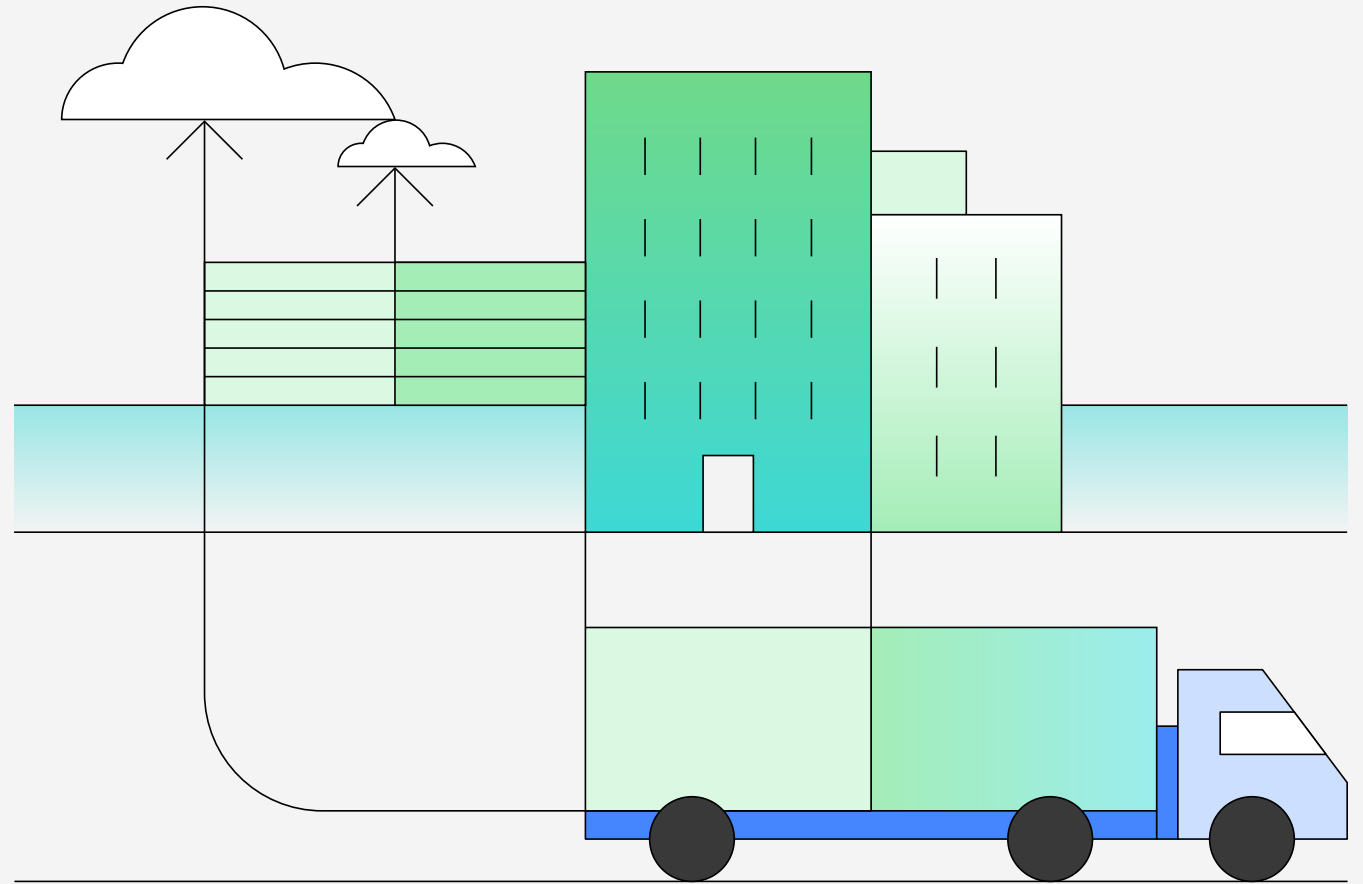


# A guide to GHG emissions accounting and ESG data management



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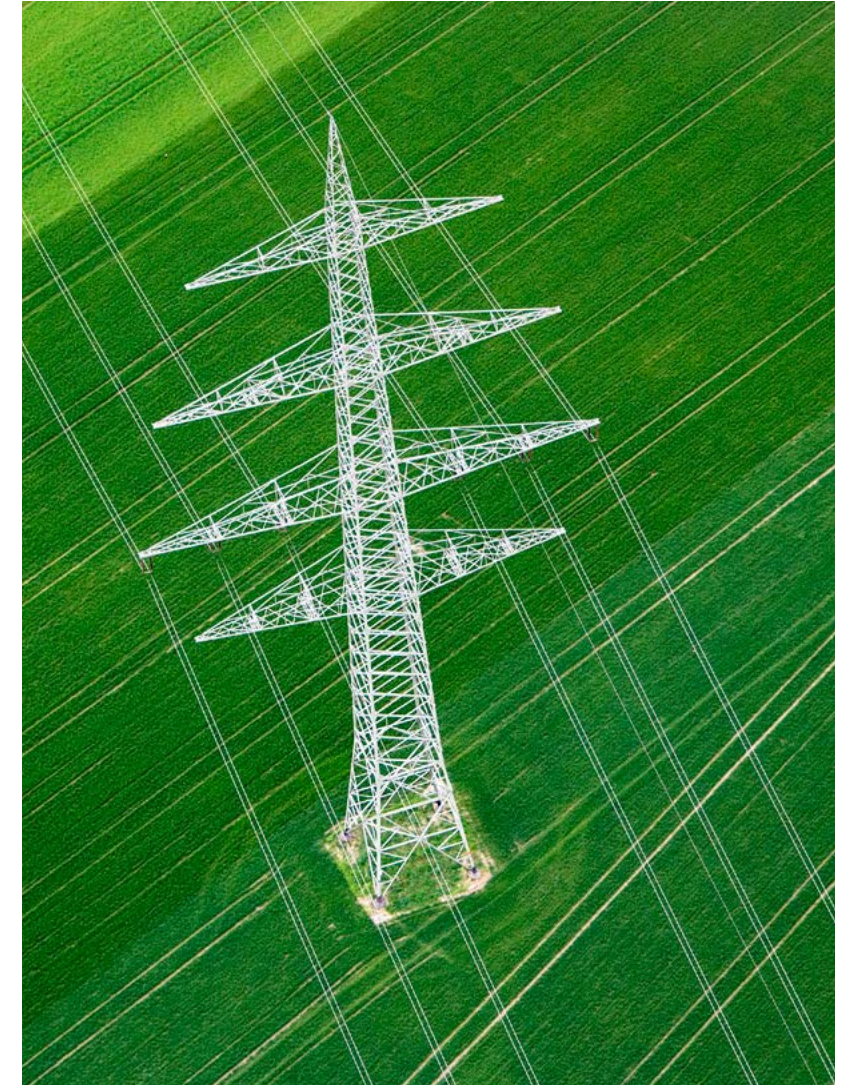
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# 01 Introduction

Investors are increasingly scrutinizing environmental, social and governance (ESG) performance—and looking for companies to rise to the challenge of delivering ESG improvements.

