

Welcome Poll: What is your experience with GHG Inventories?

Question: How familiar are you with GHG Inventory concepts and processes?

1. **Very Familiar**, may have completed a GHG Inventory before
2. **Familiar**, understand parts of the process, may be performing a GHG Inventory
3. **Somewhat Familiar**, may have aspirations of completing a GHG Inventory
4. **Not Familiar**, new to GHG Inventories but keen to learn
5. **No Familiarity**, little context for the purpose of this training





SUSTAINABLE SUPPLY CHAIN ALLIANCE

**GHG Inventory Workshop Series
Session 1: Initial Analysis
February 9, 2023**

Agenda

Program Overview	
SSCA Introduction	5 minutes
Training Program: Timeline, Goals	5 minutes
GHG Inventory Basics	
What is a GHG Inventory?	10 minutes
What is the value in doing one?	5 minutes
Initial Analysis	
Defining Scope and Ambition	10 minutes
Identifying “In-Scope” Emissions	10 minutes
Identifying Data Owners	5 minutes
Homework	





SUSTAINABLE SUPPLY CHAIN ALLIANCE

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What we do

- Partner with stakeholders and value chain partners to identify, promote and adopt successful sustainability practices;
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- Deliver tangible business value to the industry through the application of sustainability practices.

Our 2023 Ambition

Responsibly raise our ambition, industry leadership, member performance and value through 2023 to meet the growing interest and demand for supply chain sustainability

We also have over 75 Supplier Affiliate Members representing small, medium, large, product, service and diverse organizations covering most of our key spend categories.

Our Utility Members



Supplier Affiliate Member

Supplier Affiliate Membership is open to firms and/or individuals that have an interest in advancing sustainability within the electric utility supply chain.

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Expertise: Expand your expertise through various training sessions and Alliance materials, and share your knowledge with peers through various practice sharing opportunities

Discounts: Take advantage of discounts and visibility in our Supplier Affiliate Member Only Showcase during the Annual Sourcing Conference

Expectations

- **Interest in advancing sustainability**
- **Complete our annual supplier survey (TSP)**
- **Engage with utility and supplier peers**

Become a member today!	Annual fee
Large Business (>\$1B revenue)	\$4,500
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Assumptions for GHG Inventory trainings

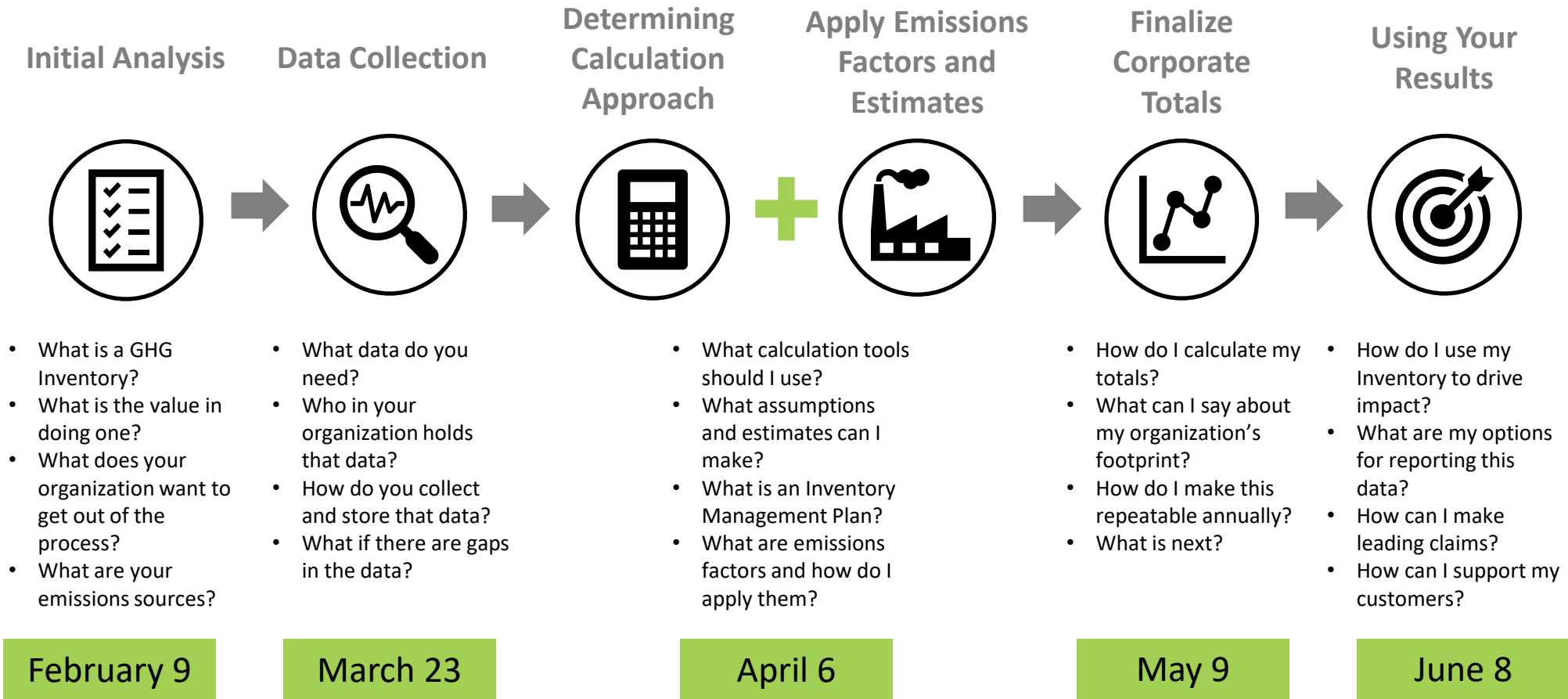
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- Your organization has not calculated a GHG inventory before, or are looking to improve your process
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Overview of GHG Inventory Training Series

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GHG Inventory Basics



Introduction to greenhouse gas emissions (GHGs)

The issue: Greenhouse gases trap heat from the sun and warm the planet's surface. Primary human-derived sources of GHG emissions are the burning of fossil fuels for electricity, heat and transportation

Example sources →



Stationary combustion



Purchased electricity



Mobile combustion



Purchased heating & cooling



Process & refrigeration gases

- Greenhouse gases are composed of 7 types of gases →
 - CO₂ (Carbon Dioxide)
 - CH₄ (Methane)
 - N₂O (Nitrous Oxide)
 - SF₆ (Sulfur hexafluoride)
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- GHG emissions are often tracked in terms of CO₂ equivalent (CO₂e), which is a factor that incorporates the seven gases' impacts into a single figure (CO₂ is used as the primary term as it's the largest source of the seven)



GHG Emissions Boundaries - Definitions

Scopes 1-3

GHG emissions are categorized into *Scopes*, defined by operational boundaries in relation to direct and indirect GHG emissions.

Scope 1

Direct emissions from sources owned or controlled by the company, such as combustion of fuels on-site or in owned/leased vehicles & emissions from refrigerant leaks.

Scope 2

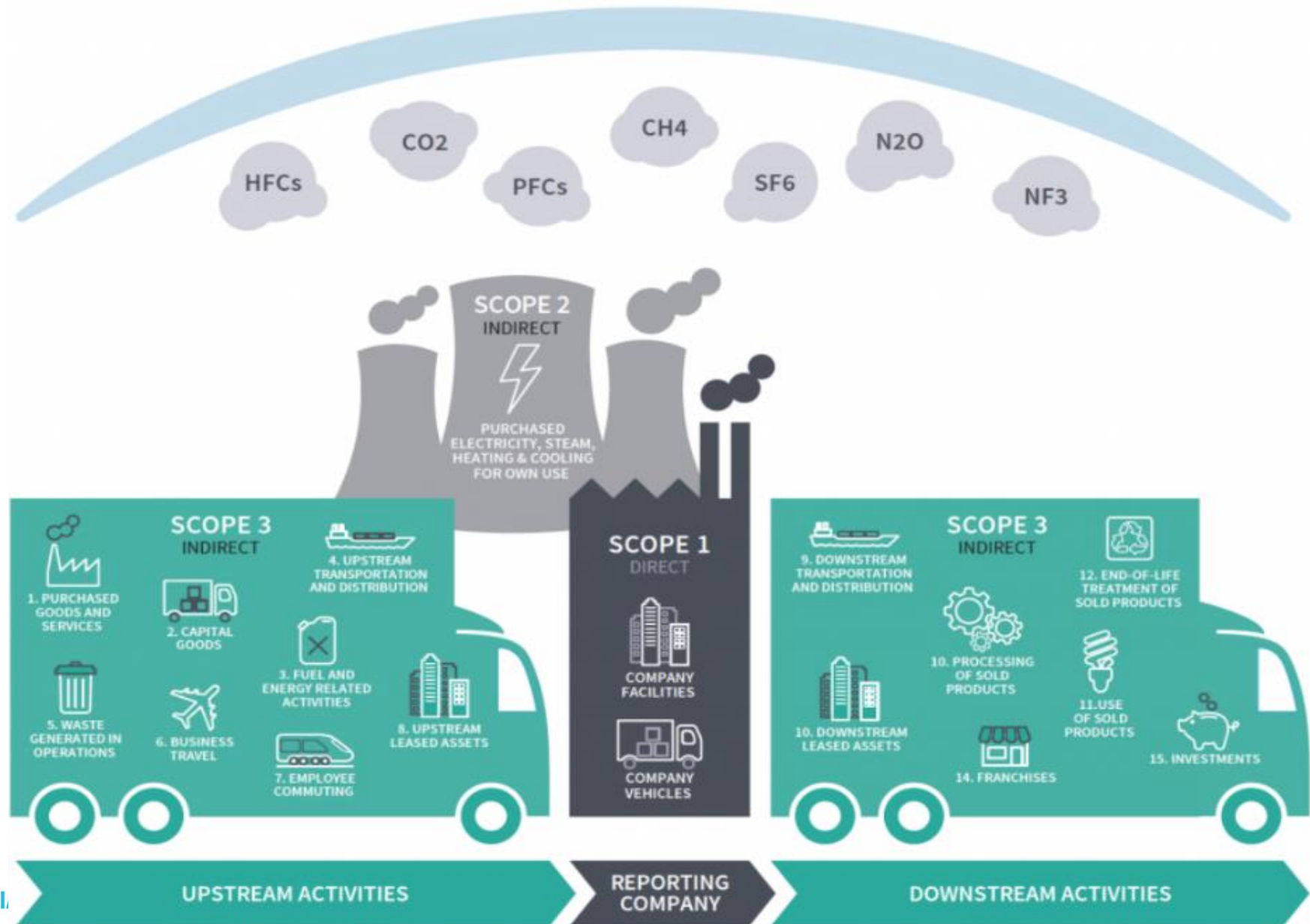
Indirect emissions from generation of purchased electricity, heating, cooling, or steam for the company (owned/operated).

Scope 3

Other indirect emissions in the company value chain resulting from activities such as product manufacturing, business travel, transportation & distribution, the use of sold products, etc.



GHG Emissions Boundaries – Categories of Emissions



Common sources of GHG emissions

Own operations		Value chain	
Scope 1	Scope 2	Scope 3 – upstream	Scope 3 - downstream
<ul style="list-style-type: none"> Fuels used in operations (Natural gas, fuel oil, diesel, gasoline, propane, etc.) Refrigerants and process gases Mobile fuels used in vehicles (Gasoline, diesel, etc.) 	<ul style="list-style-type: none"> Purchased utilities <ul style="list-style-type: none"> Electricity steam/heat chilled water 	<ul style="list-style-type: none"> Product materials processing and manufacturing Indirect procurement Capital goods Fuel/energy related activities Upstream transportation and distribution Waste generated from operations Business travel Employee commuting 	<ul style="list-style-type: none"> Downstream transportation and distribution Processing of sold products Use of sold products End-of-life treatment of sold products Downstream leased assets Franchises Investments



Why Calculate a GHG Inventory?

Value of a GHG Inventory

GHG inventories help quantify, understand, and assess emissions associated with a company's activities. Companies must be able to understand and manage GHG risks if they are to ensure long-term success in a competitive business environment.

- **Support utility customer needs to report on Scope 3 emissions:** More than ever, utilities are expected to report their Scope 3 supplier emissions. Supplier GHG inventories are critical to customers now and will become more important in the future.
- **Save money and improve energy efficiency:** Measuring emissions helps identify where efficiency and reduction opportunities lie, and thus, operational and energy cost savings.
- **Manage risks:** Measuring emissions helps prepare for risks (e.g., energy cost increases, supply disruption, evolving customer expectations) and changing regulations (e.g., SEC Climate Disclosure ruling).
- **Develop an effective corporate strategy:** Use inventory to establish performance goals, develop business continuity planning, location strategy, and operational improvements.
- **Build competitive advantage:** GHG inventories help identify opportunities to re-design business operations/processes, implement technological innovations, improve products & services, and build sustainable competitive advantage.
- **Protect and build your reputation:** Demonstrating leadership and environmental stewardship are integral to maintaining your social license to operate.



Improvement Opportunities Stemming from your GHG Inventory

Improvement Opportunities

*Example
improvement
opportunities*

- Perform preventative maintenance on equipment & replace inefficient equipment
- Reduce energy or fuel consumption by optimizing reactions and processes
- Use renewable energy and adopt electric vehicle fleets
- Encourage positive energy behaviors through training and awareness building
- Design products to contain less material and/or recycled and renewable materials
- Use life cycle assessment (LCA) during product design to improve materials selection



Entergy: What is the Business Case for a GHG Inventory?

Why are GHG Inventories important?

- Global regulations around climate disclosure are emerging now, and businesses need strategies to adapt to these new demands
- As part of our net-zero by 2050 strategy, Entergy has been voluntarily tracking and reducing our GHG emissions for over 20 years using comprehensive, third-party verified annual GHG Inventories
- Entergy's history of GHG data tracking enables us to adapt our processes to any new regulations (e.g., pending SEC ruling on climate disclosures)
- Entergy's GHG inventories feed into our climate report, which is a road map of this journey!
 - There is an entire section focused on scope 3 and supplier engagement, with a focus on engaging suppliers and understanding how emissions can be reduced over time

How is the expectation for Entergy suppliers shifting over time?

- Entergy is increasingly encouraging sustainability in our supply chain through surveys, training, engagement in business reviews
- Entergy recognizes supplier ESG performance through our annual Premier Vendor Award program
- Entergy drives suppliers to incorporate this thinking into their processes and develop embedded carbon numbers that we can monitor over time
- In 2022 Entergy issued a GHG Supplier Expectation letter to over 3000 active suppliers, outlining our current and future expectations of suppliers to track and reduce their emissions



entergy



Poll: Who are your SSCA partners?

Question: Which SSCA members do you work with?*

*Results are to be used anonymously and in aggregate



Initial Analysis

**What are your GHG ambitions?
What would an inventory look like for you?**



Part 1: Initial Analysis

Follow these steps to determine your organization's ambitions and foundational GHG emissions information.

#1 Define your goals

Determine your organization's ambitions— how you want to use your GHG inventory will dictate how your inventory should be completed

#2 Define your scope

Decide on emissions Scopes to include (1+2, or 1+2+3), which Scope 3 categories are relevant to you, and whether to pursue inventory verification

#3 Identify and list emissions sources

Within each defined emissions Scope, determine and record which common emissions sources are relevant to your organization and what type of data you are likely to need

#4 Identify who might own that data

Associate at least one point of contact with each emission source identified, and ensure the right data owner is engaged and recorded for future



GHG Inventory: Defining your goals

Before getting started define:

1. Who is your intended audience?
Other stakeholders who will be using this data?
2. What is your purpose for the inventory? (Interested in setting targets? Going carbon neutral?)



This will dictate:

- Scope of assessment
- Level of detail
- Adherence to standards
- Verification requirements
- External support, software needs, etc.
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In order to align on ambition and define organization-level goals, you may need to lead one or several workshops with business leaders. If so, ensure the audience is properly prepared with context on GHG Inventories, leveraging similar content as we are discussing in this training.



Poll: What is your climate ambition?

Question: What capacity would you like to build in your organization around carbon emissions?

- A. Science-based climate targets
- B. Carbon emission reduction targets
- C. Reporting carbon emissions to stakeholders
- D. Reporting carbon emissions for regulatory compliance
- E. Transparency in carbon emissions to build customer relationships



Defining the Scope of Your GHG inventory

1. Who is your intended audience for this GHG Inventory? Will there be stakeholders who will be using this data?

- *Utility customer?*
- *Other customers?*
- *Reporting agencies, like CDP?*
- *For internal use?*

<i>Utility customer? Other customers? Reporting agencies, like CDP?</i>	Scope 1 & 2, maybe Scope 3
<i>For internal use?</i>	Scope 1 & 2

2. What is your purpose for the inventory?

- *Interested in setting internal targets?*
- *Going carbon neutral?*
- *Providing Scope 1 and 2 data to Utility customers?*
- *Understanding your own Scope 3 emissions?*

<i>Interested in setting internal targets? Providing Scope 1 and 2 data to Utility customers?</i>	Scope 1 & 2
<i>Going carbon neutral? Understanding your own Scope 3 emissions?</i>	Scope 1, 2, and 3

Defining “In Scope” Scope 3 categories

Scope 3, or Value Chain Emissions

Scope 3 – Upstream	Scope 3 - Downstream
<ul style="list-style-type: none">• Product materials processing and manufacturing• Indirect procurement• Capital goods• Fuel/energy related activities• Upstream transportation and distribution• Waste generated from operations• Business travel• Employee commuting	<ul style="list-style-type: none">• Downstream transportation and distribution• Processing of sold products• Use of sold products• End-of-life treatment of sold products• Downstream leased assets• Franchises• Investments

There are 15 Scope 3 emissions categories that define sources of emissions in your value chain.

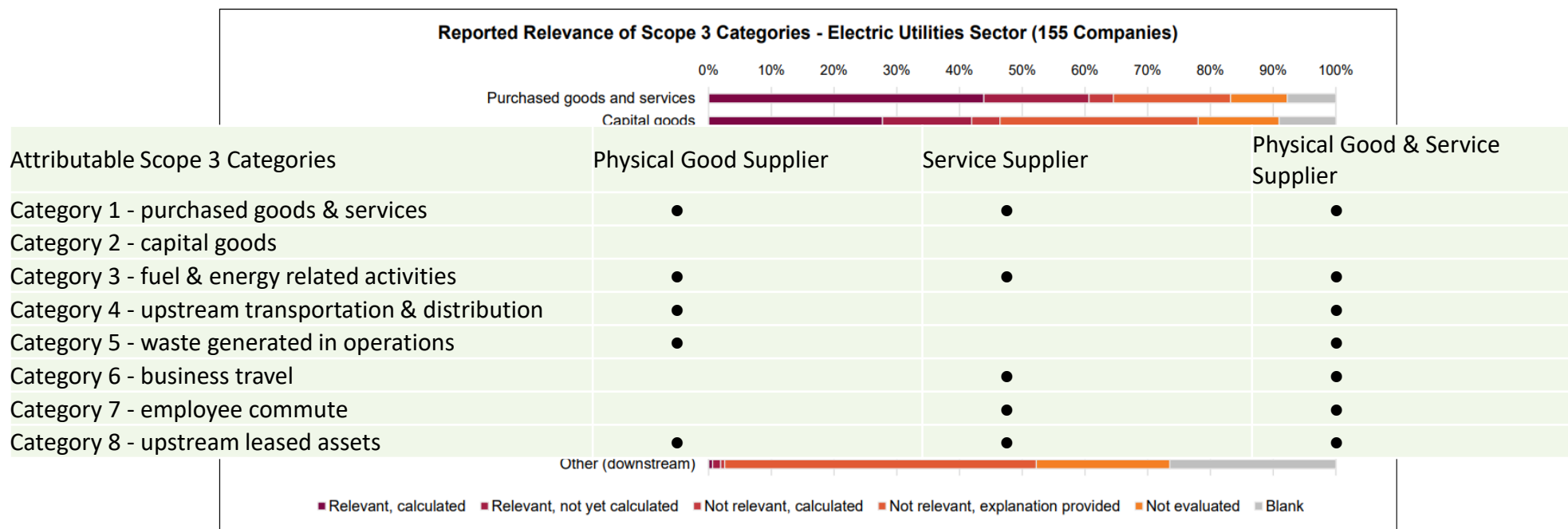
Not all these categories will be relevant to your organization, depending on:

- Size
- Influence
- Risk
- Stakeholders
- Outsourcing
- Sector guidance
- Other

Review descriptions of each category and consult appropriate contacts within your organization to determine relevance.

