.

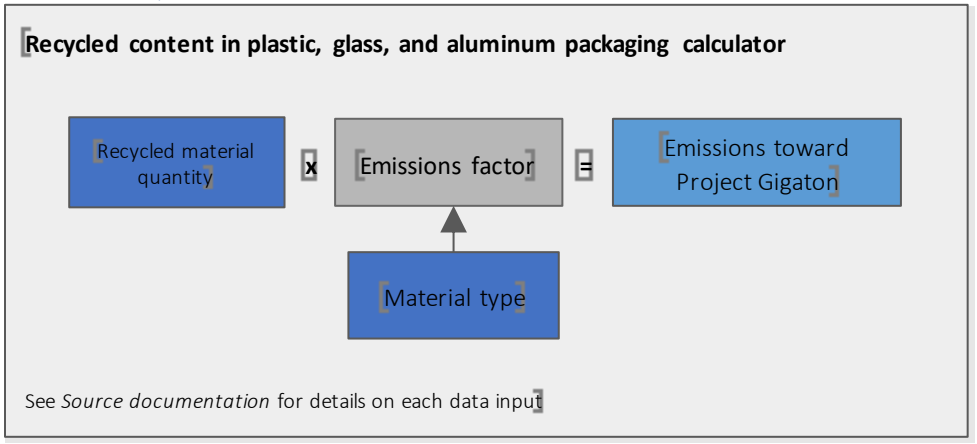
According to the EPA's definition, postconsumer recycled content is:

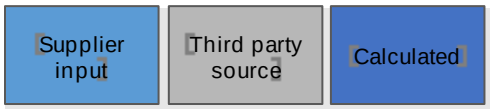
- Paper, paperboard, and fibrous wastes from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including used corrugated boxes; old newspapers; old magazines; mixed wastepaper; tabulating cards; and used cordage; and
- All paper, paperboard, and fibrous wastes that enter and are collected from municipal solid waste. Postconsumer fiber does not include fiber derived from printers' over-runs, converters' scrap, and over-issue publications.

6.4.2.2.2 Question PK.2 Calculator



6.4.2.2.3 Question PK.2 Calculation





6.4.2.2.4 Question PK.2 Source documentation

Model inputs *required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity and type.

Model inputs *required field	Source	Units	Notes
Recycled material quantity*	Supplier input	Metric tons	Mass of PCR content used to replace virgin material
Material type*	Supplier input	Select from dropdown	See *Question PK.2 Emission factors* section for list of all dropdown options The supplier should enter the type of PCR plastic being used and it's assumed that the virgin plastic being replaced is the same plastic type
Emissions Factor	Third party source	Metric tons CO_2e per metric ton material	This will be the delta between the PCR and virgin Impact for each material and 0.05 metric tons CO_2e/metric ton recycled pulp or paper content See *Question PK.2 Emission factors* section for list of all emissions factors

6.4.2.2.5 Question PK.2 Emission factors

Please note, questions PU.3 and PU.5 also refer to this section due to the similarity in methodologies.

Packaging pillar table: Virgin and PCR material emission factors

Material type	Source	Kilograms CO2e per metric ton (tonne) material	Metric tons CO2e per metric ton (tonne) material	Emissions factor used (virgin – PCR)
Polyester Fiber (used in textiles)	Virgin	5222.7006	5.223	3.792
	PCR	1431.1489	1.431	
Polyethylene Terephthalate (PET)	Virgin	3283.0463	3.283	1.852
	PCR	1431.1489	1.431	
High Density Polyethylene (HDPE)	Virgin	2178.0869	2.178	1.405
	PCR	773.26874	0.773	
Low Density Polyethylene (LDPE)	Virgin	2374.0811	2.374	1.601
	PCR	773.26874	0.773	
Polypropylene (PP)	Virgin	2193.4122	2.193	1.42
	PCR	773.26874	0.773	
Container Glass	Virgin	1257.5319	1.258	0.274
	PCR	983.76786	0.984	
Aluminum	Virgin	19261.71	19.262	18.447
	PCR	815.00396	0.815	
Steel	Virgin	1777.0328	1.777	1.042
	PCR	734.6346	0.735	

Source: COMPASS Tool

Material virgin and PCR emission factors are sourced from the COMPASS method using background data from ecoinvent 3 libraries. The IPCC 2013 method with climate feedback loops considered is used to calculate the avoided GHG impacts of the packages. The below emissions factors are for the virgin and PCR material impact for various packaging materials.

Packaging pillar table: Post-consumer recycled paper emission factor

Material	Avoided Emission Factor
Post-Consumer Recycled Paper (includes pulp and paper, boxboard and corrugate)	0.05 metric tons CO_2e/metric ton recycled content

Sources:

- **Annual Deforestation Rate**: Global Forest Watch 2011-2015, Forest Resource Assessment, FAO 2015
- **Fraction of Deforestation allocated to timber, pulp & paper**: Project Catalyst 2008; Honsuma, et al. An assessment of deforestation and forest degradation drivers in developing countries. 2012;
- Indonesia GHG Abatement Cost Curve 2010, Indonesian Government.
- **Carbon Density of Regional Forests**: FAO FRA 2015
- **Fate of Carbon**: Taverna, R., Hofer, P., Werner, F., Kaufmann, E., Thürig, E., (2007) The CO_2 effects of the Swiss forestry and timber industry Scenarios of future potential for climate-change mitigation, Environmental studies no. 0739. Federal Office for the Environment, Bern, Switzerland, p. 102.
- **Timber, Pulp & Paper Production and Certified volumes**: FAOSTAT 2015; FSC Facts & Figures, March 2017; PEFC Facts & Figures Dec 2016

These recycled content and certification calculations provide an estimate of the amount of avoided emissions reductions from deforestation/land use change from the active purchasing of certified pulp, paper & timber and purchase of recycled pulp & paper, which is acting as a proxy for deforestation-free or land use change-free material. Annual deforestation rates were calculated by region based on FAO and GFW data, and the allocation to timber and paper was estimated using several sources listed below.

6.4.2.3 *Question PK.3: Have you sourced FSC, SFI or PEFC certified timber, pulp or paper for your packaging?*

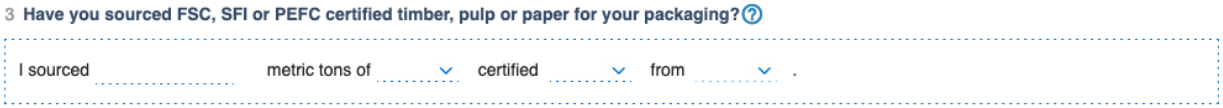
6.4.2.3.1 Question PK.3 Background and definitions

This data component captures emissions avoided from use of certified timber, pulp and paper in packaging. Project Gigaton counts virgin timber, pulp and paper certified by Forest Stewardship Council (FSC) from all countries; Sustainable Forestry Initiative (SFI) from the US and Canada; and Programme for the Endorsement of Forest Certification (PEFC) certification is counted if the wood was harvested in one of the countries listed in *Question PK.3 Emission factors* section.

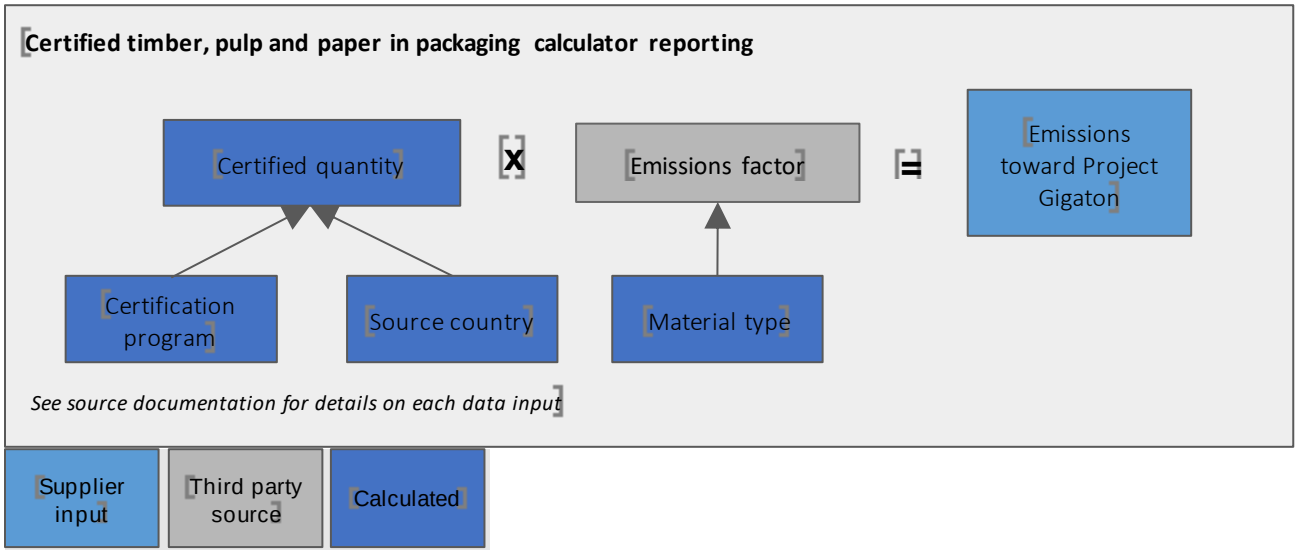
Although this data component captures emissions avoided from sustainably sourced timber, please note that timber production is not a major driver of deforestation globally – unsustainable and illegal logging is more a contributor to forest degradation.

Note that information in *Question PK.3* is also covered in *Question NAT.10*. To avoid double counting, suppliers should report on sustainable fiber sourcing in either *Question PK.3* or *Question NAT.10*.

6.4.2.3.2 Question PK.3 Calculator



6.4.2.3.3 Question PK.3 Calculation



6.4.2.3.4 Question PK.3 Source documentation

Model inputs *required field	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity, certification type, and source country. Data component also available in the Packaging pillar, however suppliers may only complete once. All emissions reported are allocated to the Nature pillar totals.
Certified quantity*	Supplier input	Metric tons	Mass of certified pulp/paper sourced
Material type*	Supplier input	Select from dropdown	Possible dropdown selections: • Timber • Pulp and paper
Certification program*	Supplier input	Select from dropdown	Project Gigaton counts virgin timber, pulp and paper certified by FSC from all

Model inputs *required field	Source	Units	Notes
Source country*	Supplier input	Select from dropdown	countries; SFI and PEFC certification is counted if the wood was harvested certain countries See *Question PK.3 Emission factors* section for a list of all possible certification program and source country dropdown combinations
Emissions factor	Developed using FAO and other data sources as described in *Question PK.2 Emission factors* section	Metric ton CO_2e/metric ton certified pulp	0.05 metric tons CO_2e/metric ton certified pulp or paper 0.003 metric tons CO_2e/metric ton certified timber See *Question PK.3 Emission factors* section for additional detail

6.4.2.3.5 Question PK.3 Emission factors

See *Question PK.2 Emission factor* section for emission factor development approach and description.

