

Carbon Accounting: A New Paradigm for Accountancy Professionals

CA. Shaleen Srivastava
Member of the Institute

Most countries under the purview of the G20 have adopted a form of regulatory carbon legislation to achieve greenhouse gas (GHG) emission reduction targets. In the coming years, therefore, most companies, factories, and firms will need to report their carbon emissions to government watchdogs in at least one of the countries in which they operate. Nowadays, sustainability has changed its path from a voluntary initiative to a mainstream regulatory concern. This is a crucial responsibility, and there is a need for inclusive actions to address challenges like inequality, climate change triggered by GHG emissions, energy transitions, and advanced sustainable development.

The global sustainability landscape has evolved rapidly as all stakeholders, such as the government, investors, regulators, and corporates, have recognised ESG factors as an integral part of their value creation and long-term economic benefits. Factors like climate change, biodiversity loss, scarcity of resources, and socio-economic inequality have driven demand for consistent and reliable standards to support policy decisions. Regulatory efforts should not only reduce the quantum of pollution, but they should also catalyse the creation of commercially viable avenues and profitable business opportunities. To overcome this, generating carbon credits (or allowances) is one such positive step.

To ensure this, the International Sustainability Standards Board (ISSB) was established in 2021 to develop baseline accounting, reporting standards, and financial disclosures. Like other platforms, there should also be a platform to record and report carbon emissions by the entity concerned. Additionally, in the absence of formal accounting standards for emissions and allowances, it is critical to assess the general level of awareness and knowledge of carbon accounting. The ISSB framework aims to harmonise existing reporting practices by providing international standards to assess sustainability-related risks and opportunities. For this, IFRS S1 (General Requirement for Disclosure of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures) were issued towards a unified global framework for transparency and comparability for sustainability-related financial information.

What is Carbon Accounting?

Carbon accounting, also known as carbon footprint, measures and tracks GHG emissions from an individual, organisation, service or activity. Under this process, emissions from different sources (for instance, energy use, transportation, waste management, and industrial processes) are quantified to assess their impact and find ways to reduce them. The practice of carbon accounting therefore advances the goals of sustainability and climate change mitigation.

Carbon accounting typically involves three main steps:

Measurement: Collection of data on energy consumption, fuel use, waste generation, and other GHG-producing activities. The data is usually collected in the form of carbon dioxide equivalent (CO_2e), which compares the global warming potential of different GHGs relative to that of CO_2.

→

Calculation: Once the data is collected, it is converted into CO_2e emissions using emission factors or other calculation methods. Emission factors are standardised values that represent the amount of GHG emissions produced per unit of activity or energy use.

→

Reporting: The calculated emissions are then reported in a standardised format, such as a carbon footprint report or an emissions inventory. This report provides a comprehensive overview of the emissions produced and allows for comparison over time or with other entities.

Various frameworks and standards, such as the Greenhouse Gas Protocol (GHG Protocol), provide guidelines and methodologies for carbon accounting. Software tools and platforms can also help in the process and lead to greater efficiency and accuracy.

Carbon accounting is not just about measuring emissions; it also involves setting reduction goals, implementing emission reduction strategies, and monitoring progress in achieving these goals. It is a crucial, well-rounded tool for individuals, organisations and governments to understand and manage their carbon footprints and contribute to global climate change mitigation efforts.

India has now emerged as one of the leading centres in mandating sustainability disclosures, moving beyond a voluntary approach to structural regulatory frameworks. This approach has enhanced transparency, corporate social responsibility and accountability. and aligned Indian businesses with global standards. India's regime centres on SEBI's Business Responsibility and Sustainability Report (BRSR), layered with assurance mandate codes that push towards ISSB alignment. ICAI, through its Sustainability Reporting Standard Board (SRSB), is actively developing the professional capacities to deliver assurance aligned with international standards, such as the BRSR reporting tool and carbon footprint calculator.

Furthermore, SEBI, MCA and ICAI are actively monitoring global ISSB adoption and compliance statements for major corporates in BRSR. Effective from 2022-23, filing of BRSR became mandatory for the top 1000 listed companies and voluntary for other entities.

