

Comprehensive Handbook on GHG Emissions Reporting

Learn GHG emissions reporting standards, key frameworks, and disclosure requirements for transparent sustainability reporting.



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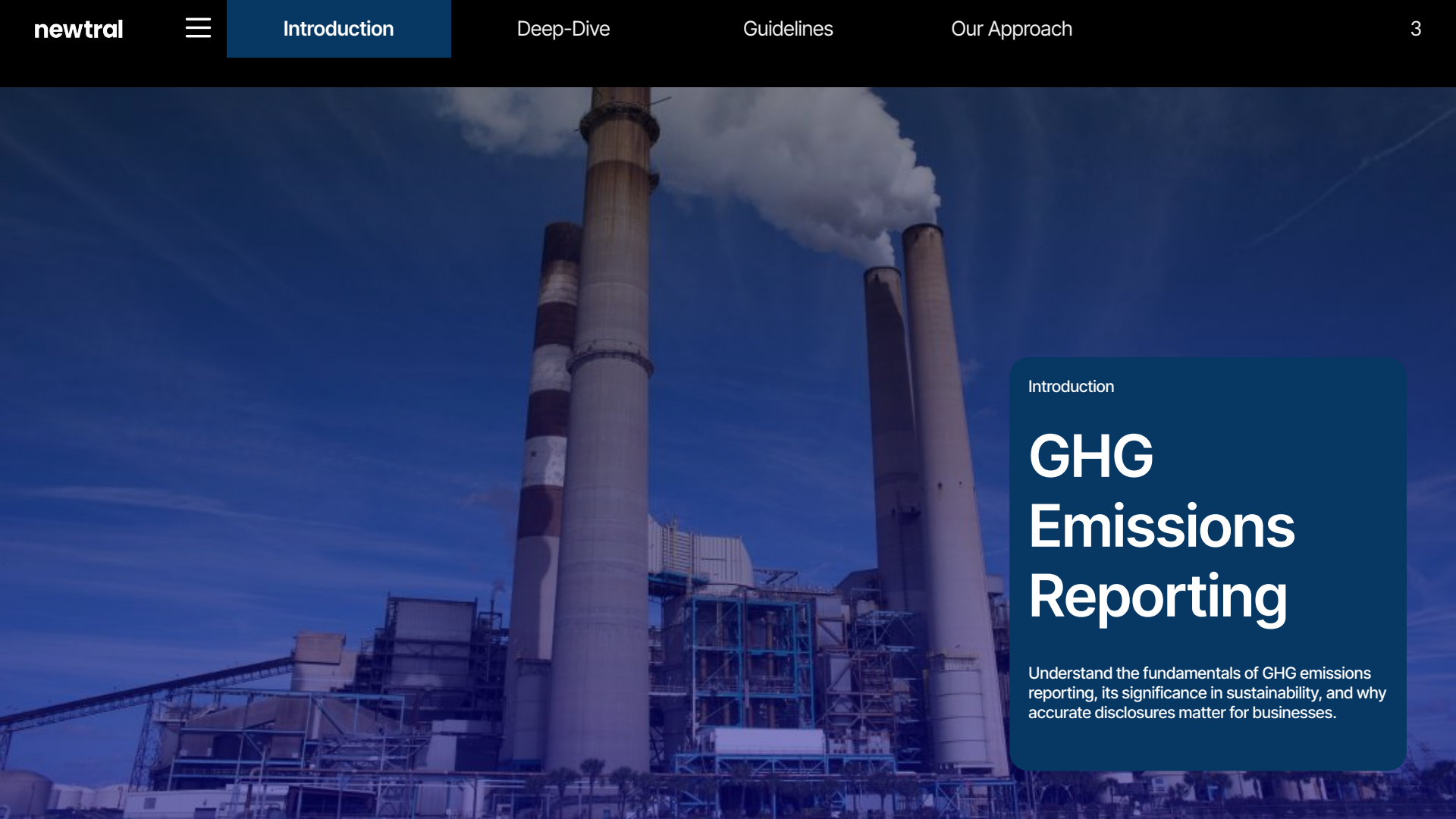
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A photograph of an industrial facility, likely a power plant or refinery, featuring several tall, cylindrical smokestacks. One stack on the left has distinctive red and white horizontal bands. Thick white plumes of smoke or steam are rising from the stacks against a clear blue sky. The foreground shows complex industrial structures, including scaffolding, pipes, and storage tanks.

Introduction

GHG Emissions Reporting

Understand the fundamentals of GHG emissions reporting, its significance in sustainability, and why accurate disclosures matter for businesses.

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1.1 Background and Demand for GHG Reporting

In today's corporate landscape, the demand for robust greenhouse gas (GHG) emissions reporting has never been greater. Stakeholders—including investors, regulators, and customers—are increasingly prioritizing sustainability and accountability. Businesses that fail to meet these growing expectations risk reputational damage and even regulatory penalties. The rising global focus on climate change, coupled with stricter regulations, has propelled companies to adopt comprehensive GHG reporting practices to ensure compliance and transparency.