Defining “In Scope” Scope 3 categories

- Scope 3 category relevance differs depending on sector too
- Most sectors have existing guidance to leverage on what should be considered relevant
 - The Carbon Disclosure Project (CDP) compiles emissions data by sector and provides annual notes on guidance for Scope 3



Step 2: Identify Relevant Sources of Emissions

Scope 1-2 Data Collection Checklist ¹		
Emission Type	Description	Data Required
1 - Stationary Emissions	Direct emissions occurring onsite from fuel combustion (e.g., natural gas, propane, diesel, coal, biomass) in stationary equipment to produce electricity, heat, or steam.	<ol style="list-style-type: none"> 1. Fuel type 2. Fuel usage 3. Fuel units (volume or weight)
1 - Mobile Emissions	Emissions from fuel combustion (e.g., diesel, biodiesel, gasoline, aviation gasoline, CNG) by vehicles owned or leased by your company.	<p>Two of the following:</p> <ol style="list-style-type: none"> 1. Total fuel used by each vehicle 2. Total distance traveled by each vehicle 3. Fuel efficiency of each vehicle
1 - Fugitive Emissions	Leaks in your company's refrigeration and air conditioning equipment through which refrigerant gas escapes.	<ol style="list-style-type: none"> 1. Refrigerant type 2. Quantity of gas serviced 3. Quantity of gas recycled 4. Units for quantity serviced or recycled <p><i>Quantity of leaked gas is assumed to equal amount of gas replaced by your maintenance company.</i></p>
2 - Purchased Energy	Indirect emissions from electricity, steam, and hot/chilled water purchased from your local utility (not combusted on-site).	<ol style="list-style-type: none"> 1. Energy source 2. Energy usage 3. Units (kWh for electricity)

¹ The data collection checklists describe the most commonly reported GHG emissions. Additional scope 1 emissions include process emissions and other fugitive emissions (e.g., methane leakages from gas transport). Additional scope 3 emissions include other business travel emissions (e.g., hotel stays), other waste emissions (e.g., wastewater treatment), and emissions associated with purchased goods and services, capital goods, fuel- and energy-related activities (not included in scope 1-2), leased assets, processing and use of sold products, end-of-life treatment of sold products, franchises, and investments.

Step 3: Identify data owners

Finding the right contact starts with a single email!



Homework

- Complete an internal assessment (workshop or otherwise) to determine your organization's goals for a GHG inventory
- Use the resources described in this training (and in the Appendix) to identify the relevant emissions sources
- Begin creating a list of potential data owners (points of contact internally who may have data for your relevant emissions sources)

In the next session we will further discuss data collection for your GHG inventory: who your data owners are, tips for engaging them, and best practices for compiling your data.

Next workshop: March 23

Future workshops: April 6, May 9, June 8



SUSTAINABLE SUPPLY CHAIN ALLIANCE



Your 2023 Alliance Team



**SUSTAINABLE
SUPPLY CHAIN
ALLIANCE**

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SUSTAINABLE SUPPLY CHAIN ALLIANCE



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Appendix

GHG Glossary

Base year: As greenhouse gas (GHG) accounting is an ongoing process, the first emissions inventory that is conducted is known as the base year. The base year is used as a point of reference to track changes in an inventory as well as progress toward reduction goals.

Baseline metrics: Basic or beginning measurements. Baseline metrics are valuable when setting management and/or reduction goals in order to have something to compare against when making improvements, diagnosing inefficiencies, or tracking progress.

CO₂e: Emissions of different greenhouse gases are often expressed in carbon dioxide (CO₂) equivalent (CO₂e) terms, which represents the amount of carbon dioxide that would have the same relative effect as the greenhouse gases actually emitted.

Direct energy: Direct energy is energy that is produced on-site by the consumption of fuel. Direct energy produces what are known as Scope 1 emissions in the World Reporting Institute's GHG Protocol.

Emissions: The exhaust gas(es) produced as the result of fuel combustion.

Energy efficiency projects: Capital investment in projects to achieve an overall reduction in energy consumption or a less energy intensive production process. Examples include low-hanging fruit such as behavioral changes or more intensive initiatives such as equipment retrofits.

Energy or GHG reduction emission targets: Goals set by an organization to reduce its energy consumption or greenhouse gas (GHG) emissions. This goal is typically set by measuring an organization's energy consumption and/or GHG emissions and establishing a start date (baseline), setting an appropriate and achievable target, and outlining a reduction plan that can be achieved by a specific date.

Environmental policies & reporting: Standards and protocols developed by various agencies to track and disclose environmental and social impacts. Environmental reporting and management standards help organizations identify how to reduce or mitigate their environmental impacts. Standards and protocols include ISO 14001, the Global Reporting Initiative, and the Carbon Disclosure Project.

GHG Protocol: The GHG Protocol is the most widely used, internationally accepted tool for accounting for greenhouse gas emissions. It was developed by the World Resources Institute and the World Business Council for Sustainable Development. <http://www.ghgprotocol.org/>

GHG Glossary

Greenhouse gases (GHGs): GHGs are naturally occurring gases in the earth's atmosphere that absorb and re-emit radiation, trapping heat and making the planet warmer, known as the greenhouse effect. There are seven major GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and the recently added and nitrogen trifluoride (NF₃). The consumption of fossil fuels is associated with an increase in the presence of these gases in the atmosphere and with climate change.

Indirect energy: Indirect energy is the energy obtained from purchased electricity, heat, or steam. This type of energy is obtained from a third-party, such as a utility provider. Indirect energy produces what are known as Scope 2 emissions under the GHG Protocol.

Onsite fuel combustion (direct): Any fuels combusted by a company-owned asset, such as natural gas used in a boiler or a back-up generator that runs on diesel fuel.

Operational boundary: Defined scope of both direct and indirect emissions within an organizational boundary. When defining operational boundaries, the entity must specify who/what is responsible for emissions, i.e. the entity itself or a 3rd party.

Organizational boundary: Those businesses and operations that make up an organization for the purpose of accounting for and reporting GHG emissions.

Purchased energy (indirect): Energy that is sourced by a third-party provider and purchased by the organization. For example, natural gas purchased from a utility or a governmental agency.

Purchased steam: Steam that is generated by a third-party provider and then purchased by the organization.

Renewable energy: Energy derived from naturally occurring, repeatable, and replenishing sources. Types of renewable energy include geothermal, solar, wind, ocean and other forms of hydropower, biomass, etc.

Science-based targets: Emissions reductions goals that are in line with what the latest climate science says is necessary to keep global temperature rise at safe levels. <https://sciencebasedtargets.org/what-is-a-science-based-target/>

Energy & GHG Data Collection & Reporting

Example process for collecting data in order to facilitate reporting and use in a GHG inventory.

Collect Data			Provide Context		Report Data
What equipment under your operational control uses fuel/energy or refrigerants?	How much of each fuel/energy source or refrigerant do you use?	Where is your data tracked and recorded?	Do you have energy and/or emission reduction goals?*	Have you completed any energy and/or emission reduction projects in the reporting year?*	Reporting year data requirements (all data should cover the same timeframe, most often the last full calendar year)
<ul style="list-style-type: none"> Boilers Furnaces Turbines Heaters Incinerators Engines Ovens/Kiln Generator 	<ul style="list-style-type: none"> Forklifts Cars/trucks/buses Aircraft Ships and boats Trains HVAC system Chillers Refrigerators 	<ul style="list-style-type: none"> Utility records Bills Receipts Meter measurements Maintenance invoices Government reports 	<ul style="list-style-type: none"> Goal Base year Target year 	<ul style="list-style-type: none"> Expected annual energy savings as a result of the project Detailed project description (new equipment, policy implementation, behavior change, etc.) 	<ul style="list-style-type: none"> Types and quantities of fuel/energy and refrigerants used (see data collection checklist tables below) Documentation showing quantities of fuel/energy and refrigerants used Total weight (metric tonnes) of products produced Description of energy/emission goals* Detailed list of energy/emission reduction projects completed at your facility*

GHG Inventory Sample Tools

EPA Scope 1 & 2 Inventory Guidance: <https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance>

EPA GHG Emissions Factors Hub: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

GHG Protocol Scope 3 Standard: https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf

EPA Scope 3 Evaluator Tool: <https://quantis-suite.com/Scope-3-Evaluator/>

CDP Scope 3 Relevant Categories: <https://cdn.cdp.net/cdp-production>

GHG Protocol Calculation Tools: <https://ghgprotocol.org/calculation-tools>



Poll: Who are your SSCA partners?

Question:

Which SSCA members do you work with?*

*Training participant lists may be shared with SSCA members upon request. By participating in this training, you consent to us sharing your attendance with SSCA members.





SUSTAINABLE SUPPLY CHAIN ALLIANCE

**GHG Inventory Workshop Series
Session 2: Data Collection
March 23, 2023**

Agenda

RECAP: Program Overview	
SSCA Introduction	5 minutes
Program Goals, Timeline, Content	
RECAP: GHG Inventory First Steps	
What is the value in doing a GHG Inventory?	5 minutes
Defining scope, identify relevant emissions	5 minutes
Data Collection	
Identifying data sources and owners	15 minutes
How to request data	10 minutes
How to begin compiling and using data	10 minutes
Homework	





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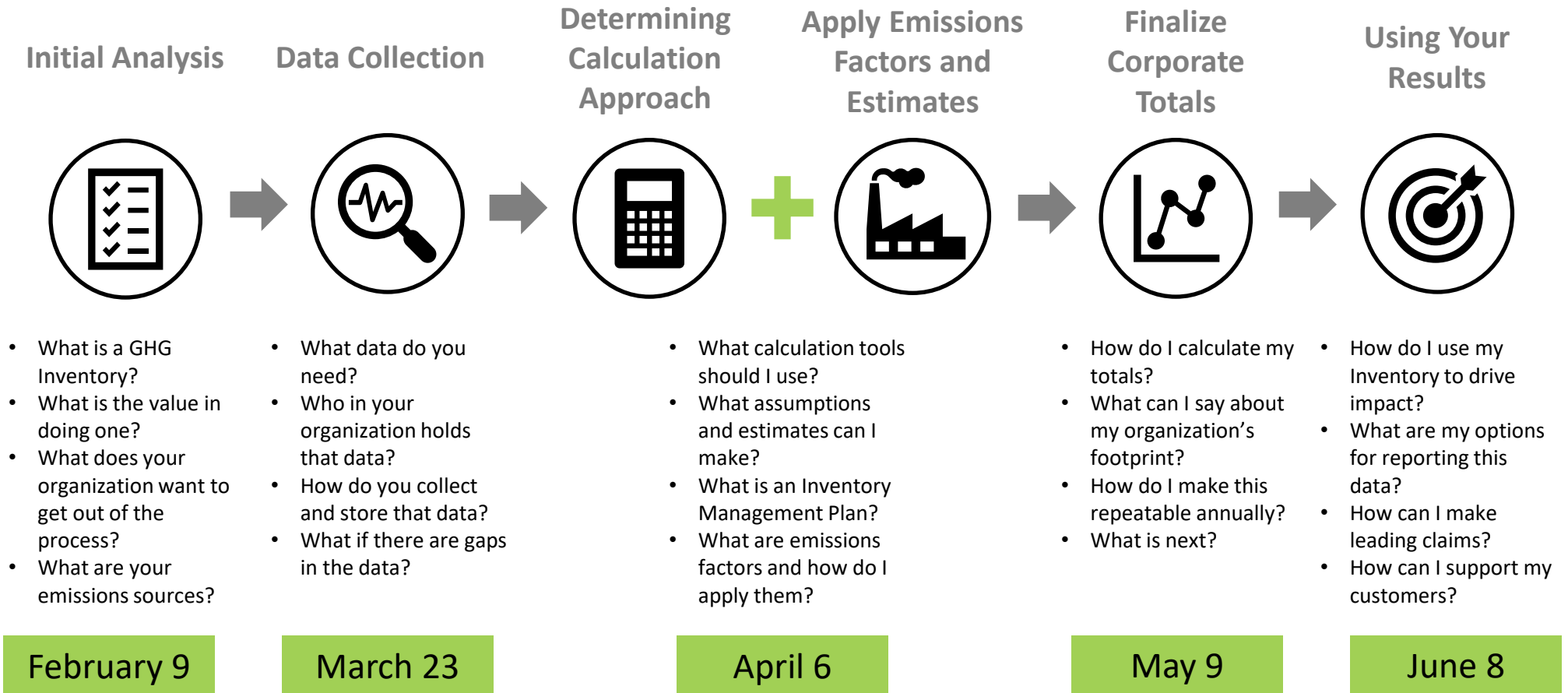
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S&C Electric Company

PRESENTED BY

Ursula Moss

Sustainability Sr. Manager



About S&C Electric Company



Empowering people to transform the grid



GLOBAL REACH AND LONGEVITY



Founded in 1911



Headquartered in Chicago



Operations in the U.S., Australia, Brazil, Canada, China, Mexico, and the U.K.

IMPACTING LIVES



Employs 3,500+ team members



Serves 1,000+ customers across the globe



Provides products and services to most U.S. electric utilities

S&C's GHG Emissions Journey

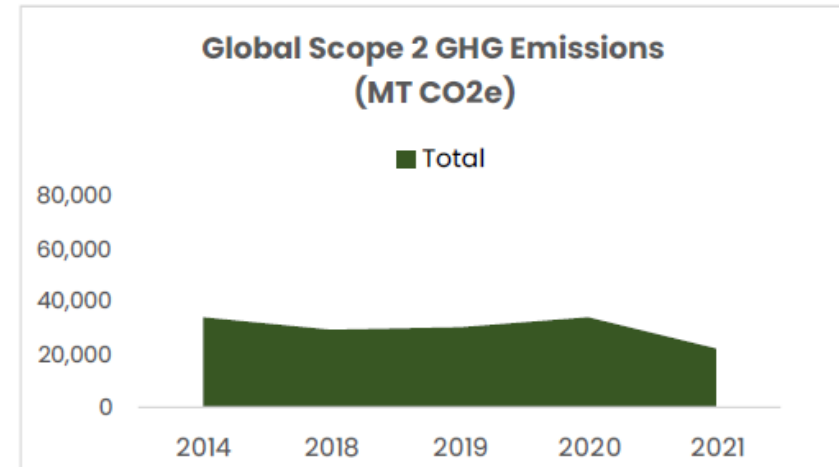
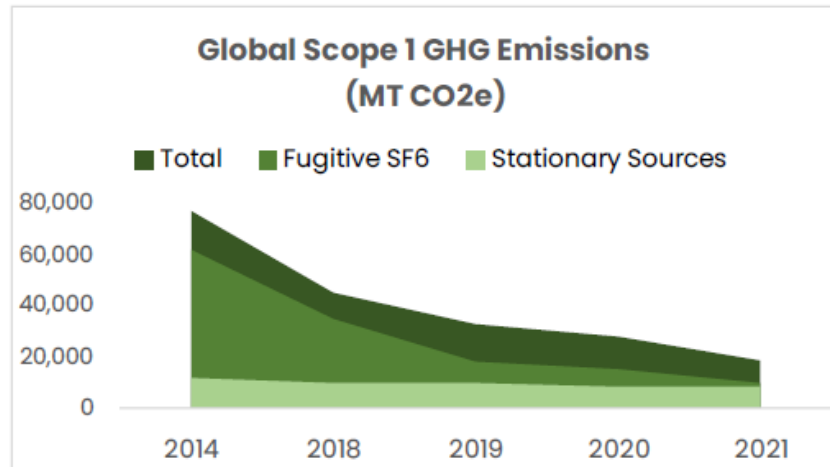


2014	2020	2022+
How we started		
<ul style="list-style-type: none"> • Scope 1+2 inventories • 3rd party assistance • Annual cadence 	<ul style="list-style-type: none"> • Scope 3 estimate • 3rd party assistance • Annual cadence 	<ul style="list-style-type: none"> • Scope 1+2 results publicized in ESG report
How it is done		
<ul style="list-style-type: none"> • Utility bills • Office & Facilities 	<ul style="list-style-type: none"> • Purchased items <i>Weight, material, usage</i> • Travel & commute data <i>Concur, mileage reports & voluntary surveys</i> • Upstream transportation <i>Supplier addresses, intra-company miles</i> • Waste data • Sourcing, Logistics, Operations, Finance & Accounting 	<ul style="list-style-type: none"> • Data consolidation for marketing

S&C's GHG Emissions Journey



	Benefits	Challenges	Opportunities
Scope 1+2	<ul style="list-style-type: none"> 76% + 34% reduction (ref. 2014) Customer disclosures positive impact <i>e.g., CDP & SCSA TSP</i> 	<ul style="list-style-type: none"> Focus on Chicago, IL HQs Manual data collection SF₆ fugitive emission calculations 	<ul style="list-style-type: none"> Global targets Future emission estimates
Scope 3	<ul style="list-style-type: none"> Value chain positive impact Customer disclosures positive impact <i>e.g., CDP & SCSA TSP</i> 	<ul style="list-style-type: none"> Manual data collection Time consuming 	<ul style="list-style-type: none"> Global targets Global baseline <i>Supplier data & scope 3 categories</i>



Step 2: Data Collection



Step 2: Data Collection

Follow these steps to initiate appropriate data collection, collect that data effectively, and identify gaps and assumptions that need to be made.

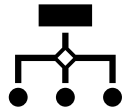
- #1 Solidify organizational data owners and data sources (Scope 1, 2, 3)** Identify emissions sources within your operational control or in relevant Scope 3 categories, what data corresponds with those sources, and who is likely to own that data in your organization; checklist!
- #2 Perform initial engagement** Send initial emails requesting data, or set up introductory calls with likely data owners to identify the correct point of contact, the data available, and collection timeline
- #3 Follow up, get involved** Make sure to follow up with and support your data owners to deliver the data on the agreed timeline, and build partnerships (as they will be important for future years!)
- #4 Identify and track gaps and assumptions** Make note of any assumptions or data gaps you may encounter, and make appropriate estimates and replacements where necessary; these can be improved in future years
- #5 Populate data into tool/storage, record process** Collect the data centrally, and begin populating tools/centralized data trackers to support calculation; consolidate notes on process, gaps, and data owners into an Inventory Management Plan

Consolidation Approach

Organizational Boundaries (Choose one)		
Equity Share	Control	
	Financial Control	Operational Control*
Organizational Boundary	Definition	
Equity share	Companies account for emissions according to their share of equity in the operation	
Financial Control	Companies account for emissions from operations in which they can direct financial & operating policies	
Operational Control* (most common)	Companies account for emissions from operations where they have the authority to introduce and implement their operating policies	

It is important to set initial boundaries on your inventory and your emissions scopes. We recommend you use the Operational Control boundary: meaning your Scope 1 and 2 are defined by emissions from operations for which you can direct financial and operating policies.

Examples of scope 1, 2 & 3 for different businesses



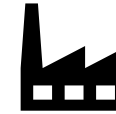
Parent company with multiple subsidiary companies

- **Scope 1:** Includes direct emissions from energy/fuel use in all owned/operated parts of the business, including subsidiary companies' direct emissions
- **Scope 2:** indirect emissions from purchasing electricity/steam/chilled water for all owned and operated facilities
- **Scope 3:** All indirect value chain emissions of the parent and subsidiary companies (e.g. manufacturing, distribution, product use)



Vendor that both owns/operates and outsources manufacturing

- **Scope 1:** Includes direct emissions from energy/fuel use in all owned/operated parts of the business, including all owned/operated manufacturing facilities
- **Scope 2:** indirect emissions from purchasing electricity/steam/chilled water for all owned and operated facilities
- **Scope 3:** All indirect value chain emissions, including from outsourced manufacturing and downstream emissions (e.g. third-party distribution to DCs)



Vertically integrated manufacturer

- **Scope 1:** Includes direct emissions from energy/fuel use in owned/operated facilities and operations across production stages
- **Scope 2:** indirect emissions from purchasing electricity/steam/chilled water for all owned/operated facilities across all production stages
- **Scope 3:** All indirect value chain emissions, both upstream (e.g. material manufacturing if materials are being purchased from a supplier, and/or raw materials extraction) and downstream (e.g. third party distribution to DCs)

Note on leased facilities & fleet: Emissions from leased facilities or fleet are typically counted in scope 1 and 2 if your company operates these assets; however if you choose not to count them in scope 1, they must be counted in scope 3 (upstream or downstream leased assets) – just make sure not to double count leased asset emissions regardless of how you choose to account for them.