Packaging pillar table: Certified timber, pulp and paper in packaging certification, country and avoided emissions factor combinations

Certification	Country	Timber	Pulp and paper
Forest Stewardship Council (FSC)	All Countries	0.003 metric tons CO_2e/metric ton certified timber	0.05 metric tons CO_2e/metric ton certified pulp
Sustainable Forestry Initiative (SFI)* *Note SFI is a member of PEFC	US		
	Canada		
Programme for the Endorsement of Forest Certification (PEFC)	Anguilla		
	Belgium		
	Czech Republic		
	Denmark		
	Estonia		
	Germany		
	Hungary		
	Ireland		
	Latvia		
	Lithuania		
	Netherlands		
	Portugal		
	South Korea		
	Spain		
	Switzerland		
	United Kingdom		

6.4.2.4 *Question PK.4: Have you substituted one packaging material with another?*

6.4.2.4.1 Question PK.4 Background and definitions

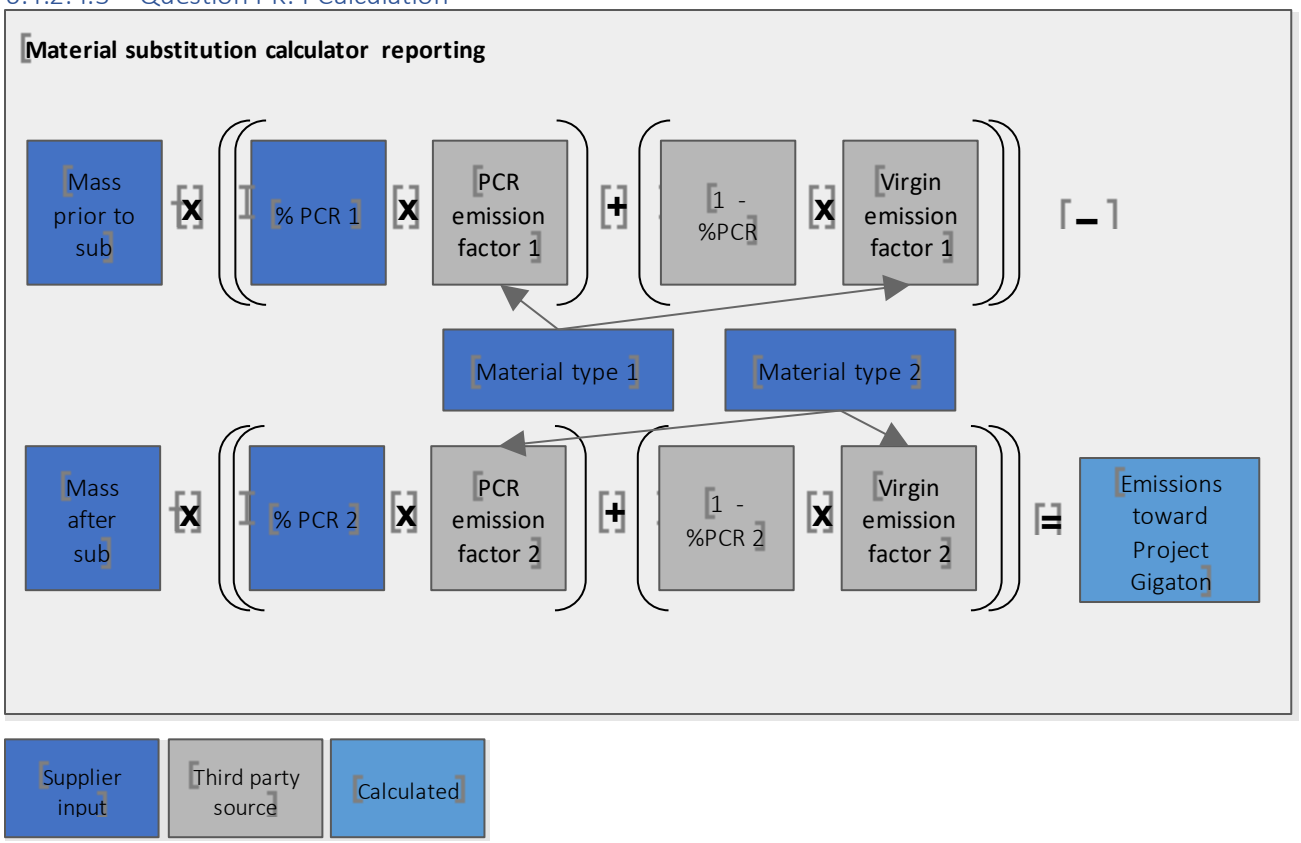
Different packaging materials incur different amounts of greenhouse gas emissions during their manufacture, and thoughtful changes in packaging materials used may lower greenhouse gas emissions. Suppliers must ensure that packaging performance is maintained when considering different packaging materials, and suppliers must take care to ensure that any corresponding changes in the overall packaging system, such as an increase in transport packaging to compensate for reduced primary packaging, are accounted for in this pathway. Suppliers are asked to input the percentage of material reduced that was post-consumer recycled content, since the greenhouse gas emissions incurred during the manufacture of post-consumer recycled content differ from those or virgin material.

6.4.2.4.2 Question PK.4 Calculator

4 **Have you substituted one packaging material with another?**

I changed the material used for my package. The mass of my new package across all packaging units sold or shipped during the reporting period was ..... metric tons of ..... of which ..... % was recycled content. The mass of my previous packaging material across the same number of units would have been ..... metric tons of ..... of which ..... % was recycled content.

6.4.2.4.3 Question PK.4 Calculation



6.4.2.4.4 Question PK.4 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity and type
Mass prior to sub*	Supplier input	Metric tons	Mass of the package before the material is substituted for the new one This should be calculated as follows: [material mass per unit prior to substitution] x [number of units sold in the **current** reporting year]
Material type 1*	Supplier input	Select from dropdown	Material type prior to material substitution Possible dropdown selections: • PET • HDPE • LDPE • PP • Glass • Aluminum • Steel • Boxboard • Corrugate
PCR 1*	Supplier input	Percentage	Percentage of recycled material incorporated into the package before material substitution
Emissions factor 1	Third party source	Metric tons CO_2e per metric ton material	Based on selection of material type 1. If no PCR emissions factor is available, use virgin emissions factor See *Question PK.6 Emission factors* section for list of all emissions factors
Mass after sub*	Supplier input	Metric Tons	Mass of the package after the material substitution This should be calculated as follows: [material mass per unit after substitution] x [number of units sold in the **current** reporting year]
Material type 2*	Supplier input	Select from dropdown	Material type after substitution Possible dropdown selections: • PET

Model inputs *required field	Source	Units	Notes
			• HDPE • LDPE • PP • Glass • Aluminum • Steel • Boxboard • Corrugate
PCR 2*	Supplier input	Percentage	Percentage of recycled material incorporated into the package after material substitution
Emissions factor 2	Third party source	Metric tons CO_2e per metric ton material	Based on selection of material type 2. If no PCR emissions factor is available, use virgin emissions factor. See *Question PK.6 Emission factors* section for list of all emissions factors

6.4.2.4.5 Question PK.4 Emission factors

See *Question PK.2 Emission factors* section for emission factors.

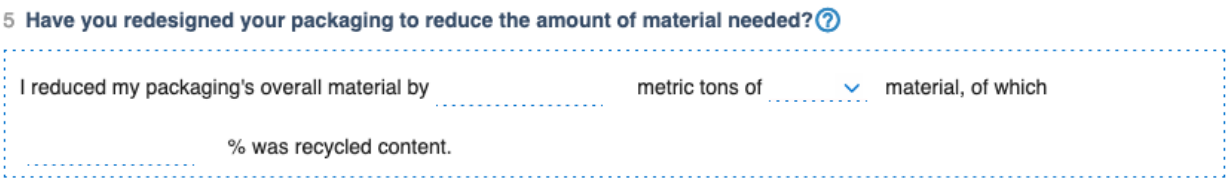
6.4.2.5 *Question PK.5: Have you redesigned your packaging to reduce the amount of material needed?*

6.4.2.5.1 Question PK.5 Background and definitions

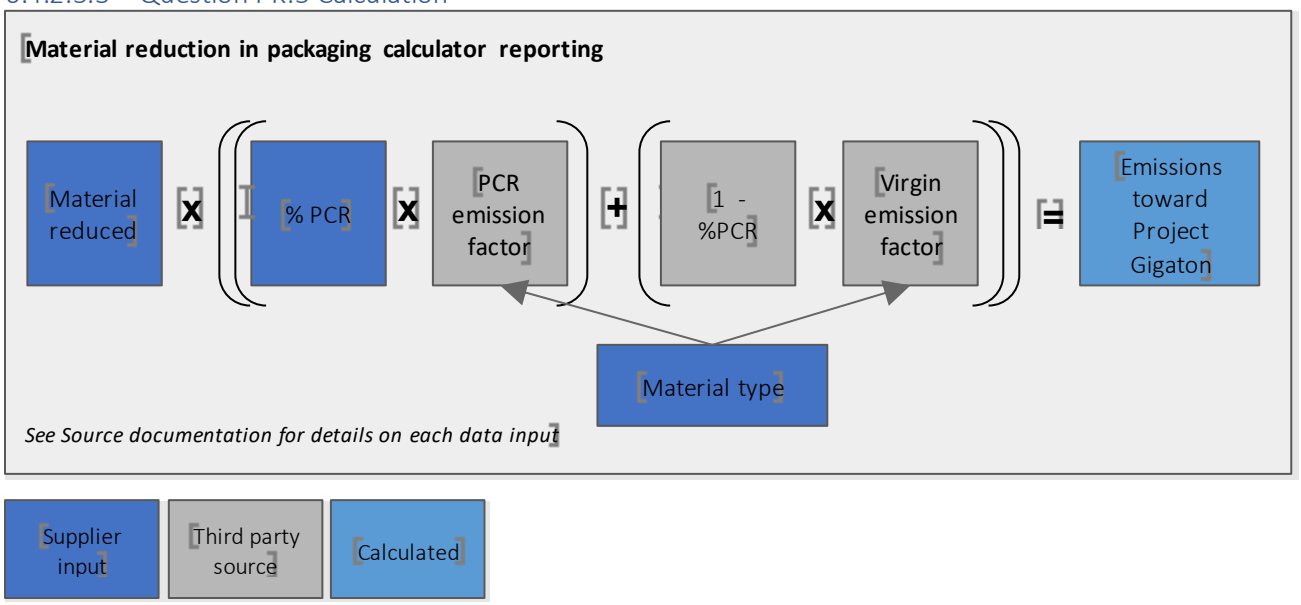
All packaging materials produce greenhouse gas emissions during their manufacture and reducing the amount of material needed to make effective packaging will avoid unnecessary emissions. This data component captures emissions avoided from material reduction in packaging. Reducing material in products should be reported to *Question PU.6*.

Suppliers must make careful design decisions so as not to compromise the ability of packaging to adequately protect the product, and suppliers must take care to ensure that any corresponding changes in the overall packaging system, such as an increase in transport packaging to compensate for reduced primary packaging, are accounted for in this pathway. Suppliers are asked to input the percentage of material reduced that was post-consumer recycled content, since the greenhouse gas emissions incurred during the manufacture of post-consumer recycled content differ from those or virgin material.

6.4.2.5.2 Question PK.5 Calculator



6.4.2.5.3 Question PK.5 Calculation



6.4.2.5.4 Question PK.5 Source documentation

Model inputs *required field	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity and type
Material reduced*	Supplier input	Metric tons	Aggregate mass of material that has been eliminated from the package over the units shipped
Material type*	Supplier input	Select from dropdown	See *Question PK.5 Emission factors* section for list of all dropdown options
PCR*	Supplier Input	Percentage	Percentage of recycled material incorporated into the package prior to material reduction
Emissions factor	Third party source	Metric tons CO_2e per metric ton material	See *Question PK.5 Emission factors* section for list of all emissions factors

6.4.2.5.5 Question PK.5 Emission factors

Please note, *Question PU.6* also refers to this section due to the similarity in methodologies.

See *Question PK.2 Emission factors* section for emission factors.