The origins of GHG emissions reporting can be traced back to international efforts to combat climate change, such as the Kyoto Protocol and the Paris Agreement. These global accords set the stage for a more structured and standardized approach to tracking emissions. Over time, GHG reporting has evolved from a voluntary practice to a critical aspect of corporate responsibility, essential for mitigating environmental impacts and contributing to global climate goals.

As the regulatory landscape becomes more stringent, stakeholders demand greater accountability from businesses regarding their environmental footprint. Regulatory bodies around the world, from the European Union to the United States, are enforcing stricter reporting standards. This has increased the urgency for companies to adopt and disclose GHG inventories, ensuring they align with best practices and meet the expectations of both regulators and the public.

1.2 Basic GHG Concepts

To understand GHG emissions reporting, it's essential to grasp a few fundamental concepts:

1. What are Greenhouse Gases (GHGs)?

Greenhouse gases are components of the Earth's atmosphere that trap heat, contributing to global warming and climate change. The most common GHGs tracked in emissions inventories include:

1. **Carbon Dioxide (CO₂)**: The most significant anthropogenic GHG, primarily produced by the burning of fossil fuels.
2. **Methane (CH₄)**: A potent GHG primarily emitted from agriculture, livestock, and fossil fuel extraction.
3. **Nitrous Oxide (N₂O)**: Emitted from agricultural activities and fossil fuel combustion.
4. **Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF₆), and Nitrogen Trifluoride (NF₃)**: Industrial gases with much higher global warming potentials (GWPs) than CO₂, though emitted in smaller quantities.

2. Direct vs. Indirect Emissions

Understanding the distinction between direct and indirect emissions is crucial for accurate GHG accounting:

- **Direct Emissions (Scope 1)**: Emissions that occur from sources directly owned or controlled by a company (e.g., emissions from company vehicles or on-site manufacturing processes).
- **Indirect Emissions (Scope 2 and 3)**:
 - **Scope 2**: Indirect emissions from the consumption of purchased electricity, steam, heating, and cooling.
 - **Scope 3**: Emissions that occur in the value chain, such as those from suppliers, business travel, and waste disposal.



3. The Three Scopes

GHG emissions are categorized into three scopes:

- **Scope 1:** Direct emissions from owned or controlled sources.
- **Scope 2:** Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company.
- **Scope 3:** All other indirect emissions that occur throughout the value chain, both upstream and downstream.

4. Unit of Measurement

GHG emissions are typically measured in **tonnes of carbon dioxide equivalent (tCO₂e)**, which standardizes the reporting of different GHGs based on their respective global warming potentials (GWPs). This allows for a consistent and comparable measure of emissions regardless of the specific gases involved.

1.3 The Role of the GHG Protocol

The **Greenhouse Gas (GHG) Protocol** is the most widely used framework for GHG emissions accounting and reporting. It provides standards and guidance for companies and other types of organizations to use in preparing a GHG emissions inventory. The GHG Protocol is a critical tool for companies to ensure that their emissions data is accurate, comprehensive, and aligned with best practices.

The **GHG Protocol Corporate Standard** provides the guidance necessary for companies to measure and report their direct GHG emissions. The **Scope 2 Guidance** offers specific protocols for reporting emissions related to purchased electricity, while the **Scope 3 Standard** helps organizations account for emissions across their entire value chain, including upstream and downstream activities.

The GHG Protocol is built on several **generally accepted GHG accounting principles**:

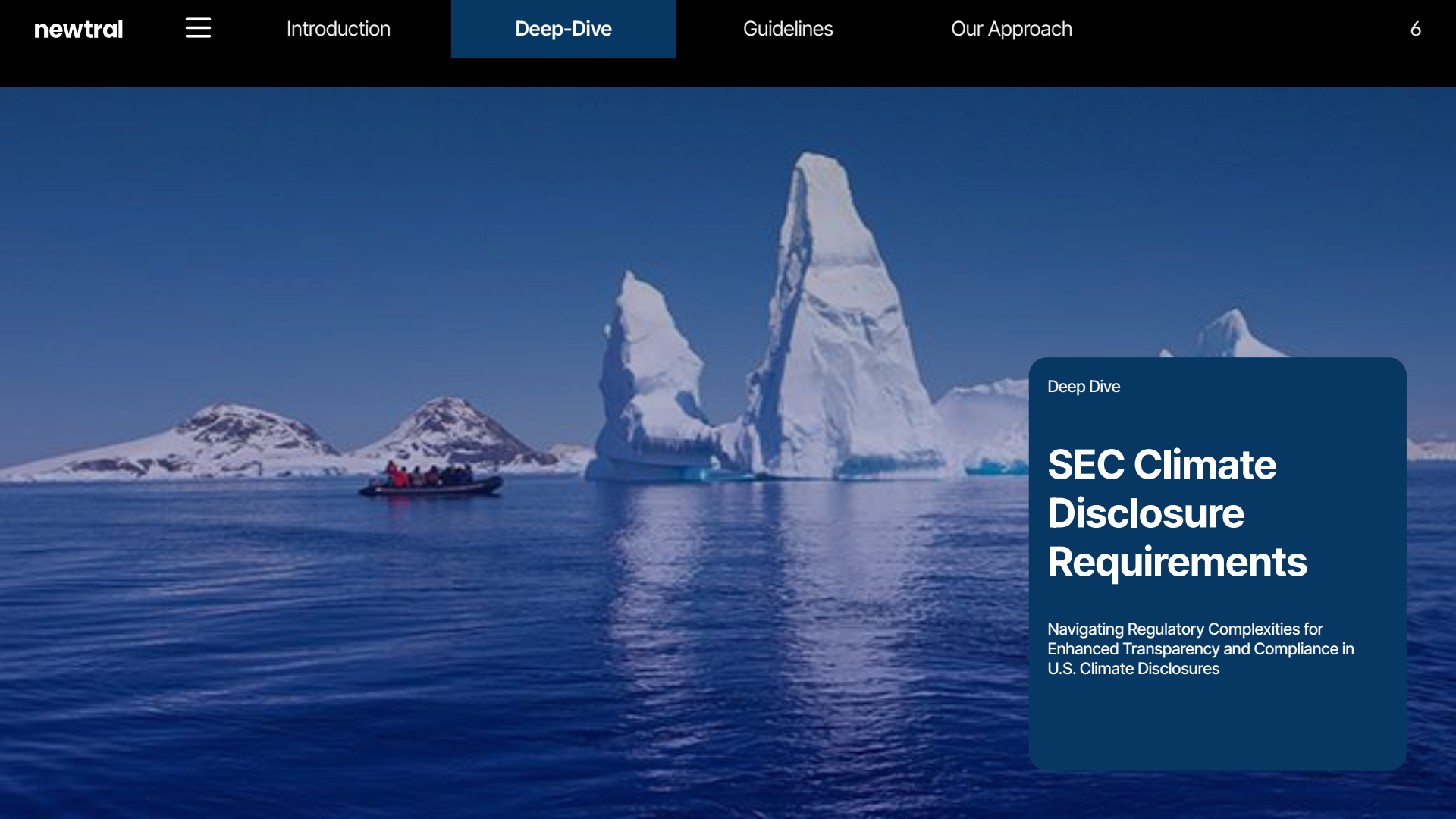
- **Relevance:** Ensure the reported data serves the intended decision-making purposes.
- **Completeness:** Account for all relevant emissions sources and activities.
- **Consistency:** Use consistent methodologies, transparently disclosing any changes.
- **Transparency:** Provide a clear and comprehensive report for stakeholders.
- **Accuracy:** Ensure the reported data is sufficiently precise to enable decision-making.

An **GHG inventory** is a comprehensive accounting of the total greenhouse gases emitted by an organization. This inventory allows businesses to track their emissions, measure progress against targets, and meet regulatory or voluntary reporting requirements.

1.4 How the Handbook is Organized

This handbook is designed to help you navigate the complexities of GHG emissions reporting, offering practical guidance, technical insights, and best practices for effective implementation. The subsequent sections will cover:

- Detailed methodologies for measuring Scope 1, Scope 2, and Scope 3 emissions.
- The tools and resources necessary for creating an accurate GHG inventory.
- How to ensure compliance with evolving regulations and global standards.
- Strategies for communicating your GHG emissions data to stakeholders and using it to drive sustainability initiatives.

A large iceberg with two prominent peaks in the ocean, with a small boat nearby.

Deep Dive

SEC Climate Disclosure Requirements

Navigating Regulatory Complexities for Enhanced Transparency and Compliance in U.S. Climate Disclosures

Deep Dive

Mastering GHG Calculations

Explore detailed methodologies for measuring, calculating, and presenting GHG emissions, including Scope 1, 2, and 3 reporting essentials.

2.1 Setting Boundaries

1. Organizational Boundary

The **organizational boundary** defines the extent of the organization's operations and assets that should be included in a GHG inventory. This concept is analogous to the 'reporting entity' used in financial statements, ensuring that all relevant parts of the business are accounted for. Establishing this boundary is crucial because it determines which operations are considered part of the organization for GHG emissions accounting.

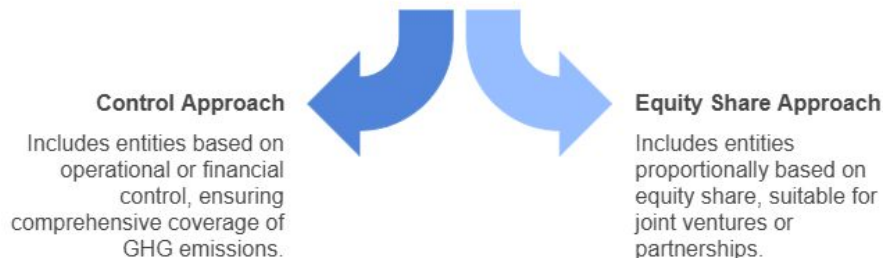
There are several approaches to setting the organizational boundary:

- **Control approach:** This is the most commonly used method and includes both operational and financial control.