Reference from 'Guidance Note on Accounting for Self-Generated Certified Emission Reductions (CERs)' by ICAI

In 2009, the Institute of Chartered Accountants of India (ICAI) issued an Exposure Draft of the 'Guidance Note on Accounting for Self-generated CERs' in 2009. The draft, finalised in 2012, suggested accounting principles for CERs generated by an entity.

Under the Clean Development Mechanism (CDM), emission-reduction projects in developing countries can earn certified emission reduction credits. These saleable credits can be used by industrialised countries to fulfil a part of their emission reduction targets under the Kyoto Protocol. The exposure draft has provisions for accounting principles relating to recognition, measurement and disclosures of CERs generated under CDM. While undertaking a CDM project, an entity has to pass significant research and development, documentation and approval processes.

> **"Carbon accounting, also known as carbon footprint, measures and tracks GHG emissions from an individual, organisation, service or activity. Under this process, emissions from different sources (for instance, energy use, transportation, waste management, and industrial processes) are quantified to assess their impact and find ways to reduce them."**

The Exposure Draft proposes the accounting treatment for CERs in the following manner:

The generating entity should identify CERs as assets only after receiving communication for credit from the United Nations Framework for Climate Change (UNFCC), provided that it is possible that future benefits linked to CERs will flow into the entity, and costs to generate CERs can be measured reliably.
In case of CERs in the possession of the CDM Executive Board, the note on accounting for carbon credits states that when they are in the approval stage, CERs should be accounted for, as per the provisions of Accounting Standard (AS 29), as Contingent Assets. Once approved, these should be recorded in the books as an intangible asset.
During the processes when CERs are being generated, and till the time the communication about its verification is received from UNFCC, they are, at best, to be classified as Contingent Assets, as per AS 29.
When such communication for recognition is received, these assets meet the definition of the term 'Inventory' given under AS 2 (Valuation of Inventories). Hence, they are valued at a lower cost and net realisable value.
Only the costs borne by the entity for certification of CERs can bring the CERs to life. Therefore, only those costs (cost for certification of CER, consultant fees, and fixed cash payment made per unit of CER as a levy towards administrative charges) should be factored in the cost of the inventory.
According to the prescribed criteria, all other costs are either not directly relevant in bringing the inventory to its present location and condition, or they are incurred before CERs come into existence. Thus, those costs cannot be inventoried.

Expenses in the research and development stage are categorised under the pre-implementation cost of CDM. However, when undertaking a project for reduction in carbon emissions, costs incurred in development should be accounted for as highlighted in AS 26, for intangible assets.

In cases where an entity uses a tangible asset or installs devices to reduce emissions and generate CER, the cost related to such equipment/devices will be treated as per the provisions of the Revised AS 10 for Property, Plant and Equipment. Accordingly, their depreciation should not be included in the cost of the inventory of the principal product(s) of the generating entity, because they do not contribute to bringing the inventory of the principal product(s) to their present location and condition, and the depreciation happens before CERs come into existence.

With respect to CERs for sale, in case an enterprise has CERs to be traded in the ordinary course of business, (i.e., the enterprise holds the asset as 'available for sale'), the same should be accounted for as inventory under provisions of AS 2. Furthermore, it is the 'intent' of the entity that determines whether these credits shall be recorded as intangible assets or as inventory.

Source: *Exposure Draft of the 'Guidance Note on Accounting for Self-generated CERs', ICAI, 2009*

Companies should ensure that alignment and disclosures are presented outside the audited financial statements. The accounting treatment is not yet unified under a single sustainability accounting standard; it's a patchwork of existing Ind AS/AS applied through a climate lens plus the Guidance Note (above) for carbon credits.

How would our financial statements look under carbon accounting?

Carbon accounting itself is more commonly reported in sustainability or environmental reports than on traditional financial balance sheets. Nevertheless, we can show an example of how the concept may be incorporated into an organisation's reporting, in its financial and non-financial aspects.

