TEDDY EXPORTS

AurovilleConsulting

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GREENHOUSE GAS INVENTORY

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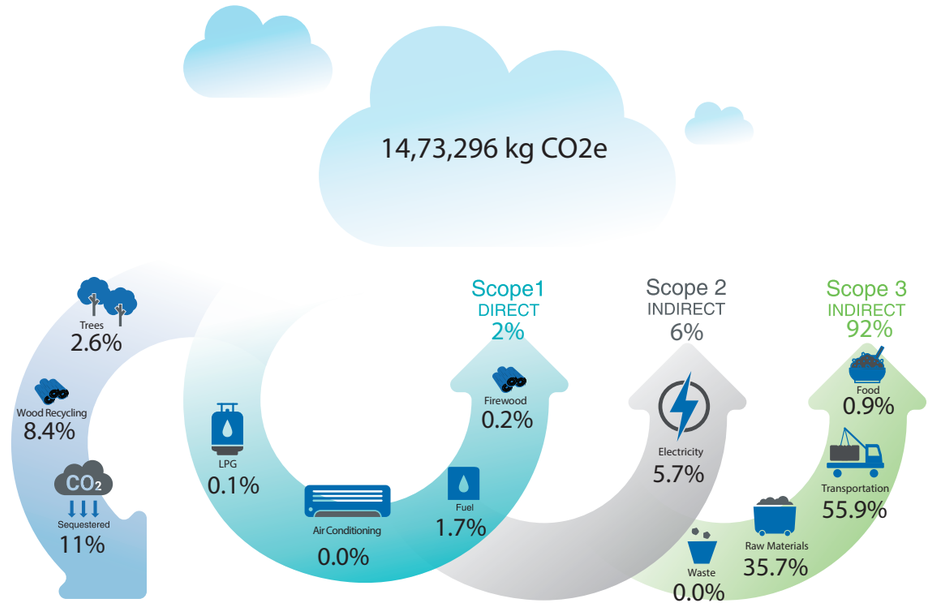
FY 2021-22

Summary



Recommendations pertaining to improvement in data collection processes

Scope	Activity	Recommendations
1	Fuel	1. Record vehicle-wise fuel consumption to ensure proper functioning and efficiency.
1	Refrigerants	1. Detailed records of maintenance activities for ACs, with type and volume of refrigerant gas filled.
2	Electricity	1. Measure, monitor consumption for each department.
3	Transportation	1. Improve accuracy of logbooks.
3	Raw materials	1. Categorize and document type and quantity of raw material.
3	Carbon sequestration through tree planting	1. Document plantation activities.
3	Process-based waste generation	1. Periodically collect and quantify the waste from packaging and organic waste from the kitchen.

Recommendations pertaining to the process efficiency and emissions reduction

Scope	Activity	Recommendations
1	Fuel	1. Regular maintenance of vehicles. 2. Transition to renewable energy to reduce diesel dependency. 3. Transition to electric vehicles.
2	Electricity	1. Explore interventions for reduction based on energy efficiency assessment. 2. Transition to renewable energy.
3	Transportation	1. Introduce lower carbon modes of commuting, e.g, e-bikes, cycles. 2. Set up infrastructure to support e-vehicle transition with charging stations. 3. Introduce shared transport and e-vehicle shuttle for last mile commute.
3	Raw materials	1. Switching to organic and natural fibres as much as possible. 2. Shifting to upcycled, recycled materials for packaging.
3	Process-based water use	1. Increase ground water reserves by digging pits. 2. Reuse water recycled from ETP, STP in manufacturing process.
3	Process-based waste generation	1. Develop effective methods for reduction after collecting and understanding the waste.

Contents

Introduction

Climate change is one of the most pressing challenges faced by planet Earth today. Human activities have contributed to a global temperature rise of over 1˚C from the pre-industrial era. This rise of temperature can be attributed to the presence of greenhouse gases (GHGs) in the atmosphere. The consequences can be seen in the form of extreme weather conditions, extinction of plant and animal species, rise in sea level, reduction in crop yields and scarcity of water, to name a few.