Common sources of GHG emissions

Own operations		Value chain	
Scope 1	Scope 2	Scope 3 – upstream	Scope 3 - downstream
<ul style="list-style-type: none"> Fuels used in operations, or stationary emissions (Natural gas, fuel oil, diesel, gasoline, propane, etc.) Refrigerants and process gases Mobile fuels used in vehicles, or mobile emissions (Gasoline, diesel, etc.) 	<ul style="list-style-type: none"> Purchased utilities <ul style="list-style-type: none"> Electricity steam/heat chilled water 	<ul style="list-style-type: none"> Product materials processing and manufacturing Indirect procurement Capital goods Fuel/energy related activities Upstream transportation and distribution Waste generated from operations Business travel Employee commuting 	<ul style="list-style-type: none"> Downstream transportation and distribution Processing of sold products Use of sold products End-of-life treatment of sold products Downstream leased assets Franchises Investments

Scope 3 Screening

Begin with large and generic datasets

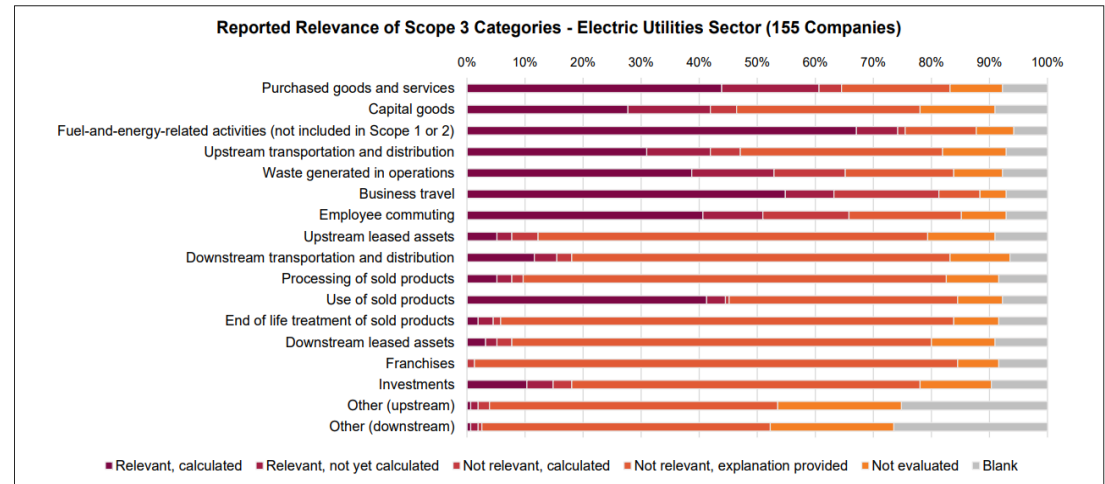
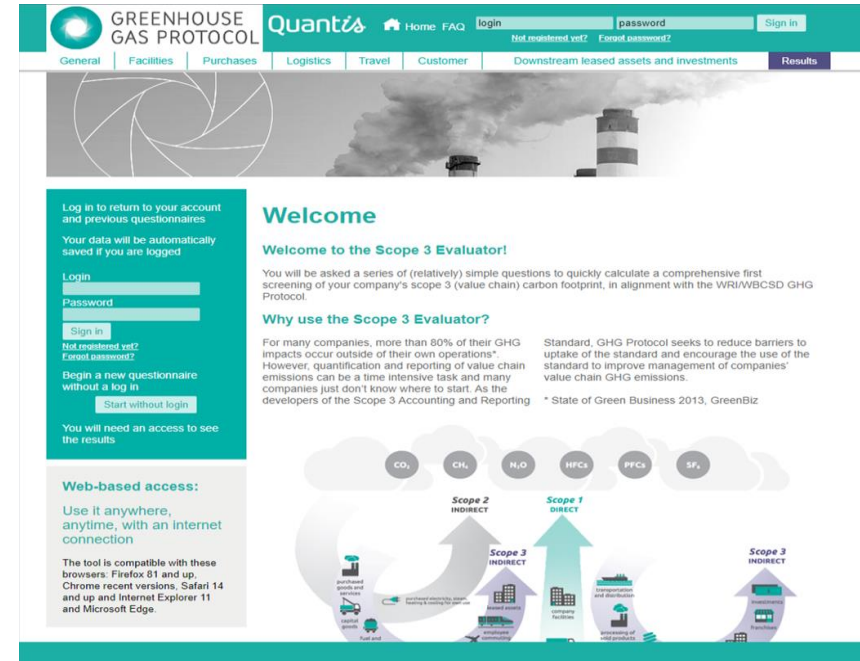
Scope 3 has many parts and can quickly become complex. It is important **to not spend too much time digging** into calculations that **may not be material**.

Benchmark S3 breakdown in your Industry

- SBTi publishes the average breakdown (Figure 2) of Scope 3 emissions by category for various sectors.
- Look at published emission profiles through CDP and Sustainability Reports.

GHG Protocol Scope 3 Evaluator Tool

- **Free** online tool.
- Provides rough estimate of Scope 3 emissions.
- Great first step for organizations that have never evaluated their Scope 3.
- Can **help determine key emission categories**.



What Makes a Scope 3 Category “Relevant”?

Criteria	Description of Activities
Size	Contributes significantly to the company’s total anticipated scope 3 emissions.
Influence	Potential emissions reductions that could be undertaken or influenced by the company.
Risk	Contributes to the company’s risk exposure (e.g., climate change related risks such as financial, regulatory, supply chain, product and technology, compliance/litigation, and reputational risks).
Stakeholders	Deemed critical by key stakeholders (e.g., customers, suppliers, investors, or civil society).
Outsourcing	Outsourced activities previously performed in-house or activities outsourced by the reporting company that are typically performed in-house by other companies in the reporting company’s sector.
Sector guidance	Identified as significant by sector-specific guidance.
High costs or revenue	Areas that require a high level of spending or generate a high level of revenue (and are sometimes correlated with high GHG emissions).
Other	Meets any additional criteria developed by the company or industry sector.

There is no standardized threshold to determine relevance.

Ex: a company with small business travel emissions may still consider the category relevant because of stakeholder pressure and the ability to influence emissions

Prioritize data collection for most relevant categories

Avoid chasing data for smaller, less relevant Scope 3 categories

Identify and Solidifying Data Owners

Once you know what your emissions sources are within your operational boundary/relevant scope 3 categories, its time to find that data!

Finding the right contact starts with a single email!



How to Ask for Data

- **Summarize the ask**
 - “Hi Bill, I’m wondering if your team has a record of our electricity usage for 2020 or electricity invoices from 2020? I’m looking for the total amount of electricity we used at each facility.”
- **Outline the reason for the ask**
 - “We are being asked by our utility customers to provide our emissions for 2022, and our electricity use data will be used in the calculation.”
- **Identify a timeline for receiving data**
 - “If this is something you already collect, are you able to send me the data by the end of this month?”
- **Ask for support if they’re not the right contact**
 - “If your team doesn’t collect this data, do you have a suggestion of who I may reach out to instead?”

Be patient!

Identifying data owners and collecting data for GHG inventories could take months, depending on the data availability.

Getting started early is important.



Data Collection

Scope 1-2 Data Collection Checklist ¹				
Type	Description	Examples	Data Required	Likely Data Owner
1 - Stationary Emissions	Direct emissions occurring onsite from fuel combustion (e.g., natural gas, propane, diesel, coal, biomass) in stationary equipment to produce electricity, heat, or steam.	<ul style="list-style-type: none"> Boilers Furnaces Turbines Heaters Incinerators Engines Ovens/Kiln Generator 	<ol style="list-style-type: none"> Fuel type Fuel usage Fuel units (volume or weight) 	Facilities/Operations leader, energy managers, or individual site managers
1 - Mobile Emissions	Emissions from fuel combustion (e.g., diesel, biodiesel, gasoline, aviation gasoline, CNG) by vehicles owned or leased by your company.	<ul style="list-style-type: none"> Forklifts Cars/trucks/buses Aircraft Ships and boats Trains 	Two of the following: <ol style="list-style-type: none"> Total fuel used by each vehicle Total distance traveled by each vehicle Fuel efficiency of each vehicle 	Facilities/Operations leader, fleet managers, or individual site managers
1 - Fugitive Emissions	Leaks in your company's refrigeration and air conditioning equipment through which refrigerant gas escapes.	<ul style="list-style-type: none"> HVAC system Chillers Refrigerators 	<ol style="list-style-type: none"> Refrigerant type Quantity of gas serviced Quantity of gas recycled Units for quantity serviced or recycled <p><i>Quantity of leaked gas is assumed to equal amount of gas replaced by your maintenance company.</i></p>	Facilities/Operations leader, energy managers, or individual site managers
2 - Purchased Energy	Indirect emissions from electricity, steam, and hot/chilled water purchased from your local utility (not combusted on-site).	<ul style="list-style-type: none"> Purchased energy for all sites 	<ol style="list-style-type: none"> Energy source Energy usage Units (kWh for electricity) 	Accounting/Finance leader, or individual site managers

¹ The data collection checklists describe the most commonly reported GHG emissions. Additional scope 1 emissions include process emissions and other fugitive emissions (e.g., methane leakages from gas transport). Additional scope 3 emissions include other business travel emissions (e.g., hotel stays), other waste emissions (e.g., wastewater treatment), and emissions associated with purchased goods and services, capital goods, fuel- and energy-related activities (not included in scope 1-2), leased assets, processing and use of sold products, end-of-life treatment of sold products, franchises, and investments.

Example invoice – will look different depending on data category

Here, we are looking at kWh for the period of March 30 - April 29. Where possible, this information should be aggregated into a spreadsheet by month, and ensure there are no monthly gaps.

JOHN DOE		Your electric bill for the period			
Account number: 1234 5678 9000		March 30, 2011 to April 29, 2011			
Details of your Electric Charges					
Residential Service - service number 1234 5678 9000					
Electricity you used this period					
Meter Number	Current Reading	Previous Reading	Difference	Multiplier	Total Usage
80568070	Apr 29	Mar 30			
Usage (kWh)	092580 (actual)	091787 (actual)	793	1	793
Your next meter reading is scheduled for May 31, 2011					
Electric Summary					
Balance from your last bill		\$145.24			
Payment Apr 1		\$100.00-			
Payment Apr 15		\$ 45.24-			
Total Payments		\$145.24-			
Electric Charges (Residential Heating)		\$138.07			
New electric charges		\$138.07			
Total amount due by		\$138.07			
May 22, 2011					

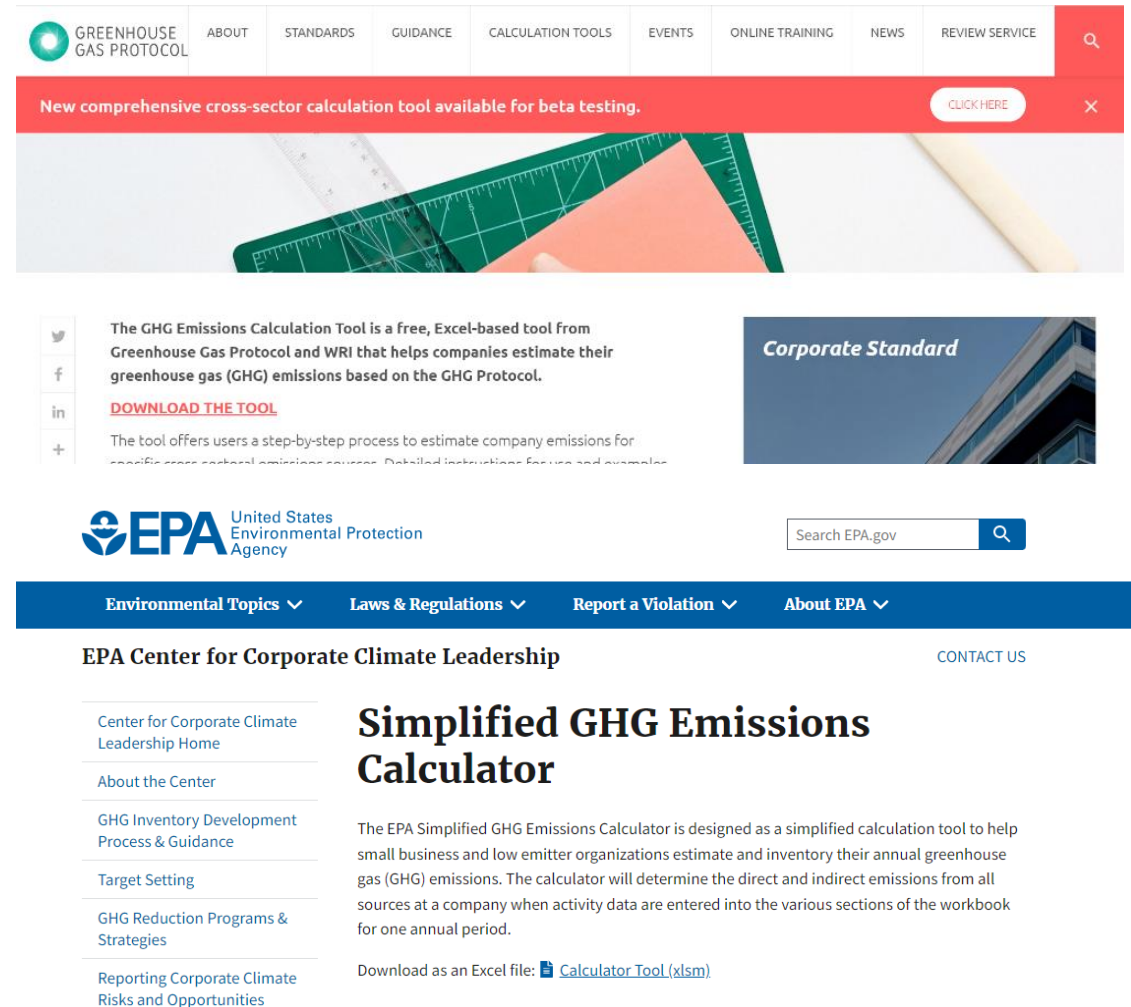


Enter collected data into a single file

Your calculation tool can act as a central file for inputting all collected data

Recommended tools:

- [GHG Protocol GHG Emissions Calculation Tool](#)
 - The GHG Protocol recently paused access to their tool as they revise it, so stay tuned
- [EPA GHG Calculator](#)
 - The EPA Simplified GHG Calculator also provides a streamlined calculation process, with explanations and help tabs for every input



The screenshot shows the EPA website's navigation bar with links for ABOUT, STANDARDS, GUIDANCE, CALCULATION TOOLS, EVENTS, ONLINE TRAINING, NEWS, and REVIEW SERVICE. A red banner below the navigation bar reads "New comprehensive cross-sector calculation tool available for beta testing." with a "CLICK HERE" button. The main content area features a large image of a green ruler and a yellow pencil. Below this, there is a section for the "GHG Emissions Calculation Tool" with a "DOWNLOAD THE TOOL" link. To the right, there is a "Corporate Standard" section with an image of a building. The EPA logo and "United States Environmental Protection Agency" are visible in the footer. A search bar is located in the top right corner. The main heading for the calculator is "Simplified GHG Emissions Calculator" with a sub-heading "EPA Center for Corporate Climate Leadership". The text describes the calculator as a tool for small businesses and low emitters to estimate annual greenhouse gas emissions. A download link for the Excel file "Calculator Tool (.xlsm)" is provided.

Check data for consistency and correctness

- Less necessary to check for correctness when data comes from monthly invoices
- If data is being collected in another method or format, do a high-level check of:
 - **Consistency of numbers with similar sites** (example: Site A and B are both located in Texas and have similar number of FTEs. If both sites serve the same business purpose and have similar building types, it may be unreasonable for Site A to have significantly higher purchased every usage)
 - **Consistency of numbers month to month** (example: a facilities manager sends a spreadsheet of information on Site A, located in Texas, and the electricity consumption is much higher in the winter compared to the summer. This may be an error, because we can assume air conditioning use in the summer would cause consumption to be higher.)
- If number looks incorrect or inconsistent, don't throw it out right away. Ask the data provider to provide any context on why the numbers may be off

Use estimations/ averages to fill data gaps

Guidance from [GHG Protocol](#): Emission estimates are acceptable if there is transparency regarding the estimation approach, and the data used for the analysis are adequate to support the objectives of the inventory. Be sure to record all estimates used in your IMP.

Estimation methods:

- Comparison of similar site data
 - Site A and B are both located in Texas and have similar number of FTEs. Site B data may be used to fill gaps in Site A data
- Comparison/average of available site data to fill gaps
 - Site A has purchased energy data for October and December, but not for November. Average October and December data to get an estimation for November

* If a high level of estimation is required, consider refining data collection process before calculating



Record an inventory management plan

Inventory Management Plan (IMP):

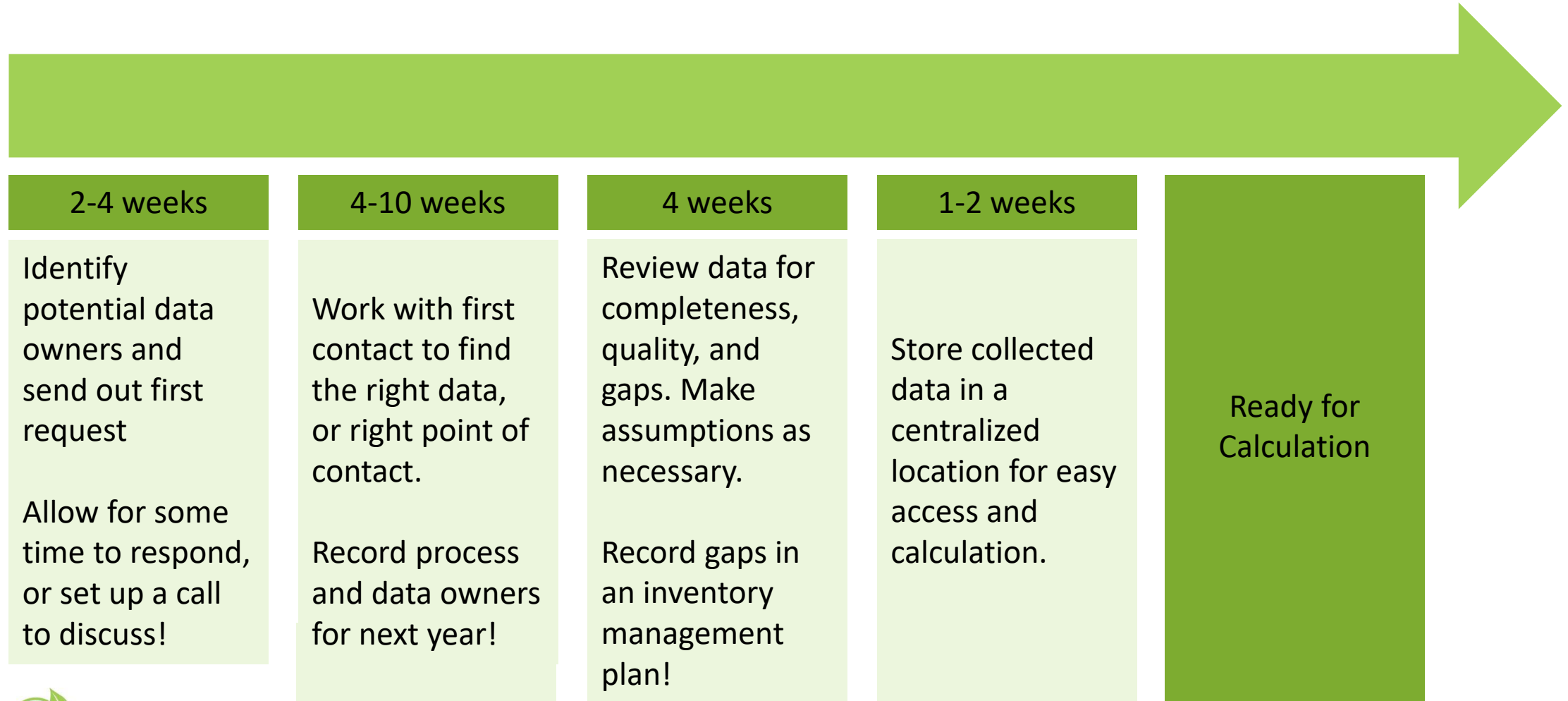
Intended for internal and external stakeholders interested in learning more about the emissions sources included in the company's inventory and the details of the emissions calculations.

