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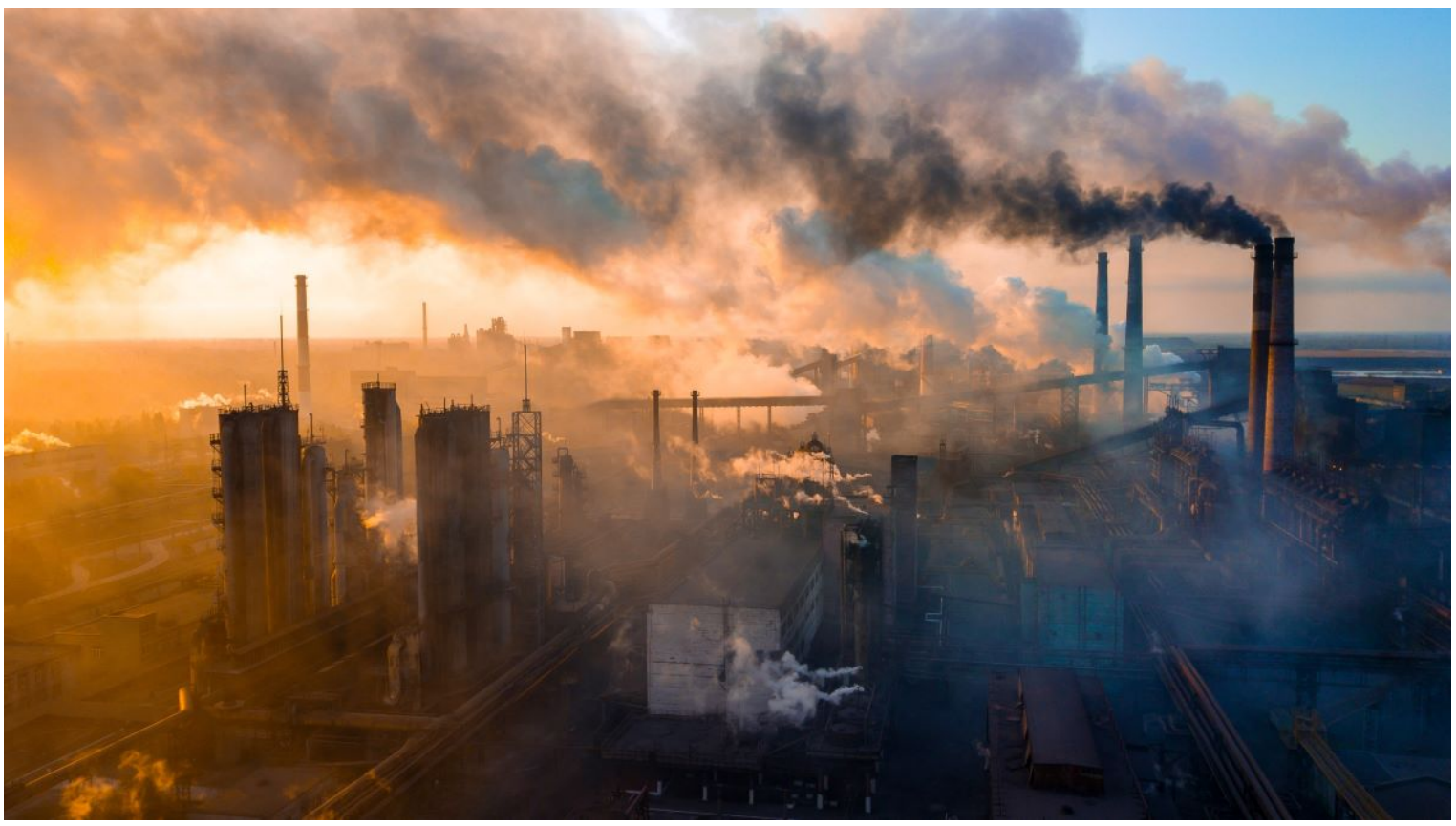
What Are Scope 1 & Scope 2 Greenhouse Gas Emissions?

By Gemma Alexander

MAY 9, 2023 greenhouse gas emissions, Greenhouse Gas Protocol, scope 1, scope 2



Climate science is complicated, and it only gets worse when you start trying to measure emissions and their impacts. But understanding the vocabulary can go a long way towards making sense of a confusing subject. As you move deeper into your studies of climate impacts, you're likely to see the term "scope" used to classify greenhouse gas emissions from commercial and industrial processes. So what exactly does scope measure?

Emission Scope

Without any context, the word scope might seem to relate to the amount or impact of a greenhouse gas that is released into the environment. But CO2-eq is the unit of measurement used to equate the impact of different gases like

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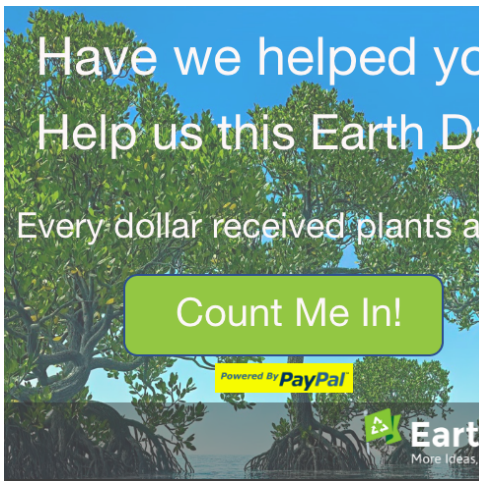