- **Operational control:** If an entity has the authority to introduce and implement operating policies, it is considered part of the organizational boundary.
- **Financial control:** If an entity has the authority to govern the financial and operating policies to gain economic benefits, it is included.
- **Equity share approach:** This method includes an entity in proportion to the company's share of equity. This approach is often used in joint ventures or partnerships where the company shares ownership but not full control.

When there is **joint control**, both operational and financial control must be applied based on the agreements in place. The decision on the appropriate boundary has significant impacts on the GHG inventory and must be made with careful consideration of the organization's structure.

How should the organizational boundary for GHG emissions be set?



Deep Dive

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2. Operational Boundary

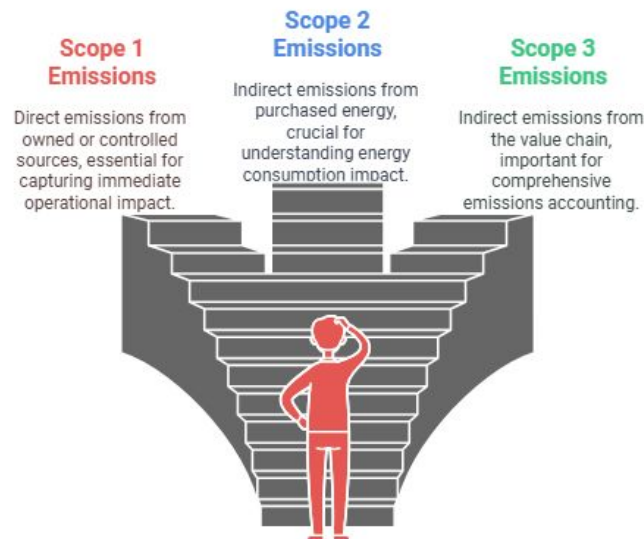
The **operational boundary** refers to the scope of activities covered by a GHG inventory, including all scope 1, scope 2, and selected scope 3 categories. The operational boundary is essential to define the emissions sources that fall under the organization's control.

- **Scope 1 emissions:** Direct emissions from owned or controlled sources (e.g., company-owned vehicles, on-site manufacturing).
- **Scope 2 emissions:** Indirect emissions from purchased energy (electricity, steam, heating).
- **Scope 3 emissions:** Indirect emissions from the value chain, including upstream and downstream activities.

The **inventory boundary** combines both organizational and operational boundaries to capture all relevant emissions sources and activities. It's important to choose the scope 3 categories to include based on their relevance to the business goals and the significance of each category.

Operational boundary considerations also extend to **contractual** and **leasing arrangements**, ensuring that emissions from leased assets or services are appropriately accounted for within the organization's emissions inventory.

How to define the operational boundary for GHG inventory?





2.2 Emissions Calculation

1. Steps in Calculating Emissions

Calculating emissions involves identifying the sources of emissions, selecting the appropriate calculation methods, collecting relevant data, and using this information to calculate the emissions.

The basic steps include:

- **Identifying emissions sources:** Recognizing where emissions occur, both within the organization and across the value chain.
- **Selecting a calculation method:** Choosing from several methods based on the type of data available (e.g., direct measurements, estimation, emission factors).
- **Collecting data:** Gathering data from various sources (e.g., energy usage records, travel logs, fuel consumption).
- **Calculating emissions:** Applying the appropriate emission factors to the collected data.

2. The Calculation Formula

The emissions calculation is based on the following formula:

$$\{ \text{tCO}_2\text{e} = \text{Activity Data} \times \text{Emission Factor} \times \text{Global Warming Potential (GWP)} \}$$

Where:

- **Activity data:** Represents the quantity of activity (e.g., fuel consumption, distance traveled).
- **Emission factor:** A coefficient that quantifies the emissions associated with each unit of activity.
- **GWP:** The Global Warming Potential of each GHG, which adjusts emissions to a common scale, usually CO₂e.

3. Global Warming Potential (GWP)

The **GWP** is a measure of how much heat a greenhouse gas traps in the atmosphere over a given time period, relative to CO₂. For example:

- **CO₂** has a GWP of 1.
- **Methane (CH₄)** has a GWP of 25 over 100 years.
- **Nitrous Oxide (N₂O)** has a GWP of 298.

It is crucial to use the most up-to-date GWP values from recognized sources like the IPCC (Intergovernmental Panel on Climate Change) when calculating emissions.

4. Activity Data and Emission Factors

The calculation of emissions depends on accurate **activity data** (e.g., amount of fuel used, distance traveled) and the application of the correct **emission factors**, which vary by sector and emission source:

- **Stationary combustion:** Emissions from burning fuels at fixed locations (e.g., factories, power plants).
- **Mobile combustion:** Emissions from vehicles and other mobile equipment.
- **Process emissions:** Emissions from manufacturing processes (e.g., chemical reactions).
- **Fugitive emissions:** Unintentional leaks from equipment, such as refrigerant loss.

Accurate emission factors are essential for calculating emissions across all scopes.