- Documentation of all information gathered during the inventory calculation process, including **boundaries, raw data and sources, data owners (names and positions), emission factors and GWPs, calculation methodology, and assumptions**
- Should be used to facilitate business decisions and ensure a consistent approach to inventory calculation every year

Example information in an IMP:

Boundaries	Data was collected for all sites in North America
Raw data and sources	Data source: 2020 fleet schedule site A
Data Owner	Fleet manager, Don Smith
Emission factors and GWPs	Used EFs and GWPs in GHG Protocol GHG Emissions Calculation Tool
Calculation methodology	Used GHG Protocol GHG Emissions Calculation Tool
Assumptions	Assumed/averaged data for October and December to get an estimation for site A in November

Potential Data Collection Timeline



Poll: What is your organization's GHG bandwidth?

Question: How will your organization complete their GHG Inventory?

- A. One person will own the development of the inventory
- B. A small team will own the development of the inventory
- C. An external company will own the development of the inventory
- D. A person/small team will use external software to support inventory development
- E. No plan for an inventory yet

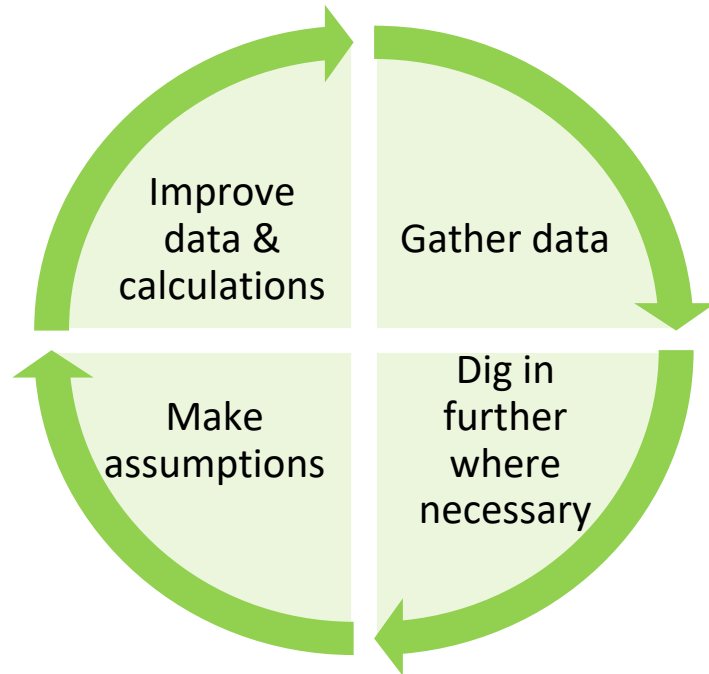


Do not let perfection become the enemy of the good!

Data collected in the first few years is usually of low quality.

That is okay.

It is better to start and learn from your experience, build capacity, and improve year over year than to be halted by data quality concerns.



Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1	Black	Light Blue	Light Blue	Dark Blue	Dark Blue
2	Black	Light Blue	Light Blue	Dark Blue	Dark Blue
3	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
4	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
5	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue
6	Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
7	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue
8	Black	Dark Blue	Dark Blue	Dark Blue	Dark Blue
9	White	White	White	White	White
10	Black	Black	Light Blue	Light Blue	Light Blue
11	Black	Black	Light Blue	Light Blue	Light Blue
12	Black	Black	Black	Light Blue	Light Blue
13	White	White	White	White	White
14	White	White	White	White	White
15	Black	Black	Light Blue	Light Blue	Dark Blue

- Dark Blue: Specific method (e.g. supplier-specific method, fuel-based method)
- Light Blue: Average method (e.g. average-data method, spend-based method)
- Black: Lack of data, cannot report
- White: Not Relevant

Homework

- Identify data sources and data owners based on your inventory scope and organizational boundaries
- Request data from key points of contact in your organization, and begin identifying the true owners of the data you need
- Record all assumptions, gaps, and data owners in an inventory management plan
- Begin compiling your data in a centralized location (folder structure, inventory tool, etc.)

In the next session we will discuss how to begin manipulating your gathered data in a calculation tool: inputting data into a tool, making assumptions and filling data gaps as necessary, and properly manipulating your data.

Next workshop: April 6

Future workshops: May 9, June 8



SUSTAINABLE SUPPLY CHAIN ALLIANCE



Your 2023 Alliance Team



**SUSTAINABLE
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ALLIANCE**

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SUSTAINABLE SUPPLY CHAIN ALLIANCE



SUSTAINABLE SUPPLY CHAIN ALLIANCE

Appendix

GHG Glossary

Base year: As greenhouse gas (GHG) accounting is an ongoing process, the first emissions inventory that is conducted is known as the base year. The base year is used as a point of reference to track changes in an inventory as well as progress toward reduction goals.

Baseline metrics: Basic or beginning measurements. Baseline metrics are valuable when setting management and/or reduction goals in order to have something to compare against when making improvements, diagnosing inefficiencies, or tracking progress.

CO₂e: Emissions of different greenhouse gases are often expressed in carbon dioxide (CO₂) equivalent (CO₂e) terms, which represents the amount of carbon dioxide that would have the same relative effect as the greenhouse gases actually emitted.

Direct energy: Direct energy is energy that is produced on-site by the consumption of fuel. Direct energy produces what are known as Scope 1 emissions in the World Reporting Institute's GHG Protocol.

Emissions: The exhaust gas(es) produced as the result of fuel combustion.

Energy efficiency projects: Capital investment in projects to achieve an overall reduction in energy consumption or a less energy intensive production process. Examples include low-hanging fruit such as behavioral changes or more intensive initiatives such as equipment retrofits.

Energy or GHG reduction emission targets: Goals set by an organization to reduce its energy consumption or greenhouse gas (GHG) emissions. This goal is typically set by measuring an organization's energy consumption and/or GHG emissions and establishing a start date (baseline), setting an appropriate and achievable target, and outlining a reduction plan that can be achieved by a specific date.

Environmental policies & reporting: Standards and protocols developed by various agencies to track and disclose environmental and social impacts. Environmental reporting and management standards help organizations identify how to reduce or mitigate their environmental impacts. Standards and protocols include ISO 14001, the Global Reporting Initiative, and the Carbon Disclosure Project.

GHG Protocol: The GHG Protocol is the most widely used, internationally accepted tool for accounting for greenhouse gas emissions. It was developed by the World Resources Institute and the World Business Council for Sustainable Development. <http://www.ghgprotocol.org/>

GHG Glossary

Greenhouse gases (GHGs): GHGs are naturally occurring gases in the earth's atmosphere that absorb and re-emit radiation, trapping heat and making the planet warmer, known as the greenhouse effect. There are seven major GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and the recently added and nitrogen trifluoride (NF₃). The consumption of fossil fuels is associated with an increase in the presence of these gases in the atmosphere and with climate change.

Indirect energy: Indirect energy is the energy obtained from purchased electricity, heat, or steam. This type of energy is obtained from a third-party, such as a utility provider. Indirect energy produces what are known as Scope 2 emissions under the GHG Protocol.

Onsite fuel combustion (direct): Any fuels combusted by a company-owned asset, such as natural gas used in a boiler or a back-up generator that runs on diesel fuel.

Operational boundary: Defined scope of both direct and indirect emissions within an organizational boundary. When defining operational boundaries, the entity must specify who/what is responsible for emissions, i.e. the entity itself or a 3rd party.

Organizational boundary: Those businesses and operations that make up an organization for the purpose of accounting for and reporting GHG emissions.

Purchased energy (indirect): Energy that is sourced by a third-party provider and purchased by the organization. For example, natural gas purchased from a utility or a governmental agency.

Purchased steam: Steam that is generated by a third-party provider and then purchased by the organization.

Renewable energy: Energy derived from naturally occurring, repeatable, and replenishing sources. Types of renewable energy include geothermal, solar, wind, ocean and other forms of hydropower, biomass, etc.

Science-based targets: Emissions reductions goals that are in line with what the latest climate science says is necessary to keep global temperature rise at safe levels. <https://sciencebasedtargets.org/what-is-a-science-based-target/>



GHG Inventory Sample Tools

EPA Scope 1 & 2 Inventory Guidance: <https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance>

EPA Scope 3 Inventory Guidance: <https://www.epa.gov/climateleadership/scope-3-inventory-guidance>

EPA GHG Emissions Factors Hub: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

GHG Protocol Scope 3 Standard: https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf

EPA Scope 3 Evaluator Tool: <https://quantis-suite.com/Scope-3-Evaluator/>

CDP Scope 3 Relevant Categories: <https://cdn.cdp.net/cdp-production>

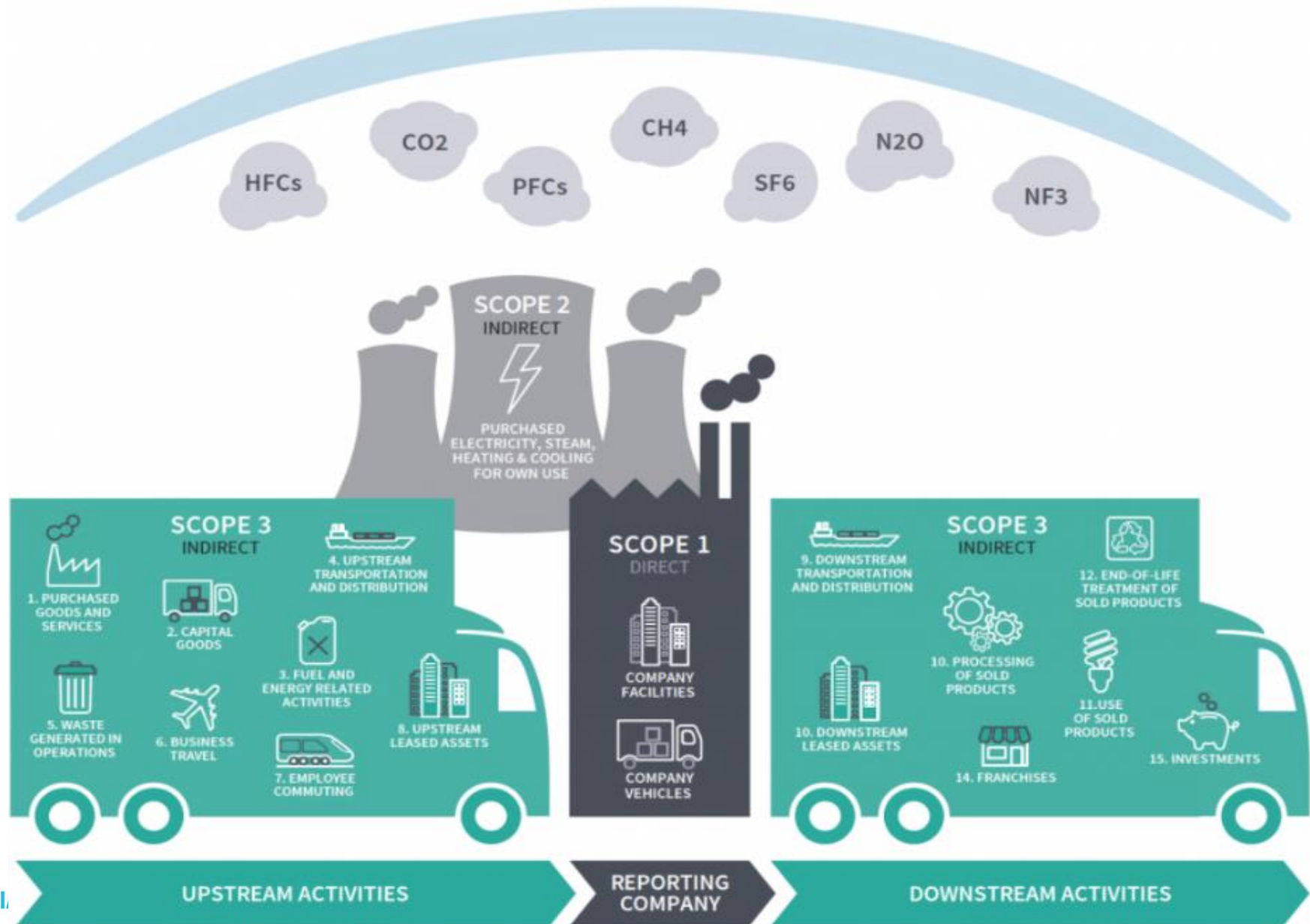
GHG Protocol Calculation Tools: <https://ghgprotocol.org/calculation-tools>

EPA WARM (for waste-related emissions estimates): <https://www.epa.gov/warm/versions-waste-reduction-model-warm#15>

CBEX Estimates (for upstream leased assets: per-sqft estimates on emissions): <https://www.eia.gov/consumption/commercial/>



GHG Emissions Boundaries – Categories of Emissions



Scope 3 Upstream Categories



What are Upstream Emissions?

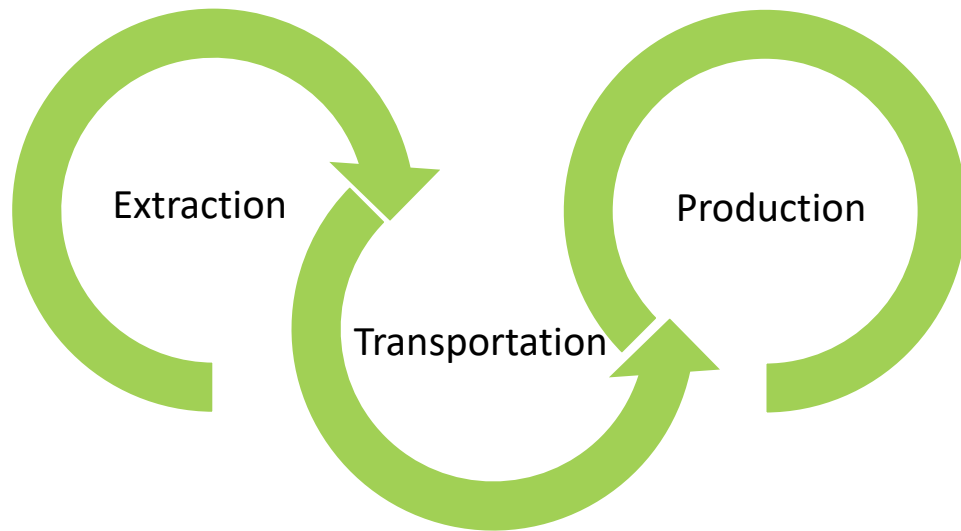
Upstream & downstream relates to where sources falls along the corporate value chain: **upstream (before)** and **downstream (after)** the reporting company. In GHG accounting, it also ties into who pays for the source/ creates the demand.

1	Purchased Goods & Services
2	Capital Goods
3	Fuel and Energy Related Activities
4	Upstream Transportation & Distribution
5	Waste Generated in Operations
6	Business Travel
7	Employee Commuting
8	Upstream Leased Assets

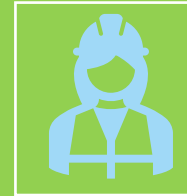


Category 1: Purchased Goods & Services

Embodied emissions (a.k.a. upstream or cradle-to-gate) of purchased goods & services



Examples

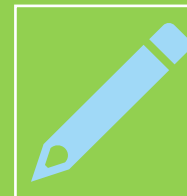
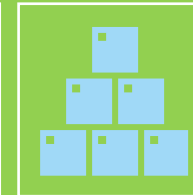


Services

- Advertising
- Accounting
- Legal Services
- Maintenance

Goods

- Steel
- Glue
- Wood
- Finished products



Other operational goods/services

Data Source Examples

- Internal data systems
- Bill of materials
- Purchasing records

Category 2: Capital Goods

Embodied emissions (a.k.a. upstream or cradle-to-gate) of capital goods

Capital Goods – products with extended life used by companies to deliver their products/services

Fixed assets

Plant, Property, & Equipment

Examples



Machinery/Equipment



Buildings/Facilities



Vehicles

Data Source Examples

- Internal data systems
- Bill of materials
- Purchasing records



Category 3: Fuel & Energy Related Activities

Extraction, production, and transportation of fuel & electricity used by the reporting company.

There are 4 parts to this category:

1

Upstream emissions of fuel

2

Upstream emissions of electricity

3

Emissions from transmission & distribution (T&D) losses

4

Generation of purchased fuel sold to end users

Only applies to utilities or energy retailers

Examples

Refining of natural gas consumed for heating

Company X used 100 kWh of electricity. 10 kWh were lost during T&D. Company X should account for upstream emissions of 100 kWh as well as the upstream emissions & combustion for the 10 kWh that were lost in T&D

Data Source Examples

- Reference to Scope 1 & 2 GHG inventory, including quantity, source, and type of fuel
- Collecting data from fuel procurement departments



Category 4: Upstream Transportation & Distribution

This category includes:



Inbound transportation & distribution of purchased products



Purchased transportation & distribution services

- Inbound
- Outbound
- Between own facilities

Purchased outbound logistics services are categorized as upstream because they are a purchased service.

Examples



Inbound ocean transport



UPS transportation of sold products paid for by the reporting company



Storage of purchased products in warehouses

Data Source Examples

- Internal transport management systems
- Purchase orders
- Specific carrier or mode operator



Category 5: Waste Generated in Operations



Disposal and treatment of waste generated in operations

- Solid waste
- Wastewater
- Optional: transportation of waste

Examples



Company X landfilled 65% of mixed waste



Wastewater produced from chemical manufacturing



Company X recycled 80% of paper waste

Data Source Examples

- Internal IT systems
- Utility bills



Category 6: Business Travel

Transportation of employees for business-related activities in third party vehicles



Air travel



Rental car & mileage reimbursement



Train/bus/taxi/etc.



Hotel stays (optional)

This category does not include emissions from:

Transportation in owned or controlled vehicles

- Scope 1 or 2

Transportation of employees to & from work

- Scope 3, Category 7 (employee commuting)

Transportation in leased vehicles not included in scope 1 or 2

- Scope 3, Category 8 (upstream leased assets)

Data Source Examples

- Travel agency/provider reports
- Internal expense/reimbursement systems



Category 7: Employee Commuting

Transportation of employees between their homes and their worksites in vehicles not owned/controlled by the reporting company



Automobile, bus, rail, bicycle, etc.



Optional: Remote work emissions

Examples

An employee commutes 4 miles each way by passenger vehicle 5 days per week

An employee always uses public transportation to get to work & travels 7 miles each way

Not employee commute: an employee uses a company owned car to get to work

- What Scope/Category does this fall under?

Data Source Examples

- Average national data
- Internal commuting survey
- Employee location data



Category 8: Upstream Leased Assets



Emissions from the operation of assets that are leased & not already included in scope 1 or 2



Applies to companies that operate leased assets (i.e., lessees)

Companies that own and lease assets to others (i.e., lessors), see category 13 (Downstream leased assets)

Inclusion in Scope 1 & 2 vs Scope 3 Category 8 depends on the **organizational boundary**

Examples

Fuel use from leased corporate jet not already in scope 1

Electricity from leased offices not already in scope 2

Not Upstream Leased Assets: Fuel use for a leased vehicle when the company uses an operational control boundary

- Scope 1

Data Source Examples

- Utility bills
- Purchase records
- Meter readings
- Internal IT systems



Scope 3 Downstream Categories



What are Downstream Emissions?

Downstream emissions happens **after** the product/service leaves your organization's walls. This may include the transportation from warehouse to the customers, use of your organization's products/services by your clients/customers, etc.