The key sustainable topics can be treated as follows: -

Sustainable Topics	Applicable Ind AS	Corresponding AS	Accounting treatment
Asset retirement obligation	Ind AS 16 and Ind 37	AS 10 and AS 29	Capitalisation of restoration cost
Renewable Energy assets	Ind AS 16	AS 10	Capitalisation and Depreciation
Environmental provision	Ind AS 37	AS 29	Recognition of provision of contingent liabilities
Carbon Credit	Ind AS 2, Ind AS 38, Ind AS 115	AS 2, AS 26 and AS 9	Accounting depends on intended use
Climate-related impairment	Ind AS 36	AS 28	Impairment based on recoverable amount
Government sustainability grants	Ind AS 20	AS 12	Recognition of grants and related disclosures
ESG loans and advances or bonds	Ind AS 109 and Ind AS 107	AS 13 and AS 32	Measurement and financial instrument disclosures
Climate risk	Ind AS 1	AS1	Disclosure of material uncertainties affecting going concern
Environmental Litigation	Ind AS 37	AS 29	Provision or contingent liability depending upon probability

The concept of a Carbon Profit and Loss Statement and an Environmental Balance Sheet has been playing an important role in the current situation, as it measures their impact both in monetary and physical terms. These tools/or reports do not form a part of statutory financial statements prepared under Ind AS or Sch-III of the Companies Act, 2013; however, they play a significant supplementary role in management reporting and sustainability reporting disclosures that help in decision-making by stakeholders while remaining reconciled with audited financial statements. These tools extend traditional financial reporting by incorporating the costs and benefits associated with GHG emissions, pollution, and ecosystem impacts.

Carbon Profit and Loss Accounts

Carbon Profit and Loss Accounts is an analytical statement that quantifies the environmental cost associated with an organisation's greenhouse gas emissions by assigning a monetary value to carbon emissions using carbon pricing in the prevailing market. It is intended to complement the traditional Statement of Profit and Loss, illustrating the financial implications of climate-related externalities. Carbon P&L should be presented as a supplementary disclosure that may be reconciled with the statement of Profit and Loss through:

- accounting expenses recognised in accordance with Ind AS;
- environmental expenditure disclosed under BRSR or ISSB; and
- carbon pricing adjustments for management decision-making.

Environmental Balance Sheet

An Environmental Balance Sheet presents the organisational environmental assets, liabilities and ecological impacts and obligations. It aims to provide stakeholders with a comprehensive view of environmental impacts beyond the conventional financial reporting system.

- Natural capital, biodiversity, and ecosystems are generally not recognised as assets, unless they satisfy the recognition criteria under applicable accounting standards.
- Environmental liabilities are recognised only where a present obligation exists, and the recognition criteria under Ind AS 37 are met.
- Costs associated with plant, property and equipment are recognised as part of assets' carrying value under Ind AS 16 with corresponding provisions under Ind AS 37.
- Carbon credits are recognised as inventory or intangible assets depending upon the adopted accounting policies.
- Environmental grants and incentives are recognised under Ind AS 20.

In the hypothetical example below, the financial balance sheet represents the traditional financial aspects of the organisation, including its assets, liabilities, and equity.

Non-financial Balance Sheet

- The concept of 'Environmental Assets' stands for the positive contributions the organisation has made towards sustainability and carbon reduction. This includes investments in renewable energy infrastructure, energy-efficient facilities, and sustainable transportation, all of which can contribute to reducing the organisation's carbon emissions.
- 'Environmental Liabilities' include costs associated with waste management, carbon offset requirements (if any), and potential environmental restoration costs.
- 'Environmental Equity' represents the net positive or negative impact of the organisation's environmental efforts. This could include benefits like avoided emissions, biodiversity enhancement, and other positive environmental outcomes.

It's important to note that this is a simplified and conceptual representation. In practice, the integration of carbon accounting into financial statements and reports can vary widely depending on the organisation, its industry, reporting standards, and regulatory requirements.

> "SEBI, MCA and ICAI are actively monitoring global ISSB adoption and compliance statements for major corporates in BRSR. Effective from 2022-23, filing of BRSR became mandatory for the top 1000 listed companies and voluntary for other entities."

The expanded Profit and Loss (P&L) statement can include environmental and sustainability-related information to reflect the organisation's financial performance alongside its carbon emission-reduction efforts. This extended statement is often considered as a 'Carbon P&L' or 'Environmental P&L'.