In this publication, we focus on the “E” in ESG, specifically the processes used to manage environmental performance data and the steps required to account for greenhouse gas (GHG) emissions. The pathway to reduce emissions starts with accurate calculation of the emissions baseline and requires ongoing measurement of emissions reductions. The calculation and reporting of emissions is not just required for internal tracking of performance, it is required by virtually every ESG reporting framework. However, the highly developed and deeply embedded processes that exist to capture and disclose financial data are not yet standard practice for ESG metrics such as GHG emissions.



In this ebook, we outline the steps to establishing finance-grade sustainability data and unpack a best-practice approach to calculating GHG emissions for reporting and disclosure.

Setting decarbonization goals and tracking progress toward those goals requires two essential ingredients: finance-grade sustainability data and a robust, auditable GHG emissions accounting process. Both equip key stakeholders with the information they need to accelerate their sustainability performance.

In the following chapters, you'll learn how to:

- Establish finance-grade sustainability data
- Calculate GHG emissions for reporting and disclosure
- Master the complexities of GHG accounting

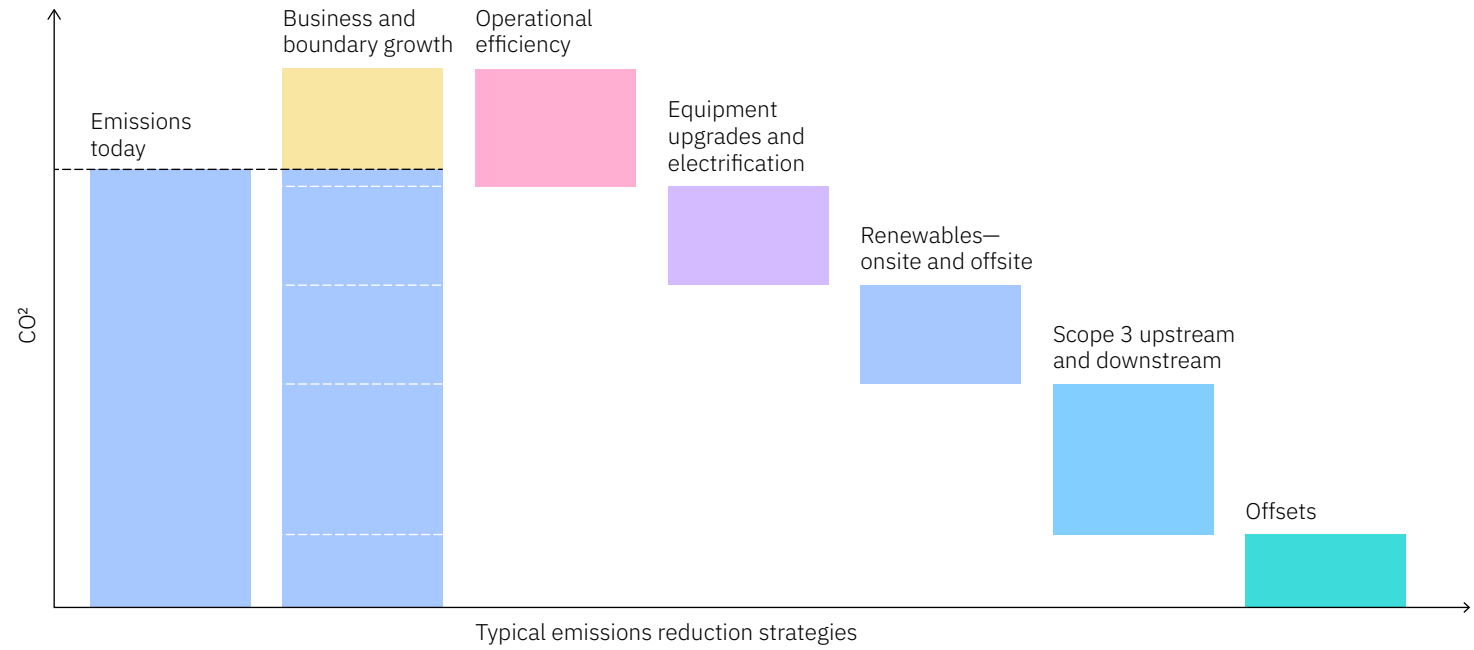


Figure 1. The emissions reduction journey

# 02

## Establish finance-grade sustainability data

Increasingly, organizations are using sustainability performance to assess performance in a manner akin to the way investors use financial data. But the deeply embedded and highly developed structures and processes for capturing and managing financial data do not always exist for sustainability and energy data.

*In over a decade of supporting organizations along their decarbonization journey, we're constantly reminded that data capture and management present a challenge for many. There are a few practices, however, to help simplify data collection and consolidation into a foundation that supports your GHG accounting and sustainability disclosures.*

### Review data accessibility and evaluate options for data capture.

The data required for setting and implementing decarbonization strategies is often scattered across various internal systems throughout the organization, many of which may be incompatible. Alternatively, the data may be held by suppliers that don't have systems and processes in place to share it. To complete your data foundation, your team must determine how it will source the data it needs on an ongoing basis.

#### Tips ↴

- Consider outsourcing the data capture process to a specialist service provider.
- Get as close to the original data source as you can.
- Aim for automated data transfer wherever possible. Minimize human intervention: files touched by people prior to data collection are more prone to precision loss, metric confusion and failure to load.
- Consider how you'll store and manage the data on an ongoing basis. A cloud-based enterprise software platform is infinitely superior to spreadsheets for this task.

## Work with your utility providers.

Energy consumption data informs decarbonization strategies and sourcing this data from utility providers through utility meters is the gold standard. This seems straightforward until you consider that there are thousands of utility providers with different rules and processes for data provision. The resulting variability in each utility’s willingness and ability to provide data creates difficulties, particularly for organizations with multiple facilities in different geographic locations.

