



Organizational **Carbon Footprinting**

Assessing the 'Carbon footprint' is the first step an organization should take to proceed towards strategizing for Climate Change and realizing carbon emission reduction. This factsheet helps the readers in understanding the process of conducting a carbon footprinting assessment for organizations. It guides them on boundary setting, inclusion of sources of emission, data collection and assessment of carbon footprint. It takes a stock of business outlook on carbon footprinting in India and stresses the need for organizational carbon footprint assessment to be carried out in the Mumbai Metropolitan Region (MMR).

Measuring the carbon footprint or Greenhouse Gas (GHG) inventORIZATION is an important step for organizations towards developing strategies for Climate Change. It can help organizations understand its baseline GHG emission and GHG intensive business operations, assess risks and opportunities and formulate strategies accordingly. Many organizations find that once they start measuring their GHG emissions, they identify ways to do things differently and save money as well as carbon. **Amongst the methodologies to measure GHG emission, the GHG Protocol Standard and ISO 14064 are predominantly used by organizations globally.**

In line with these methodologies, the process of developing an organizational carbon footprint consists of four steps (see Figure 1).

1. Setting Organizational Boundaries

Organizational boundaries determine which facilities of your organization to include in the GHG emission inventory. This step helps parent organizations having foreign subsidiaries, joint ventures, or leased assets to identify what share of emissions from operations in these entities should the parent organization account for. Two fundamental approaches exist for determining the share of emission to be accounted for in such cases as follows:

i) **Equity Share approach** : Under this approach company accounts for GHG emissions from operations according to its share of equity in the operation

ii) **Control approach** : This approach is further divided into financial control approach and operational control approach. Under this approach, an organization accounts for 100% of the GHG emissions from operations over which it has operational or financial control (ability to make important operating or financial decisions). It does not account for GHG emissions from operations in which it owns an interest but has no control

While most companies choose the control approach, the business goals and focus of the carbon footprint exercise would influence the choice of approach. It is important to document the type of approach selected to maintain consistency while adjusting the baseline GHG emission

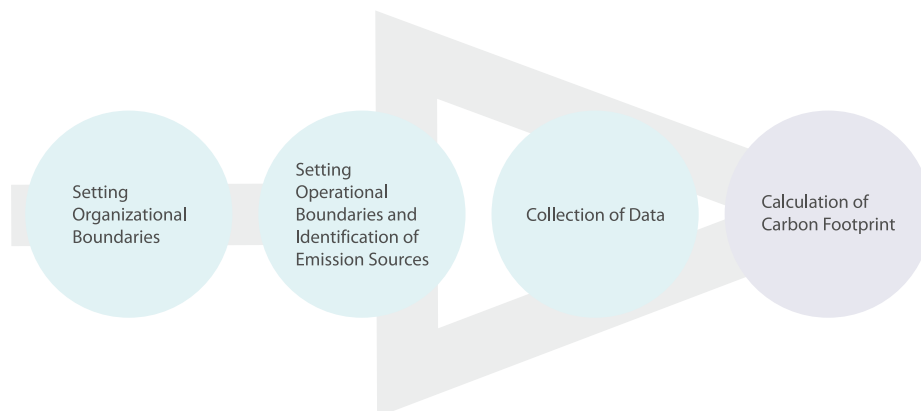


Figure 1: Process of Developing Organizational Carbon Footprint

for the organization to account for further acquisitions, sales or mergers.

2.

Setting Operational Boundaries and Identification of Emission Sources

Operational boundaries determine which activities in the operations to include in the GHG emission inventory. The most widely used approach for defining operational boundaries is as per 'Scopes of emission'. The three scopes of assessment help identify and categorize activities over the entire chain of operations, based on the level of control an organization has over these activities (see Figure 2).

The three scopes of emission are as below:

Scope1 emissions : Direct GHG emissions due to activities or assets owned or controlled by the organization. These

include sources like onsite fuel combustion in owned or controlled boilers or furnaces, fuel combustion in owned or leased vehicles, emissions from chemical production in owned or controlled process equipment, and fugitive emissions or leaks.

Scope2 emissions : Indirect GHG emissions due to consumption of purchased energy such as electricity, heat, steam and cooling. These indirect emissions are consequences of the organization's activities but occur at sources not owned or controlled.

Scope3 emissions : Other indirect GHG emissions due to sources not owned or controlled by the organization, excluding those related to energy purchases classified in Scope2. The emission sources include purchased raw materials used in production processes (due to their embedded energy), use of products by customers, end-of-life disposal of products, employee commute and business travel (in non organization owned vehicles), waste disposal and outsourced operations.