Here's how a Carbon P&L statement may look, illustrating how carbon emissions and associated costs are integrated into the traditional income statement:

Traditional Financial Balance Sheet: YXZ Corporation Limited

Assets	Liabilities	Equity
Cash and Equivalents	Accounts Payable	Common Stock
Accounts Receivable	Long-Term Debt	Retained Earnings
Property, Plant, and Equipment	Other Liabilities	
Investments		
Total Assets	**Total Liabilities**	**Total Equity**

Non-financial Balance Sheet with Carbon Accounting: YXZ Corporation Limited

Environmental Assets	Environmental Liabilities	Environmental Equity
Renewable Energy Infrastructure	Carbon Offsets Required	Avoided Emissions Benefit
Energy-Efficient Facilities	Waste Management Costs	Biodiversity Enhancement
Sustainable Transportation		
Total Environmental Assets	**Total Environmental Liabilities**	**Total Environmental Equity**

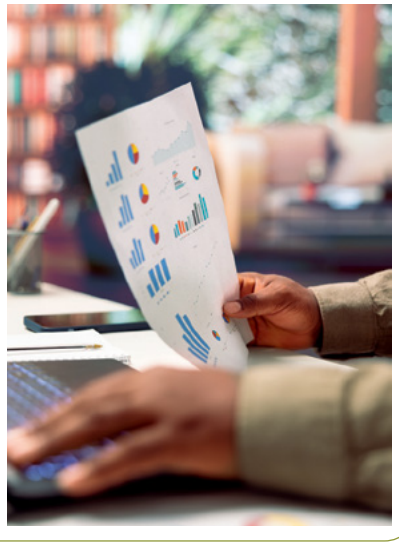
Income Statement: YXZ Corporation Limited

- **Revenues:** The organisation's regular income from sales and other sources.
- **Cost of Goods Sold:** Includes the direct and indirect costs associated with producing goods or services, including emissions and sustainability aspects.
- **Gross Profit:** Revenues minus Cost of Goods Sold.
- **Operating Expenses:** Reflects costs associated with carbon-emission-reduction initiatives, sustainability projects, and compliance efforts.
- **Operating Income:** Gross profit minus operating expenses.
- **Other Income and Expenses:** Accounts for revenue generated from carbon offset sales, savings from environmental impacts (such as reduced energy consumption), and any other relevant items.
- **Profit Before Tax:** Operating income plus other income and expenses.
- **Income Tax Expense:** Taxes paid on the net income before tax.
- **Profit After Tax:** Profit before tax minus income tax expense.

	Current Year	Previous Year
Revenues		
Sales	xxx	xxx
Other Income	xxx	xxx
Cost of Goods Sold		
Direct Cost	xxx	xxx
Direct Material/Labour Cost		
Energy Cost (Scope 1 and 2 Emissions)		
Indirect Cost	xxx	xxx
Gross Profit	xxx	xxx
Operating Expenses		
Carbon Emission Reduction Cost	xxx	xxx
Sustainability Initiative Cost	xxx	xxx
Environmental Compliance Cost	xxx	xxx
Operating Income	xxx	xxx
Other Income and Expenses		
Carbon Offset Revenue	xxx	xxx
Environmental Impact Saving	xxx	xxx
Profit Before Tax	xxx	xxx
Income Tax Expenses	xxx	xxx
Profit After Tax	xxx	xxx
Carbon Impact		
Total Scope 1 Emission (Direct)	**xxx Metric Ton CO_2e**	
Total Scope 2 Emission (Indirect)	**xxx Metric Ton CO_2e**	
Total Scope 3 Emission (Indirect)	**xxx Metric Ton CO_2e**	
Total Carbon Emissions	**xxx Metric Ton CO_2e**	

> "Emissions under Scope 3 are indirect GHG emissions that occur across the entire value chain of an organisation but are not directly owned or controlled by it. These emissions are associated with upstream and downstream activities such as the production, distribution, use of products, and disposal related to the organisation's operations."