5. Uncertainty in a GHG Inventory

Uncertainty in a GHG inventory arises from various factors such as:

- Incomplete or inaccurate data.
- Variability in emission factors.
- Assumptions made during the calculation process.

Managing uncertainty involves using conservative estimates, providing transparency in reporting, and continually improving data collection and calculation methods.

2.3 Scope Specifics

1. Scope 1 Emissions

Scope 1 emissions are direct emissions from owned or controlled sources. Examples include:

- Emissions from company-owned vehicles.
- On-site combustion of fossil fuels (e.g., boilers, furnaces).
- Process emissions from industrial activities.

These emissions are usually calculated using activity data (e.g., liters of fuel consumed) and the appropriate emission factor for each type of fuel.

2. Scope 2 Emissions

Scope 2 emissions come from the consumption of purchased electricity, steam, heating, and cooling. These are considered indirect emissions because they occur at the power generation source, not at the company's site.

There are two accounting methods for Scope 2 emissions:

- Location-based: Accounts for the emissions based on the average emissions intensity of the electricity grid in the location where the company operates.
- Market-based: Accounts for the emissions based on the specific energy contracts purchased by the company (e.g., renewable energy).

Energy attribute certificates, such as Renewable Energy Certificates (RECs), can be used to show the company's use of renewable energy and may affect the emissions calculation.

Scope 2 Quality Criteria include ensuring accurate, consistent, and transparent reporting of energy consumption and emissions, regardless of the approach used.

3. Scope 3 Emissions

Scope 3 emissions are indirect emissions from the value chain, and they often represent the largest share of emissions for many companies. Scope 3 is divided into 15 categories, including:



- **Purchased goods and services:** Emissions from producing the products and services the company buys.
- **Capital goods:** Emissions from the production of capital goods (e.g., machinery, buildings).
- **Fuel- and energy-related activities:** Emissions from the extraction, production, and transportation of fuels.
- **Upstream transportation and distribution:** Emissions from transporting goods to and from the company.
- **Waste generated in operations:** Emissions from waste disposal.
- **Business travel:** Emissions from employee travel for business purposes.
- **Employee commuting:** Emissions from employees traveling to and from work.
- **Upstream Leased Assets:** Emissions from leased assets owned by the company but used by others in the supply chain.

Each of these categories requires different data sources and emission factors. The level of detail and accuracy required depends on the company's specific operations and goals.

2.4 Tracking Emissions and Setting Targets

To track emissions over time, it's essential to establish a **base year** and maintain consistent measurement methodologies. Recalculations are necessary when there are significant changes in business operations, emission factors, or data collection methods.

Setting GHG emissions targets involves defining goals, such as **absolute reductions** (reducing total emissions) or **intensity-based targets** (reducing emissions per unit of output).

Science-based targets (SBTs) ensure alignment with the latest climate science, helping companies contribute to the global goal of limiting warming to 1.5°C.

It's also crucial to understand the difference between **carbon neutral** (balancing emissions with offsets) and **net-zero** (reducing emissions to zero and offsetting any remaining emissions).