### Tips ↴

- Contact your utility provider and explore data-sharing options—ideally an automated data provision through either an online portal or an application programming interface that allows data exchange.
- Consider working with a specialist partner to automate the data capture process.
- Include a data provision clause in all new energy procurement contracts.

## Create a robust and flexible data structure.

Your data must be organized in a structured way that best supports the decarbonization target you identified. Consider which types of data your organization needs to capture and how the data should be tagged and aggregated to support your reporting requirements. Your ESG reporting software should support tagging of data at the account or meter level, which can be aggregated to locations and even further to groups.

### Tips ↴

- Review the detailed reporting requirements of pledges or commitments you’ve made and ensure your team understands what data it needs to support them.
- Regularly check and maintain metadata, such as tags, labels, opening and closing dates, and so on.
- Set minimum key performance indicators for the data management process to define thresholds such as “data completeness,” and document the decisions.

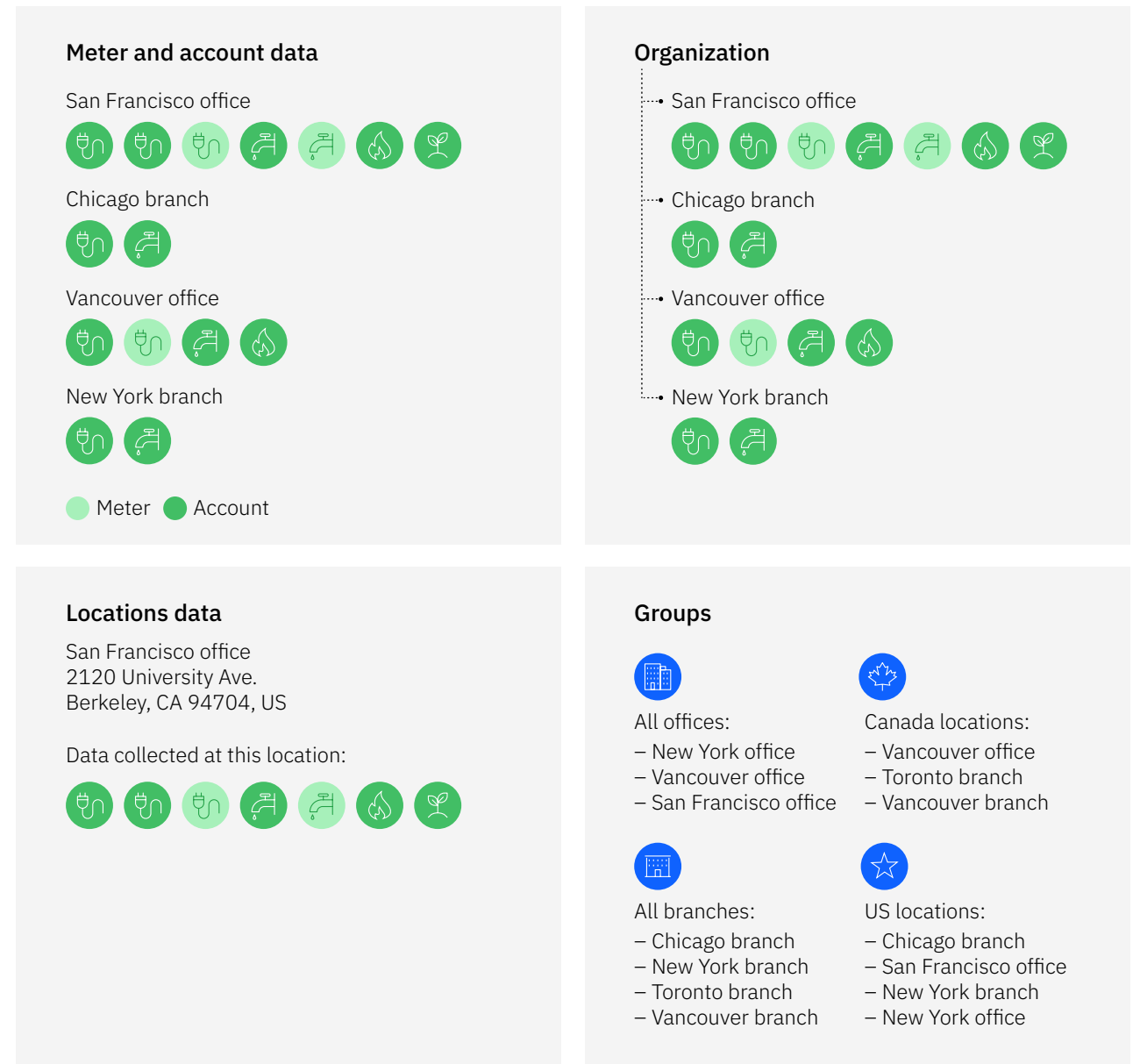


Figure 2: A robust and flexible data structure to meet multiple reporting requirements

## Develop processes for data management and assign ownership.

Data-driven decision-making is only valuable if the data is accurate, complete and up to date. Effective data management requires dedicated attention to detail, ownership and diligence.

### Tips ↘

- Create an accountability matrix for data management and assign responsibilities to staff. This matrix should set out a regular schedule to review data completeness and catch errors in time to address them.
- Keep a close eye on data flowing in. Set up inactivity alerts against each data source to identify data gaps early on.
- Institute a process to reconfigure formatting updates from utility suppliers. A small change such as the column containing data within a bill can prevent your data from loading properly.
- Follow up promptly with parties that have not fulfilled data provision commitments.

## Create a single, trusted source to store and share your data.

Data is an increasingly valuable resource for guiding business decisions, so it should be made accessible to both internal and external stakeholders. If the process is outsourced, remember that sharing finance-grade sustainability data poses as much of a business risk as financial data, and the governance structure to protect it should be similar.

### Tips ↘

- Use cloud-based storage to provide password-protected access for all stakeholders.
- Use appropriate wording in supplier contracts to ensure that data ownership rests with your organization.
- Align your data capture and management plan with audit requirements.

## Prepare up front for an audit and future-proof your data.

The audit process is a critical step to validating reported progress. The outcome is important to the organization's governance, but the steps to achieve audit-ready, traceable data can be challenging.

### Tips ↘

- Consult with your auditor up front, understand the requirements and ensure your policies for data retention and tagging are aligned.
- Use a cloud-based single system of record that includes change tracking and document storage and can easily be configured to provide access to external parties as required.

## Engage your teams early in the process.

The responsibility for energy and sustainability data management cannot fall solely on the sustainability team. There is much to be learned from organizations that have successfully tackled this challenge. Our most successful clients have embedded policies and procedures to drive companywide engagement in data capture and management.