This extended P&L statement, in particular the 'Carbon Impact' section that provides information on total carbon emissions under Scope 1, 2, and 3, helps stakeholders understand how carbon management efforts and sustainable practices impact the organisation's financial bottom line. Keep in mind that the specific categories and values will vary depending on the organisation's activities, carbon reduction initiatives, and reporting standards.



What are Scope 1, 2, and 3 Emissions?

Scope 1 Emissions

GHG emissions that are directly generated from sources that are owned or controlled by an organisation. Scope 1 emissions are the most direct and immediate emissions linked to an organisation's operations.

Sources

Combustion of fossil fuels: Emissions from the burning of fossil fuels for heating, cooling, and electricity generation. This includes emissions from on-site power plants, boilers, diesel in DG, Mobile fuels and other equipment.

Industrial processes: Emissions from chemical reactions or industrial processes that release greenhouse gases directly into the atmosphere. Examples include emissions from cement production, chemical manufacturing, and metal production.

Fugitive emissions: Emissions that escape into the atmosphere during the production, processing, handling, or transportation of fuels, chemicals, or other materials —for instance, methane leaks from natural gas pipelines or during oil and gas extraction.

In the case of Scope 1 emissions, the entity can take direct actions to reduce them by taking measures such as improving energy efficiency, transitioning to cleaner fuels, implementing waste-reduction strategies, and upgrading emission-reducing equipment. Scope 1 emissions, generally measured in metric tons of CO_2 equivalent (tCO_2e), are an integral part of overall carbon footprint assessment, and addressing them is an important aspect of sustainability and corporate social responsibility (CSR) efforts.

Scope 2 Emissions

These are indirectly generated due to the consumption of purchased electricity, heat, or steam by an organisation where the sources of energy are not under the entity's ownership.

Sources

Location-based emissions: This category analyses the average emission factor associated with the electricity consumed from the grid within a specific geographical region. It takes into account the mix of energy sources used to generate electricity in that region.

Market-based emissions: This category considers the actual emission factor of the electricity or energy sources that the organisation has purchased. It accounts for the specific sources of energy the organisation has chosen to buy, which may include renewable energy, power agreements, and other direct procurement methods.

> "Carbon Profit and Loss Accounts is an analytical statement that quantifies the environmental cost associated with an organisation's greenhouse gas emissions by assigning a monetary value to carbon emissions using carbon pricing in the prevailing market."

Addressing Scope 2 emissions often requires adopting strategies such as increasing the use of renewable energy sources, improving energy efficiency, and actively engaging with electricity suppliers to buy and use cleaner energy.

Scope 3 Emissions

Emissions under Scope 3 are indirect GHG emissions that occur across the entire value chain of an organisation but are not directly owned or controlled by it. These emissions are associated with upstream and downstream activities such as the production, distribution, use of products, and disposal related to the organisation's operations. In other words, Scope 3 emissions encompass





the entire lifecycle of a product or service, from raw material extraction to end-of-life disposal.

The Greenhouse Gas Protocol defines 15 categories of Scope 3 emissions, which are grouped into two main types:

Upstream emissions (produced during production of goods and services that the reporting company uses)

- Purchased goods and services
- Capital goods (such as buildings and equipment)
- Fuel- and energyrelated activities (not included in Scope 1 or Scope 2)
- Upstream transportation and distribution (e.g., shipping and logistics)
- Waste generated in operations
- Upstream leased assets (e.g., a car for business travel)

Downstream emissions (produced from the customers' use of a company's products and services)

- Business travel
- Employee commute
- Use of sold products (e.g., energy consumption by customers)
- Processing of sold products
- End-of-life treatment of sold products
- Downstream leased assets (not linked to Scope 1 or Scope 2)
- Franchises
- Investments
- Downstream transportation and distribution

Calculating and reporting Scope 3 emissions is voluntary but complex due to the broad range of activities involved. Numerous stakeholders may also be involved in the process, especially in the case of industries with long, complex supply chains. However, companies that do report these emissions, by collaborating with suppliers, customers, and partners, demonstrate a more comprehensive approach to sustainability and environmental responsibility.