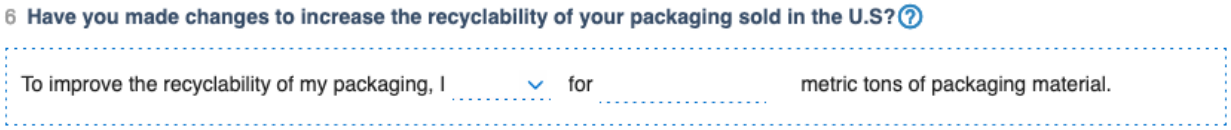
6.4.2.6 *Question PK.6: Have you made changes to increase the recyclability of your packaging sold in the U.S?*

6.4.2.6.1 Question PK.6 Background and definitions

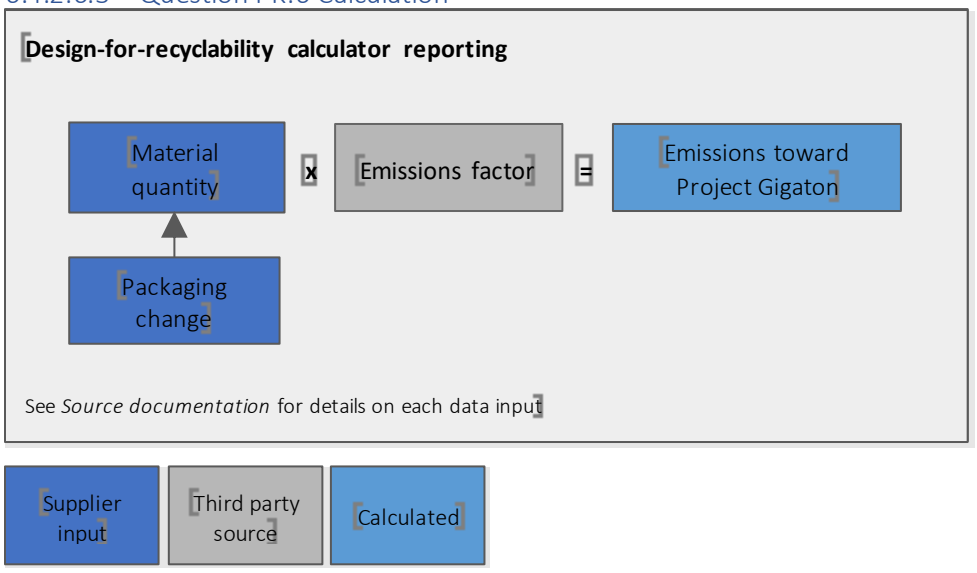
Common design changes can eliminate technical incompatibilities with the U.S. recycling system and increase recycling rates of specific packaging types. The design changes are: 1) Removing or replacing non-recyclable PETG, non-recyclable shrink-wrap sleeve, or non-recyclable pressure sensitive labels from PET packaging; 2) Removing or replacing wax coatings from corrugated trays or cases; 3) Removing or replacing metal, PVC, and/or silicone closures, pumps, or sprayers from packaging; and 4) Removing barrier additives and non-PET layers from PET bottles.

Only data for packaging sold in the United States should be reported to this question.

6.4.2.6.2 Question PK.6 Calculator



6.4.2.6.3 Question PK.6 Calculation



6.4.2.6.4 Question PK.6 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity and packaging change.
Packaging change*	Supplier input	Selected from dropdown	See *Question PK.6 Emission factors* for list of possible dropdown options

Model inputs **required field*	Source	Units	Notes
Material quantity*	Supplier input	Metric tones	Total mass of packaging material that has been improved over all units in the reporting period.
Emissions factor	Third party source	Metric tons CO_2e per metric ton material	See *Question PK.6 Emission factors* for list of all emissions factors

6.4.2.6.5 Question PK.6 Emission factors

For these calculations, an assumption is made that the previous design entirely prevented the packaging from being recycled and that 100% of that packaging ended up in landfill. With the improved design, Walmart assumes that recycling is enabled, and emissions reductions are calculated based on the EPA's metrics for the national average recycling rate for the waste type (e.g., PET bottle, corrugate). Because this methodology uses US national average recycling rates, suppliers may only report data for packaging in the United States. Data entered for the material type of the bottle/container determines the recycling rate and the emissions factor used for the calculation.

Emissions factors are determined by the following formula:

Emissions factor for packaging change = (Recycling emissions factor + landfill emissions factor) x recycling rate

Packaging pillar table. Packaging change for recyclability emission factors

Packaging change	Material type	Avoided emissions factor (metric tons CO_2e per short ton)			Recycling rate	Emissions factor for Project Gigaton
		Recycling	Landfill	Total		
Removed or replaced wax coatings from corrugated trays or cases	Corrugate	3.12	0.23	3.35	89.5%	**2.99825**
Removed or replaced non-recyclable PETG, non-recyclable shrink-wrap sleeve, or non-recyclable pressure sensitive labels from PET packaging	PET	1.12	0.02	1.14	31.2%	**0.35568**
Removed or replaced metal, PVC, and/or	PET	1.12	0.02	1.14	31.2%	**0.35568**

Packaging change	Material type	Avoided emissions factor (metric tons CO_2e per short ton)			Recycling rate	Emissions factor for Project Gigaton
		Recycling	Landfill	Total		
silicone closures, pumps, or sprayers from PET packaging						
Removed or replaced metal, PVC, and/or silicone closures, pumps, or sprayers from **HDPE packaging**	HDPE	0.87	0.02	0.89	21.6%	**0.19224**

Sources: Emissions factors: Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM), US EPA, February 2016; Advancing Sustainable Materials Management: 2014 Tables and Figures, US EPA, December 2016

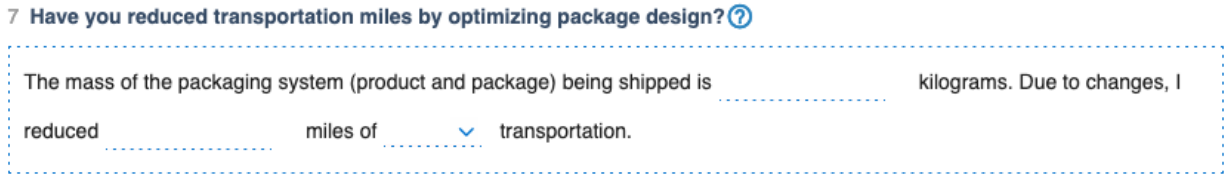
6.4.2.7 *Question PK.7: Have you reduced transportation miles by optimizing package design?*

6.4.2.7.1 Question PK.7 Background and definitions

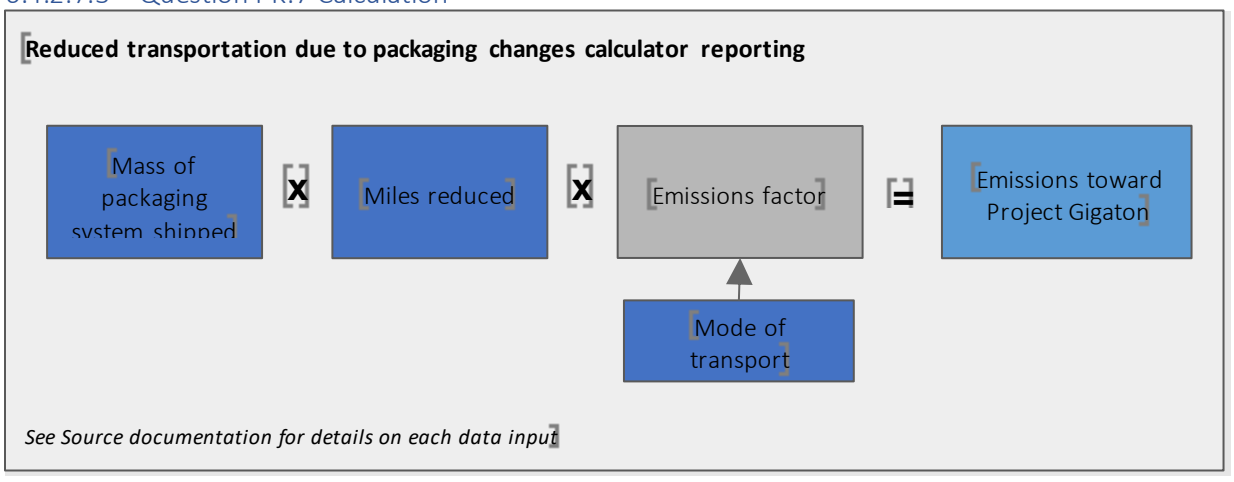
When packaging designs are optimized for volume efficiency, products can be shipped with lessened transportation requirements and greenhouse gas emissions associated with transportation can be avoided.

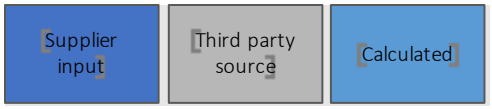
To avoid double counting, suppliers should only report packaging changes in either packaging pillar or transportation pillar questions, but not both.

6.4.2.7.2 Question PK.7 Calculator



6.4.2.7.3 Question PK.7 Calculation





6.4.2.7.4 Question PK.7 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of mass, miles, and mode of transportation
Mass of packaging system shipped*	Supplier input	Kilograms	Mass of the packaging system that is being shipped; this should be weight of the full pallet being shipped including product, primary packaging, and transport packaging This mass is used to calculate the impact of transporting the product/package
Mode of Transport*	Supplier input	Select from dropdown	Possible dropdown selections: • Air freight • International air freight • Freight train, diesel • Truck > 32 ton • Truck 7.5-16 ton • Barge • Transoceanic freight ship
Emissions factor	Third party source	Metric tons CO_2e per kilogram-mile of transport	See *Question PK.7 Emission factors* for list of all emissions factors
Number of Miles Reduced For Transport of Packaging System*	Supplier input	Miles	Number of miles the transport of the packaging system was reduced Used along with the mass to calculate the impact of transporting the product and package this far → kilogram-mile emission-based factor

6.4.2.7.5 Question PK.7 Emission factors

The miles of transport reduced in this equation is user defined. It could be based on using less pallets to ship the same amount of product/package and therefore less trucks corresponding to less distance travelled. The supplier needs to determine how much transportation has been reduced by overall for a particular packaging system.

To derive emissions factors in metric tons CO_2e per kilogram-mile of transport, the kilograms CO_2e per kilogram-kilometer of transport factors were multiplied by 0.621371 and divided by 1000.

Packaging pillar table. GHG emissions by transportation mode

Mode of transport	Vehicle Type	Kilograms CO_2e per kilogram-kilometer (kgkm) of transport	Metric tons CO_2e per kilogram-mile of transport
Air	Air Freight	0.001119844	0.000000696
	International Air Freight	0.001088329	0.000000676
Rail	Freight Train, diesel	5.88E-05	0.000000037
Road	Truck > 32 ton	9.17E-05	0.000000057
	Truck 7.5-16 ton	0.000217817	0.000000135
Sea	Barge	4.86E-05	0.000000030
	Transoceanic Freight Ship	1.15E-05	0.000000007

Source:

6.4.2.8 *Question PK.8: Do you have emissions reductions to report as a result of an investment in the Closed Loop Fund?*

6.4.2.8.1 Question PK.8 Background and definitions

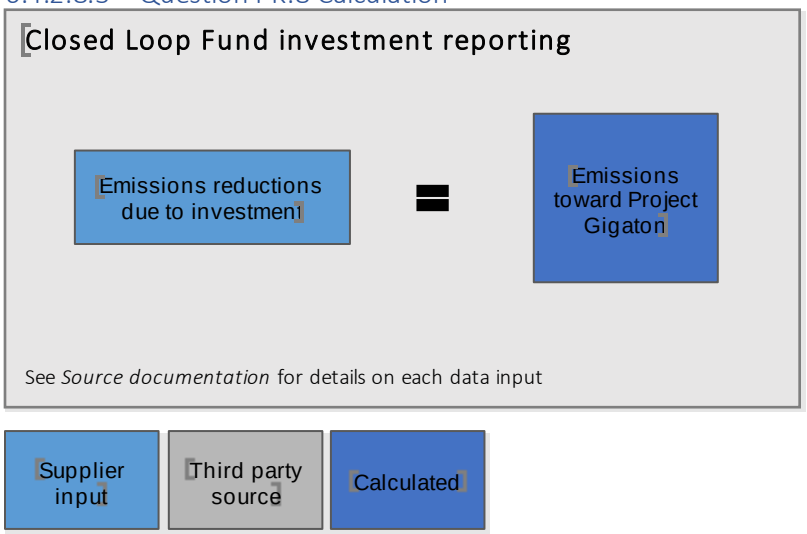
The Closed Loop Fund invests in scaling recycling infrastructure to improve recycling, and they estimate the greenhouse gas emission reductions associated with those activities. The Closed Loop Fund may attribute portions of the overall emission reductions to investors based on the magnitude of the investment and the timeframe in which the capital was deployed. The Closed Loop Fund will provide investors with a figure reflecting the approximate annual emissions reductions resulting from their company's investment in Closed Loop Fund projects that can be used to report to Project Gigaton; no further calculations will be required.