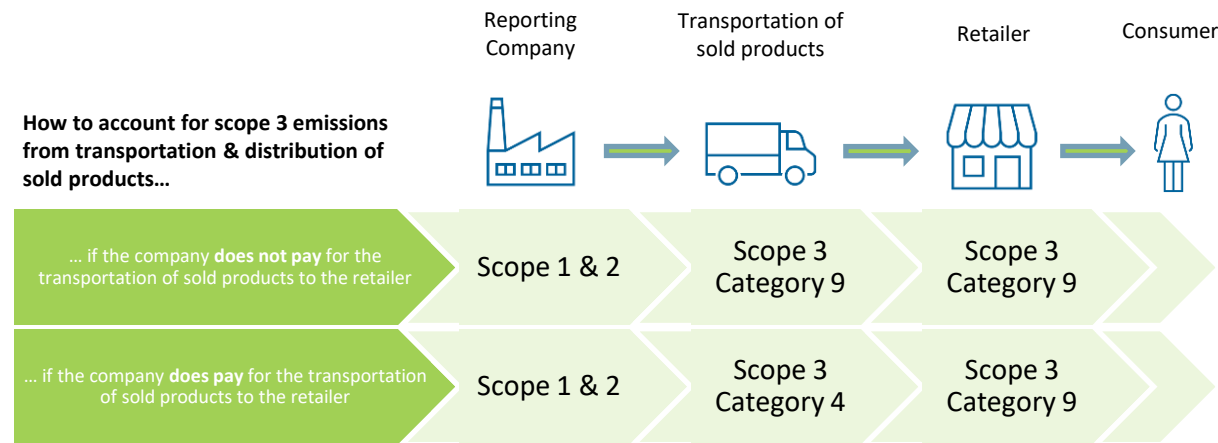
9	Downstream Transportation & Distribution
10	Processing of Sold Products
11	Use of Sold Products
12	End-of-Life Treatment of Sold Products
13	Downstream Leased Assets
14	Franchises
15	Investments



Category 9: Downstream Transportation & Distribution

Outbound transportation & distribution of sold products

- In non-owned/controlled vehicles and facilities
- NOT paid for by the reporting company



Many assumptions will likely need to be made for this category as data quality tends to be poor

Examples



Outbound truck transportation paid for by customer



Sold goods stored in customer distribution centers



Sold goods shelved in a retailer's store

Category 10: Processing of Sold Products

Processing of an intermediate product into a finished good

Only applicable to companies who sell intermediate products

Intermediate products require further work, transformation, or inclusion in another product before use

Emissions should be allocated to the intermediate product

Data Source Examples

- Purchasing records/internal data systems
- Industry-average data from associations/databases

Examples of intermediate products:

Steel

- This could be processed into a fabricated metal product

Yarn

- This could be processed into clothing

Wires

- This may be a part of an electronic device

Example

- Company X (reporting company) sells sugar to a candy manufacturer. The emissions associated with the processes to produce the candy falls within Category 10



Category 11: Use of Sold Products

Emissions from the use phase of sold products

- Over the product's entire expected lifetime
- Emissions may be direct or indirect

Direct
<ul style="list-style-type: none">• Energy consumed directly by the sold product

Indirect
<ul style="list-style-type: none">• Energy consumed during the use of the sold product but not by the product itself• Optional, but recommended where emissions are expected to be significant

This category should account for the emissions over the product's entire expected lifetime during the year the product was sold.

Examples



Electricity use from a refrigerator sold in the reporting year over its lifetime (direct)



Electricity consumed by running a software package sold by the reporting company (indirect - optional)

Data Source Examples

- Internal data systems
- Sales records
- Industry associations
- Surveys

Category 12: End-of-Life Treatment of Sold Products

Emissions from the disposal and treatment of products sold in the reporting year at the end of their life



Requires assumptions about the end-of-life treatment methods used by consumers.



Emissions will vary by waste material and by disposal method (e.g., landfilled, recycled, combusted).

Examples

Company X sells socks. 90% of their consumers throw the socks out at the end of their useful life

Dunder Mifflin sells paper. 85% of their consumers recycle the paper after use

Data Source Examples

- Mass of products/packaging sold in the reporting year
- Consumer surveys
- National averages of disposal patterns
- Government directives on waste treatment



Category 13: Downstream Leased Assets



Emissions from the operation of assets that are owned, leased to another entity, and have not already been included in scope 1 or 2



Applies to Companies that own and lease assets to others (i.e., lessors)

Companies that operate leased assets (i.e., lessees) should refer to category 8 (Upstream leased assets).

Inclusion in Scope 1 & 2 vs Scope 3 Category 13 depends on the **organizational boundary**

Examples

Company X subleases an office which is not included in their scope 1 or 2

- Emissions from this office's electricity, fuel, & refrigerant usage fall in this category

Company Y leases a forklift that is not in their scope 1 or 2

- Emissions from the fuel used to operate that forklift are within this category

Data Source Examples

- Utility bills
- Purchase records
- Internal IT systems



Category 14: Franchises



Emissions from the operation of franchises that have not already been included in scope 1 or 2



Applies to franchisors

Companies that grant licenses to other entities to sell/distribute its goods/services in return for payments (e.g., royalties for the use of trademarks and other services)

Optional: The life cycle emissions associated with manufacturing or constructing franchises

There may be less data granularity at this level which may require assumptions.

Examples

Company X owns a franchise which is not included in their Scope 1 & 2

- Emissions from the electricity, fuel, & refrigerants use from this franchise fall in this category

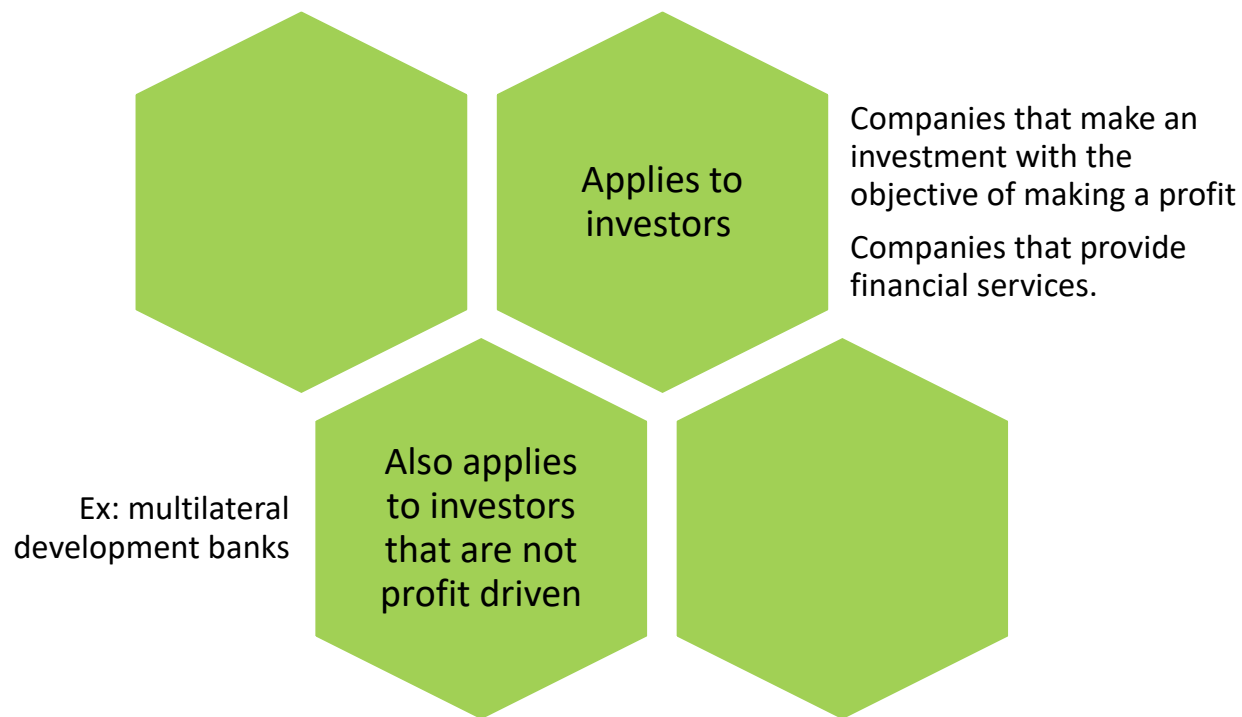
Data Source Examples

- Public GHG inventory reports
- Utility bills
- Purchase records
- Internal IT systems



Category 15: Investments

Emissions associated with the reporting company's investments



Considered a downstream category because providing capital or financing is a service provided by the reporting company

Designed primarily for private financial institutions

Also relevant to:

- Public financial institutions
- Other entities with investments not included in scope 1 & 2

Examples

Company X has 2 joint ventures

- Scope 1 & 2 emissions associated with the investments fall in this category

Data Source Examples

- Financial records
 - From reporting company
 - From investee company



Poll: Who are your SSCA partners?

Question: Which SSCA members do you work with?*

*Training participant lists may be shared with SSCA members upon request. By participating in this training, you consent to us sharing your attendance with SSCA members.





SUSTAINABLE SUPPLY CHAIN ALLIANCE

GHG Inventory Workshop Series
Session 3: Inventory Calculation Approaches
April 6, 2023

Agenda

RECAP: Program Overview

SSCA Introduction	5 minutes
Program Goals, Timeline, Content	

RECAP: Step 1 and 2

Defining scope, identify relevant emissions	5 minutes
Initiating and completing data collection	5 minutes

Inventory Calculation Approaches

Choosing an inventory approach and tool	10 minutes
Populating data, estimates, and emissions factors	10 minutes
Methodologies for scope 1, 2, 3	10 minutes

Homework





SUSTAINABLE SUPPLY CHAIN ALLIANCE

The Alliance leads the electric utility industry in enhancing and promoting supply chain sustainable practices across utilities and suppliers

What we do

- Partner with stakeholders and value chain partners to identify, promote and adopt successful sustainability practices;
- Foster the availability of and demand for more sustainable solutions; and
- Deliver tangible business value to the industry through the application of sustainability practices.

Our 2023 Ambition

Responsibly raise our ambition, industry leadership, member performance and value through 2023 to meet the growing interest and demand for supply chain sustainability

We also have over 75 Supplier Affiliate Members representing small, medium, large, product, service and diverse organizations covering most of our key spend categories.

Our Utility Members



Supplier Affiliate Member

Supplier Affiliate Membership is open to firms and/or individuals that have an interest in advancing sustainability within the electric utility supply chain.

Value of Membership

Access: Participate in year-round activities and work teams with peer utility and supplier members, attend virtual workshops, join us in person at the annual Conference

Visibility: Share your membership status and use the SSCA as an opportunity to collaborate with industry peers

Expertise: Expand your expertise through various training sessions and Alliance materials, and share your knowledge with peers through various practice sharing opportunities

Discounts: Take advantage of discounts and visibility in our Supplier Affiliate Member Only Showcase during the Annual Sourcing Conference

Expectations

- **Interest in advancing sustainability**
- **Complete our annual supplier survey (TSP)**
- **Engage with utility and supplier peers**

Become a member today!	Annual fee
Large Business (>\$1B revenue)	\$4,500
Medium Business (\$100M - \$1B revenue)	\$2,700
Enterprise Business (<\$100M revenue)	\$1,500

Assumptions for GHG Inventory trainings

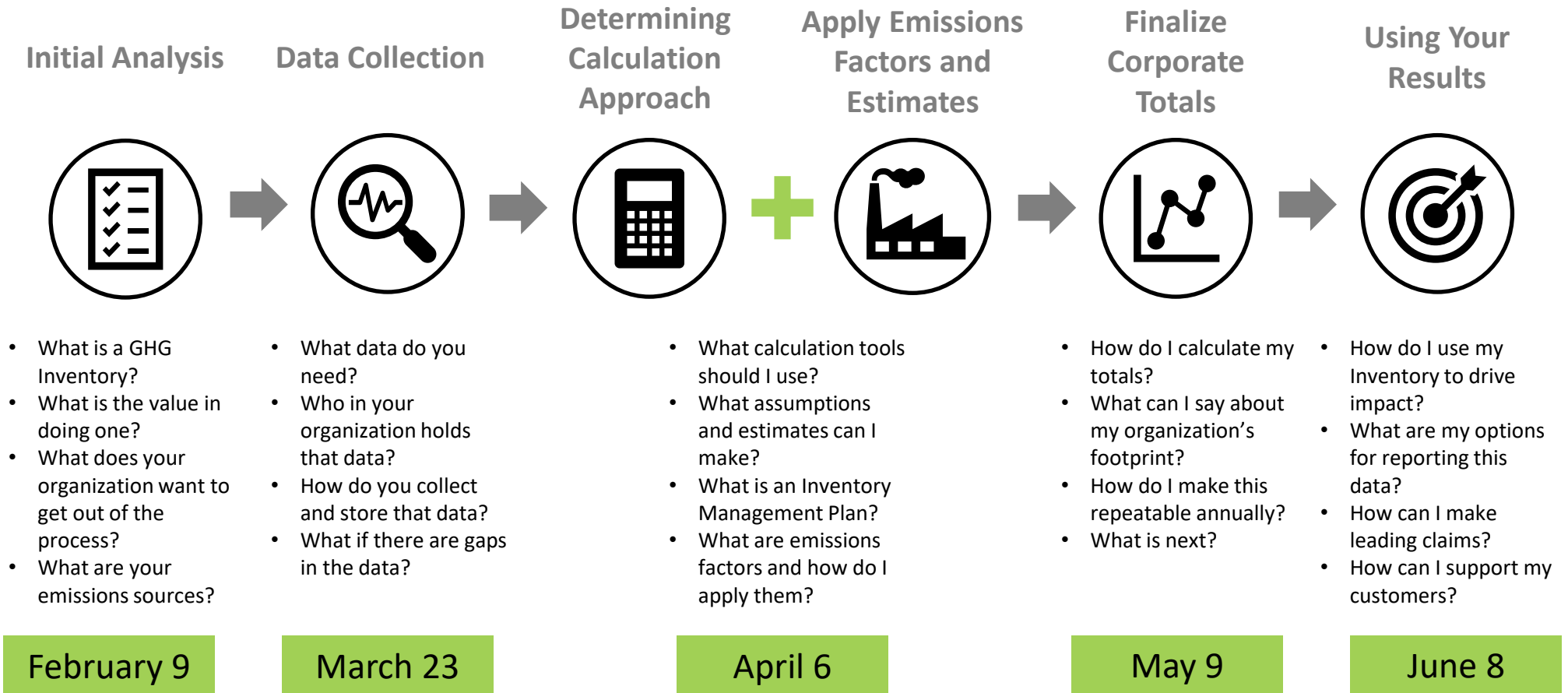
We are assuming...

- Your organization has not calculated a GHG inventory before, or are looking to improve your process
- Your organization is interested in calculating Scope 1 and 2 emissions – we will focus on these
- You are looking to understand the value of doing a GHG inventory in the near future



Overview of GHG Inventory Training Series

Remember to register ahead of time for future trainings!



RECAP: Step 1 and 2



GHG Emissions Boundaries - Definitions

Scopes 1-3

GHG emissions are categorized into *Scopes*, defined by operational boundaries in relation to direct and indirect GHG emissions.

Scope 1

Direct emissions from sources owned or controlled by the company, such as combustion of fuels on-site or in owned/leased vehicles & emissions from refrigerant leaks.

Scope 2

Indirect emissions from generation of purchased electricity, heating, cooling, or steam for the company (owned/operated).

Scope 3

Other indirect emissions in the company value chain resulting from activities such as product manufacturing, business travel, transportation & distribution, the use of sold products, etc.



Part 1: Initial Analysis

Follow these steps to determine your organization's ambitions and foundational GHG emissions information.

#1 Define your goals

Determine your organization's ambitions— how you want to use your GHG inventory will dictate how your inventory should be completed

#2 Define your scope

Decide on emissions Scopes to include (1+2, or 1+2+3), which Scope 3 categories are relevant to you, and whether to pursue inventory verification

#3 Identify and list emissions sources

Within each defined emissions Scope, determine and record which common emissions sources are relevant to your organization and what type of data you are likely to need

#4 Identify who might own that data

Associate at least one point of contact with each emission source identified, and ensure the right data owner is engaged and recorded for future

GHG Inventory: Defining your goals

Before getting started define:

1. Who is your intended audience?
Other stakeholders who will be using this data?
2. What is your purpose for the inventory? (Interested in setting targets? Going carbon neutral?)



This will dictate:

- Scope of assessment
- Level of detail
- Adherence to standards
- Verification requirements
- External support, software needs, etc.
- Cost and level of effort

In order to align on ambition and define organization-level goals, you may need to lead one or several workshops with business leaders. If so, ensure the audience is properly prepared with context on GHG Inventories, leveraging similar content as we are discussing in this training.



Step 2: Data Collection

Follow these steps to initiate appropriate data collection, collect that data effectively, and identify gaps and assumptions that need to be made.

- #1 Solidify organizational data owners and data sources (Scope 1, 2, 3)** Identify emissions sources within your operational control or in relevant Scope 3 categories, what data corresponds with those sources, and who is likely to own that data in your organization
- #2 Perform initial engagement** Send initial emails requesting data, or set up introductory calls with likely data owners to identify the correct point of contact, the data available, and collection timeline
- #3 Follow up, get involved** Make sure to follow up with and support your data owners to deliver the data on the agreed timeline, and build partnerships (as they will be important for future years!)
- #4 Identify and track gaps and assumptions** Make note of any assumptions or data gaps you may encounter, and make appropriate estimates and replacements where necessary; these can be improved in future years
- #5 Populate data into tool/storage, record process** Collect the data centrally, and begin populating tools/centralized data trackers to support calculation; consolidate notes on process, gaps, and data owners into an Inventory Management Plan

Identify and Solidifying Data Owners

Finding the right contact starts with a single email!



Data Collection

Scope 1-2 Data Collection Checklist ¹				
Type	Description	Examples	Data Required	Likely Data Owner
1 - Stationary Emissions	Direct emissions occurring onsite from fuel combustion (e.g., natural gas, propane, diesel, coal, biomass) in stationary equipment to produce electricity, heat, or steam.	<ul style="list-style-type: none"> Boilers Furnaces Turbines Heaters Incinerators Engines Ovens/Kiln Generator 	<ol style="list-style-type: none"> Fuel type Fuel usage Fuel units (volume or weight) 	Facilities/Operations leader, energy managers, or individual site managers
1 - Mobile Emissions	Emissions from fuel combustion (e.g., diesel, biodiesel, gasoline, aviation gasoline, CNG) by vehicles owned or leased by your company.	<ul style="list-style-type: none"> Forklifts Cars/trucks/buses Aircraft Ships and boats Trains 	Two of the following: <ol style="list-style-type: none"> Total fuel used by each vehicle Total distance traveled by each vehicle Fuel efficiency of each vehicle 	Facilities/Operations leader, fleet managers, or individual site managers
1 - Fugitive Emissions	Leaks in your company's refrigeration and air conditioning equipment through which refrigerant gas escapes.	<ul style="list-style-type: none"> HVAC system Chillers Refrigerators 	<ol style="list-style-type: none"> Refrigerant type Quantity of gas serviced Quantity of gas recycled Units for quantity serviced or recycled <p><i>Quantity of leaked gas is assumed to equal amount of gas replaced by your maintenance company.</i></p>	Facilities/Operations leader, energy managers, or individual site managers
2 - Purchased Energy	Indirect emissions from electricity, steam, and hot/chilled water purchased from your local utility (not combusted on-site).	<ul style="list-style-type: none"> Purchased energy for all sites 	<ol style="list-style-type: none"> Energy source Energy usage Units (kWh for electricity) 	Accounting/Finance leader, or individual site managers

¹ The data collection checklists describe the most commonly reported GHG emissions. Additional scope 1 emissions include process emissions and other fugitive emissions (e.g., methane leakages from gas transport). Additional scope 3 emissions include other business travel emissions (e.g., hotel stays), other waste emissions (e.g., wastewater treatment), and emissions associated with purchased goods and services, capital goods, fuel- and energy-related activities (not included in scope 1-2), leased assets, processing and use of sold products, end-of-life treatment of sold products, franchises, and investments.

Do not let perfection become the enemy of the good!

Data collected in the first few years is usually of low quality.

That is okay.

It is better to start and learn from your experience, build capacity, and improve year over year than to be halted by data quality concerns.



Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1	■	■	■	■	■
2	■	■	■	■	■
3	■	■	■	■	■
4	■	■	■	■	■
5	■	■	■	■	■
6	■	■	■	■	■
7	■	■	■	■	■
8	■	■	■	■	■
9	□	□	□	□	□
10	■	■	■	■	■
11	■	■	■	■	■
12	■	■	■	■	■
13	□	□	□	□	□
14	□	□	□	□	□
15	■	■	■	■	■

Legend:

- Specific method (e.g. supplier-specific method, fuel-based method)
- Average method (e.g. average-data method, spend-based method)
- Lack of data, cannot report
- Not Relevant

Poll: Progress on data collection?

Question: How advanced are you in the data collection process?

- A) We have completed data collection and just need guidance on calculations
- B) We feel comfortable with the emissions sources, data owners, but have not received all the data yet
- C) We have reached out to some data owners and are tracking down others
- d) We have not yet reached out to data owners
- e) We do not feel we have the information necessary to request from data owners



Step 3: Inventory Calculation Approaches



Step 3: Inventory Calculation

Follow these steps to select and initiate a data calculation approach, filling gaps and making assumptions where necessary and ensuring your data is scaled with factors fitting your location and emission types.