2.5 Offset Credits

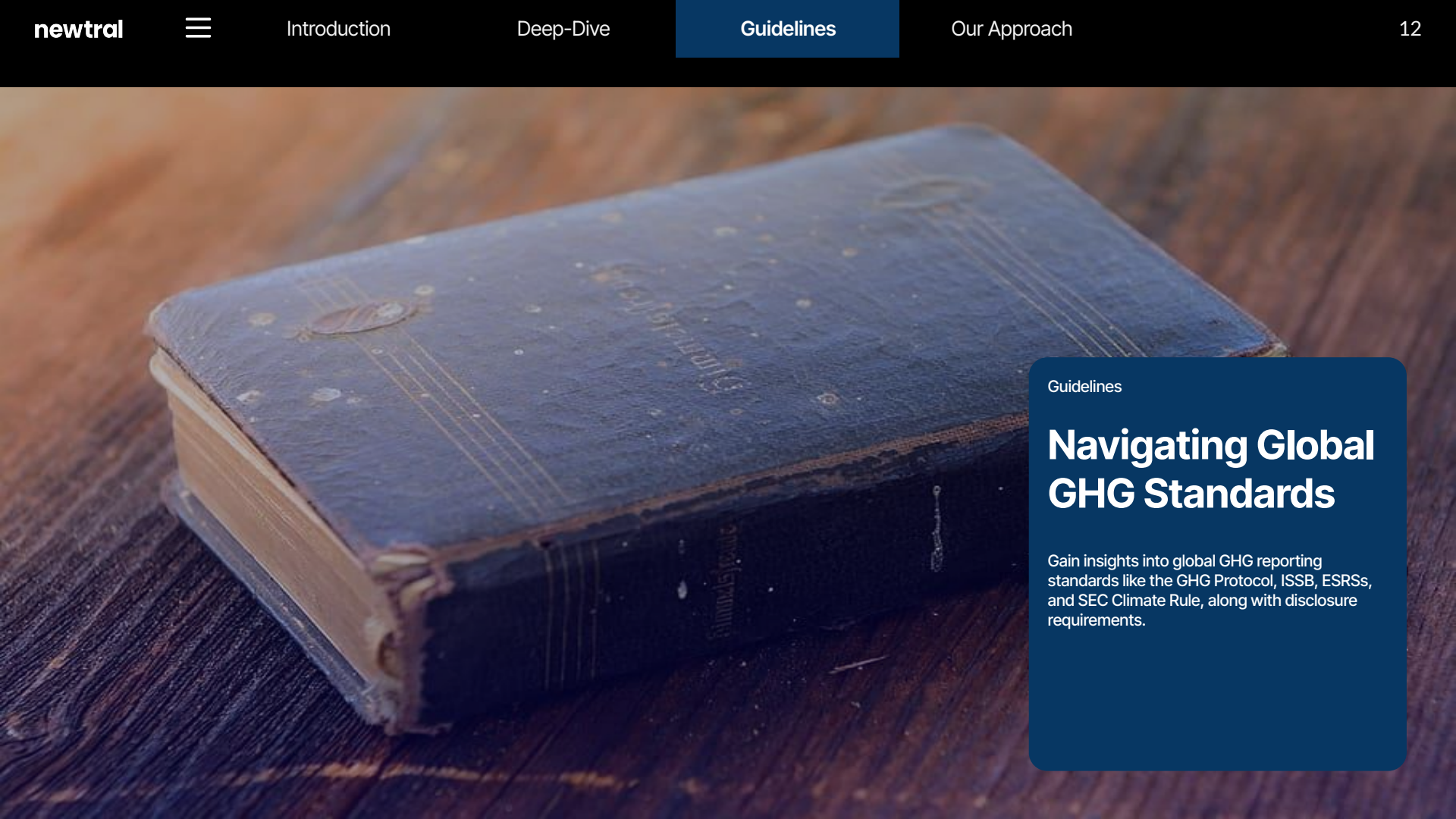
GHG offsets allow companies to neutralize their emissions by investing in projects that reduce or remove GHGs from the atmosphere. These projects include renewable energy installations, reforestation, and methane capture.

GHG trading programs facilitate the buying and selling of offset credits, helping companies meet emissions reduction targets.

Additionality ensures that the offset projects would not have occurred without the investment in the credit.

Offsets can be derived from **ex-ante** (future) or **ex-post** (actual) emission reductions. The quality of offset credits depends on their permanence, additionality, and verification by third-party auditors.

When offset credits are reversed, due to project failure or unforeseen events, companies may need to replace the credits or recalculate their emissions.



Guidelines

Navigating Global GHG Standards

Gain insights into global GHG reporting standards like the GHG Protocol, ISSB, ESRs, and SEC Climate Rule, along with disclosure requirements.

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Gain insights into global GHG reporting standards like the GHG Protocol, ISSB, ESRs, and SEC Climate Rule, along with disclosure requirements.

3. Regulatory Guidelines

This section outlines the reporting requirements and standards for GHG emissions, focusing on the GHG Protocol and contrasting it with other frameworks such as ISSB, ESRs, and the SEC Climate Rule.

3.1 Reporting Standards and Guidance

1. Presentation of GHG Information

- Much like financial statements, the method of presentation must be clearly stated in the GHG emissions report.
- A public GHG report should be based on the best available data, highlighting limitations, disclosing any material discrepancies, and clearly separating gross emissions from any GHG trades (e.g., offsets).

2. Importance of Basis of Presentation

- For emissions statements prepared under the GHGP, there are two common acceptable presentation methods:
 - **Approach A:** Aligning with the Corporate Standard and Scope 2 Amendment, including Scope 1, Scope 2, and optional Scope 3 emissions (e.g., business travel).
 - **Approach B:** Following the entire GHGP, covering Scope 1, Scope 2, and all Scope 3 emissions, with any exclusions properly justified.

3. Reporting Without the Scope 2 Amendment

The Corporate Standard's reporting includes the Scope 2 Guidance, as the Scope 2 Guidance is an amendment to the Corporate Standard and not a standalone document.

4. Scope 3 Reporting Under the Corporate Standard

- The Corporate Standard does not mandate Scope 3 emissions reporting.
- If Scope 3 is reported, it is advised to follow Scope 3 calculation guidelines.
- Scope 3 categories should be presented individually, rather than combined under a single 'scope 3 emissions' line.
- Recommended additional disclosures include a list of Scope 3 categories, along with methodologies, allocation methods, and assumptions used.

3.2 GHG Protocol Reporting Requirements

1. Minimum Reporting Requirements

The GHGP mandates reporting of at least Scope 1 and 2 emissions.

2. Disclosures Under the Corporate Standard

A public GHG emissions report must include:

- Chosen organizational boundaries and consolidation approach.
- Operational boundaries, and if Scope 3 is included, the relevant activities covered.
- Reporting period covered.
- Total Scope 1 and 2 emissions, excluding GHG trades.
- Emissions data separately for each scope, in both metric tonnes and CO₂e.
- Emissions from biologically sequestered carbon (e.g., burning biomass) should be reported separately.
- Methodologies used for calculating emissions, with references to any calculation tools.
- Specific exclusions of sources, facilities, or operations.