6.4.2.8.2 Question PK.8 Calculator

8 **Do you have emissions reductions to report as a result of an investment in the Closed Loop Fund?**

My funding of the Closed Loop Fund has reduced or avoided emissions by _____ metric tons CO2e.

6.4.2.8.3 Question PK.8 Calculation



6.4.2.8.4 Question PK.8 Source documentation

Model inputs *required field	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	Data component should only be completed once (one line of data)
Emissions reductions due to investment*	Supplier input	Metric tons CO_2e	The Closed Loop Fund will provide investors with a figure reflecting the approximate annual emissions reductions resulting from their company's investment in Closed Loop Fund projects

6.4.2.9 *Question PK.9: Do you have other packaging activities you'd like to report and know how many metric tons CO_2e you saved?*

More information available in the *Reporting aggregate emissions* section.

6.5 Transport

6.5.1 Transportation pillar background

Transporting goods across a company's supply chain, via air, road, rail, or ocean is associated with significant amounts of greenhouse gas emissions. Reducing total miles transported, reducing weight of products transported, improving fleet efficiency, and switching to lower impact transportation modes, can avoid greenhouse emissions that would otherwise have been emitted.

Project Gigaton allows suppliers to report activity-specific reductions achieved in a supplier's transportation network (e.g., fleet electrification) and/or product impacts on transportation supply chain (e.g., light weighting packaging to reduce total weight transported, etc.).

6.5.2 Transportation questions

6.5.2.1 *Question TR.1: Have you reduced the miles driven within your transportation fleet (through optimization) last year?*

6.5.2.1.1 Question TR.1 Background and definitions

All fossil fuel powered vehicles produce greenhouse gas emissions during their operation. Reducing the miles travelled by the fleet avoids unnecessary emissions. This data capture emissions avoided due to reduction in miles travelled.

Suppliers are asked to input the avoided distance in miles, vehicle type and further details of how the transport was optimized.

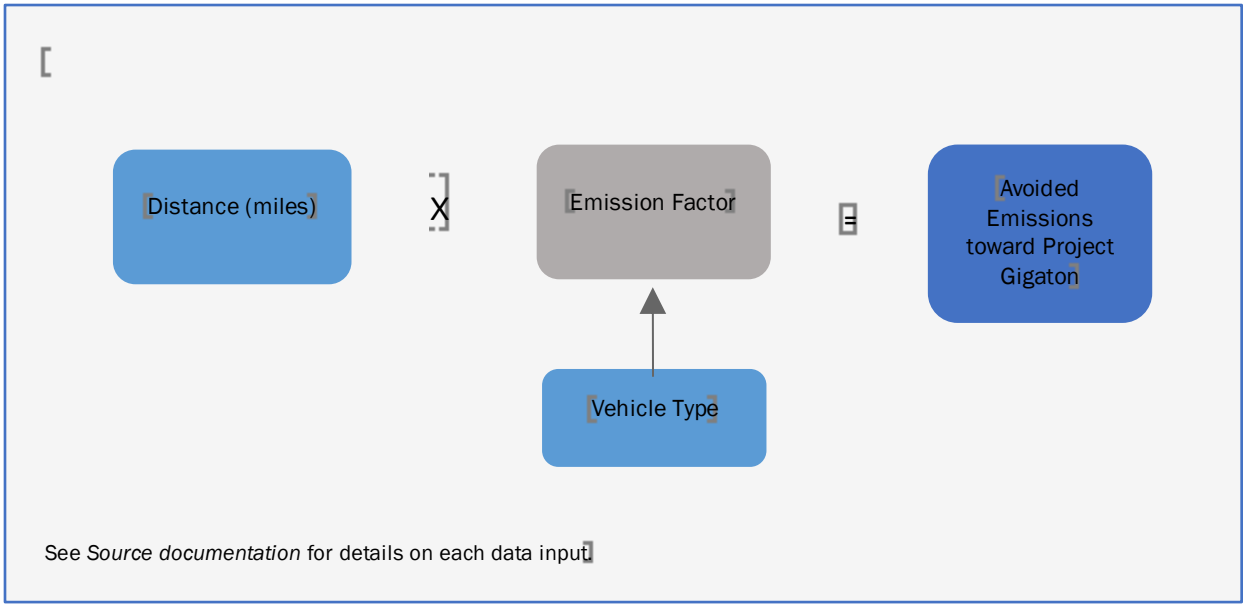
6.5.2.1.2 Question TR.1 Calculator

1 **Have you reduced the miles driven within your transportation fleet (through optimization) last year?**

We avoided Distance in miles miles of conventional Vehicle Ty... transportation due to Optimization meth... .

Please provide additional details: Other option-[free text] .

6.5.2.1.3 Question TR.1 Calculation



6.5.2.1.4 Question TR.1 Source Documentation

Model inputs *required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of avoided miles and vehicle type
Distance*	Supplier input	Miles	Avoided miles achieved by optimizing fleet
Vehicle Type*	Supplier input	Select from dropdown	Possible dropdown selections: • Truck (All) • Truck (Dray) • Truck (Expedited) • Truck (Flatbed) • Truck (Heavy Bulk) • Truck (LTL Dry Vans) • Truck Mixed

Model inputs *required field	Source	Units	Notes
			• Truck Refrigerated • Truck Tanker • Truck load Dry Vans
Optimization method*	Supplier Input	Select from dropdown	Possible dropdown selections: • Network optimization • Route optimization • Better load utilization • Co-loading • Backhauling • Multiple initiatives • Other
Emissions factor	Third party source	Metric tons CO_2e	Emission factors sourced from the EDF Green Freight Handbook
Details	Supplier input	Free text	Additional details on fleet optimization

6.5.2.1.5 Question TR.1 Emission factors

Vehicle Type	Metric tons CO_2e per mile of transport
Truck All	0.0017
Truck Dray	0.00175
Truck Expedited	0.0012
Truck Flatbed	0.0018
Truck Heavy Bulk	0.002
Truck LTL Dry Vans	0.001625
Truck Mixed	0.0017
Truck Refrigerated	0.00175
Truck Tanker	0.00175
Truck load Dry Vans	0.0017

Source: EDF Green Freight Handbook (2019)

6.5.2.2 *Question TR.2: Did the efficiency of your transportation fleet improve last year?*

6.5.2.2.1 Question TR.2 Background and definitions

All fossil fuel powered vehicles produce greenhouse gas emissions during their operation. Increasing the fleet efficiency avoids unnecessary emissions. This data captures emissions avoided due to an increase in efficiency.

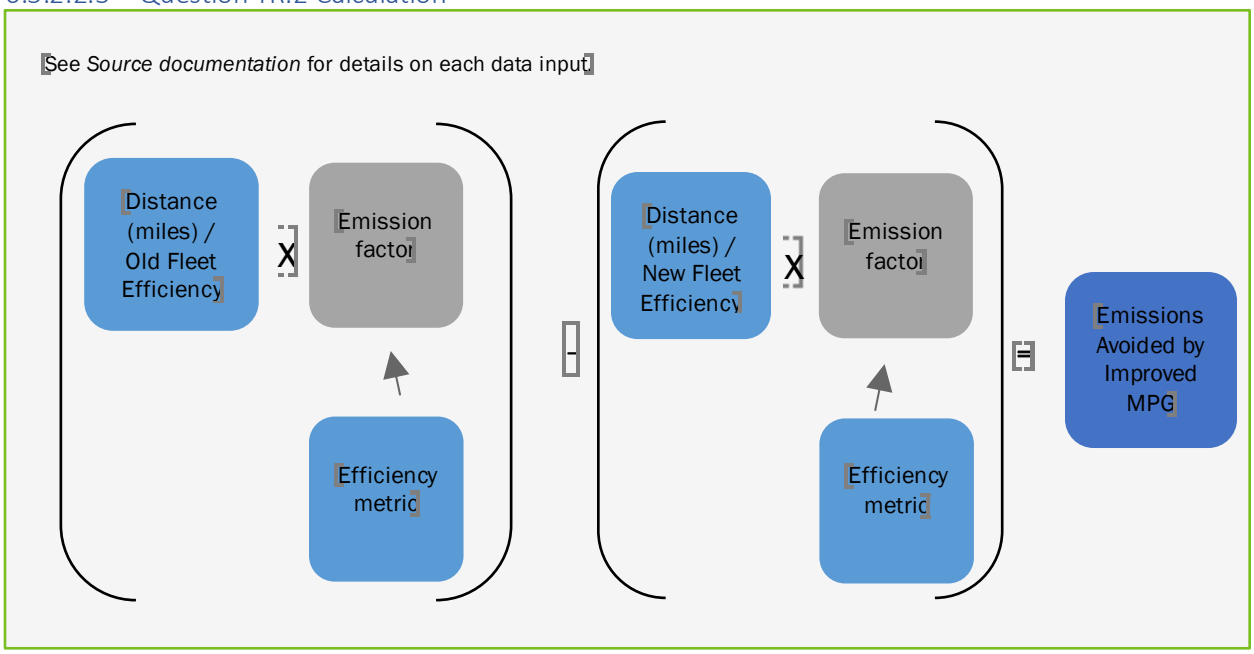
Suppliers are asked to input the distance in miles, efficiency metric, efficiency strategy, old efficiency (MPG etc.) and new efficiency (MPG etc.)

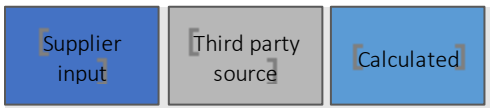
6.5.2.2.2 Question TR.2 Calculator

2 Did the efficiency of your transportation fleet improve last year?

We improved our fleet efficiency from Old fleet efficiency to New fleet efficie… Efficiency met… compared to previous year due to Efficiency strate… and drove Distance in miles miles in the reporting year. Please provide additional details: Free text .