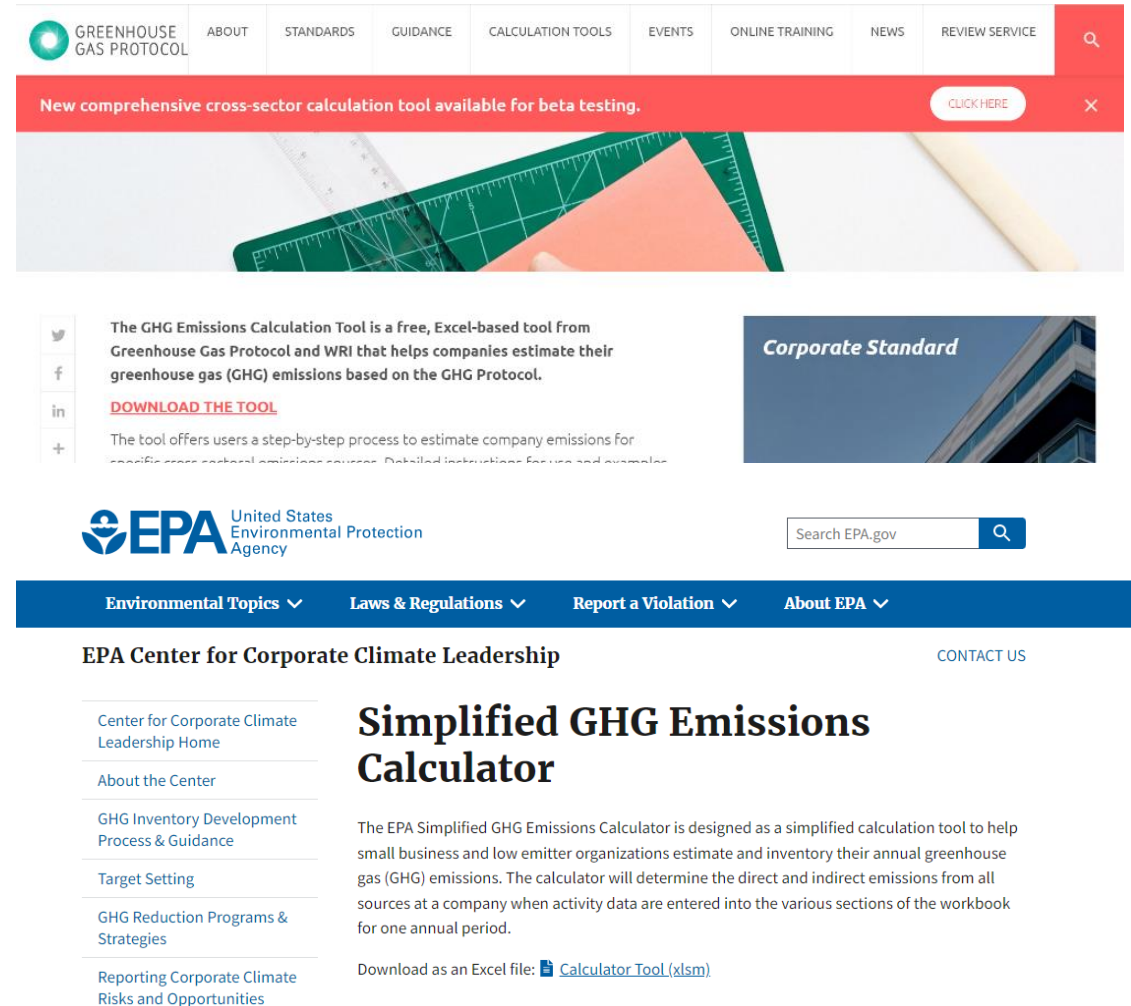
- #1 Select a calculation tool** Identify the tool that suits your inventory (free, supported, software, consultancy), and try to understand the process and systems of the tool.
- #2 Ensure all data is entered and complete, gaps filled** Enter your data to meet the format of the tool, and ensure it is complete and anomaly/error free.
- #3 Apply emissions factors** Ensure emissions factors (EFs) and Global Warming Potentials (GWPs) are applied to your data correctly (e.g. most accurate to your location, site, etc.); may be done automatically.
- #4 Check calculations and gauge results for errors** Sense check results as you input data, check for broken calculations; especially important for Scope 3 where methodology may be more ad hoc.
- #5 Ensure process, assumptions are recorded in an IMP** Record all processes, assumptions, and calculation methodologies in your inventory management plan.

Choosing a calculation tool, entering data

Your calculation tool can act as a central file for inputting all collected data

Recommended tools:

- [GHG Protocol GHG Emissions Calculation Tool](#)
 - The GHG Protocol recently paused access to their tool as they revise it, so stay tuned
- [EPA GHG Calculator](#)
 - The EPA Simplified GHG Calculator also provides a streamlined calculation process, with explanations and help tabs for every input
 - **We will use this tool as an example for this session**



The screenshot shows the EPA website's navigation menu with 'CALCULATION TOOLS' selected. A red banner at the top reads 'New comprehensive cross-sector calculation tool available for beta testing.' Below this is a large image of a green ruler and a yellow pencil. A social media section on the left includes a 'DOWNLOAD THE TOOL' link. A search bar on the right contains 'Search EPA.gov'. The main content area features the EPA logo and a navigation bar with 'Environmental Topics', 'Laws & Regulations', 'Report a Violation', and 'About EPA'. The page title is 'EPA Center for Corporate Climate Leadership' with a 'CONTACT US' link. A sidebar on the left lists links: 'Center for Corporate Climate Leadership Home', 'About the Center', 'GHG Inventory Development Process & Guidance', 'Target Setting', 'GHG Reduction Programs & Strategies', and 'Reporting Corporate Climate Risks and Opportunities'. The main heading is 'Simplified GHG Emissions Calculator', followed by a description: 'The EPA Simplified GHG Emissions Calculator is designed as a simplified calculation tool to help small business and low emitter organizations estimate and inventory their annual greenhouse gas (GHG) emissions. The calculator will determine the direct and indirect emissions from all sources at a company when activity data are entered into the various sections of the workbook for one annual period.' A download link is provided: 'Download as an Excel file: [Calculator Tool \(xslm\)](#)'.

Tool Limitations

The tools you choose will likely have limitations on functionality/adaptability.

Consider:

- Some free/paid inventory tools do not have all Scope 3 categories included
 - e.g. EPA GHG Inventory Calculator is missing most Scope 3 categories
- Most free/paid tools have very specific data entry templates, and data must be cleaned/organized to fit that template
- Errors in a free/in house operated tool are more difficult to identify and rectify

	Cost	Specificity of Data	Likelihood of Error
Third Party Consultants	Highest	Data in any form may be accepted	Lowest
Third-Party GHG Inventory Software	High	Data should must be in specific format	Low
Free GHG Inventory Tools	Free	Data should must be in specific format	Medium
Improvised Calculations	Free	Data in any form may be accepted	Highest


Tool Functionalities

The US EPA GHG Calculator Tool offers:

Help for every emissions category (data collection tips, input explanations, etc.)

Help with unit conversions

[Back to Intro](#)
[Back to Summary](#)



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U.S. Environmental Protection Agency

Tool Sheet: Unit Conversions


Mass			
Convert From	Convert To	Multiply By	Units
pounds (lb)	gram (g)	453.6	g / lb
pounds (lb)	kilogram (kg)	0.4536	kg / lb
pounds (lb)	metric ton	0.0004536	metric ton / lb
kilogram (kg)	pounds (lb)	2.205	lb / kg
gram (g)	short ton	0.00001102	short ton / g
kilogram (kg)	short ton	0.001102000	short ton / kg
metric ton	short ton	1.102	short ton / metric ton
pounds (lb)	short ton	0.0005	short ton / lb
short ton	short ton	1.00	short ton / short ton
metric ton	pounds (lb)	2,205	lb / metric ton
metric ton	kilogram (kg)	1,000	kg / metric ton

Volume			
Convert From	Convert To	Multiply By	Units
standard cubic foot (scf)	US gallon (gal)	7.4805	gal / scf
standard cubic foot (scf)	barrel (bbl)	0.1781	bbl / scf
standard cubic foot (scf)	liters (L)	28.32	L / scf
standard cubic foot (scf)	cubic meters (m3)	0.02832	m3 / scf
US gallon (gal)	barrel (bbl)	0.0238	bbl / gal



Data management guidance, as well as recommended data QA/QC checks

[Back to Intro](#)
[Stationary Combustion](#)
[Go To Data Entry](#)



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U.S. Environmental Protection Agency

Data Management - HELP SHEET

On this sheet you will find general suggestions regarding GHG inventory data management.

DATA MANAGEMENT

This Calculator provides the calculations to quantify your organization's GHG emissions based on annual totals for activity data, which are entered in the ORANGE data entry cells in this workbook. It is good practice to use a spreadsheet or database to track more detailed activity data, such as monthly energy consumption, and aggregate that detailed data into annual totals for entry into the Calculator. This approach provides an "audit trail" that retraces the steps completed to arrive at the annual usage numbers you enter into the Calculator. ENERGY STAR's Portfolio Manager is one database option if your business is already using this tool. (More information on Portfolio Manager is available in the Guide to GHG Management). The bullets below suggest the type of data you may want to store in the data management spreadsheet or database.

A List of Facilities and Attributes

- * Facility Name or Site ID
- * Address (including zip code)
- * Floor area (sq ft)
- * Number of Employees

Purchased Gas Data


- * Types of Gas Purchased
- * Amount of Gas Purchased

Steam Data

- * Monthly Consumption Data by Meter or Facility

Transparent Emissions Factors

[Back to Intro](#)
[Back to Summary](#)



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U.S. Environmental Protection Agency

Tool Sheet: Emission Factors

All emission factors sourced from EPA's Emission Factors Hub, April 2022. Unless otherwise noted, Fuel emission factors presented represent the combustion-only emissions (e.g., tank-to-wheel) <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub>

Stationary Combustion Emission Factors (Used for Steam and Stationary Combustion)

Fuel Type	CO ₂ Factor (kg / mmBtu)	CH ₄ Factor (g / mmBtu)	N ₂ O Factor (g / mmBtu)	CO ₂ Factor (kg / Unit)	CH ₄ Factor (g / unit)	N ₂ O Factor (g / unit)
Natural Gas	53.06	1.0	0.10	0.05444	0.00103	0.00010
Distillate Fuel Oil No. 2	73.96	3.0	0.60	10.21	0.41	0.08
Residual Fuel Oil No. 6	75.10	3.0	0.60	11.27	0.45	0.09
Kerosene	75.20	3.0	0.60	10.15	0.41	0.08
Liquefied Petroleum Gases (LPG)	61.71	3.0	0.60	5.68	0.28	0.06
Anthracite Coal	103.69	11	1.6	2,602	276	40
Bituminous Coal	93.28	11	1.6	2,325	274	40
Sub-bituminous Coal	97.17	11	1.6	1,676	190	28
Lignite Coal	97.72	11	1.6	1,389	156	23

Use estimations/ averages to fill data gaps

Guidance from [GHG Protocol](#): Emission estimates are acceptable if there is transparency regarding the estimation approach, and the data used for the analysis are adequate to support the objectives of the inventory

Estimation methods:

- Comparison of similar site data
 - Site A and B are both located in Texas and have similar number of FTEs. Site B data may be used to fill gaps in Site A data
- Comparison/average of available site data to fill gaps
 - Site A has purchased energy data for October and December, but not for November. Average October and December data to get an estimation for November

* If a high level of estimation is required, consider refining data collection process before calculating



Step 3.5: Applying Emissions Factors, Honing Calculation



Emission Calculation Formula

**GHG Emissions in
CO₂e**

- By convention, express CO₂e in metric tons
- Different GHGs cause different levels of warming
- CO₂e standardizes the amount of warming relative to CO₂

=

Activity Data

Example data types:

- Fuel used/purchased
- Dollars spent
- Distance traveled
- Units sold
- kWh of electricity consumed/purchased

x

**Emission Factor
(EF)**

Emissions per relevant unit (i.e., per mile traveled, per dollar spent)

- Ex: 2 kg CO₂e/mile
- Ex: 4 g CH₄/kWh

x

**Global Warming
Potential (GWP)**

- How much a gas warms the atmosphere relative to CO₂
- If EFs are already in CO₂e per unit, GWP is not needed
- If the EF is not in CO₂e, GWP is needed
- See IPCC reports for GWP values



Guidance on Emissions Factors and Global Warming Potentials

Emissions factors (EFs) and Global Warming Potentials (GWPs) are essential in converting your emissions data into the regular metric of CO₂e that is standardized in carbon accounting.

Emissions Factors (EFs):

- Electricity
 - [eGRID 2021](#) (US EPA)
 - [CO₂ Emissions from Fuel Combustion](#) (IEA)
 - [International Electricity Emissions Factors by Country](#) (IEA)
- Combustion
 - [Emission Factor Hub 2022](#) (US EPA)
 - [Guidelines for National GHG Inventories](#) (IPCC)

$$\text{MT CO}_2\text{e} = \text{Electricity Use (MWh)} \times \text{EF (MT CO}_2\text{/MWh)}$$

Global Warming Potentials (GWPs):

- Compares amount of heat trapped by a given mass of a GHG to the amount of heat trapped by similar mass of CO₂
- Converts mass of various gases to mass of CO₂e
- Recommend using:
- [100-year GWPs from IPCC Fourth Assessment Report](#) (AR4)

$$\text{MT CO}_2\text{e} = (\text{MT of CH}_4) \times (\text{CH}_4 \text{ GWP})$$



Scope 1



Scope 1: Stationary Combustion Calculation

Common stationary combustion sources and fuels in processing facilities:

Stationary Combustion Sources and Fuels	
Stationary Combustion Sources	Common Fuels Used
Boiler	Natural gas, Fuel oil, Propane, Diesel
Combustion Turbines	Fuel oil, Coal, Propane, Kerosene
Process Heaters	Natural gas, Propane
Incinerators	Natural gas, Propane

$$\begin{array}{l} \text{Scope 1} \\ \text{Emissions} \end{array} = \begin{array}{l} \text{Activity Data} \\ \text{(Fuel)} \end{array} \times \begin{array}{l} \text{Emission Factor (EF)} \\ \text{(mT CO}_2\text{e/unit)} \end{array}$$

Scope 1: Mobile Combustion Calculation

Common mobile emission sources and fuels used in processing plants

Mobile Emission Sources and Fuels		
Common Mobile Combustion Sources		Common Fuels Used
On-Road Vehicles	Company vehicles	Gasoline
	Combination trucks	Diesel fuel, gasoline, bio-diesel
Non-Road Vehicles (Mobile Machinery)	Forklifts and non-road equipment	Gasoline, diesel fuel, propane
	Construction equipment	Diesel fuel

Activity Data for Mobile Emission Calculations	
Type	Data Needed
Fuel Consumption	Number of gallons, barrels, cubic meters, etc.
Distance Traveled	Number of miles, kilometers
Vehicle Characteristics	Vehicle type and model year
Fuel Characteristics	Type of fuel and heating value

Activity data that should be collected for each source of mobile combustion emissions

$$\text{Mobile Combustion} = \text{Fuel or Distance Data} \times \text{Emission Factor (EF)}$$

Scope 2



Scope 2: Purchased Energy Calculation

How do I calculate scope 2 emissions?

$$\text{Scope 2 Emissions} = \text{Activity Data} \times \text{Emission Factor (EF)}$$

MWh

mt CO₂e/
MWh

For every MWh...
Need an EF for
each method.

MWh

Location-based

Market-based

EF represents
what's generating
on the grid

EF derived from
contractual
information,
applied on a
MWh basis

Scope 2 Emissions (Purchased Electricity)

- In 2015, [new electricity emissions calculation guidance](#) was issued by the World Council on Sustainable Business Development (WBCSD) and the World Resources Institute (WRI)
- Companies must quantify and report two electricity emissions totals, using a **location-based** method and a **market-based** method

Method	Explanation	Emission Factor
Location-based	Uses average emission factors for the electricity grids that provide electricity to a reporting organization	Grid average (e.g., eGRID)
Market-based	Considers contractual arrangements under which the reporting organization procures power from specific suppliers or sources, such as renewable energy	Most specific factor available

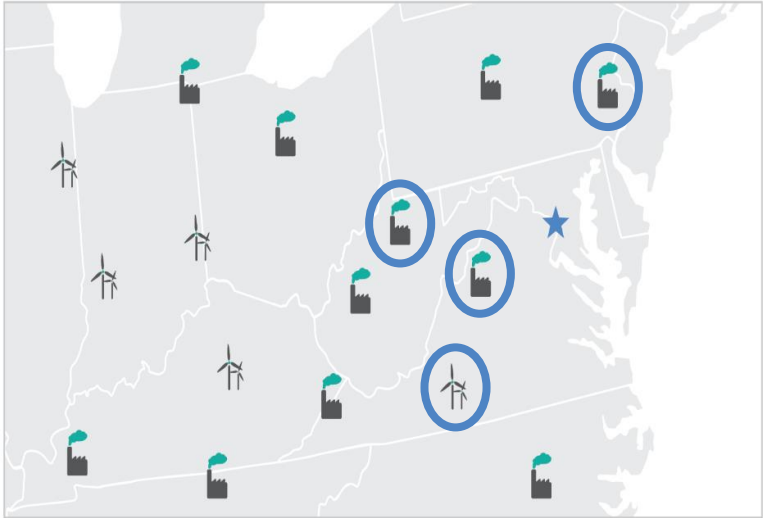


Understanding the Two Scope 2 Accounting Methods

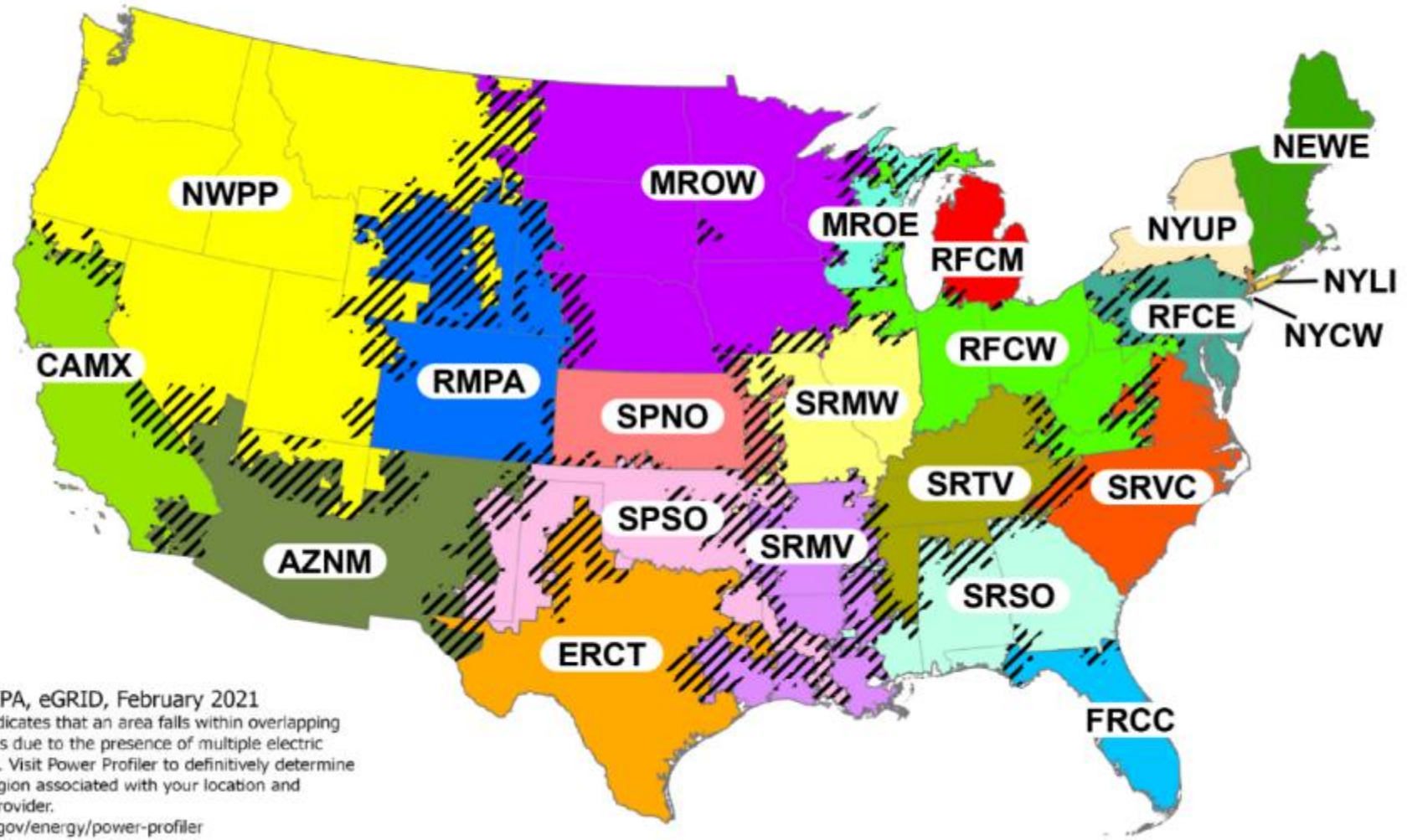
Location-based



Market-based



Map of eGRID Subregions



USEPA, eGRID, February 2021
Crosshatching indicates that an area falls within overlapping eGRID subregions due to the presence of multiple electric service providers. Visit Power Profiler to definitively determine the eGRID subregion associated with your location and electric service provider.
<http://www.epa.gov/energy/power-profiler>



In the tool...