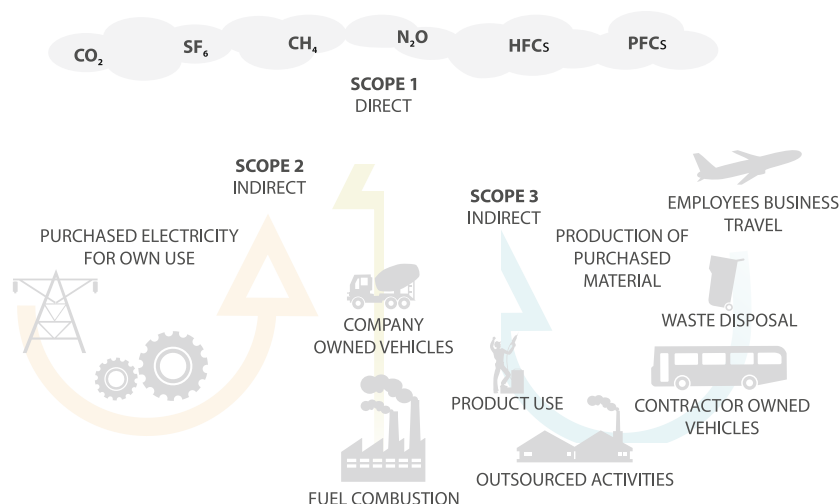


Figure 2: Scopes of GHG emission for organizations

(Source: WRI (2004): The GHG Protocol: A Corporate Accounting and Reporting Standard
Accessed from: <http://www.ghgprotocol.org/standards/corporate-standard>, Nov 2012)

Estimation of GHG emission is largely done considering Scope1 and Scope2 emissions by organizations during the initial assessment. As Scope 3 emission includes downstream and upstream activities within the supply chain, organizational control and data availability can be an issue. Some of the Scope3 emissions can be important based on the profile of the organization as well as the goal of the carbon footprint. For instance, if an organization aims to reduce GHG emission from business travel, strategize towards greening its supply chain or undertake product lifecycle carbon footprint, then Scope3 emissions assume importance. **Distribution of GHG emissions by scope can vary over sectors due to diverse operations and energy use.** The Carbon Disclosure Project's Global 500 Report, which captures emission for the top 500 global organizations across sectors, shows variation in distribution of GHG emission by scope. The Industrial Sector is fuel and process intensive and has majority of GHG emission from these sources, while the Telecommunication Sector has higher Scope2 emissions from electricity use in buildings (see Figure 3).

Case Study: Benefits of Carbon Footprint Mapping

Tata Consultancy Services (TCS), a leading IT services, business solutions and outsourcing organization, headquartered in Mumbai, mapped its baseline carbon footprint in FY 2007-08. This exercise helped the organization assess carbon intensities across various sources of GHG emission, set time bound targets for emission reduction, and initiate actions to achieve the set target.

The organization undertook various initiatives directed towards

- Maximizing energy efficiency in its offices by actions such as undertaking energy audits in older buildings, developing new buildings as green buildings, using energy efficient appliances, and putting operational controls in place
- Increasing share of renewable energy gradually by setting up solar photovoltaic systems and solar thermal water heaters onsite, and procuring 'green power'
- Optimizing the business air travel by encouraging audio and video conferencing

These initiatives have enabled the organization to achieve large reduction in energy consumption by 28% and savings in energy costs. The carbon footprint of the organization has reduced by 29% in FY 2011-12 compared to its baseline in FY 2007-08.

(Source: WWF and CI-ITC CESD (2008): Indian Companies with Solutions that the World Needs)

3.

Collection of Data

The most common approach used to calculate GHG emissions is to apply documented emission factors to known activity data from the organization.

$$\text{Activity Data} \times \text{Emission factor} = \text{GHG emission}$$

Activity data is information such as electricity consumption, fuel purchases for use in equipments or in vehicles, vehicle kilometers travelled, distances on business trips, waste generation which can help estimate GHG emission. To estimate emissions more accurately, it is best to collect activity data by volume or mass (e.g. liters of diesel used). Accurate data collection is vital to obtain and accurate carbon footprint. **Standardized reporting formats such as spreadsheet templates and other quality management tools can help develop systematic process of data collection and collation in multiple departments, business units, and locations. The period of data collection should ideally be over 12 months** and can be based to suit organization's internal and external reporting period.

4.

Calculation of Carbon Footprint

Post collection of activity data, the final step is to calculate the carbon footprint using appropriate and documented emission factors. As far as possible, the emission factors for the respective country of operation should be used. In the case of India, the Central Electricity Authority (CEA) regularly publishes and updates emission factors for grid electricity. Fuel emission factors can be accessed from the GHG Protocol calculation tools. Various databases and guidance are also available for other emission factors on the internet.