Companies across the world are increasingly aware of the global drive towards sustainable development. To ensure long-term success in a competitive business environment, companies are developing effective strategies to take early action. The first step for any company is to have a detailed understanding of its GHG emissions. An emissions inventory helps them:

- Identify reduction opportunities and thereby improve operational efficiency.
- Prepare for future climate policies, e.g., regulations on energy efficiency, carbon taxes, decarbonisation goals and Carbon Border Adjustment Mechanisms.
- Communicate their commitment to key stakeholders, such as customers and investors.

Teddy Exports, a fairtrade export company based in Madurai, Tamil Nadu decided to put together a GHG emissions inventory report for the financial year 2021-22. Teddy Exports, established in 1987, manufactures high quality textile and wooden products and exports them to various brands across the globe.

Scope of work

This study is put together using the guidelines of the globally recognised tool, the GHG Protocol: Corporate Accounting and Reporting Standard. The standard helps organisations identify, calculate, and report their GHG emissions in an accurate, consistent, and transparent manner.

The tool incorporates national emission factors where available or default global values to convert different organisational activities into the respective greenhouse gases emitted. The seven greenhouse gases reported under this standard include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The combined emissions are expressed in kilograms of carbon dioxide equivalent (kg CO2e), which compares all the greenhouse gasses to carbon dioxide. The use of CO2e helps simplify the accounting process and analysis as the emissions are represented by a single value.

The GHG Protocol mandates that the activities of organisations be split into three categories or scopes for a more transparent accounting structure. The activities covered under each scope are shown below in Table 1:

Table 1: Definition of scopes for corporate accounting

Scope 1	Direct emissions	Emissions from sources owned and controlled by the company; e.g. emissions from equipment and vehicles owned by the company.
Scope 2	Indirect emissions	Emissions from the generation of purchased electricity consumed at company facilities.
Scope 3	Other indirect emissions (optional)	Emissions that occur as a consequence of the company's activities, but from sources not owned by the company, e.g. transport of purchased goods, work-related travel.

This is an initial report of Teddy Exports' GHG emissions inventory for the FY 2021-22. The report identifies and quantifies Teddy Export's operational carbon emissions. A strong focus of this initial report was to identify opportunities for streamlining and improving data collection and data accuracy.

Annual GHG Emissions

The sources of emissions covered under each scope are given below.

Scope 1

Emissions from machines and processes inside the operational control of the company, i.e., the unit premises in Madurai, Tamil Nadu. The sources include:

- Diesel burnt for operating generators and company-owned vehicles.
- LPG used for cooking in the canteen.
- Refrigerant leaks (in the form of HFCs and HCFCs) from air conditioners.

Scope 2

Grid-supplied electricity consumed by the unit, or the electricity produced outside the unit premises by the state utility.

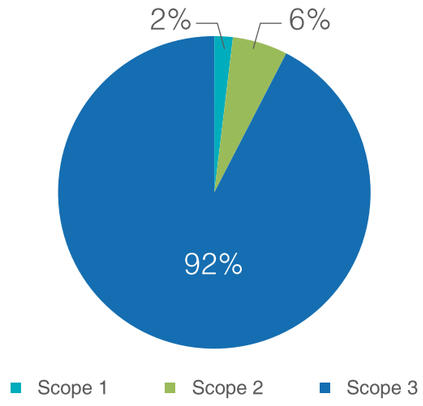
Scope 3

Indirect emissions from activities outside the operational boundary of the unit. The categories covered are:

- Primary raw materials used, namely, paper, and natural fibres.
- Transportation
  - Business travel and employee daily commute.
  - Transportation of finished goods.
- Wastes from manufacturing processes.
- Food prepared in the canteen.