### Tips ↘

- Elevate the importance of GHG data capture and storage within the organization to senior-level management to encourage participation and support.
- Consider internal reporting tools to provide transparency and drive accountability for data capture and storage.

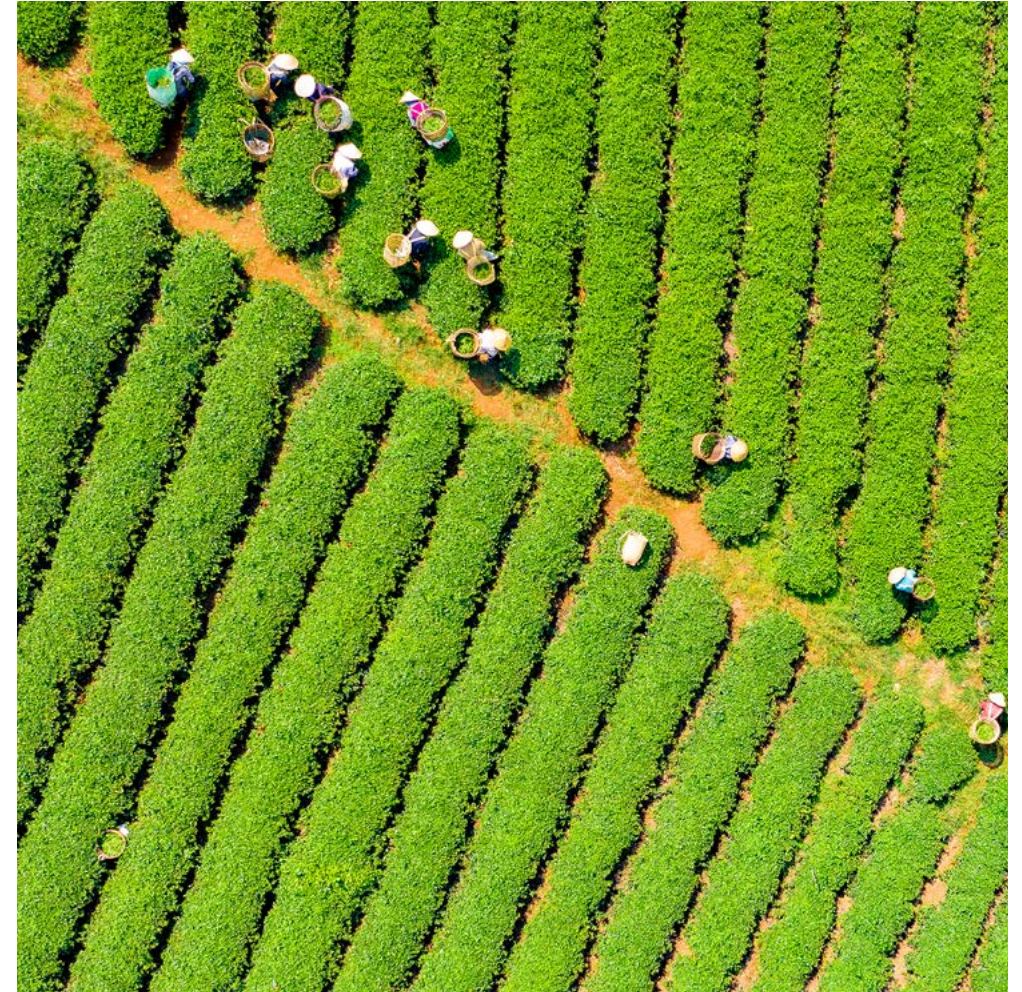
# 03

## Calculate GHG emissions for reporting and disclosure

After you establish a finance-grade system and process to capture and manage your sustainability data, the next step is to calculate your GHG emissions for reporting and disclosure.

The Greenhouse Gas Protocol, developed by the World Resources Institute and World Business Council for Sustainable Development, sets numerous accounting standards that help organizations track and measure their progress toward decarbonization. These guidelines inform the “E” in ESG reporting across many frameworks, such as CDP, GRESB, SASB and DJSI.

Next, we’ll discuss the key areas to focus on to prepare your sustainability data for GHG accounting, reporting and disclosure.





## Establish the technical criteria and baseline for reporting.

Be clear on your baseline. All reporting frameworks require organizations to draw a clear line in the sand against which to measure progress. This baseline, or existing carbon footprint, is the marker that all future improvements will be measured against, so it's essential to ensure your baseline is accurate and appropriate.

### Tips ↴

When setting your baseline, consider:

- How you will define the boundaries of your activities
- How you can structure your data so it can be easily compared to future activity
- What date is the most appropriate to use (you'll want to ensure your historical work on carbon reduction initiatives is not discounted)

Understand the technical requirements and considerations of the commitments you are making. Be clear on your objectives and take the time to understand the varying technical criteria associated with each pledge platform, commitment or reporting framework, and how they may conflict with each other. For instance, does the pledge platform allow for the use of green energy already on the grid?

## Can you source the required data?

Before making any commitments, it's important to understand what data types you'll need and the level of granularity required. Signing up to a commitment when you have no way of accessing the data required to measure progress toward your goal happens more often than you'd think and can be the source of many headaches.



## Use resources to simplify GHG accounting.

Every business is different, so it's important to either build internal knowledge or engage a consultant for support. Once a strategic approach is in place, make sure your ESG reporting software can capture renewable energy certificate allocation decisions, store and manage your emissions factors, and calculate your emissions inventory, including market-based emissions.

## Be diligent in selecting and applying emissions factors.

Emissions factors form the basis for GHG calculation. Using the correct emissions factors is essential for GHG calculation, but the selection, sourcing, allocation and management of factors present a range of challenges.

How do you select the most appropriate factors for your organization? Here are three primary considerations:

### 1. Region

Consider location factors that are as granular as possible. Assuming you have a presence in multiple locations, consider setting state-level regions over a full country-based region. This will allow for more nuanced accounting relative to state policies, guidelines, private utility companies and so on.

### 2. Reporting period and factor period

Use the most recent period with granular detail to ensure the most relevant data.