The US EPA GHG Calculator tool has tabs for:

- Purchased Electricity (pictured)
- Purchased Steam

These Scope 2 component categories each have their own data layouts, inputs, and guidance (where to get data, how to format it, what it all means)

[Back to Intro](#) [Back to Summary](#) [Help](#) [Help - Market-Based Method](#)



Scope 2 Emissions from Purchase of Electricity

Guidance

The Indirect Emissions from Purchased Electricity Guidance document provides guidance for quantifying two scope 2 emissions totals, using a **location-based method** and a **market-based method**. The organization should quantify and report both totals in its GHG inventory. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as renewable energy.

- (A) Enter total annual electricity purchased in kWh and each eGRID subregion for each facility or site in ORANGE cells of **Table 1**.
- (B) If electricity consumption data are not available for a facility, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.
- (C) Select "eGRID subregion" from drop box and enter "Electricity Purchased."
 - Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion. If subregion cannot be determined from the map, find the correct subregion by entering the location's zip code into EPA's Power Profiler: <https://www.epa.gov/eGRID/power-profiler/>
- (D) See the market-based emission factor hierarchy on the market-based method Help sheet. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions. Example entry is shown in first row (*GREEN Italics*) for a facility that purchases RECs for 100% of its consumption, and therefore has a market-based emission factor of 0.

[Help - Market-Based Method](#)

Tips: Enter electricity usage by location and then look up the eGRID subregion for each location. If you purchase renewable energy that is less than 100% of your site's electricity, see the example in the market-based method Help sheet.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

Source ID	Source Description	Source Area (sq ft)	eGRID Subregion where electricity is consumed	Electricity Purchased (kWh)	Market-Based						Location-Based		
					Emission Factors			Emissions			Emissions		
					CO ₂ Emissions (lb/MWh)	CH ₄ Emissions (lb/MWh)	N ₂ O Emissions (lb/MWh)	CO ₂ Emissions (lb)	CH ₄ Emissions (lb)	N ₂ O Emissions (lb)	CO ₂ Emissions (lb)	CH ₄ Emissions (lb)	N ₂ O Emissions (lb)
<i>Bldg-012</i>	<i>East Power Plant</i>	<i>12,517</i>	<i>HIMS (HICC Miscellaneous)</i>	<i>200,000</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>228,640.0</i>	<i>22.0</i>	<i>3.4</i>
					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
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Scope 3



Emission Calculation Formula

GHG Emissions in CO₂e

- By convention, express CO₂e in metric tons
- Different GHGs cause different levels of warming
- CO₂e standardizes the amount of warming relative to CO₂

=

Activity Data

- Example data types:
- Dollars spent
 - Distance traveled
 - Units sold
 - kWh of electricity consumed

x

Emission Factor (EF)

- Emissions per relevant unit (i.e., per mile traveled, per dollar spent)
- Ex: 2 kg CO₂e/mile
 - Ex: 1.3 kg CO₂e/\$

x

Global Warming Potential (GWP)

- How much a gas warms the atmosphere relative to CO₂
- If EFs are already in CO₂e per unit, GWP is not needed
- If the EF is not in CO₂e, GWP is needed
- See IPCC reports for GWP values



Different Scope 3 Calculation Methods

Scope 3 is less straightforward to calculate compared to Scopes 1 & 2

There are multiple methodologies available for each category

- Provides flexibility in calculations based on data availability and relevance

See [GHG Protocol Scope 3 Calculation Guidance](#) for detailed guidance on methodologies

Example Methodology Types:

Supplier Specific	Relies on relevant emissions data from suppliers
Hybrid	Combination of supplier specific data and other methods
Average data	Uses averages to determine the activity data
Spend-based	Utilizes dollars spent on a good or service to estimate emissions
Distance-based	Relies on distance traveled to calculate emissions
Fuel-based	Emissions calculated using fuel consumed

Scope 3 Categories

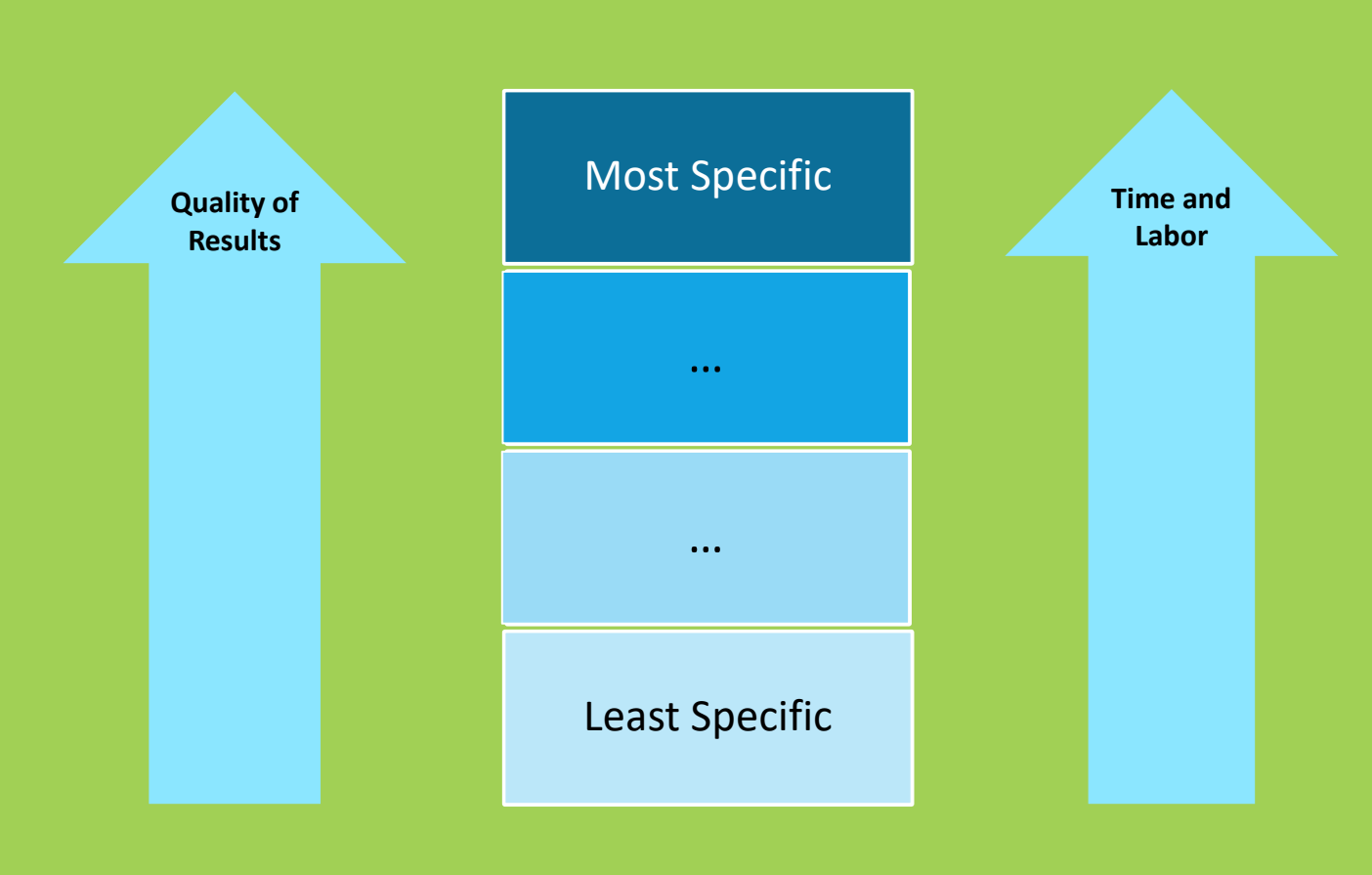
*For more detail/direction, see Appendix

Scope 3 – Upstream	Data Types*	Scope 3 - Downstream	Data Types*
1. Purchased Goods and Services	Spend data, bill of materials/LCA data	9. Downstream Transportation and Distribution	Assumptions, national averages
2. Capital Goods	Purchasing records, bill of materials/LCA data	10. Processing of Sold Products	Purchasing records, industry averages
3. Fuel and Energy Related Activities	Scope 1 and 2 data, fuel procurement data	11. Use of Sold Products	Sales records, industry associations, surveys/estimates on emissions from use
4. Upstream Transportation and Distribution	Supplier transport data, PO data	12. End of Life Treatment of Sold Products	Mass of products sold data, disposal patterns/averages
5. Waste Generated in Operations	Company waste data, public waste-related emissions data	13. Downstream Leased Assets	Utility bills, purchase records
6. Business Travel	Internal travel data, expense reports, travel agency reports	14. Franchises	Public GHG inventories, purchase records, utility bills
7. Employee Commuting	Employee travel/location data	15. Investments	Financial records
8. Upstream Leased Assets	Utility bills, meter data		

Selecting an Appropriate Methodology

Criteria for methodology selection:

- The relative size of the emissions from the scope 3 activity
- The company’s business goals
- Data availability
- Data quality
- The cost and effort required to apply each method
- Other criteria identified by the company



Note: [GHG Protocol Scope 3 Calculation Guidance](#) provides decision trees to help determine the appropriate methodology to use

Spend-Based Methodology

Environmentally-extended input output (EEIO) models estimate energy use and/or GHG emissions resulting from the production and upstream supply chain activities of different sectors and products within an economy. The resulting EEIO emissions factors can be used to estimate GHG emissions for a given industry or product category. EEIO data are particularly useful in screening emission sources when prioritizing data collection efforts.

EEIO models are derived by allocating national GHG emissions to groups of finished products based on economic flows between industry sectors. EEIO models vary in the number of sectors and products included and how often they are updated. EEIO data are often comprehensive, but the level of granularity is relatively low compared to other sources of data.

Spend needs to be broken down by categories to determine appropriate emission factors.

Annual Spend

X

EEIO Spend-based Emission Factor
(e.g., EPA Supply Chain EFs)

=

GHG Emissions

Average Data Method

Involves estimating activity data based on industry/national/etc. averages

For Purchased Goods & Services and Capital Goods this includes using:
Purchased good/service data and life cycle analysis (LCA) emission factors.

Example: Category 7 Employee Commuting

Company A has 1,000 employees all based in the US. Since Company A does not have detailed information on employee commute, it refers to a national survey on commuter habits. Employees at Company A work an average of 240 days per year.

Commute Group	Percent of total commuters	Average one-way distance (mi)	Emission factor (kgCO ₂ e/vehicle or passenger mi)
Car	90%	10	0.2
Bus	10%	5	0.1

Note: the activity data and emission factors are illustrative only and do not refer to actual data.

Car Commuter Emissions

of employees * % of employees per commute mode * round trip distance * days worked per year * emission factor
 $1,000 * 0.9 * (10 * 2) * 240 * 0.2 = 864,000 \text{ kg CO}_2\text{e}$

Bus Commuters

of employees * % of employees per commute mode * round trip distance * days worked per year * emission factor
 $1,000 * 0.1 * (5 * 2) * 240 * 0.1 = 2,400 \text{ kg CO}_2\text{e}$

Total Employee Commute Emissions

Car Emissions + Bus Emissions
 $864,000 + 2,400 = 866,400 \text{ kg CO}_2\text{e} = 866.4 \text{ tCO}_2\text{e}$

Distance-Based Method

Applies to travel/transportation related categories

Activity data is vehicle miles, passenger miles, and/or ton miles

Example: Category 4 Upstream Transportation & Distribution

Company A makes computers and sources parts & materials from Supplier B. Company A also pays for transportation services of their finished goods. They calculated the inbound distance traveled by their materials and pulled outbound transportation data from their logistics team. The information is summarized below:

Transportation leg	Mass of transported goods (US ton)	Distance transported (mi)	Transport mode or vehicle type	Emission factor (kg CO2e/ton mi)
Inbound	6	4,000	Ocean	0.05
Outbound	4	2,000	Truck	0.2

Note: the activity data and emission factors are illustrative only, and do not refer to actual data.

Ocean Emissions

$$\text{mass of goods} * \text{distance transported} * \text{emission factor}$$
$$6 * 4,000 * 0.05 = 1,200 \text{ kg CO}_2\text{e}$$

Truck Emissions

$$\text{mass of goods} * \text{distance transported} * \text{emission factor}$$
$$4 * 2,000 * 0.2 = 1,600 \text{ kg CO}_2\text{e}$$

Upstream Transport Emissions

$$\text{Ocean Emissions} + \text{Truck Emissions}$$
$$1,200 + 1,600 = 2,800 \text{ kg CO}_2\text{e} = 2.8 \text{ tCO}_2\text{e}$$

Where to Find Emission Factors

Emission factors should come from reputable data sources such as national datasets

Use the most recent version of the datasets available, and always document the emission factors used in your inventory management plan

The [GHG Protocol Scope 3 Calculation Guidance](#) gives examples of emission factor sources under each category

Examples of Common Emission Factor Sources:

- International Energy Agency (IEA)
- Published LCA studies
- LCA databases
 - EcoInvent
 - OpenLCA Nexus
- EPA GHG Emission Factor Hub (appendix)
- UK DEFRA
- EEIO
 - EPA Supply Chain Emission Factors
 - USEEIO
 - Carnegie Mellon EIO-LCA
 - E3IOT

Note

Be sure to check the units!

Ensure units line up appropriately between your activity data and emission factors. For example, if your activity data is in miles but your emission factor is kg CO₂e/km, this will cause an error.



Scope 3 Upstream Categories

Scope 3 – Upstream	Included in Tool*?	Process
1. Purchased Goods and Services	No	Spend-based Scope 3 methodology
2. Capital Goods	No	Spend-based Scope 3 methodology
3. Fuel and Energy Related Activities	No	Activity data from Scope 1 & 2
4. Upstream Transportation and Distribution	Yes	See EPA tool and additional guidance
5. Waste Generated in Operations	Yes	See EPA tool and additional guidance
6. Business Travel	Yes	See EPA tool and additional guidance
7. Employee Commuting	Yes	See EPA tool and additional guidance
8. Upstream Leased Assets	No	Activity data not included Scope 1 & 2

[*EPA GHG Calculator Tool](#)

Scope 3 Downstream Categories

Scope 3 - Downstream	Included in Tool*?	Process
9. Downstream Transportation and Distribution	No	Spend-based OR Distance-based
10. Processing of Sold Products	No	Fuel-based
11. Use of Sold Products	No	Fuel-based OR Energy-based
12. End of Life Treatment of Sold Products	No	Product mass & material (WARM Tool)
13. Downstream Leased Assets	No	Activity data not included Scope 1 & 2
14. Franchises	No	Spend-based
15. Investments	No	Spend-based

*EPA GHG Calculator Tool

Inventory Management Plan

Features of a verifiable and reliable Inventory Management Plan:

- Consolidation approach
- Base year
- Significance threshold for re-calculating base year
- Inclusions/exclusions & how they are determined
- GWP and EFs used
- Miscellaneous notes
- Activity data used and data owners
- Calculation approach for each category
- Reference to emission factor used (with version year)
- Assumptions

Homework

- Continue collecting data for your defined scope
- Choose your inventory calculation method, and define how your data must be configured for it (e.g. if using the EPA Tool, check the column structure for each tab and configure your data accordingly)
- Input data you collect into the tool to compute your totals

In the next session we will further discuss how to finalize and operationalize your inventory: how to complete your calculation process, what to do with your complete inventory, how to prepare your organization for the annual inventory process (e.g. inventory management plan specifics).

Next workshop: May 9

Future workshops: June 8



SUSTAINABLE SUPPLY CHAIN ALLIANCE



Your 2023 Alliance Team



SUSTAINABLE SUPPLY CHAIN ALLIANCE

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SUSTAINABLE SUPPLY CHAIN ALLIANCE



SUSTAINABLE SUPPLY CHAIN ALLIANCE

Appendix

GHG Glossary

Base year: As greenhouse gas (GHG) accounting is an ongoing process, the first emissions inventory that is conducted is known as the base year. The base year is used as a point of reference to track changes in an inventory as well as progress toward reduction goals.

Baseline metrics: Basic or beginning measurements. Baseline metrics are valuable when setting management and/or reduction goals in order to have something to compare against when making improvements, diagnosing inefficiencies, or tracking progress.

CO₂e: Emissions of different greenhouse gases are often expressed in carbon dioxide (CO₂) equivalent (CO₂e) terms, which represents the amount of carbon dioxide that would have the same relative effect as the greenhouse gases actually emitted.

Direct energy: Direct energy is energy that is produced on-site by the consumption of fuel. Direct energy produces what are known as Scope 1 emissions in the World Reporting Institute's GHG Protocol.

Emissions: The exhaust gas(es) produced as the result of fuel combustion.

Energy efficiency projects: Capital investment in projects to achieve an overall reduction in energy consumption or a less energy intensive production process. Examples include low-hanging fruit such as behavioral changes or more intensive initiatives such as equipment retrofits.

Energy or GHG reduction emission targets: Goals set by an organization to reduce its energy consumption or greenhouse gas (GHG) emissions. This goal is typically set by measuring an organization's energy consumption and/or GHG emissions and establishing a start date (baseline), setting an appropriate and achievable target, and outlining a reduction plan that can be achieved by a specific date.

Environmental policies & reporting: Standards and protocols developed by various agencies to track and disclose environmental and social impacts. Environmental reporting and management standards help organizations identify how to reduce or mitigate their environmental impacts. Standards and protocols include ISO 14001, the Global Reporting Initiative, and the Carbon Disclosure Project.

GHG Protocol: The GHG Protocol is the most widely used, internationally accepted tool for accounting for greenhouse gas emissions. It was developed by the World Resources Institute and the World Business Council for Sustainable Development. <http://www.ghgprotocol.org/>

GHG Glossary

Greenhouse gases (GHGs): GHGs are naturally occurring gases in the earth's atmosphere that absorb and re-emit radiation, trapping heat and making the planet warmer, known as the greenhouse effect. There are seven major GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and the recently added and nitrogen trifluoride (NF₃). The consumption of fossil fuels is associated with an increase in the presence of these gases in the atmosphere and with climate change.

Indirect energy: Indirect energy is the energy obtained from purchased electricity, heat, or steam. This type of energy is obtained from a third-party, such as a utility provider. Indirect energy produces what are known as Scope 2 emissions under the GHG Protocol.

Onsite fuel combustion (direct): Any fuels combusted by a company-owned asset, such as natural gas used in a boiler or a back-up generator that runs on diesel fuel.

Operational boundary: Defined scope of both direct and indirect emissions within an organizational boundary. When defining operational boundaries, the entity must specify who/what is responsible for emissions, i.e. the entity itself or a 3rd party.

Organizational boundary: Those businesses and operations that make up an organization for the purpose of accounting for and reporting GHG emissions.

Purchased energy (indirect): Energy that is sourced by a third-party provider and purchased by the organization. For example, natural gas purchased from a utility or a governmental agency.

Purchased steam: Steam that is generated by a third-party provider and then purchased by the organization.

Renewable energy: Energy derived from naturally occurring, repeatable, and replenishing sources. Types of renewable energy include geothermal, solar, wind, ocean and other forms of hydropower, biomass, etc.