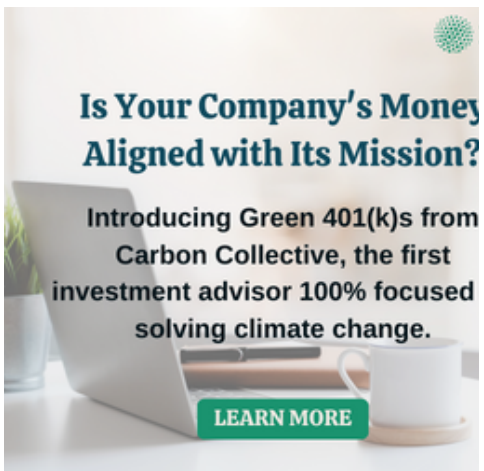

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methane and CFCs. Scope relates to the source of th[CLOSE]mission. The name "scope" comes from the Greenhouse Gas Protocol, which sets the standard for greenhouse gas accounting.

If you think of industry as a stone tossed into a still pond and environmental impact as the resulting outwardly expanding ripples, scope defines the area of impact of a company's activities. Each ring of ripples equates to an increasingly indirect impact from the company. The three categories of scope are used to inventory the different ways that emissions are generated by a company's actions. By breaking emissions down into categories, companies can understand the complete scope of their emissions along their entire value chain. Scope 1 and scope 2 emissions are owned or controlled by a company. Scope 3 emissions are relevant but are more indirect. Because scope 3 inventories and impacts are a little more complicated, they will be considered in a separate article.

Scope 1

In our metaphor, scope 1 emissions occur at the point where the rock hits the water. They are the GHG emissions that directly result from a company's operations. They are directly emitted from sources controlled or owned by the organization. Scope 1 emissions include the emissions generated by the factories that make a company's products, the furnaces that heat its offices, and vehicles that employees operate in the course of company work.

The factories that make a company's products are one source of its scope 1 emissions.

Scope 2

The initial wave that moves out from point of contact defines the second scope of emissions. Scope 2 emissions are indirect GHG emissions. The company does not generate the emissions itself, but it does have control over the amount of scope 2 emissions associated with its operations. Scope 2 refers to emissions from the power source that provides a company's electricity, heating, and cooling. Although Scope 2 emissions usually physically occur somewhere else, the company is responsible for their generation through its energy use.

The purchased energy that powers a company's operations is the source of scope 2 emissions.

Using Scope

Any company that genuinely intends to pursue carbon neutrality, or even just reduce its climate impact, needs to begin with a greenhouse gas inventory. Following the Greenhouse Gas Protocol provides some consistency in the way industries inventory and report emissions. This saves individual companies from having to develop inventory processes and calculations from scratch and helps to minimize creative reporting for greenwashing purposes.

By itself, an emissions inventory has no impact. It is only useful as a tool for setting appropriate emissions reduction targets and measuring progress against them. EPA identifies best practices for emissions targets. Targets should be:

- Fully and publicly declared
- Aggressive – as aligned with the Science Based Targets initiative
- Aim for clearly defined, absolute reductions
- Cover global operations, and
- Include all scope 1 and 2 emissions (as well as addressing at least some scope 3 emissions)

Reporting Emissions

For individuals, understanding emissions scoping is a prerequisite for making sense of corporate sustainability reports. So, for example, the E.&J. Gallo Winery 2023 Sustainability Report identifies reducing greenhouse gas emissions as a core sustainability goal, with a focus on reducing transportation emissions. They report more than 12 million kilowatt hours of electricity generated annually and a 30% annual energy offset through biofuel and solar power generation. These sound like impressive achievements. But there is no mention of scope, base year emissions inventory, or specific targets. A more valuable report would include a specific statement like:

> *Gallo commits to X% absolute reduction from 2020 levels of scope 1 and 2 global emissions, and Y% reduction of A, B, and C scope 3 emissions by 2030.*

In contrast, Carnival Corporation's 2022 Sustainability Report states:

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> *We quantify, report and verify our greenhouse gas (GHG) emissions for our direct (Scope 1) and indirect (Scope 2) emissions. Our fiscal year 2022 direct GHG emissions, which are largely generated from our ships, represented over 99% of our total Scope 1 and 2 emissions. … Following the Greenhouse Gas Protocol guidance, we determined that our Scope 3 emissions were estimated to be approximately one half of our total emissions …"*

The report acknowledges up front that the company has yet to fully disclose scope 3 emissions. But they set clear targets such as an annual 15% reduction in fuel consumption (a scope 1 emission) compared to a 2019 baseline. Emissions are calculated "per berth" to account for variations in cruise ship activity from year to year (a critical factor in the pandemic-influenced tourism industry).

It may be the case that Gallo has done more to improve its environmental performance than Carnival. But the Carnival report is the one that provides meaningful information for concerned consumers, thanks to its use of standardized scoping practices presented in the Greenhouse Gas Protocol.

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Forest Agism: How the Young Forest Movement Greenwashes Logging

By Gemma Alexander

Gemma Alexander has an M.S. in urban horticulture and a backyard filled with native plants. After working in a genetics laboratory and at a landfill, she now writes about the environment, the arts and family. See more of her writing here.

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