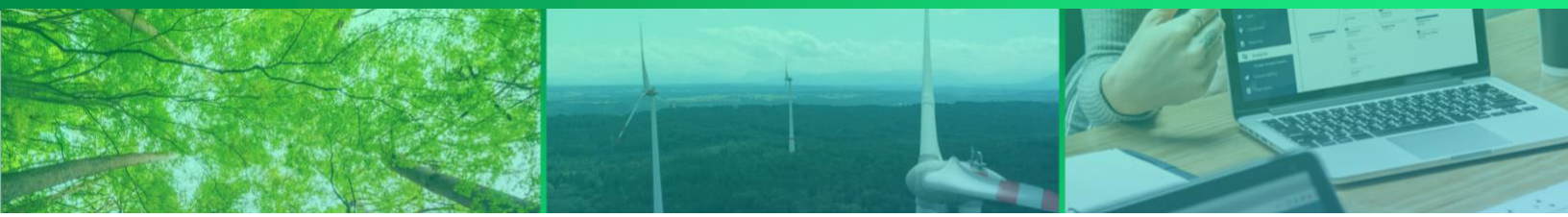
Constellation Navigator℠

Reducing Corporate Greenhouse Gas Emissions:

A Guide to Scope 1, 2 and 3 Emissions



Climate change is driven by increasing greenhouse gas (GHG) emissions, like carbon dioxide, methane, and nitrous oxide, which trap heat in the atmosphere.

These gases are released into the atmosphere, often from business operations, including, but not limited to power usage for facilities, transportation of goods and industrial manufacturing processes. Climate change is one of the most urgent challenges facing businesses today. As public awareness grows around this issue, major corporations are looking to reduce their carbon footprint and lessen their emissions impacts. The first step is critical understanding the different categories of emissions associated with business operations. Only then can a business implement targeted strategies for reduction.

This paper will help organizations understand the key differences between scope 1, 2 and 3 emissions. It explores sources, provides examples and emphasizes the importance of addressing emissions across all three scopes.

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Scope 1 Emissions

Direct Greenhouse Gas Releases

Scope 1 refers to direct GHG emissions from sources owned or controlled by the company. These emissions come directly from a company's activities, making them the most straightforward emissions for businesses to measure, control and reduce.

Scope 1 emissions can be separated into four primary categories:

Stationary Combustion

Stationary combustion includes emissions from the on-site burning of fossil fuels for equipment like boilers, generators, furnaces and more. Fuels incorporated in stationary combustion include, but are not limited to, natural gas, propane, gasoline, diesel, biomass and wood. Facilities with a large physical footprint like factories, refineries or office campuses usually have significant stationary combustion emissions from heating, cooling and powering buildings and equipment.

For instance, a manufacturing facility would likely have emissions from natural gas used to generate heat for industrial processes, or an office space may release emissions by burning natural gas or oil to heat buildings.

Mobile Combustion

Mobile combustion covers emissions from fuel burned by vehicles owned or leased by the company. This includes cars, trucks, vans, ships, planes, construction equipment and any other vehicles powered by gasoline, diesel or other fuels.

Transportation-based companies and businesses with large fleets for moving goods or providing services have high mobile combustion emissions. For example, a parcel delivery service would create mobile emissions from gasoline and diesel used in its delivery trucks. A landscaping business would have emissions from gas-powered lawn mowers and other portable equipment. Companies with sales teams or personnel who drive company vehicles regularly for work also release emissions from mobile combustion.

Fugitive Emissions

Fugitive emissions refer to unintentional leaks and releases of greenhouse gases. This includes emissions from refrigeration, air conditioning, fire suppression systems and other equipment that may leak refrigerants or other chemicals. For instance, commercial buildings can experience fugitive emissions when refrigerants leak from AC units during maintenance or servicing.

Process Emissions

Process emissions are greenhouse gases generated directly from industrial activities and chemical reactions that occur at facilities owned by the business, such as factories, plants and mills. Since heavy industry and manufacturing enterprises tend to have the most on-site production processes, they also experience the highest process emissions compared to other industries.

Importance of Addressing Scope 1

Since scope 1 covers emissions released directly by the company, it is the area over which businesses have the most control and is a direct way for a company to reduce its carbon footprint. Measuring and reducing scope 1 emissions is foundational to any corporate carbon management strategy.

While scope 1 can sometimes be the most straightforward and easiest to reduce, it is important for a company to look at its emissions holistically by calculating a GHG inventory.

Scope 2 Emissions

Indirect Emissions from Purchased Energy

Scope 2 refers to indirect GHG emissions associated with purchased electricity, steam, heating and cooling used to power company and operations. Since these emissions come from an external generation process, they are considered indirect. However, addressing scope 2 is important for companies aiming to reduce buildings emissions tied to their energy consumption.