In addition to emissions generated, the report considers the CO2 sequestered by the trees planted on site. No offsetting activities outside the factory have been documented and hence have not been considered in the report.

Figure 1: Emissions by scope (%)



The annual emissions of Teddy Exports for FY 2021-22 are 16,56,503 kg CO2e.

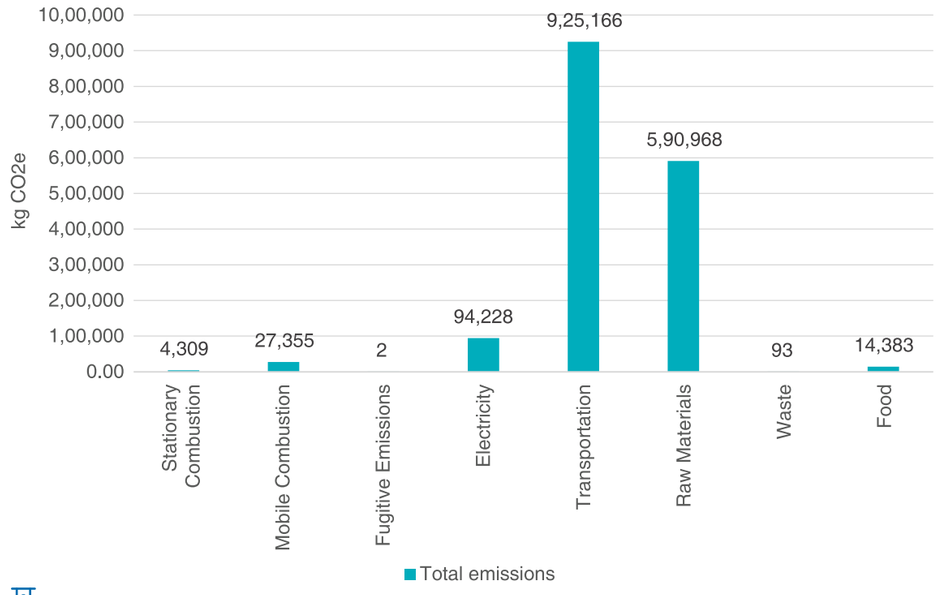
As seen in figure 1, scope 3 emissions account to 92% (15,30,609 kgCO2e) and hence is the highest contributor of all the scopes followed by scope 2, which is 6% (94,228 kg CO2e) and scope 1 at 2% (31,666 kg CO2e).

The emissions from scope 3 can be attributed to the upstream emissions from the raw materials used in the manufacturing of textile products, product waste and transportation. These emissions are attributed to external factors not within the direct operational control of the organization.

Emissions by category

The objective of analysing emissions based on their category is to provide awareness on the major emitting sectors, which can lead to targeted interventions. In addition, inputs on improving the quality of data and recommendations for future inventories have also been provided below.

Figure 2: Emissions by category (kg CO2e)