Science-based targets: Emissions reductions goals that are in line with what the latest climate science says is necessary to keep global temperature rise at safe levels. <https://sciencebasedtargets.org/what-is-a-science-based-target/>

GHG Inventory Sample Tools

EPA Scope 1 & 2 Inventory Guidance: <https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance>

EPA Scope 3 Inventory Guidance: <https://www.epa.gov/climateleadership/scope-3-inventory-guidance>

EPA GHG Emissions Factors Hub: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

GHG Protocol Scope 3 Standard: https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf

EPA Scope 3 Evaluator Tool: <https://quantis-suite.com/Scope-3-Evaluator/>

CDP Scope 3 Relevant Categories: <https://cdn.cdp.net/cdp-production>

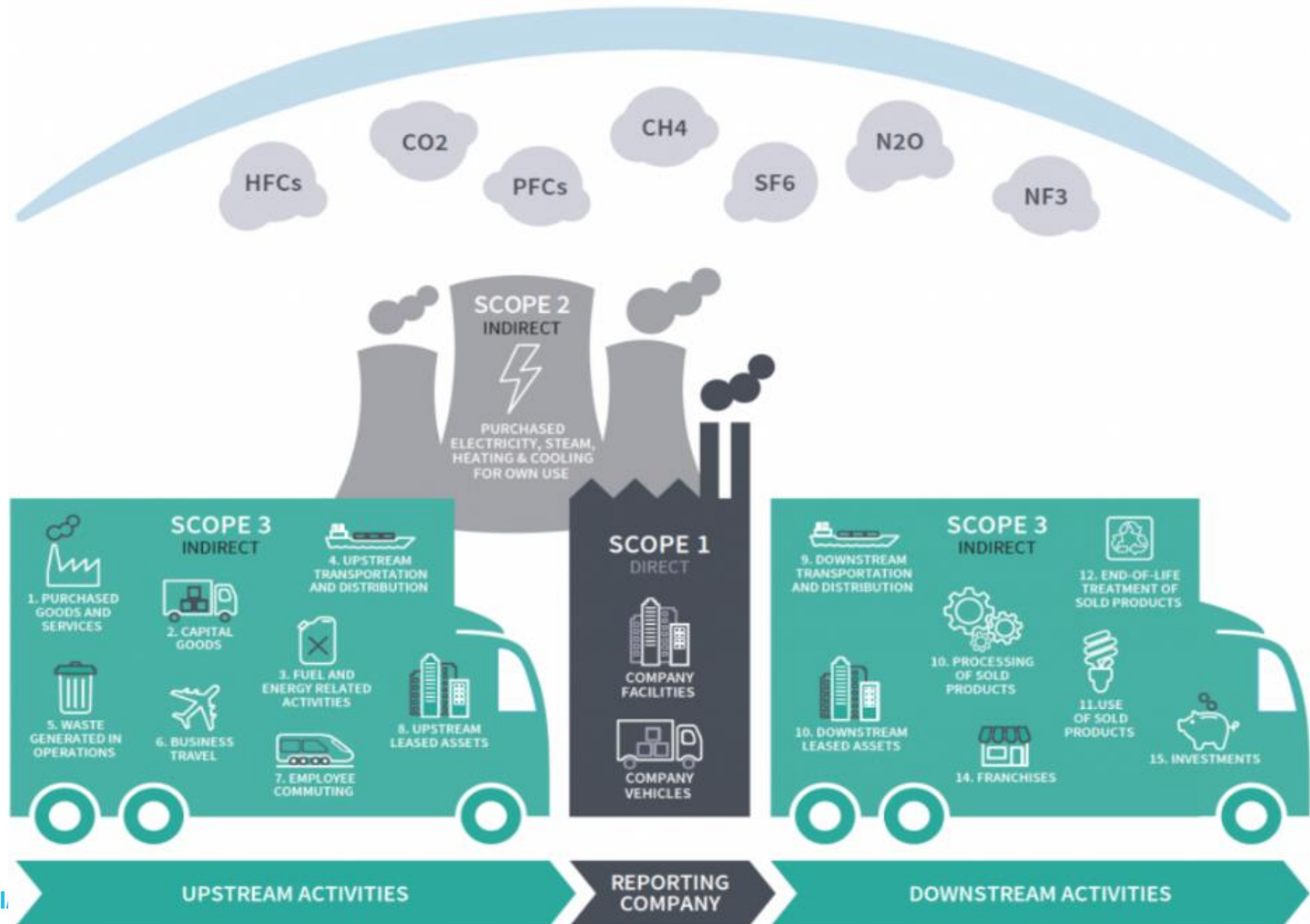
GHG Protocol Calculation Tools: <https://ghgprotocol.org/calculation-tools>

EPA WARM (for waste-related emissions estimates): <https://www.epa.gov/warm/versions-waste-reduction-model-warm#15>

CBEX Estimates (for upstream leased assets: per-sqft estimates on emissions): <https://www.eia.gov/consumption/commercial/>



GHG Emissions Boundaries – Categories of Emissions



Why Calculate a GHG Inventory?

Value of a GHG Inventory

GHG inventories help quantify, understand, and assess emissions associated with a company's activities. Companies must be able to understand and manage GHG risks if they are to ensure long-term success in a competitive business environment.

- **Support utility customer needs to report on Scope 3 emissions:** More than ever, utilities are expected to report their Scope 3 supplier emissions. Supplier GHG inventories are critical to customers now and will become more important in the future.
- **Save money and improve energy efficiency:** Measuring emissions helps identify where efficiency and reduction opportunities lie, and thus, operational and energy cost savings.
- **Manage risks:** Measuring emissions helps prepare for risks (e.g., energy cost increases, new regulations, evolving customer expectations).
- **Develop an effective corporate strategy:** Use inventory to establish performance goals, develop business continuity planning, location strategy, and operational improvements.
- **Build competitive advantage:** GHG inventories help identify opportunities to re-design business operations/processes, implement technological innovations, improve products & services, and build sustainable competitive advantage.
- **Protect and build your reputation:** Demonstrating leadership and environmental stewardship are integral to maintaining your social license to operate.



Scope 3 Upstream Categories



What are Upstream Emissions?

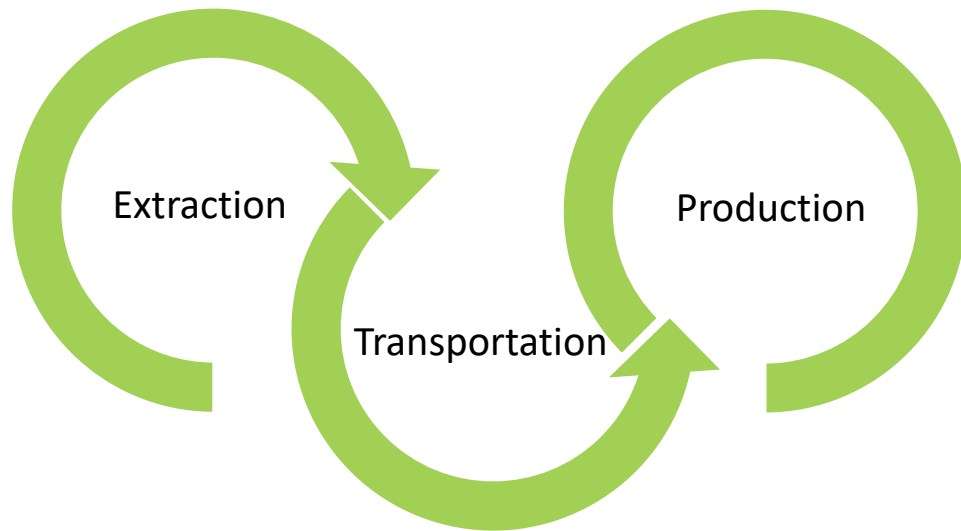
Upstream & downstream relates to where sources falls along the corporate value chain: **upstream (before)** and **downstream (after)** the reporting company. In GHG accounting, it also ties into who pays for the source/ creates the demand.

1	Purchased Goods & Services
2	Capital Goods
3	Fuel and Energy Related Activities
4	Upstream Transportation & Distribution
5	Waste Generated in Operations
6	Business Travel
7	Employee Commuting
8	Upstream Leased Assets

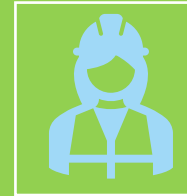


Category 1: Purchased Goods & Services

Embodied emissions (a.k.a. upstream or cradle-to-gate) of purchased goods & services



Examples

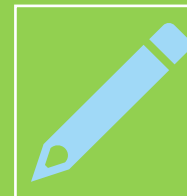
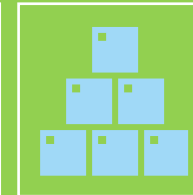


Services

- Advertising
- Accounting
- Legal Services
- Maintenance

Goods

- Steel
- Glue
- Wood
- Finished products



Other operational goods/services

Data Source Examples

- Internal data systems
- Bill of materials
- Purchasing records

Category 2: Capital Goods

Embodied emissions (a.k.a. upstream or cradle-to-gate) of capital goods

Capital Goods – products with extended life used by companies to deliver their products/services

Fixed assets

Plant, Property, & Equipment

Examples



Machinery/Equipment



Buildings/Facilities



Vehicles

Data Source Examples

- Internal data systems
- Bill of materials
- Purchasing records



Category 3: Fuel & Energy Related Activities

Extraction, production, and transportation of fuel & electricity used by the reporting company.

There are 4 parts to this category:

1

Upstream emissions of fuel

2

Upstream emissions of electricity

3

Emissions from transmission & distribution (T&D) losses

4

Generation of purchased fuel sold to end users

Only applies to utilities or energy retailers

Examples

Refining of natural gas consumed for heating

Company X used 100 kWh of electricity. 10 kWh were lost during T&D. Company X should account for upstream emissions of 100 kWh as well as the upstream emissions & combustion for the 10 kWh that were lost in T&D

Data Source Examples

- Reference to Scope 1 & 2 GHG inventory, including quantity, source, and type of fuel
- Collecting data from fuel procurement departments



Category 4: Upstream Transportation & Distribution

This category includes:



Inbound transportation & distribution of purchased products



Purchased transportation & distribution services

- Inbound
- Outbound
- Between own facilities

Purchased outbound logistics services are categorized as upstream because they are a purchased service.

Examples



Inbound ocean transport



UPS transportation of sold products paid for by the reporting company



Storage of purchased products in warehouses

Data Source Examples

- Internal transport management systems
- Purchase orders
- Specific carrier or mode operator



Category 5: Waste Generated in Operations



Disposal and treatment of waste generated in operations

- Solid waste
- Wastewater
- Optional: transportation of waste

Examples



Company X landfilled 65% of mixed waste



Wastewater produced from chemical manufacturing



Company X recycled 80% of paper waste

Data Source Examples

- Internal IT systems
- Utility bills



Category 6: Business Travel

Transportation of employees for business-related activities in third party vehicles



Air travel



Rental car & mileage reimbursement



Train/bus/taxi/etc.



Hotel stays (optional)

This category does not include emissions from:

Transportation in owned or controlled vehicles

- Scope 1 or 2

Transportation of employees to & from work

- Scope 3, Category 7 (employee commuting)

Transportation in leased vehicles not included in scope 1 or 2

- Scope 3, Category 8 (upstream leased assets)

Data Source Examples

- Travel agency/provider reports
- Internal expense/reimbursement systems

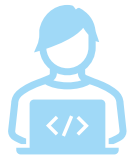


Category 7: Employee Commuting

Transportation of employees between their homes and their worksites in vehicles not owned/controlled by the reporting company



Automobile, bus, rail, bicycle, etc.



Optional: Remote work emissions

Examples

An employee commutes 4 miles each way by passenger vehicle 5 days per week

An employee always uses public transportation to get to work & travels 7 miles each way

Not employee commute: an employee uses a company owned car to get to work

- What Scope/Category does this fall under?

Data Source Examples

- Average national data
- Internal commuting survey
- Employee location data

Category 8: Upstream Leased Assets



Emissions from the operation of assets that are leased & not already included in scope 1 or 2



Applies to companies that operate leased assets (i.e., lessees)

Companies that own and lease assets to others (i.e., lessors), see category 13 (Downstream leased assets)

Inclusion in Scope 1 & 2 vs Scope 3 Category 8 depends on the **organizational boundary**

Examples

Fuel use from leased corporate jet not already in scope 1

Electricity from leased offices not already in scope 2

Not Upstream Leased Assets: Fuel use for a leased vehicle when the company uses an operational control boundary

- Scope 1

Data Source Examples

- Utility bills
- Purchase records
- Meter readings
- Internal IT systems



Scope 3 Downstream Categories



What are Downstream Emissions?

Downstream emissions happens **after** the product/service leaves your organization's walls. This may include the transportation from warehouse to the customers, use of your organization's products/services by your clients/customers, etc.

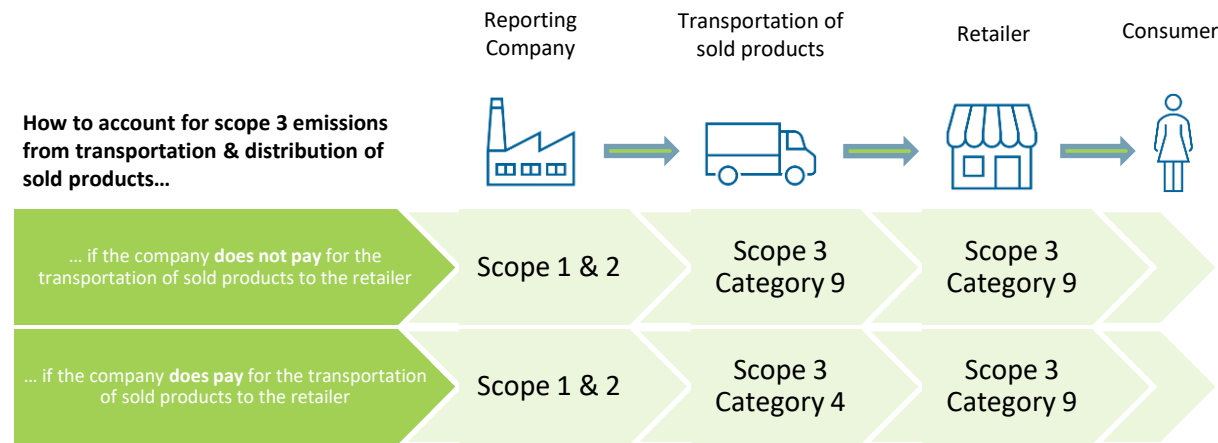
9	Downstream Transportation & Distribution
10	Processing of Sold Products
11	Use of Sold Products
12	End-of-Life Treatment of Sold Products
13	Downstream Leased Assets
14	Franchises
15	Investments



Category 9: Downstream Transportation & Distribution

Outbound transportation & distribution of sold products

- In non-owned/controlled vehicles and facilities
- NOT paid for by the reporting company



Many assumptions will likely need to be made for this category as data quality tends to be poor

Examples



Outbound truck transportation paid for by customer



Sold goods stored in customer distribution centers



Sold goods shelved in a retailer's store

Category 10: Processing of Sold Products

Processing of an intermediate product into a finished good

Only applicable to companies who sell intermediate products

Intermediate products require further work, transformation, or inclusion in another product before use

Emissions should be allocated to the intermediate product

Data Source Examples

- Purchasing records/internal data systems
- Industry-average data from associations/databases

Examples of intermediate products:

Steel

- This could be processed into a fabricated metal product

Yarn

- This could be processed into clothing

Wires

- This may be a part of an electronic device

Example

- Company X (reporting company) sells sugar to a candy manufacturer. The emissions associated with the processes to produce the candy falls within Category 10



Category 11: Use of Sold Products

Emissions from the use phase of sold products

- Over the product's entire expected lifetime
- Emissions may be direct or indirect

Direct
<ul style="list-style-type: none">• Energy consumed directly by the sold product

Indirect
<ul style="list-style-type: none">• Energy consumed during the use of the sold product but not by the product itself• Optional, but recommended where emissions are expected to be significant

This category should account for the emissions over the product's entire expected lifetime during the year the product was sold.

Examples



Electricity use from a refrigerator sold in the reporting year over its lifetime (direct)



Electricity consumed by running a software package sold by the reporting company (indirect - optional)

Data Source Examples

- Internal data systems
- Sales records
- Industry associations
- Surveys

Category 12: End-of-Life Treatment of Sold Products

Emissions from the disposal and treatment of products sold in the reporting year at the end of their life



Requires assumptions about the end-of-life treatment methods used by consumers.



Emissions will vary by waste material and by disposal method (e.g., landfilled, recycled, combusted).

Examples

Company X sells socks. 90% of their consumers throw the socks out at the end of their useful life

Dunder Mifflin sells paper. 85% of their consumers recycle the paper after use

Data Source Examples

- Mass of products/packaging sold in the reporting year
- Consumer surveys
- National averages of disposal patterns
- Government directives on waste treatment



Category 13: Downstream Leased Assets



Emissions from the operation of assets that are owned, leased to another entity, and have not already been included in scope 1 or 2



Applies to Companies that own and lease assets to others (i.e., lessors)

Companies that operate leased assets (i.e., lessees) should refer to category 8 (Upstream leased assets).

Inclusion in Scope 1 & 2 vs Scope 3 Category 13 depends on the **organizational boundary**

Examples

Company X subleases an office which is not included in their scope 1 or 2

- Emissions from this office's electricity, fuel, & refrigerant usage fall in this category

Company Y leases a forklift that is not in their scope 1 or 2

- Emissions from the fuel used to operate that forklift are within this category

Data Source Examples

- Utility bills
- Purchase records
- Internal IT systems



Category 14: Franchises



Emissions from the operation of franchises that have not already been included in scope 1 or 2



Applies to franchisors

Companies that grant licenses to other entities to sell/distribute its goods/services in return for payments (e.g., royalties for the use of trademarks and other services)

Optional: The life cycle emissions associated with manufacturing or constructing franchises

There may be less data granularity at this level which may require assumptions.

Examples

Company X owns a franchise which is not included in their Scope 1 & 2

- Emissions from the electricity, fuel, & refrigerants use from this franchise fall in this category

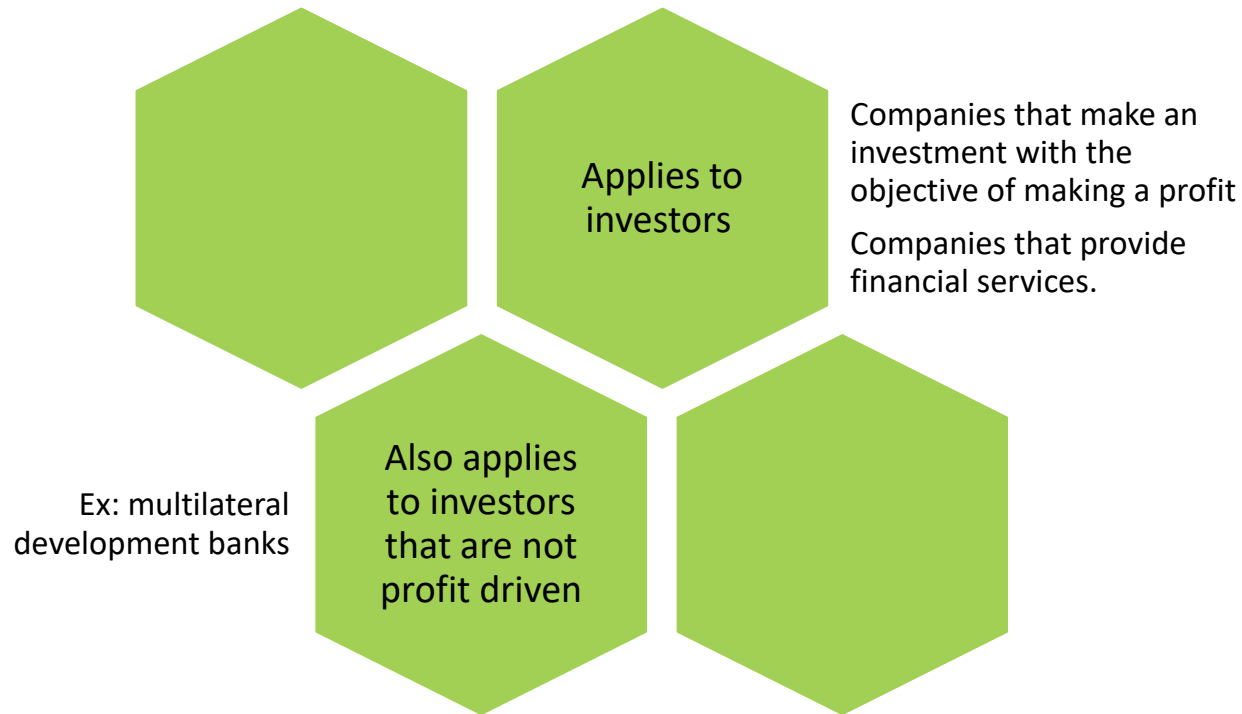
Data Source Examples

- Public GHG inventory reports
- Utility bills
- Purchase records
- Internal IT systems



Category 15: Investments

Emissions associated with the reporting company's investments



Considered a downstream category because providing capital or financing is a service provided by the reporting company

Designed primarily for private financial institutions

Also relevant to:

- Public financial institutions
- Other entities with investments not included in scope 1 & 2

Examples

Company X has 2 joint ventures

- Scope 1 & 2 emissions associated with the investments fall in this category

Data Source Examples

- Financial records
 - From reporting company
 - From investee company