3. Disclosures for Scope 3 Reporting

- The report must include Scope 1 and Scope 2 emissions in accordance with the Corporate Standard, and Scope 3 emissions reported separately by category.
- For each Scope 3 category, report total GHG emissions in CO₂e (excluding biogenic CO₂) and independent of GHG trades.
- Disclose a list of included and excluded Scope 3 categories, with justification for exclusions.
- Once a base year is established, disclose the base year, emissions recalculation policy, and emissions by category.
- Report data sources, including activity data, emission factors, GWP values, and data quality.
- Describe the methodologies and assumptions used to calculate Scope 3 emissions, and disclose the percentage of emissions calculated using supplier data.⁴

4. Required and Optional Information

The GHGP distinguishes between:

- Shall: Mandatory disclosures that can only be omitted if immaterial.
- Should: Recommended but not mandatory disclosures.
- May: Optional disclosures at the entity's discretion.

There are also conditional disclosures that are recommended if specific optional disclosures are made.

5. Comparative Information

Year-over-year comparisons are not required, but the base year and emissions profile over time must be disclosed, along with the recalculation policy.

6. Presentation of Key GHGs

Scope 1 and Scope 2 emissions must be reported separately from any GHG trades, with emissions data for all seven GHGs presented in both metric tonnes and CO₂e.

7. Biogenic Emissions

Direct CO₂ emissions from biomass combustion should be reported separately, as they are part of the biogenic carbon cycle.



3.3 Comparison with Other Frameworks

1. Overview of Other Reporting Frameworks:

- ISSB Sustainability Disclosure Standards.
- European Sustainability Reporting Standards (ESRSs).
- The SEC's Climate Rule.

2. Key Similarities and Differences:

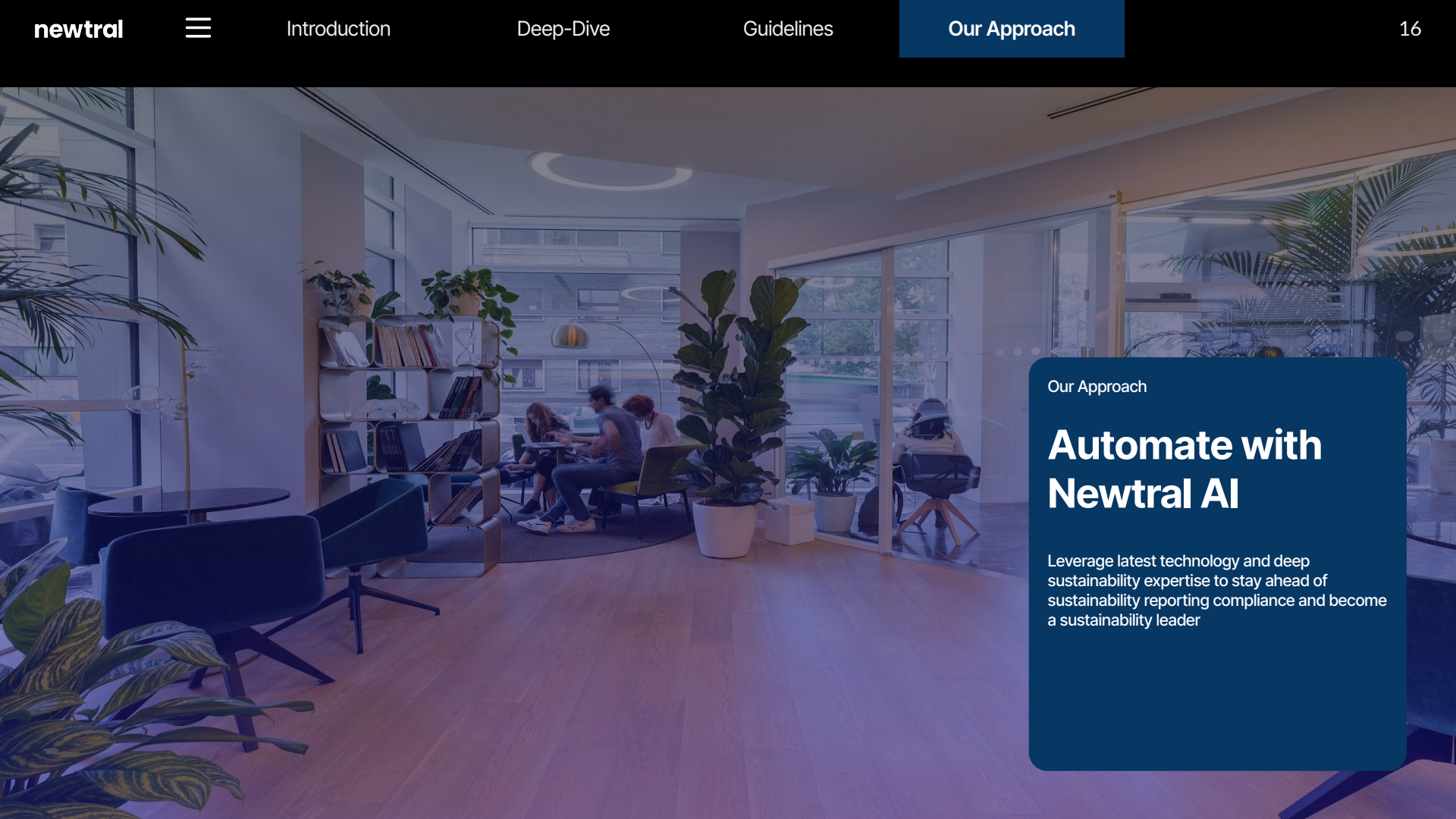
- **ISSB Standards:** Entities use the GHGP for emissions measurement, with exceptions in specific cases. It applies the GHGP's three approaches for defining organizational boundaries. It also requires disclosure of Scope 3 categories and emissions using the latest IPCC GWP values.
- **ESRS:** Entities must follow the Corporate Standard (2004), Scope 2 Guidance (2015), and Scope 3 Standard (2011). They disclose their chosen approach and significant Scope 3 categories, using the most recent IPCC GWP values. They also disclose net-zero targets, including the scope and methodologies.
- **SEC Climate Rule:** The SEC leverages GHGP concepts but does not mandate specific organizational boundary approaches. Scope 3 disclosures are voluntary, and large entities must disclose gross Scope 1 and 2 emissions.