6.5.2.2.3 Question TR.2 Calculation





6.5.2.2.4 Question TR.2 Source Documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of avoided miles and vehicle type
Miles Per Gallon*	Supplier input	Miles per gallon	Initial miles per gallon (MPG) before intervention and miles per gallon (MPG) due to efficiency strategy
Distance*	Supplier input	Miles	Avoided miles achieved by optimizing fleet

Model inputs *required field	Source	Units	Notes
Efficiency Metric*	Supplier Input	Select from dropdown	• Miles-per gallon (MPG) of diesel • Miles-per gallon (MPG) of gasoline • Miles-per gallon (MPG) of diesel and gasoline
Efficiency Strategy*	Supplier Input	Select from dropdown	• Engine improvements • Light weighting • Aerodynamics • Driver training • Multiple initiatives • Other
Emissions factor	Third party source	Metric tons CO_2e	Emission factors sourced from the U.S. EPA Center for Corporate Climate Leadership GHG Emission Factors Hub (2022)
Additional details	Supplier input	Free text	Additional details related to efficiency strategy

6.5.2.2.5 Question TR.2 Emission factors

Fuel Type	Metric tons CO_2e per gallon
Diesel	0.01021
Gasoline	0.00878
Average of diesel and gasoline	0.009495

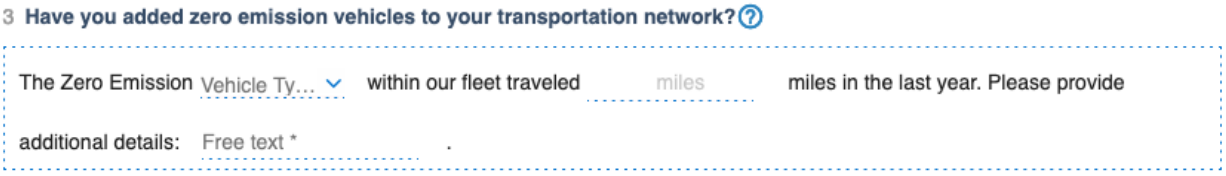
Source: U.S. EPA Center for Corporate Climate Leadership GHG Emission Factors Hub (2022)

6.5.2.3 *Question TR.3: Have you added zero emission vehicles to your transportation network?*

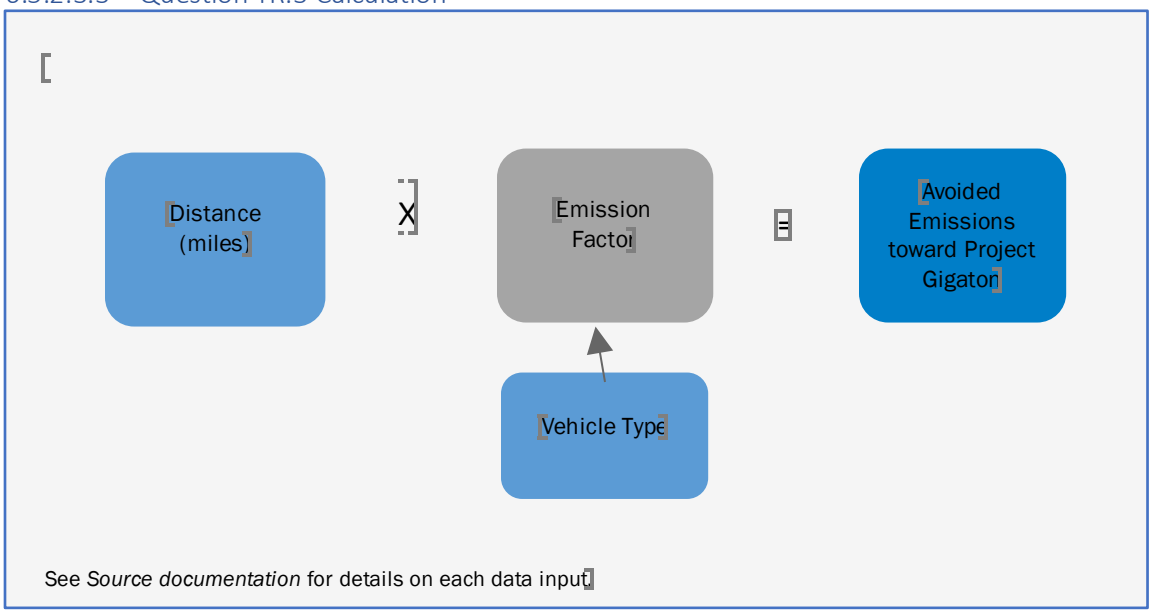
6.5.2.3.1 Question TR.3 Background and definitions

According to the U.S. Department of Energy's Alternative Fuels Data Center, zero emission vehicles (ZEV) produce zero exhaust emissions of any criteria pollutant (or precursor pollutant) under all possible operational modes and conditions. Because ZEV do not produce tail pipe emissions during their operation, increasing the number of ZEV avoids unnecessary emissions. This data captures emissions avoided due to an increased used of ZEV. Suppliers are asked to input the distance in miles and vehicle type.

6.5.2.3.2 Question TR.3 Calculator



6.5.2.3.3 Question TR.3 Calculation



6.5.2.3.4 Question TR.3 Source Documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of avoided miles and vehicle type
Distance*	Supplier input	Miles	Avoided miles achieved by optimizing fleet
Vehicle Type*	Third party source		• Truck (All) • Truck (Dray) • Truck (Expedited) • Truck (Flatbed) • Truck (Heavy Bulk) • Truck (LTL Dry Vans) • Truck Mixed • Truck Refrigerated • Truck Tanker • Truck load Dry Vans
Emissions factor	Third party source	Metric tons CO_2e	Emission factors sourced from the EDF Green Freight Handbook

Model inputs *required field	Source	Units	Notes
Additional details	Supplier input	Free text	Additional details related to ZEV

6.5.2.3.5 Question TR.3 Emission factors

See *Question TR.1 Emission factors* for list of emissions factors.

6.5.2.4 *Question TR.4: Have you reduced transportation miles by optimizing package design?*

Same as *Question PK.7*. See *Question PK.7* for question information.

6.5.2.5 *Question TR.5: Do you have other transportation activities you'd like to report, and know how many metric tons CO_2e you saved?*

More information available in the *Reporting aggregate emissions* section.

6.6 Product use and design

6.6.1 Product use and design pillar background

All products produce greenhouse gas emissions during their manufacturing, and electricity-consuming products also generate emissions when used by customers at home. Designers, manufacturers and brands have a unique opportunity to help deliver more efficient and innovative products to shelf by making smart material choices during product design, as well as helping the customer lower the greenhouse gas emissions associated with their use of the product after bringing it home.

Project Gigaton's Product Use and Design pillar counts activities associated with upstream greenhouse gas emissions reductions from product material production/manufacturing (such as optimizing design or sourcing materials sustainably), as well as activities associated with downstream greenhouse gas emissions reductions during customer use of a product after bringing it home (such as improvements in the energy efficiency of the product, or use of low global warming potential (GWP) refrigerants in products like air conditioners). Since the produce use and design pillar questions calculate emissions reduction benefits across the lifetime of the product, product design improvements should only be reported on once.

Walmart's methodology for calculating greenhouse gas improvements during product use involves estimating the lifetime emissions savings resulting from a more energy efficient or low-GWP product when compared to a baseline model.

Walmart's methodology for calculating greenhouse gas improvements through product design involves a collection of approaches related to sourcing materials sustainably and/or optimizing design:

Source sustainably:

- Increasing usage of post-consumer recycled content
- Using certified virgin fiber

Optimizing design:

- Reducing material usage

6.6.2 Product use and design pillar questions

6.6.2.1 *Question PU.1: Have you introduced a more energy efficient product to your assortment that is sold for use in consumers' homes?*

6.6.2.1.1 Question PU.1 Background and definitions

This data pathway calculates the greenhouse gas impact of delivering a more energy efficient product to consumers for use in their homes.

The supplier chooses the "baseline product" which must be the supplier's own product that represents the generation immediately preceding the more efficient product. If no such prior product exists, default values for a baseline product will be provided based on current ENERGY STAR energy performance thresholds for the product category they select. ENERGY STAR performance thresholds are not available if "Other" is selected, and therefore selecting "Other" for *Product category* will default *Baseline product* input to "have". If the initial retail date of the "more efficient" product was before the start of Project Gigaton or is five years or more before the reporting dates the supplier selected, then current ENERGY STAR thresholds will be used as a baseline.

Instead of reporting at an item level, the supplier may choose to also report consolidated data for multiple products by developing average figures that are weighted proportionately to the products represented. An average figure may be used for product lifetime. Only energy efficiency gains for products that use electricity are currently allowed to be reported under the product use and design pillar of Project Gigaton.

If supplier installed more energy efficient products or equipment within own company facilities, this activity should be reported through the Energy Pillar rather than product use.

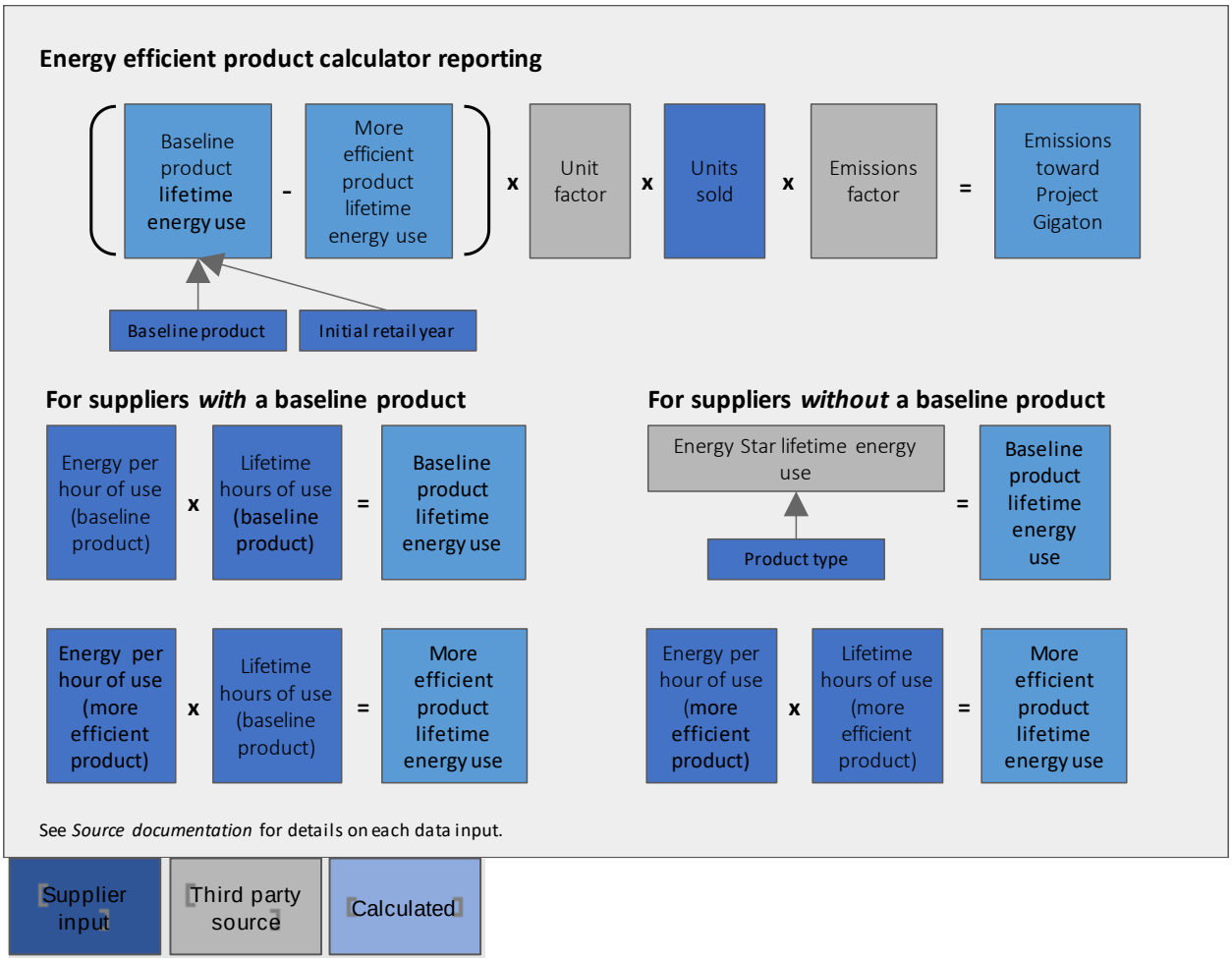
6.6.2.1.2 Question PU.1 Calculator

1 **Have you introduced a more energy efficient product to your assortment that is sold for use in consumers' homes?**

I am reporting data for a more efficient product in the _____ category, which consumes _____ watts(W) per hour of use and has a lifetime of _____ hours. The initial retail year of this more efficient product is _____ and I sold _____ units during the reporting period. This more efficient product _____ ENERGY STAR certified.I _____ a baseline product.