The GHG emission from various sources and activities are collated and the carbon footprint is generally reported as the gross GHG emission in CO₂ equivalents (CO₂e). Disaggregated figures of GHG emission based on scopes, activities or business units can help in identifying carbon hotspots and consequently devise actions for emission reduction and metrics for monitoring.

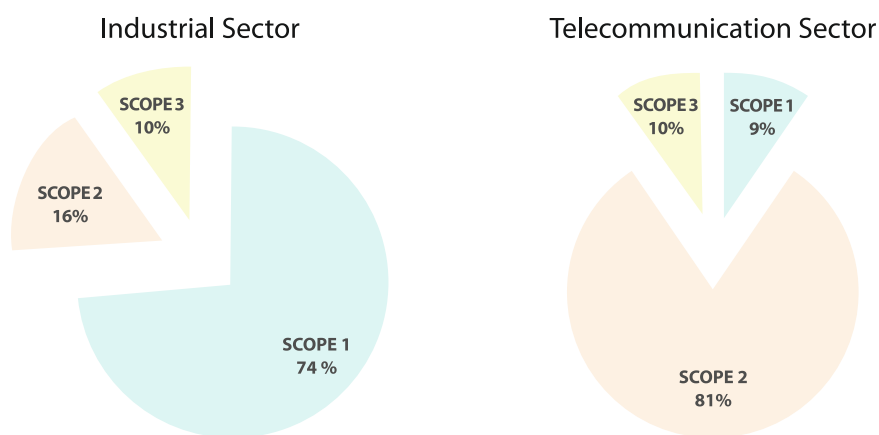







Figure 3: Variation in Distribution of GHG emission by Sector

(Source: CDP (2012): Global 500 Climate Change Report.
Accessed from: <https://www.cdproject.net/en-US/Pages/global500.aspx>, Nov 2012)

Examples of Activity Data		Examples of Emission Factors
○ Liters of fuel consumed		○ kg CO ₂ emitted per liters of fuel consumed
○ Kilowatt hours of electricity consumed		○ kg CO ₂ emitted per kWh of electricity consumed
○ Kilograms of material purchased		○ kg of CO ₂ emitted per kg of material purchased
○ Kilometers of air travel		○ tonnes of CO ₂ emitted per km of air travel
○ Kilograms of waste generated		○ kg of CH ₄ emitted per kg of waste generated

India's Outlook on Carbon Foot Printing

There is a long way to go for Indian businesses on the path of carbon footprint mapping and disclosure. Only 37 of the top businesses in India (based on market capitalization) responded to the Carbon Disclosure Project's (CDP) request in 2007 seeking information on Climate Change strategy, risks and opportunity assessment, and carbon accounting¹. The number would be much lower if the numerous medium and small businesses spread through India are considered.

However, businesses in India are slowly starting to see the value in undertaking carbon footprint accounting and its disclosure, with the number of businesses responding to CDP rising to 55 in 2013².



The Need for Carbon Footprinting within the Mumbai Metropolitan Region

The MMR currently houses about 7,800 industries units. Some major GHG emitting industries such as thermal power plants, cement, iron and steel, aluminium, pulp and paper, and petrochemicals are located in MMR.

The industrial sector is the biggest electricity consumer in MMR, accounting for 39% of the total consumption. Mumbai is the financial hub of India and it is seen that industries housed in the MMR have large energy and carbon intensities. Thus, there is an ample scope for organizations within the MMR to quantify their carbon footprint and subsequently act on minimizing their carbon emissions.

(Sources:
1. MMRDA (1999): Regional Plan for Mumbai Metropolitan Region 1996-2011, Ch.2 'Regional setting', Maharashtra Government Gazette, Mumbai;
2. NEERI and MTSU (2011): Study of Mumbai MMR Sustainability: Housing and Transport)

For further information, refer to:

1. Department of Environment, Food and Rural Affairs, U.K. (2009): Guidance on how to measure and report your greenhouse gas emissions.

Available at:

<http://www.defra.gov.uk/publications/2011/03/26/ghg-guidance-pb13309/>

2. Small Firms Association (2007): Environmental Management Guidelines for Small Businesses: Carbon Footprint. Available at:

[Http://www.ibec.ie/IBEC/DFB.nsf/vPages/Environment~Resources~environmental-management-guidelines-09-04-2009/\\$file/5+Carbon+Footprint.pdf](http://www.ibec.ie/IBEC/DFB.nsf/vPages/Environment~Resources~environmental-management-guidelines-09-04-2009/$file/5+Carbon+Footprint.pdf)

3. CDP and Chicago Climate Exchange: White Paper on the Commercial Value of Carbon Measurement

Available at: <https://www.cdproject.net/en-US/WhatWeDo/CDPNewsArticlePages/white-paper-commercial-value-of-carbon-measurement.aspx>

¹ CDP (2007): India Report
² CDP : India 200 Climate Change Report 2013