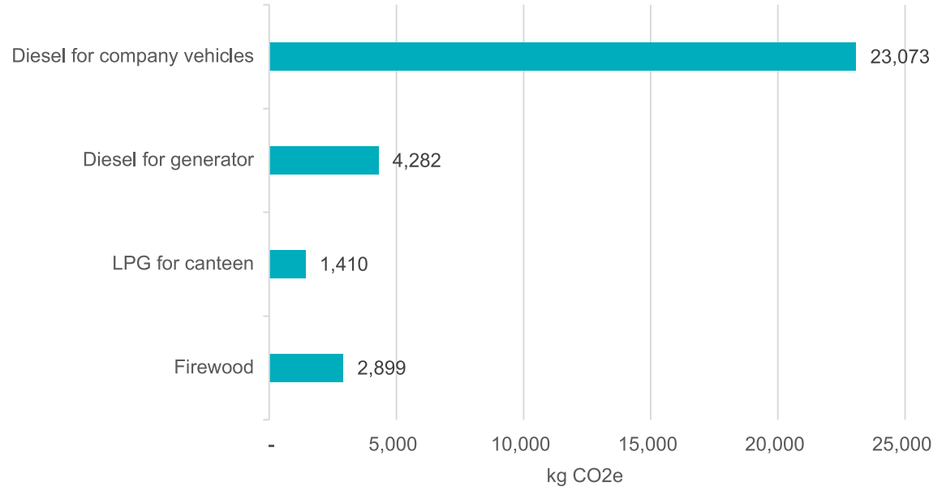
Fuels

The company uses fuels for manufacturing processes and in stationary and mobile equipment, all of which form part of scope 1 emissions.

The **mobile combustion emissions** include diesel used for transporting goods and other company owned vehicles used for commuting. With a total of 27,355 kg CO2e, mobile combustion contributes to 86% of total scope 1 emissions and is the highest contributing category of emissions.

Consumption of wood and LPG in the preparation of meals form the sources of emissions under **stationary combustion**. With a total of 4,309 kg CO2e, mobile combustion contributes to 14% of the total scope 1 emissions and is the next highest contributor.

Figure 3: Annual emissions from fuel consumption



The diesel consumption data was collated based on purchase details through monthly purchase bills. The quantities for company owned and operated vehicles was provided through logbooks that recorded fuel bills and are found to be accurate. The data on the quantity of LPG used was collected in the form of purchase records of cylinders and is found to be accurate.

The emissions from mobile combustion of diesel can be reduced by:

- Regular maintenance of vehicles to ensure proper functioning and efficiency.
- Recording vehicle-wise fuel consumption to make sure they are functioning properly and to improve data quality.
- Transitioning to renewable energy generation to reduce reliance on diesel-based generators.
- Transitioning to electric vehicles to reduce transportation emissions.

Refrigerants

Fugitive emissions caused by the leakage of refrigerants from the use of air conditioners, which form part of scope 1 emissions, released 2kg CO2e or 0.01% of the total scope 1 based emissions.

For this year's inventory, the data available was the number of air conditioners used by the company and the year of purchase. From this data, the total fugitive emissions were derived based on the average leakage and possible refrigerant type.

Recommendation to reduce fugitive emissions:

- Detailed records of maintenance activities undertaken on air conditioners along with type and volume of refrigerant gas refilled will help enhance accuracy of future inventories.

Electricity

Grid-supplied electricity contributed to a total of 94,228 kg CO2e or 6% of the total emissions of the unit. The consumption data was collected through the utility bills, which is a reliable and accurate source of data.

Few recommendations to reduce electricity-related emissions:

- The company can measure and monitor the consumption of individual departments and processes' energy consumption for further accuracy and efficiency.
- The energy efficiency assessment conducted by the organisation can lead to effective interventions to reduce consumption.
- Shifting over to renewable energy can reduce Scope 2 emissions.

Transportation

Transport information was provided in two categories, daily commute by employees in buses and two wheelers, and outgoing goods transported from the unit by road, air, and sea. Total transport-related emissions amounted to 9,25,166 kg CO2e which contributed to 60% of scope 3 emissions and 56% of the total emissions of the organisation making it the largest contributing sector of emissions for the organisation.

The data was collated from bills of freight companies, which provided details on the destination of the goods. Based on the distance travelled, the emissions were estimated through the known mode of transport. The data on business travel was put together through the invoices of flight, ship and four-wheeler, and two-wheeler travel logs maintained by the company. The data for employee commute was acquired through a data sheet recording the home-to-work distances of all employees, along with the attendance register logged by the human resources department.