For Baseline products only : The product consumes _____ Watts per hour of use and has a lifetime of _____ hours.

6.6.2.1.3 Question PU.1 Calculation



6.6.2.1.4 Question PU.1 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	Suppliers may enter multiple lines of data. Instead of reporting at an item level, suppliers may choose to also report consolidated data for a large number of products by developing average figures that are weighted proportionately to the products represented. The calculation methodology remains the same.
Product category*	Supplier input	Selected from dropdown	See *Question PU.1. Emission factors* for list of all dropdown options. This field is collected for suppliers with and without a baseline product.

Model inputs **required field*	Source	Units	Notes
			Selection does not impact calculation for suppliers *with* a baseline product.
Baseline product*	Supplier input	Selected from dropdown	Possible dropdown selections: • have • do not have Selecting "Other" for *Product category* will default *Baseline product* input to "have".
Units sold*	Supplier input	Numerical value	Number of units sold during the specified reporting period
Emissions factor	IEA	Metric tons CO_2e per kWh	The emissions factor for the United States is used as proxy for all geographies of use. See *Question E.2 Emission factors* for list of all emissions factors.
Energy per hour of use (baseline product)	Supplier input	Numerical value	Watts (Wh) per hour Field available only for suppliers specifying they "have" a Baseline product. *See Question PU.1. Emission factors* for list of baseline values by Product Type
Energy per hour of use (more efficient product)*	Supplier input	Numerical value	Watts (Wh) per hour
Unit factor	Conversion	Numerical value	0.001 Converts watt hours into kilowatt hours to be comparable with other units used in the equation.
Lifetime hours of use (baseline product)	Supplier input	Numerical value	Field available only for suppliers specifying they "have" a Baseline product. *Average* lifetime hours of use for the baseline product. Walmart assumes the average lifetime is consistent between the baseline and more efficient product.

Model inputs *required field	Source	Units	Notes
Lifetime hours of use (more efficient product)*	Supplier input	Numerical value	*Average* lifetime hours of use for the more efficient product.
ENERGY STAR lifetime energy use	EPA	kWh	Data used only for 1) suppliers specifying they "do not have" a Baseline product, or 2) suppliers with a "more efficient" product that has either an initial retail date before the start of Project Gigaton in 2016 or more than five years before the reporting dates they selected. See *Question PU.1. Emission factors* for list of values by product type.
ENERGY STAR certification*	Supplier input	Selected from dropdown	Possible dropdown selections: • is • is not This selection does not impact the calculation.
Initial retail year*	Supplier input	Selected from dropdown	Initial retail year of the *more efficient* product. Possible dropdown selections: 2015 or earlier 2016 2017 2018 2019 2020 **Please note:** if the initial retail date was before the start of Project Gigaton in 2016 (i.e., 2015 or earlier), suppliers are treated the same as those ***without a baseline product*** and are not permitted to enter baseline product information. Similarly, suppliers whose initial retail date is 5 or more years before the start date of their selected reporting period will also be treated as suppliers without a baseline product. This is because in these cases the unit sales of the "more efficient" product can continue to be reported to Project Gigaton only if the product's energy performance exceeds the default ENERGY STAR

Model inputs *required field	Source	Units	Notes
			performance thresholds based on the product category selected.

6.6.2.1.5 Question PU.1 Emission factors

See *Question E.2 Emission factors* for list of emissions factors. The emissions factor for the United States is used as proxy for all geographies of use.

Product use and design pillar table: Estimated energy use of products that meet ENERGY STAR performance thresholds

ENERGY STAR Product Category(selected from dropdown)	ENERGY STAR Product Category Description	ENERGY STAR Performance (kWh/year)	ENERGY STAR Assumed Product Lifetime (yrs)	ENERGY STAR Lifetime Energy Use (kWh)
Consumer Electronics & IT				
Notebook Computers	A computer designed specifically for portability and to be operated for extended periods of time both with and without a direct connection to an ac mains power source. Notebook Computers include an Integrated Display, a non-detachable, mechanical keyboard (using physical, moveable keys), and pointing device.	25	4	102
Desktops	A computer whose main unit is designed to be located in a permanent location, often on a desk or on the floor. Desktop computers are not designed for portability and are designed for use with an external display, keyboard, and mouse. Desktop computers are intended for a broad range of home and office applications, including point of sale applications.	166	4	663
Small Network Equipment	A device whose primary function is to pass Internet Protocol (IP) traffic among various network interfaces / ports intended for use in residential and small business settings.	61	5	305
Set Top Boxes	A device with the primary purpose of receiving digital television services from a coaxial, hybrid fiber coaxial, or fiber-to-the-home distribution system, from satellites, or encapsulated in IP packets from managed IP distribution networks; decrypting or descrambling these signals; and decoding/ decompressing for delivery to residential consumer displays and/or recording devices, and/or one or more other Set-Top Boxes, including Thin Clients, in a residential multi-room architecture. STBs that incorporate common LAN functionality as a secondary function are considered STBs for this specification	60	6	360
Inkjet Multifunction Imaging Equipment	A product that performs the core functions of a Printer and Scanner. An MFD may have a physically integrated form factor, or it may consist of a combination of functionally integrated components. MFD copy functionality is considered to be distinct from single-sheet convenience copying functionality sometimes offered by fax machines. This definition includes products marketed as MFDs and "multi-function products" (MFPs).	16	3.5	56
Decorative Light String	A string of lamps that operates on AC power in North America (120 V RMS AC, 60 Hz) or via a power adapter or controller that connects directly to AC power, and is used for decorative, residential lighting purposes. The lamps may be replaceable or sealed into the lamp holder/wiring harness.	3	5	15
Standard A Shape Light Bulbs (Halogen vs. LED)	A general service replacement lamp with an ANSI standard base that emits the majority of light produced in an even distribution. These lamps can be standard; having an ANSI standard lamp shape of A or non-standard, such as a self-ballasted compact fluorescent that utilizes a bare spiral.	10	13.7	137

ENERGY STAR Product Category(selected from dropdown)	ENERGY STAR Product Category Description	ENERGY STAR Performance (kWh/year)	ENERGY STAR Assumed Product Lifetime (yrs)	ENERGY STAR Lifetime Energy Use (kWh)
Typical Candle Shape Light Bulbs (Incandescent vs. LED)	A lamp with a candle-like shape envelope including shapes B, BA, C, CA, DC, and F as defined in ANSI C79.1-2002.	5.5	13.7	75
Typical Globe Shape Light Bulbs (Incandescent vs. LED)	A lamp with a globe shape envelope "G" as defined in ANSI C79.1-2002.	5.5	13.7	75
Typical Reflector (R Shapes) Light Bulbs (Halogen vs. LED)	ANSI standard PAR and MR lamps having at least 80% light output with a solid angle of π steradians, corresponding to a cone with an angle of 120°, self-ballasted compact fluorescent forms that utilize a reflector, and ANSI standard R, BR and ER shapes.	10.95	13.7	137
Luminaires (Light Fixture)	A complete lighting unit consisting of lamp(s) and ballast(s) (when applicable) together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamp(s) to the power supply (as per ANSI/IES RP-16-17).	10	13.7	137
TVs	A product designed to produce dynamic video, contains an internal TV tuner encased within the product housing, and that is capable of receiving dynamic visual content from wired or wireless sources including but not limited to: (a) Broadcast and similar services for terrestrial, cable, satellite, and/or broadband transmission of analog and/or digital signals; and/or (b) Display-specific data connections, such as HDMI, Component video, S-video, Composite video; and/or (c) Media storage devices such as a USB flash drive, a memory card, or a DVD; and/or (d) Network connections, usually using Internet Protocol, typically carried over Ethernet or Wi-Fi.	81	5	405
Home/Office Telephony	A commercially available electronic product whose primary purpose is to transmit and receive sound over a distance using a voice or data network.	7	7	49
Computer Monitors	A product with a display screen and associated electronics, often encased in a single housing, that as its primary function produces visual information from (1) a computer, workstation, or server via one or more inputs (e.g., VGA, DVI, HDMI, DisplayPort, IEEE 1394, USB), (2) external storage (e.g., USB flash drive, memory card), or (3) a network connection.	32	7	224
Blu-Ray Player	A mains-connected product that offers Audio Amplification and/or Optical Disc Player functions.	9	7	63
Home Audio Equipment	A mains-connected product that offers Audio Amplification and/or Optical Disc Player functions.	22	7	154
Appliances				
Dehumidifiers	A product, other than a portable air conditioner, room air conditioner, or packaged terminal air conditioner, that is a self-contained, electrically operated, and mechanically encased assembly consisting of: (a) a refrigerated surface (evaporator) that condenses moisture from the atmosphere; (b) a refrigerating system, including an electric motor; (c) an air-circulating fan; and (d) means for collecting or disposing of the condensate.	428	11	4708
Air Purifier (Cleaner)	An electric cord-connected, portable appliance with the primary function of removing particulate matter from the air and which can be moved from room to room.	317	9	2853
Residential Clothes Washers	As defined in page 1 of the ENERGY STAR Product Specification for Clothes Washers.	316	11	3476
Residential Clothes Dryers	As defined in page 1 of the ENERGY STAR Product Specification for Clothes Dryers.	608	12	7302
Room Air Conditioners	A consumer product, other than a "packaged terminal air conditioner," which is powered by a single phase electric current and which is an encased assembly designed as a unit for mounting in a window or through the wall for the purpose of providing delivery of conditioned air to an enclosed space. It includes a prime source of refrigeration and may include a means for ventilating and heating.	556	9	5004
Residential Dishwashers	A cabinet-like appliance which with the aid of water and detergent, washes, rinses, and dries (when a drying process is included) dishware, glassware, eating utensils, and most cooking utensils by chemical, mechanical and/or electrical means and discharges to the plumbing drainage system.	181	12	2171
Residential Refrigerators	A cabinet designed for the refrigerated storage of food, designed to be capable of achieving storage temperatures above 32 °F (0 °C) and below 39 °F	488	12	5860