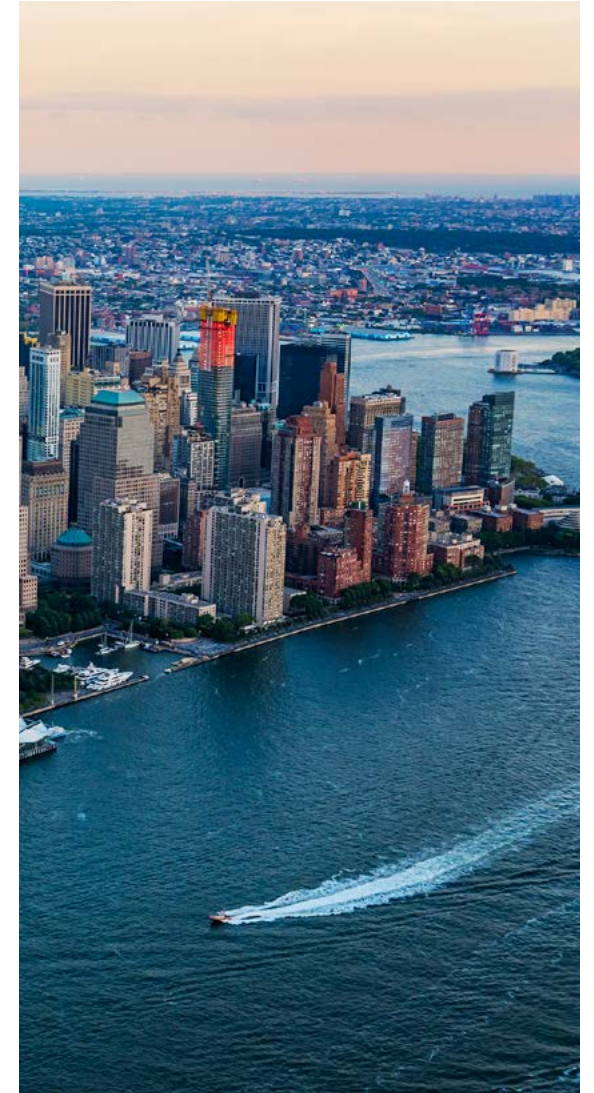
### 3. Emissions source

Make sure to closely follow GHG accounting principles because choosing incorrect factors can cause significant errors. For example, for ground travel emissions, are vehicles running on diesel or gasoline? If gasoline, is there a biofuel content?

## Stay organized when calculating GHG emissions.

Many organizations run their annual GHG accounting process using spreadsheets, which leads to enhanced risk and productivity loss—especially for complex global organizations that report to multiple frameworks. ESG reporting software such as the suite offered by [IBM](#) can help you stay organized. The solution automates data capture directly from the source and maintains an emissions factor engine for nationally recognized carbon emissions factor data tables. These include:

- The US EPA Climate Leaders Program
- Emissions & Generation Resource Integrated Database (eGRID)
- Intergovernmental Panel on Climate Change (IPCC)
- International Energy Agency (IEA) National Electricity Factors
- Australian National Greenhouse Accounts (NGA)
- Ministry for the Environment in New Zealand
- Department for Environment, Food and Rural Affairs (Defra) in the United Kingdom
- Eora66 global supply chain database—MRIO (Multi-region input-output)



## Establish consistency and reliability in data and processes.

Certification is typically a multiyear process that is increasingly subject to third-party audit. Your GHG accounting practices must support reliable, consistent reporting that eases the audit process and allows for year-on-year repeatability and comparison.

### Keep detailed records.

Keeping an up-to-the-minute record of calculations and their inputs will save headaches at audit time. It's imperative that you keep track of decisions and the reasons for them, store supporting paperwork and maintain a clear record of any changes made to the data used for certification.

### Maintain data quality.

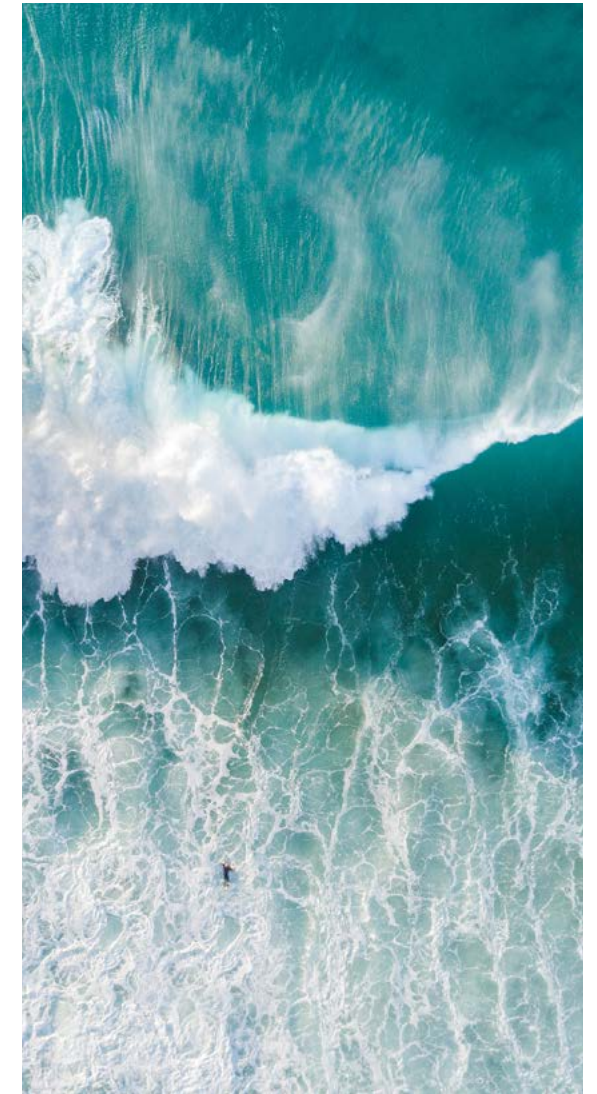
Effective data maintenance requires dedicated focus, regular attention and clear lines of responsibility. Use reporting tools to keep track of data gaps and regularly interrogate data records to assess data quality.

### Secure ongoing stakeholder engagement.

Though commitments, targets, strategy and GHG accounting may stem from one team within your organization, the data must be sourced from a much larger pool of internal stakeholders. Ideally, a diverse group will be engaged in and accountable for collecting and sharing data from its representative business units and can help flag potential gaps in the ability to collect data. Getting everyone's buy-in can be difficult, so it's important to be mindful of the challenges and to not underestimate the effort required to address this issue up front.

### Tips ↴

- Visibly engage senior-level staff in sustainability performance
- Follow an engagement plan that maps the vision and criteria for stakeholder communication efforts
- Use internal reporting tools to inform and engage stakeholders
- Stay up to date on changes in reporting frameworks. The rules associated with emissions reductions frameworks, guidelines and pledge platforms are maturing and remain subject to regular change. Keeping abreast of updates and modifications is essential. Signing up to update alerts from the relevant reporting authority and keeping in regular contact with your data management and reporting platform provider and your specialist consultant can help support your decarbonization efforts.