Rather than tracing carbon credits back to Kyoto-era international mechanisms, the more relevant frame today is IFRS S1 (General Requirements for Disclosures of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures), which mandate the disclosure of Scope 1, Scope 2 and Scope 3 emissions as baseline requirements, not a voluntary add-on.

- **Scope 1 (Direct Emissions):** The emissions a company physically generates. Where a company undertakes abatement projects that generate saleable carbon credits, the resulting reduction feeds directly into Scope 1 figures disclosed under IFRS S2, while the credit itself is separately accounted for as an asset.
- **Scope 2 (Indirect Emissions from Purchased Energy):** Relevant where a renewable energy certificate is purchased or generated to offset grid-based consumption. IFRS S2 requires both location-based and market-based Scope 2 reporting; measuring REC use has a direct, disclosure effect on the reporting figures.
- **Scope 3 (Value Chain Emission):** IFRS 2 expects Scope 3 disclosure where materials, and India`s BRSR core has followed this trajectory: value chain ESG disclosures become mandatory.

Accounting of Carbon Offsets

The accounting treatment of carbon offsets depends on the standards being used and the specific circumstances of the entity engaging in carbon offset activities.

1. **Recognition of Carbon Offsets:** An organisation buying carbon offsets is, in effect, investing in projects that reduce or remove an equivalent amount of GHG emissions from the environment. The accounting treatment would of course depend on the type of carbon offset and the particular accounting standard applicable, but broadly speaking, it would likely involve recognising them as an asset on the balance sheet.
2. **Measurement and Valuation:** The amount of emissions reduced or removed is the primary

> "Under the Clean Development Mechanism (CDM), emission-reduction projects in developing countries can earn certified emission reduction credits. These saleable credits can be used by industrialised countries to fulfil a part of their emission reduction targets under the Kyoto Protocol."

criterion for measuring and determining the value of carbon credits. For this, the company needs to establish reliable and accurate methods to measure and analyse the effectiveness of carbon offset projects and the reduction in emissions. The value of carbon offsets is then decided based on the market rate/price of carbon credits, and the cost of the offset projects themselves.

3. **Initial Recognition:** After buying carbon offsets, the company may recognise them as an asset on its balance sheet, assigning a valuation proportionate to the equivalent amount of emissions reduced or removed. This asset could be classified under a specific category, such as 'Carbon Offset Credits' or 'Environmental Assets'.

4. **Subsequent Measurement:** The effectiveness of carbon offset projects, and the value of carbon offsets should be periodically reassessed and adjusted by the organisation, as deemed necessary. The value of the carbon offset asset could be impacted by factors such as changes in the estimated emissions reduced or removed, or fluctuations in market prices or project costs.

5. **Presentation and Disclosure:** The company's balance sheet should accurately record and reflect all carbon offsets and their associated assets and liabilities. Organisations also need to transparently reveal information about the nature of the carbon offset projects, the methodology used to measure the reduction in emissions, the value assigned to the offsets, and any significant assumptions made in the valuation process.

6. **Income Statement Impact:** The organisation's income statement could be potentially influenced by the purchase and subsequent valuation of carbon offsets. For instance, any increment in the value of a carbon offset over time could result in a corresponding increase in the company's income as well.

The accounting treatment of carbon offsets, however, can be complex, and may vary based on factors such as the industry concerned, the type of carbon offset projects, and the applicable accounting standards (e.g., International Financial Reporting Standards—IFRS, Generally Accepted Accounting Principles—GAAP).

In this context, the auditor's role has expanded from providing assurance over historical financial reporting information, which enhances the credibility of sustainability reporting in the new era. Given the complexity of emissions measurement methodologies, auditors perform assurance procedures to evaluate the following aspects:

- Organisational and operational boundaries
- Emission source identification
- Completeness of emissions inventories



- Accuracy of emission factors and activity data
- Internal control over environmental data
- Consistency with GHG Protocols
- Calculation methodologies and data aggregation processes

Carbon footprints assurance, which is now a fast-growing area of sustainability assurance related to GHG emissions reporting, is gaining prominence. Independent assurance over carbon footprints, and climate related disclosures is becoming a cornerstone of corporate accountability.

Author may be reached at cashaleensrivastava@gmail.com and eboard@icai.in