When accounting for scope 2 emissions from purchased electricity, businesses can use either a location-based or market-based approach:

Purchased Electricity

Most companies purchase electricity from the grid to run their facilities and equipment. The emissions related to electricity depend on how it was generated, by the utility or supplier. For example, a retailer would have scope 2 emissions from the electricity used to power lighting, heating and cooling in its stores.

When accounting for scope 2 emissions from purchased electricity, businesses can use either a location-based or market-based approach:

- **Location-based method:** Looks at the average emission factors for the regional utility grids supplying a company's facilities. This reflects the general carbon intensity of electricity where they operate.
- **Market-based method:** Looks at factors from a company's specific renewable energy contracts and certificates. This reflects emissions only from the renewable energy and low-carbon sources within a company's energy mix.

Purchased Heating and Cooling

Some industrial companies purchase steam, heat and cooling from utilities or energy suppliers for use in their processes and facilities rather than generating these energies on-site.

For instance, an industrial facility that purchases heat from a thermal power plant for specific equipment needed in their industrial processes would be increasing their scope 2 emissions.

Importance of Addressing Scope 2

While scope 2 is considered indirect, it can account for a major portion of an organization's total emissions depending on the business's energy use.

Managing energy efficiency and switching to renewable or low-carbon energy through clean, carbon-free power and carbon accounting options can significantly reduce scope 2 emissions.

Scope 3 Emissions

Indirect Emissions Across the Value Chain

Scope 3 emissions encompass all other indirect GHG emissions associated with upstream and downstream activities across a company's supply chain. While not directly within a company's control, scope 3 emissions are a consequence of the company's activities and represent the majority of total emissions for most companies.

According to the Greenhouse Gas Protocol, scope 3 emissions can be divided into these categories:

UPSTREAM EMISSIONS

Purchased Goods and Services

This includes emissions from the extraction, production and transportation of goods and services purchased by a company. For companies that manufacture physical products, the raw materials and components make up a large portion of scope 3 emissions. For service providers, emissions come from purchased equipment, supplies and contracted services.

For example, a clothing manufacturer has emissions associated with the purchase of fabric, sewing equipment and packaging materials used in its operations, while a consulting firm has emissions from purchased office supplies, computers and outsourced design services.

Capital Goods

Capital goods represent emissions from manufacturing or constructing physical infrastructure owned or used by the company. This includes equipment, machinery, buildings and other infrastructure. Companies that frequently acquire or upgrade their physical property have higher capital goods emissions.

For instance, an engineering firm constructing a new office building would have emissions from the materials, transportation and construction of that building. A manufacturer buying new fabrication machinery would have emissions from the metal, motors and electronic components of that equipment.

Fuel and Energy Related Activities

This covers emissions related to producing, transmitting and distributing fuel and energy purchased by the company. Extraction, production and transportation of fuels like natural gas and crude oil create emissions before the energy is even used.

For example, an office building has emissions from the natural gas extraction and pipeline transport before the gas is burned onsite. A manufacturer has emissions from electricity lost in transmission and distribution before it reaches the facility.

Transportation and Distribution

Emissions from all types of transportation and distribution of the company's operations. This includes moving supplies, materials, components from direct suppliers and finished products to the company's facilities. This relates to all types of transport, including ship, rail, truck and air.

For instance, emissions from transportation of parts from an auto supplier to a car assembly manufacturer via truck.

Waste From Operations

Emissions from third-party disposal and treatment of waste generated from the company's own operations. This includes solid waste, wastewater and hazardous waste handled by waste management providers.

For example, emissions from a manufacturer's contracted waste hauler disposing of solid waste in landfills, or a wastewater treatment plant processing a company's industrial wastewater. Hazardous waste also generates emissions, even with proper disposal.

Business Travel

Emissions from transportation of employees for business purposes via modes like air, rail, bus, personal car, rental car, taxi, hotel shuttle, etc.

For instance, flights taken by a consulting team to client sites.

Employee Commuting

Emissions from employees commuting between their homes and worksites via car, bus, rail, air or other modes of transportation. Companies with large office buildings and a lot of employees commuting on a regular basis tend to have higher emissions in this category.

For example, emissions from employees' daily commutes into their designated offices.

Leased Assets

Emissions from assets that the company leases and operates, i.e., where the company is the lessee, including equipment, buildings and vehicles. Leased assets are considered upstream if their emissions are not already included in the company's scope 1 and 2 emissions.

For instance, emissions from electricity and heating in a leased office building that the company leases for workspace, or emissions from delivery trucks leased by a retailer for store deliveries.

DOWNSTREAM EMISSIONS

Transportation and Distribution

Emissions from transporting and distributing products sold by the company between the company's distributors, retailers and end consumers. This includes any transportation method, such as truck, rail, ship or plane.

For example, emissions from shipping products from a manufacturer to retail stores via third-party carrier trucks.

Processing Sold Products

Emissions from further processing of products by other companies after the initial sale but before the products reach the end consumer.