# 04 Master the complexities of GHG accounting

As ESG reporting becomes increasingly complex, so too have GHG accounting methodologies and practices. As GHG accounting continues to evolve and attract more scrutiny, complexities are emerging that can trip up even experienced reporters.

Under the GHG Protocol Corporate Standard, GHG emissions are divided into scopes for calculation and reporting. Scope 1 encompasses all “direct” emissions from an organization, including company vehicles, fugitive emissions from manufacturing processes, and fuel combustion onsite, such as burning gas to produce heat. Scope 2 encompasses “indirect” emissions from the consumption of purchased electricity, heat or steam.

Scope 3 requires organizations to look for implications of carbon emissions outside of their direct physical footprint, quantifying emissions through the supply chain outside the organization’s direct control. This includes embodied emissions within resources consumed by the organization—paper used, waste produced, coffee consumed—and the emissions of any suppliers, which are especially important to organizations that produce physical products.

Scopes 1 and 2 are the most controllable scopes for GHG accounting and reduction, and the focal point of any decarbonization journey. But for leading organizations under investor pressure and looking to expand their impact, Scope 3 emissions provide the opportunity to reach other emitters in their value chain—such as suppliers and customers—and influence them to reduce their emissions. In this chapter, we’ll discuss how to approach the most challenging scopes and calculation methods with confidence.

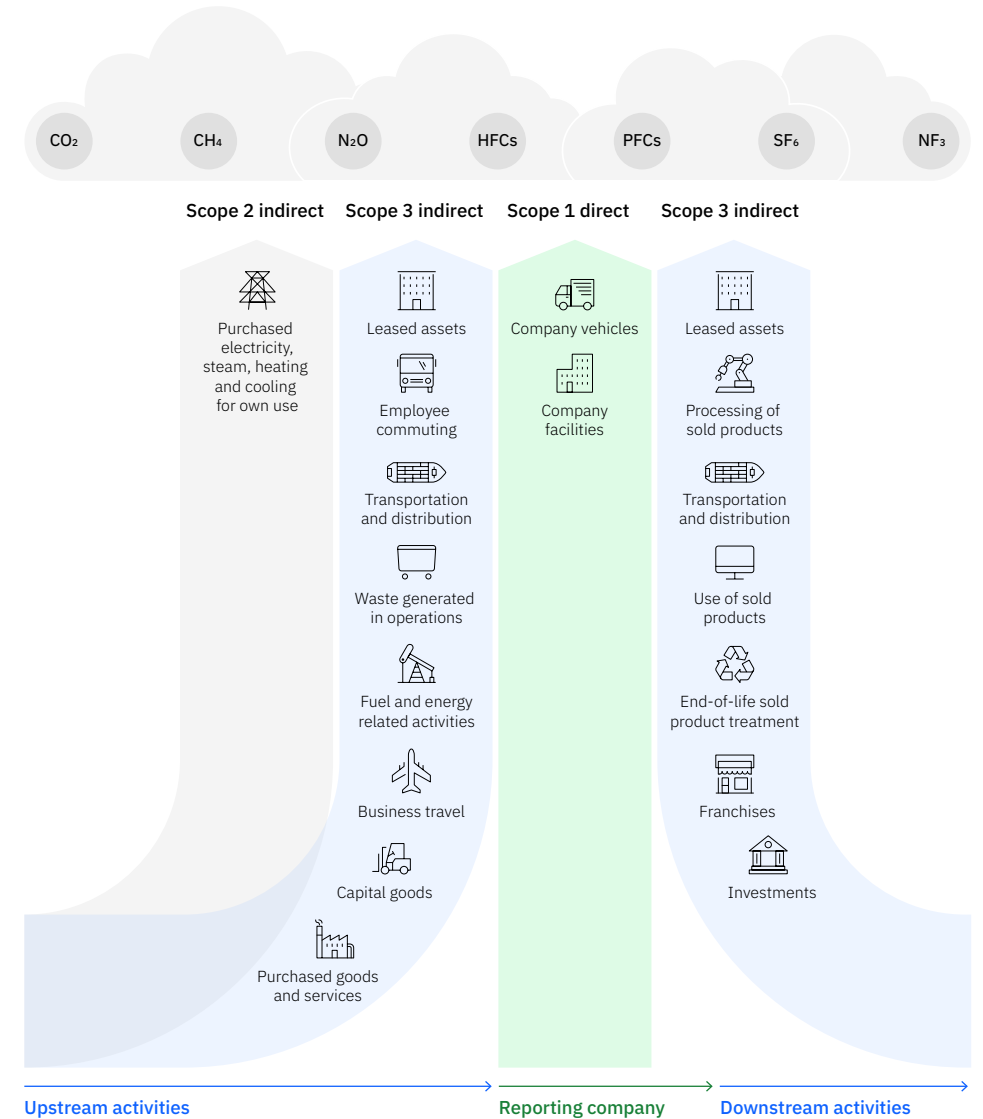


Figure 3: Overview of GHG Protocol scopes and emissions across the value chain. Source: Figure 1.1. of Scope 3 Standard, GHG Protocol.

## Accounting for renewable energy purchases with the market-based method

Several years ago, the GHG Protocol updated the reporting standard to require two methods of Scope 2 emissions calculations: the location-based method and a newer, market-based method.

Traditionally, organizations were required to report their Scope 2 emissions based on a standard set of grid-average emissions factors. Following this approach, known as the location-based method, all emissions-reduction efforts should be excluded from the GHG inventory. Initially this made sense because it enabled organizations to be compared fairly. But it prevented some organizations from showcasing their efforts or taking credit for their green power purchases in their emissions totals. The Scope 2 market-based approach addressed this issue.

The market-based approach instructs organizations to apply Energy Attribute Certificates (EACs) such as renewable energy certificates (RECs) or guarantees of origin to their consumption, and then source emissions factors from contracts or suppliers where available.

In instances where consumption is not covered by EACs or other factors, residual mix factors are applied to consumption. Residual mix factors are like grid-average factors but are calculated based on electricity generated from nonrenewable sources—oil, gas, coal—or other sources not backed by EACs. If residual mix factors are not available for a region, then standard grid-average factors should be used, because they are in the standard location-based method.