Some recommendations around transportation emissions are listed below:

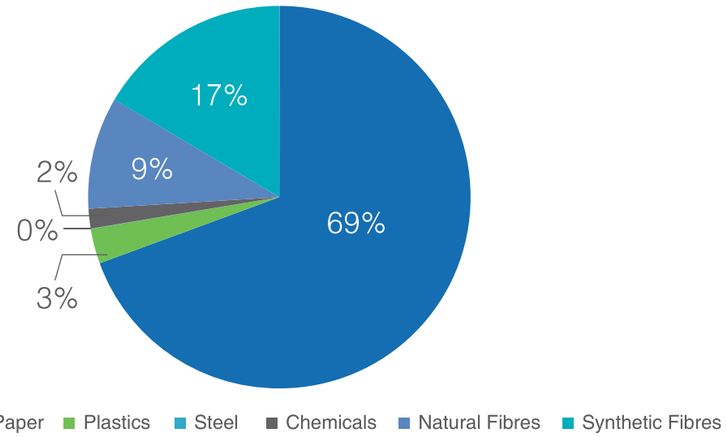
- Improvement in accuracy of the logbooks for employee commute and employee business travel would improve data for effective interventions.
- Introducing schemes for employees to use lower carbon modes of transport such as e-bikes and cycles.
- Introducing infrastructure to assist employees to transition to e-vehicles and shared modes of transport can be added to the decarbonisation strategy. This includes e-vehicle charging stations, and an e-vehicle shuttle service for last mile commute.

Raw materials

The total emissions from the purchase of raw materials are 5,90,968 kg CO2e which contributed to 39% of the emissions of scope 3 and 36% of the total emissions of the organisation making it the second largest emitting sector in the organisation. Out of the total raw material emissions, 69% was from the procurement of cardboard and paper, 16% from the purchase of synthetic fibre and 9% from natural fibre.

Raw materials are grouped into 6 categories: natural fibre, synthetic fibre, metal, chemicals, and paper.

Figure 4: Break up of emissions by type of raw material



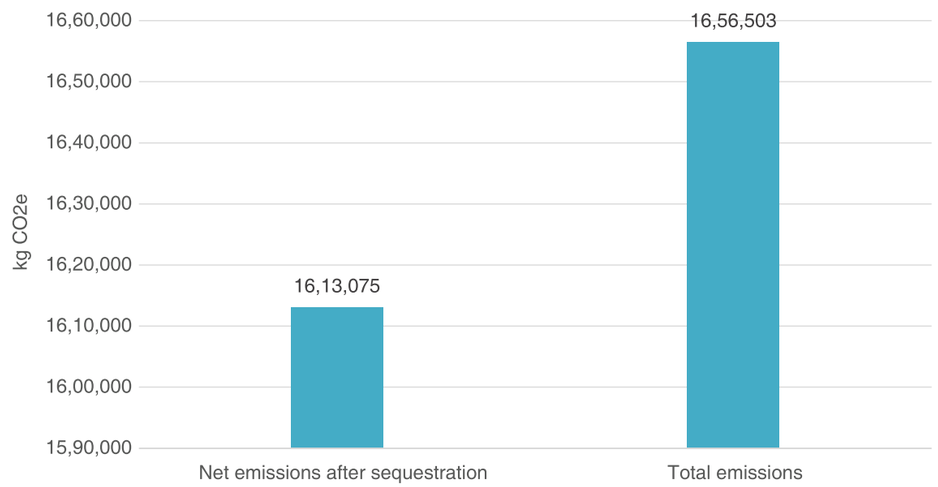
Data on the quantities and types of raw materials procured was collected from the accounts department and stores which has details on all purchase orders, thus providing accurate information.

Some recommendations around raw material emissions are listed below:

- Categorising the types of the raw materials and documenting this information will provide accurate data on the quantity used, leading to better quantification of emissions.
- Switching more production capacity over to products using organic and natural fibres would reduce the overall emissions intensity.
- Switching packaging material over to recycled or upcycled cardboard and paper would result in reduction of 4,10,060 Kg Co2e or 25% of the overall emissions of the organisation.