ENERGY STAR Product Category(selected from dropdown)	ENERGY STAR Product Category Description	ENERGY STAR Performance (kWh/year)	ENERGY STAR Assumed Product Lifetime (yrs)	ENERGY STAR Lifetime Energy Use (kWh)
	(3.9 °C), and having a source of refrigeration requiring single phase, alternating current electric energy input only. An electric refrigerator may include a compartment for the freezing and storage of food at temperatures below 32 °F (0 °C) but does not provide a separate low temperature compartment designed for the freezing and storage of food at temperatures below 8 °F (-13.3 °C).			
Residential Freezers	A cabinet designed as a unit for the freezing and storage of food at temperatures of 0 °F (-17.8 °C) or below, and having a source of refrigeration requiring single phase, alternating current electric energy input only.	281	11	3094
Pool Pumps	Residential Pool Pump.	1,410	6	8459
Water Coolers	A freestanding device that consumes energy to cool and/or heat potable water.	259	5	1293
HVAC Products				
Ceiling Fans (without lighting)	A non-portable device designed for home use that is suspended from the ceiling for circulating air via the rotation of fan blades. Some ceiling fans are sold with ceiling fan light kits.	41	14	575
Ceiling Fans (with lighting)	A fan whose purpose is to actively supply air to or remove air from the inside of a residence. This includes ceiling and wall-mounted fans, or remotely mounted in-line fans, designed to be used in a bathroom or utility room, supply fans designed to provide air to the indoor space, and kitchen range hoods. Supply fans may also be designed to filter incoming air.	55	14	777
Ventilation Fans	A product that utilizes electricity to heat potable water for use outside the heater upon demand, including: Storage type units designed to heat and store water at a thermostatically-controlled temperature of less than 180 °F, including electric heat pump type units with a maximum current rating of 24 amperes at an input voltage 250 volts or less, and having a manufacturer's rated storage capacity of 120 gallons or less.	16	11	181
Residential Electric Heat Pump Water Heater	An air-source unitary heat pump model is a product other than a packaged terminal heat pump, which consists of one or more assemblies, powered by single phase electric current, rated below 65,000 Btu per hour, utilizing an indoor conditioning coil, compressor, and refrigerant-to-outdoor air heat exchanger to provide air heating, and may also provide air cooling, dehumidifying, humidifying circulating, and air cleaning.	1,634	13	21236
Residential Air-Source Heat Pump	A product, which is powered by single phase electric current, air cooled, rated below 65,000 Btu per hour, not contained within the same cabinet as a furnace, the rated capacity of which is above 225,000 Btu per hour, and is a heat pump or a cooling unit only.	4,444	12	53331
Residential Central AC	A non-portable device designed for home use that is suspended from the ceiling for circulating air via the rotation of fan blades. Some ceiling fans are sold with ceiling fan light kits.	2,228	11	24505
Other (not an ENERGY STAR product category)				
Other	*N/A*	*N/A*	*N/A*	*N/A*

Source: All ENERGY STAR specifications with definitions and requirements

6.6.2.2 *Question PU.2: Have you switched to a low global warming potential (GWP) refrigerant for your product(s)?*

6.6.2.2.1 Question PU.2 Background and definitions

This data pathway calculates the greenhouse gas impact of transitioning a product to utilize low global warming potential (GWP) refrigerants and considers refrigerant loss during installation, operation, and disposal of residential refrigerators and air conditioning (A/C) units. The supplier chooses the "baseline product" which must be the supplier's own product that represents the generation immediately

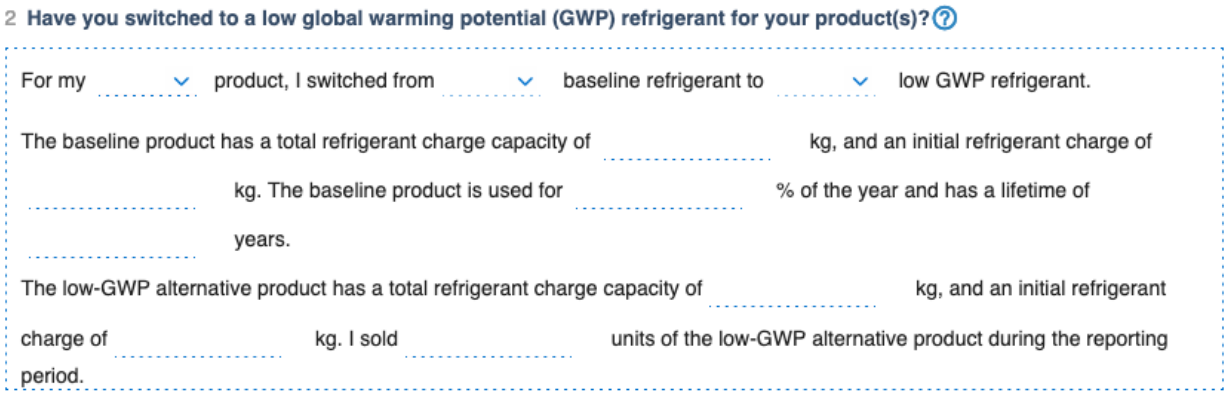
preceding the “more efficient” product. Emissions improvements from low-GWP refrigerants cannot currently be calculated if suppliers do not have a baseline product. An average figure may be used for product lifetime.

To calculate avoided emissions, the emissions from refrigerant leakage during installation, operation, and disposal and recovered refrigerant should be accounted for. Totals for each type of refrigerant used should be calculated separately. At this time, refrigerant recovery during disposal is considered to be 0% and is not accounted for in this methodology.

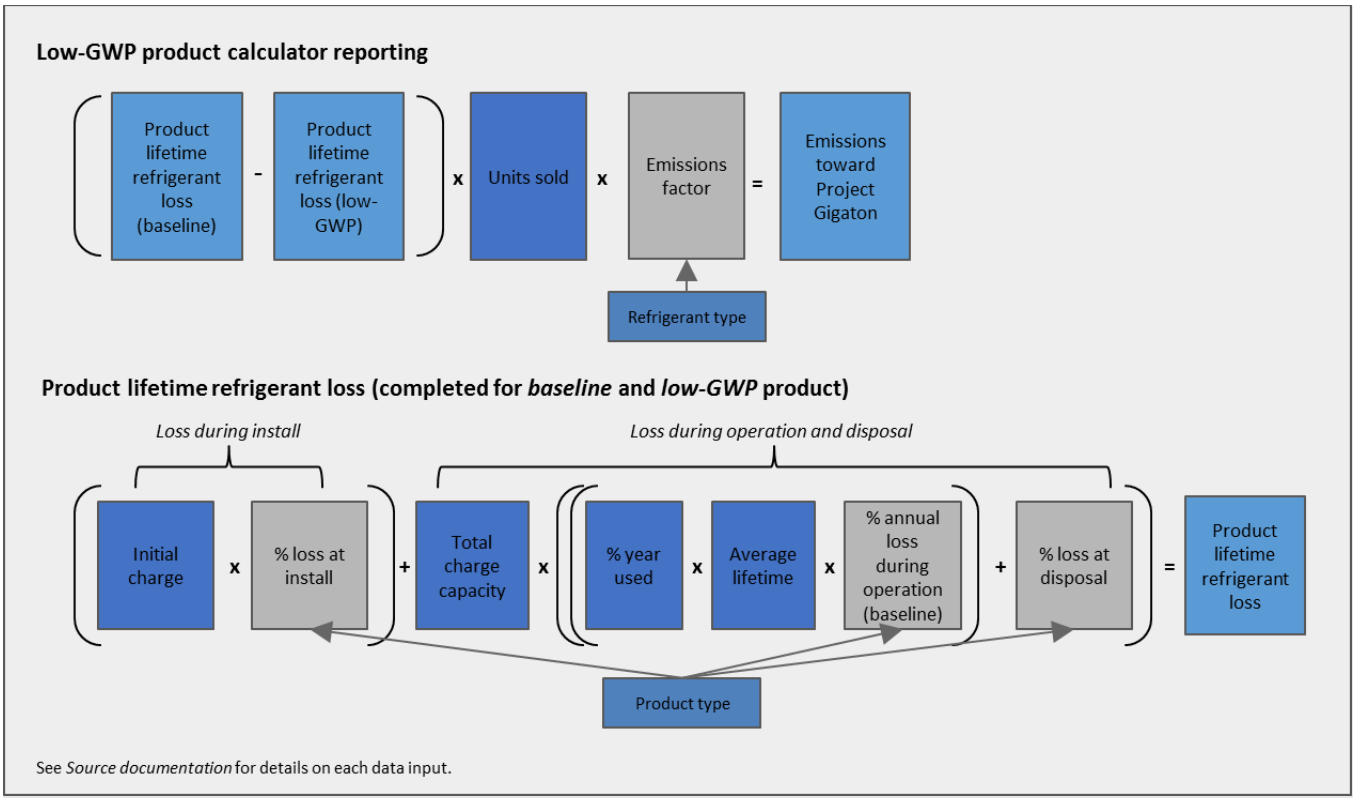
Currently, this guidance is only applicable for residential refrigerators or air-conditioning products. Any zero or low-GWP refrigerant used must be an acceptable substitute according to national or local regulatory guidelines (e.g., United States EPA Significant New Alternatives Policy (SNAP) program; China Ministry of Ecology and the Environment, Foreign Economic Cooperation Office; European Commission Directorate of Climate Action) and be used in accordance with use conditions laid out in those regulatory guidelines.

Suppliers reporting to this calculator may also report on efficiency gains through *Question PU.1*.

6.6.2.2.2 Question PU.2 Calculator



6.6.2.2.3 Question PU.2 Calculation



Supplier input | Third party source | Calculated

6.6.2.2.4 Question PU.2 Source documentation

Model inputs *required field	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	Suppliers may enter multiple lines of data.
Product type*	Supplier input	Selected from dropdown	Possible dropdown selections: • Residential Refrigerator • Residential A/C
Units sold*	Supplier input	Numerical value	Units of Low-GWP Product sold during the specified reporting period.
Refrigerant type*	Supplier input	Selected from dropdown	*See Question PU.2 Emission factors* for list of all dropdown options. Value collected for both baseline and low-GWP refrigerant product.

Model inputs **required field*	Source	Units	Notes
Product lifetime refrigerant loss	Calculated value	Numerical value	Value in kilograms (kg). Calculated value for the baseline product and low-GWP refrigerant product.
Initial charge*	Supplier input	Numerical value	Initial refrigerant charge collected in kilograms (kg). Value collected for both baseline and low-GWP refrigerant product.
% loss at install	EPA	Percent	Assumed refrigerant loss at assembly A/C: 0.2% Refrigerators: 1%.
Total charge capacity*	Supplier input	Numerical value	Product total refrigerant charge capacity collected in kilograms (kg). Value collected for both baseline and low-GWP refrigerant product.
% annual loss during operation	EPA, LBNL	Percent	Assumed annual refrigerant loss during operation. A/C: 10% Refrigerators: 5%.
% year used*	Supplier input	Percent	Percent of the year during which the product is used. Value needed for baseline product only and applied to calculation for low-GWP product.
Average lifetime*	Supplier input	Numerical value	Average lifetime years of use entered in years. Value needed for baseline product only and applied to calculation for low-GWP product.
% loss at disposal	EPA	Percent	Assumed percent value for capacity remaining at disposal. A/C: 80% Refrigerators: 80%
Emissions factor	IPCC, EPA	Numerical Value	*See Question PU.2 Emission factors* for list of emissions factors.

6.6.2.3 Question PU.2 Emission factors

Produce use and design table: Refrigerant types and GWPs by product

Product Type	Refrigerant type (Gas or Blend Name)	GWP (metric tons CO_2e / metric ton loss)	Emissions factor (GWP in metric tons C02e/kg loss)	Data Source
Low-GWP Alternative Refrigerants				
Refrigerators	R-290	3	0.003	EPA, SNAP
A/C				
Refrigerators	R-600a	3	0.003	IPCC Fourth Assessment Report (2007)
Refrigerators	R-441A	5	0.005	EPA, SNAP
A/C				
Refrigerators	R-450	601	0.601	EPA, SNAP
Refrigerators	R-513A	630	0.630	EPA, SNAP
AC	HFC-32	677	0.677	IPCC Fifth Assessment Report (2014)
Baseline Refrigerants				
Refrigerators	HFC-134a	1,300	1.3	IPCC Fifth Assessment Report (2014)
A/C				
Refrigerators	R-407C	1,744	1.744	IPCC Second Assessment Report (1996)
A/C	R-410A	2,088	2.088	IPCC Second Assessment Report (1996)
Refrigerators	R-417A	2,346	2.346	IPCC Second Assessment Report (1996)
Refrigerators	R-404A	3,922	3.922	IPCC Second Assessment Report (1996)
Refrigerators	R-507 or R-507A	3,985	3.985	IPCC Second Assessment Report (1996)

6.6.2.4 *Question PU.3: Have you used recycled content in your pulp or paper-based products?*

6.6.2.4.1 Question PU.3 Background and definitions

This data component captures emissions avoided from use of post-consumer recycled content (PCR) in pulp- and paper-based products. The definition of post-consumer recycled content is defined by ISO 14021.