*Using the market-based method should prove helpful as your organization pursues intentional procurement of clean and renewable energy.*



The first step of this accounting process is to understand your organization’s electricity purchases. There may be a mix of sources, especially if the enterprise works across various regions. Once tallied, contact every supplier and collect their emissions factors as comprehensively as possible.

If your organization purchases renewable electricity directly, the EACs already should exist and are known as “bundled certificates.” These certificates can also be purchased separately from electricity and are known as “unbundled certificates.” Use GHG Protocol’s Scope 2 Quality Criteria to ensure that these certificates can be used. Unbundled certificates must be allocated across your organization according to the Quality Criteria, with careful attention to Points 4 and 5.

Point 4 requires that certificates be issued and redeemed as close as possible to the period of energy consumption to which the instrument is applied. This means it would be incorrect to allocate certificates issued in 2018 to electricity consumption in 2021.

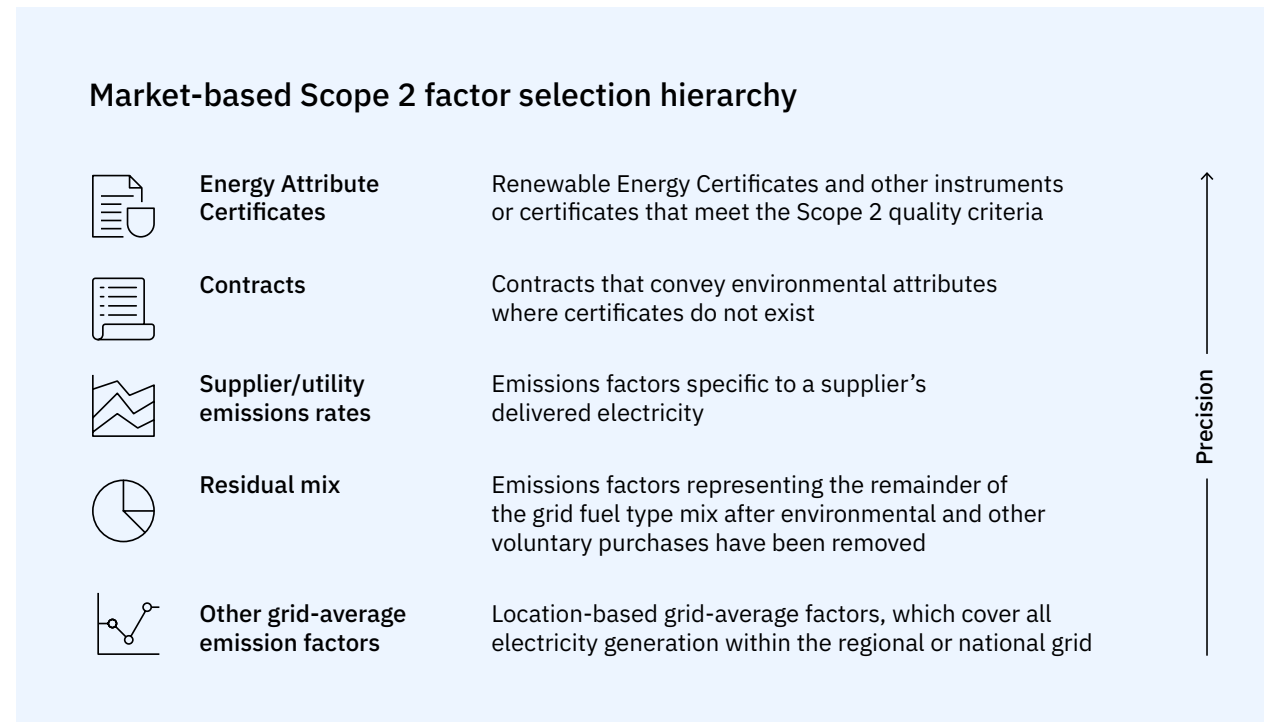


Figure 4: Market-based Scope 2 factor selection hierarchy. Source: GHG Protocol Scope 2 Guidance—an amendment to the GHG Protocol Corporate Standard.

Point 5 requires that certificates are “sourced from the same market in which the reporting entity’s electricity-consuming operations are located and to which the instrument is applied.” This means that it would be incorrect to allocate certificates issued in the US to consumption in the UK.

If your organization has power purchase agreements, the certificates may not exist. In this scenario, determine the emissions factor tied to the contract and document accordingly. Only use the publicly available residual mix emissions factors that are within the region being accounted for if the supplier’s direct information is not accessible.

This calculation method can prove complex, which is why IBM Envizi ESG Suite is designed to support both location-based and market-based calculation methods.

## Scope 3 reporting: the challenge and opportunity

Although Scope 3 emissions encompass emissions from entities up and downstream of an organization, many organizations focus on emissions from the supply chain—for example, upstream entities. An analysis conducted by CDP found that for the organizations reporting to CDP in 2022, emissions from their supply chain, which compose a major part of the value chain for many reporters, were, on average, 11.4 times greater than those produced through their direction operations.

Several ESG reporting and guidance frameworks call for Scope 3 disclosure. It may be of particular relevance to organizations that report to the Carbon Disclosure Project (CDP), have committed to the Science Based Targets initiative (SBTi), report using the Global Reporting Initiative (GRI) or the Task Force on Climate-related Financial Disclosures (TCFD) frameworks, are seeking to meet requirements under the Corporate Sustainability Reporting Directive (CSRD) regulations required by the EU, or wish to report in line with the International Sustainability Standards set out by the International Sustainability Standards Board (ISSB).

Creating a Scope 3 emissions inventory can be challenging. These challenges can impact reporting consistency and the comparability of the results. Let's look at some examples of these challenges:

- Except in limited situations, companies do not have access to primary source data for Scope 3 emissions. As consequence, proxy data, such as spend, headcount, space, and other non-specific emissions factors, are commonly used to calculate Scope 3 emissions along with the necessary assumptions, which impact the quality of the calculated results.
- Scope 3 emissions of a company are Scope 1 and 2 emissions of other companies. That can impact claims of reductions.
- Under current practices, organizations have the flexibility to decide what to include in their reported Scope 3 emissions, making it difficult to compare data.

Companies should be aware of these challenges as they make assumptions, set boundaries, develop Scope 3 emissions inventory, and represent the results.

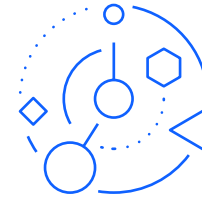


# Five steps to calculate and report on Scope 3 emissions

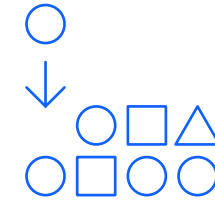
ESG reporting software such as [IBM Envizi ESG Suite](#) can prepare organizations to calculate and report Scope 3 emissions and simplify what may seem like a daunting task. With over a decade of experience supporting sustainability leaders to streamline ESG reporting against all scopes, we recommend a systematic approach that's been tried and tested by our clients.