For instance, emissions from refining crude oil into gasoline and other fuels after being sold by an extraction company.

Use of Sold Products

Emissions from end use of goods and services sold by the company, like energy consumption and product disposal. This applies to any products that combust fuel or consume electricity during use. There are two types of sold products:

- Direct phase use: Products that directly consume energy (fuels or electricity) during use.
- Indirect phase use: Products that indirectly consume energy (fuels or electricity) during use.

For example, emissions from a consumer washing shirt and pants they purchased from an apparel company would be indirect phase use emissions. While the electricity used from the washing machine would be direct phase use emissions of sold products.

End-Of-Life Treatment of Sold Products

Emissions from disposal and waste treatment of products sold by the company at the end of their life. This includes recycling, landfilling and incineration. Additionally, an organization should only account for emissions from intermediate sold products, if applicable, at the end of life and not for the consumers end of life treatment.

For instance, an example of emissions from intermediate sold products would be disposing of plastic packaging materials sold to consumer product companies.

Leased Assets

Emissions from assets owned by the company, i.e., the lessor, but leased to other companies or individual end consumers, such as buildings, equipment or vehicles.

For example, emissions from electricity used in an office building leased to another organization.

Franchises

Emissions from the operations of franchises not included in the company's scope 1 and 2 emissions. This includes fuel use, electricity use, transportation and waste disposal by franchise locations.

For instance, a fast-food chain would include emissions from gas used for cooking, electricity for lighting and refrigeration, and waste disposal at its franchise restaurant locations.

Investments

Emissions produced by companies a business has invested in. When a business invests money in another company, it gains part ownership. The investing business must report a proportional share of emissions from the company it invested in based on the investor's percentage share of equity or debt.

For example, a company that holds a 30% equity stake in an airline would account for 30% of the airline's total scope 1 and scope 2 emissions from its flight operations and facilities. This is because the company now owns 30% of the airline and is responsible for 30% of its environmental impact.

Importance of Addressing Scope 3

While scope 3 emissions are indirect, they often account for the majority of a company's total emissions. Managing scope 3 emissions is essential for reducing greenhouse gas impacts, and partnering with suppliers throughout a business's operation is key to significantly reducing a business's footprint.

While some progress has been made recently, scope 3 measurement and reporting is still in its early stages compared to other scopes. However, companies can improve their scope 3 management through collaboration, improved estimation methods, and better data collection. This will be key for companies to reduce their overall emissions footprint.

The Challenges of Reducing Scope 3 Emissions:

Emissions come from indirect activities

Scope 3 encompasses a wide variety of indirect activities, including supplier and distributor emissions, business travel and employee commuting, transportation and distribution, waste disposal, and the lifecycle impacts of products and services. This wide range of direct activities makes scope 3 more difficult to consistently measure and manage compared to scope 1 and 2.

Lack of primary emissions data

Companies often lack primary emissions data for scope 3 activities outside their operations and must rely on estimates or secondary data. This dependency on less accurate data makes it harder to get precise and consistent data compared to the direct emissions measurements possible for scope 1 and 2.

Influencing external partners

Scope 3 emissions frequently depend on convincing external partners across the value chain to share emissions data and implement reductions. However, this can be more difficult than reducing scope 1 and 2 emissions that are under the company's direct control.

Optimize Your Emissions Reduction Strategy

Baseline and scenario analysis or GHG verification:

After a business has identified emission sources and gathered data across its own operations and supply chain, it can implement a variety of reduction strategies tailored to its sustainability goals and timeline. An effective emissions reduction strategy requires comprehensive measurement and reduction across all three scopes.

It's important to keep in mind that reducing scope 3 emissions creates positive ripple effects. While scope 1 and 2 emissions from business operations are important, scope 3 emissions make up the majority of emissions for most companies. For instance, when a supplier reduces its scope 1 emissions, it can also reduce the scope 3 emissions of multiple businesses. Therefore, using suppliers with a mutual interest in sustainability is often a collaboration worth pursuing.

Our Process:

By taking a proactive, multi-prong approach to emissions reduction, businesses can effectively shrink their emissions and environmental impacts.

Kickstart your sustainability journey with energy experts.

The path to comprehensive emissions measurement and reduction is complex, requiring a customized approach tailored to each company's operations, goals and timeline. The good news is that businesses do not have to make the sustainability journey alone.

Constellation is committed to helping companies develop data-driven and strategic sustainability roadmaps. Our team of experts can assess your carbon footprint across scope 1, 2 and 3 emissions, identify opportunities and priorities, and implement customized solutions to reduce your greenhouse gas impacts.

Our Commitment:

We are committed to providing the clearest path for businesses to set and meet their goals, driven by advanced technology platforms and advisors with decades of industry experience. Contact us today to discover how our Sustainability Advisors can accelerate your progress.

Sources

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