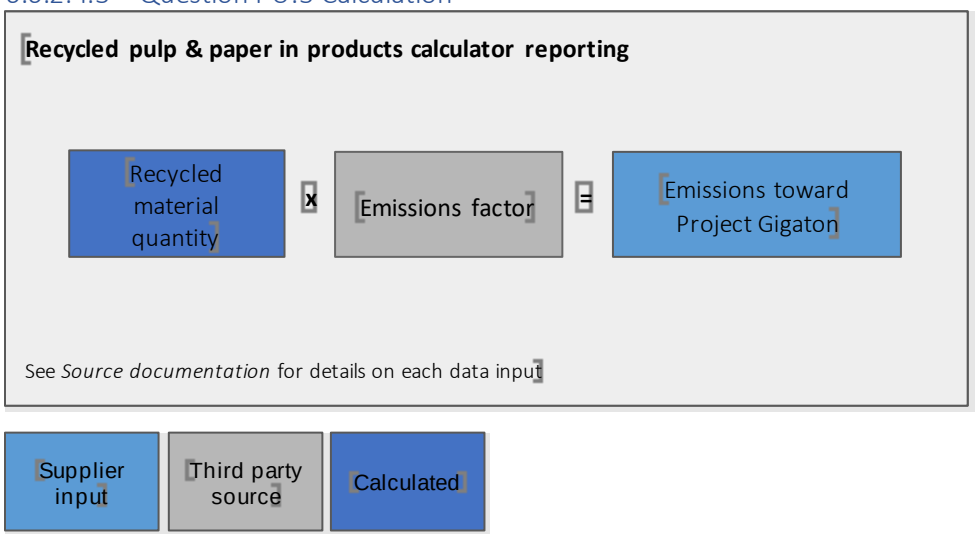
Use of recycled content in pulp- and paper-based packaging should be reported to *Question PK.2*.

6.6.2.4.2 Question PU.3 Calculator

3 **Have you used recycled content in your pulp or paper-based products?**

I sourced _____ metric tons of post-consumer recycled material for my tree-fiber based product.

6.6.2.4.3 Question PU.3 Calculation



6.6.2.4.4 Question PU.3 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may not enter multiple lines of data. Data component also available in the Product Use and Design pillar, however suppliers may only complete once. All emissions reported are allocated to the Product Use and Design pillar totals.
Recycled material quantity*	Supplier input	Metric tons	Only post-consumer recycled material is allowed. See *Question PK.2 Emission factors* section for definition
Emissions factor	Developed using FAO and other data sources as described in *Question PK.2 Emission factors* section	Metric tons CO_2e/metric ton recycled content	0.05 metric tons CO_2e/metric ton recycled content See *Question PK.2 Emission factors* section for additional detail

6.6.2.4.5 Question PU.3 Emission factors

See *Question PK.2 Emission factors* section for emission factors.

6.6.2.5 *Question PU.4: Have you sourced FSC, SFI, or PEFC certified timber, pulp or paper for your products?*

See *Question PK.3* for question information, as *Question PU.4* include the same calculations, but applied to products rather than packaging.

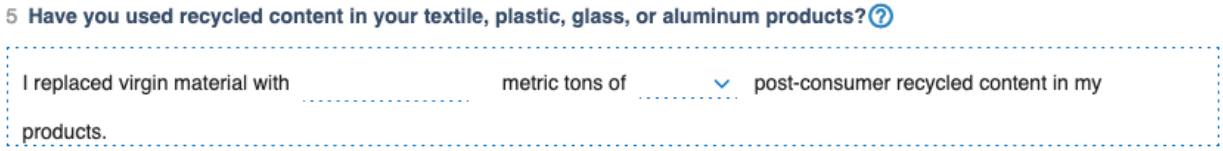
6.6.2.6 *Question PU.5: Have you used recycled content in your textile, plastic, glass, or aluminum products?*

6.6.2.6.1 Question PU.5 Background and definitions

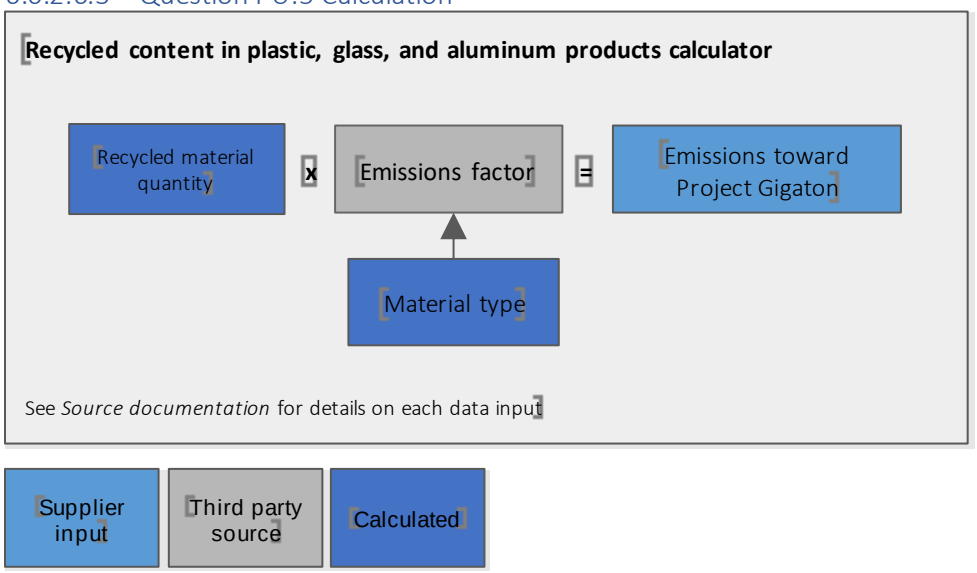
Using post-consumer recycled content instead of virgin materials reduces upstream greenhouse gas emissions associated with material manufacturing. This data component captures emissions avoided from use of recycled content in products. Use of recycled content in packaging should be reported to *Question PK.2*.

Post-consumer recycled content (PCR) refers to the amount of post-consumer recycled content contained in the package as defined by ISO 14021. The impact of converting the PCR material, so that it can be used as an input into a new package, is considered in this impact. The PCR material is incorporated into the production of the package and therefore reduces the virgin impact required to make the package.

6.6.2.6.2 Question PU.5 Calculator



6.6.2.6.3 Question PU.5 Calculation



6.6.2.6.4 Question PU.5 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity and type.
Recycled material quantity*	Supplier input	Metric tons	Mass of PCR content used to replace virgin material.
Material type*	Supplier input	Select from dropdown	See *Question PK.2 Emission factors* for list of all dropdown selections. The supplier should enter the type of PCR plastic being used and it's assumed that the virgin plastic being replaced is the same plastic type.
Emissions Factor	Third party source	Metric tons CO_2e per metric ton material	This will be the delta between the PCR and virgin Impact for each material. See *Question PK.2 Emission factors* for list of all emissions factors.

6.6.2.6.5 Question PU.5 Emission factors

See *Question PK.2 Emission factors* section for emission factors.

Material	Source	Kilograms CO2e per metric ton (tonne) material	Metric tons CO2e per metric ton (tonne) material	Emissions factor used (virgin – PCR)
Polyester fiber (used for textiles)	Virgin	5222.7006	5.223	3.792
	PCR	1431.1489	1.431	

Source: COMPASS Tool

6.6.2.7 *Question PU.6: Have you redesigned your product to reduce the amount of material needed?*

6.6.2.7.1 Question PU.6 Background and definitions

All product materials produce greenhouse gas emissions during their manufacturing. Reducing the amount of material needed to make effective products will avoid unnecessary emissions. This data component captures emissions avoided from material reduction in products. Reducing material in packaging should be reported to *Question PK.5*.

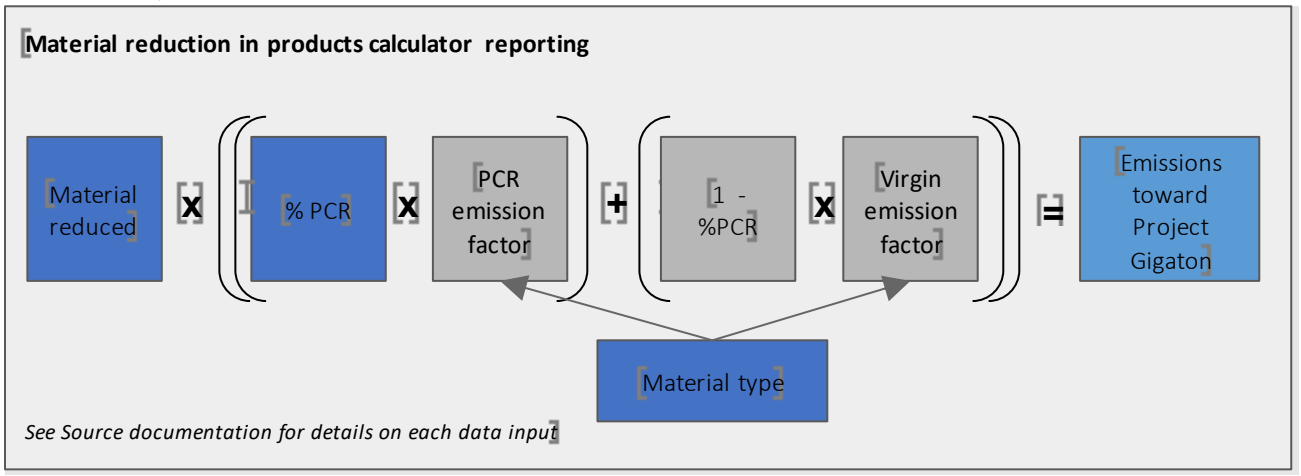
Suppliers are asked to input the percentage of material reduced that was post-consumer recycled content, since the greenhouse gas emissions incurred during the manufacture of post-consumer recycled content differ from those or virgin material.

6.6.2.7.2 Question PU.6 Calculator

6 **Have you redesigned your product to reduce the amount of material needed?**

I reduced my product's overall material by _____ metric tons of _____ material, of which _____ % was recycled content.

6.6.2.7.3 Question PU.6 Calculation



6.6.2.7.4 Question PU.6 Source documentation

Model inputs **required field*	Source	Units	Notes
Emissions toward Project Gigaton	Calculated value	Metric tons CO_2e	Suppliers may enter multiple combinations of material quantity and type.
Material reduced*	Supplier input	Metric tons	Aggregate mass of material that has been eliminated from the product over the units shipped.
Material type*	Supplier input	Select from dropdown	See *Question PK.5 Emission factors* section for list of all dropdown options
PCR*	Supplier Input	Percentage	Percentage of recycled material incorporated into the product prior to material reduction.
Emissions factor	Third party source	Metric tons CO_2e per metric ton material	See *Question PK.5 Emission factors* section for list of all emissions factors.

6.6.2.7.5 Question PU.6 Emission factors

See *Question PK.5 Emission factors* section for emission factors.

6.6.2.8 *Question PU.7: Do you have other product use and design activities you'd like to report, and know how many metric tons CO_2e you saved?*

More information available in the *Reporting aggregate emissions* section.

6.7 Enterprise level

6.7.1.1 *Question ET.1: Do you have other activities you'd like to report, and know how many metric tons CO2e you saved?*

More information available in the *Reporting aggregate emissions* section.