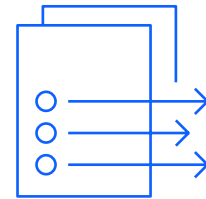
**Step 1**  
**Determine categories and data types**  
Map out categories of Scope 3 emissions in your value chain and how they intersect your business.



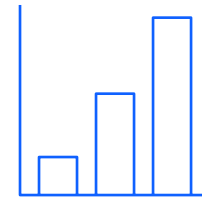
**Step 2**  
**Select calculation methodologies**  
Determine the appropriate method and suitable data for calculating Scope 3 emissions of categories of interest.



**Step 3**  
**Build a data foundation and calculate emissions**  
Source and capture data and appropriate emissions factors. Conduct calculations.



**Step 4**  
**Report emissions**  
Report emissions transparently by including boundaries and assumptions used in the calculations.



**Step 5**  
**Drive performance improvement**  
Identify emissions hotspots and work with suppliers to drive down emissions.

Let's delve into the steps to calculate and report on Scope 3 emissions. →



**Step 1**  
**Determine Scope 3 categories to report against**

Deciding which Scope 3 categories to report against is a key step in developing an approach to Scope 3 GHG emissions accounting. For reporting purposes, the GHG Protocol outlines 15 Scope 3 categories can be grouped into “upstream” or “downstream” emission types. The volume of emissions attributable to each category differs considerably by industry sector. Companies can use sectorial information to assess relevance and determine where to focus their efforts. For some organizations taking action on Category 1, purchased goods and services could cover most of their value chain emissions, while for other organizations the focus may be on Category 15, financed emissions, or Category 11, used of sold products, and so on. In addition to sector guidance, the GHG Protocol suggests organizations consider their ability to influence emissions reductions and how much these emissions contribute to a company’s risk exposure when choosing which categories to prioritize.

**Step 2**  
**Select calculation methodologies**

When calculating emissions, organizations need to deliver results as accurately as possible. In the case of Scope 1 and 2 emissions, calculations typically involve applying primary source data, for example, activity-specific, to data-specific emissions factors -such as electricity consumption in kWh to a location-specific emissions factor. This approach relies on organizations with access to primary source data, and emissions factors at granular levels. Compared with Scope 1 and 2 calculation processes, the calculation of Scope 3 emissions is significantly more complex. At the outset, organizations often do not have access to primary source data or emissions factors at a granular level Recognizing this need, the GHG Protocol describes thirteen methods that organizations can choose from to calculate Scope 3 emissions.

**Step 3**  
**Build a data foundation and calculate emissions**

The data required for Scope 3 emissions accounting is determined by categories and the emissions calculation methods selected. And this data can be significantly more extensive than that required for Scope 1 and 2 emissions. It often includes unstructured data held in third party or siloed systems. Data types may cover the amount spent on products or product types and services (spend data), supplier Scope 1 and 2 data, volumes of goods purchased, and types of services received. Along with this activity data, organizations must also source and capture emissions factors. Each calculation method requires the data and emissions factors that the method is designed for.

**Step 4**  
**Report and disclose**

Several ESG reporting frameworks and standards allow for, or require, the setting of Scope 3 emissions targets and disclosure of performance. For example, these include ISSB, SBTi Net Zero standard, [CDP](#), GRI, GRESB, ENERGY STAR and [CSRD](#).

Software can help with the reporting process. In addition to supporting data collection and conducting Scope 3 emissions calculations, IBM Envizi Suite can help streamline Scope 3 data submissions to various reporting frameworks, with prebuilt templates aligned to framework questionnaires, and a detailed dashboard that allows users to visualize the results in a single view. The software further supports an organization’s disclosure efforts with strong data health check tools and functionality to support audits, including trace-to-source capabilities.

**Step 5**  
**Engage suppliers and drive performance improvement**

Improving sustainability performance in the value chain stretches well beyond tracking and reporting Scope 3 emissions. Along with emission performance, organizations are increasingly working to track and drive improved performance on a multitude of other ESG metrics across their value chain, particularly within their supply chain.

In this regard, organizations often start using high-level Scope 3 emissions inventory to identify emissions hotspots. However, to drive emissions reductions in those hotspots, organizations need actionable, granular data, moving beyond spend-based data and calculation methods to activity-specific or supplier-specific data inputs and more accurate calculation methods.

This more granular performance data can be used to inform supplier-level emissions reduction activities to help organizations forecast, plan and track progress toward achievement.

As Scope 3 emissions are outside an organization's direct control, decarbonizing the supply chain requires engagement and influence rather than direct action from the organization. Supplier engagement, procurement policy, and choices of products and services are levers that can be pulled to help reduce emissions of value chains. Technology can streamline this process by helping to drive accountability, communication and collaboration with supply chain members.



## Simplify Scope 3 emissions accounting with IBM

The IBM Envizi ESG Suite supports the complex accounting process for Scope 3 emissions across all 15 categories and their associated calculation methodologies. Envizi's Scope 3 accounting solution leverages AI to help make Scope 3 emissions calculations more efficient, includes flexible reporting tools to deliver insights and streamline disclosures, and offers embedded Scope 3 emissions factor libraries to make calculations less time consuming.

IBM Envizi has the functionality to support organizations wherever they are in their Scope 3 journey, from those who are just starting out, all the way through to organizations looking to proactively drive Scope 3 emissions reductions. Learn more about how IBM can support you to achieve your Scope 3 emissions goals.



# 05 Conclusion

Investors are including ESG metrics in their evaluation of organizational performance, and organizations are making public commitments to deliver on these outcomes. GHG emissions are among the most widely used ESG metrics. Therefore, the processes and tools to capture and manage emissions reduction performance must meet the same robust requirements applied to financial data.

As is the case for all strategic decision-making, data must lie at the heart of any effective decarbonization strategy to inform strategy and tactics and to deliver robust and verifiable reporting.

Sustainability and energy teams willing to adopt best practices for data management will reap the benefits of robust processes and systems underpinned by technology to support data-driven decisions. Such solutions help organizations track and measure the outcomes of their emissions-reduction efforts and efficiently and effectively support their reporting commitments.

[Learn more](#) about how IBM can support you to achieve your ESG data management and GHG emissions accounting goals.



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