3. Specific Requirements for Scope 3 Disclosures

- **ISSB:** Entities disclose the Scope 3 categories they include in their emissions.
- **ESRS:** Entities disclose each significant Scope 3 category and provide justification for any exclusions.
- **SEC:** Scope 3 disclosures are voluntary, but large accelerated and accelerated filers must disclose Scope 1 and 2 emissions if material.

4. Additional Disclosures

- **Company and Inventory Boundaries:** Disclose the chosen organizational and operational boundaries, along with the activities covered by Scope 3.
- **Exclusion of Sources:** Specify any exclusions of sources, facilities, or operations.
- **Methodologies Used in Calculations:** Outline the methodologies and reference any calculation tools used.
- **Total Scope 1 and 2 Emissions:** Report Scope 1 and 2 emissions, excluding GHG trades, with separate emissions data for each scope.

A modern office interior with large windows, indoor plants, and people working. The scene is bright and airy, with a mix of greenery and contemporary furniture. In the background, three people are seated at a table, working on laptops. The room is filled with various types of plants, including a large fiddle-leaf fig in the center and several smaller potted plants on shelves and tables. The floor is made of light-colored wood, and the walls are white. Large windows on the right side of the image provide a view of the outside world.

Our Approach

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Leverage latest technology and deep sustainability expertise to stay ahead of sustainability reporting compliance and become a sustainability leader

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Leverage latest technology and deep sustainability expertise to stay ahead of sustainability reporting compliance and become a sustainability leader

At Newtral, we understand the challenges businesses face in navigating the complex landscape of sustainability reporting and ESG integration. That's why we've developed a cutting-edge, AI-powered sustainability platform that streamlines your entire sustainability workflow, ensuring compliance, transparency, and value creation for all stakeholders.

Key Features and Benefits:

Automated Sustainability Workflow:

- Our AI-driven platform automates data collection, analysis, and reporting, saving time and resources
- Seamless integration with existing systems for efficient data management
- Ensures accuracy and consistency in sustainability reporting

Comprehensive Concierge Services:

- Dedicated sustainability experts to guide you through every step of your sustainability journey
- Tailored strategies and actionable insights based on your unique business needs
- Continuous support and expertise to help you achieve your sustainability goals

ESG Supply Chain Innovation:

- Advanced tools to assess and manage ESG risks and opportunities within your supply chain
- Collaborate with suppliers to improve sustainability performance and transparency
- Gain a competitive edge by demonstrating responsible supply chain practices

Scope 3 Emissions Management:

- Accurately measure and report your Scope 3 emissions with our AI-powered platform
- Identify hotspots and implement targeted reduction strategies
- Demonstrate leadership in addressing indirect emissions and climate change

Regulatory Compliance and Transparency:

- Stay ahead of evolving sustainability regulations and disclosure requirements
- Communicate your sustainability performance effectively to investors, customers, and other stakeholders
- Build trust and credibility through transparent and reliable sustainability reporting

Take the first step towards a more sustainable future with Newtral. Our AI-powered platform and expert concierge services provide the tools and guidance you need to integrate sustainability seamlessly into your business operations. Contact us today to schedule a demo and discover how Newtral can help you create lasting value for your stakeholders while contributing to a greener, more resilient world.



Newtral AI Platform- Enterprise ESG Platform for Corporates and Supply Chain

We help organizations automate their ESG metric measurements, tracking and reporting across company as well as their supply chain. Our platform solves for all corporate sustainability reporting and carbon accounting needs, visit newtral.io for more information.

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