Carbon sequestration through tree planting

Figure 5: Comparison between business as usual and carbon sequestration



Teddy Exports has around 1,974 trees spanning 30 different species on the Unit 1 premises, including the farm, nursery, school, animal shed, transport area, shop, printing unit, reception, gate, powerhouse, creative, canteen and round house premises. During this inventory year, it is estimated that the trees sequestered 43,428 kg CO2e, which is 2.62% of the total emissions and 34% of the emissions directly linked to the organisation in Scope 1 and 2.

This does not consider the various tree planting projects outside the campus, funded by the organisation in the past.

Recommendation around carbon sequestration:

- From the next inventory, the company can record its planting efforts to have a larger understanding of its carbon offsets.
- Designating patches of land for afforestation or land rejuvination activities would result in major in-setting of carbon.

Process-based water use

The consumption, treatment and disposal of water is an important factor to consider for every entity to ensure global water security. Its scope covers GHG emissions but goes well beyond it as it also considers the depletion of the natural resource, which is vital for plant and animal life.

The company uses water majorly in the printing department. Teddy Exports sources groundwater with a borewell for all its needs in the unit. In FY 2021-22, a total of 1,95,15,200 litres were used from the borewell.

The data on water consumption was collected through metre readings for groundwater which provide accurate information.

A few recommendations around water use are listed below:

- More pits for the collection of rainwater can be dug on site to prevent runoff and increase in usable water reserves for farming and horticultural activities leading to overall reduction in water consumption.
- Reusing the water recycled from the STP and ETP systems in the manufacturing processes could eventually help the company become a net-zero water consumer meaning that it harvests as much water as it needs during the manufacturing processes and other requirements in the unit.

Process-based waste generation

The management of waste is an important factor to consider for all manufacturing companies. The scope for waste management, like water, goes beyond the GHG emissions. Waste, if not treated properly can contaminate natural resources and affect the health of the planet and its inhabitants.

The company has a waste segregation protocol, and none of the waste at the site is hazardous, hence the treatment of waste before disposal is not needed. For the FY 2021-22, a total of 15,096 kg of cotton scrap and 879 kg of metal scrap was recycled.

Waste wood form Unit 2 of Teddy Exports was used for cooking in the canteen, which otherwise would have been landfilled and hence avoided emissions amounting to 1,39,778 kg which is 8% of the overall emissions of the organisation and 11% more than the direct emissions linked to the organisation in Scope 1 and 2. This is considered an effective in-setting activity and has been subtracted from the total emissions of the organisations.

Most of the cloth scraps and all metal scraps are sold to recyclers, which prevented the waste from being landfilled. However, plastic and jute scrap are not recycled which Teddy Exports can look at doing for the next inventory year to reduce the waste from production.

Data on scrap cloth and metal was collected from logbooks at the gate, which document the weight of the waste at the time of transporting it out of the facility. In general, data for waste can be documented into categories as currently done, and monthly for better organisation of the unit's waste data.

Recommendation around process waste:

- For the next inventories, waste from paper and cardboard used during packaging and organic waste from kitchen can be collected to understand waste generation better and eventually develop effective methods for reduction.

Conclusion

With this report, Teddy Exports has a broad overview of its GHG emissions. The highest emitting categories of emissions were Transportation at 56% and Raw materials at 36%, and effective interventions in these two categories can have a major impact on the emissions reduction journey of the organisation. Parallelly, carbon sequestration activities such as afforestation or natural forestation can lead to absorbing larger amounts of carbon and lead to effective in-setting of emissions. Currently trees planted on the campus sequester 2.62% of the total emissions of the organisation and 34% more than the direct Scope 1 and 2 emissions. The waste wood from Unit 2 of Teddy Exports was used for cooking in the canteen, which otherwise would have been landfilled and hence avoided emissions amounting to 8% of the overall emissions of the organisation and 111% more than the direct emissions linked to the organisation in Scope 1 and 2.

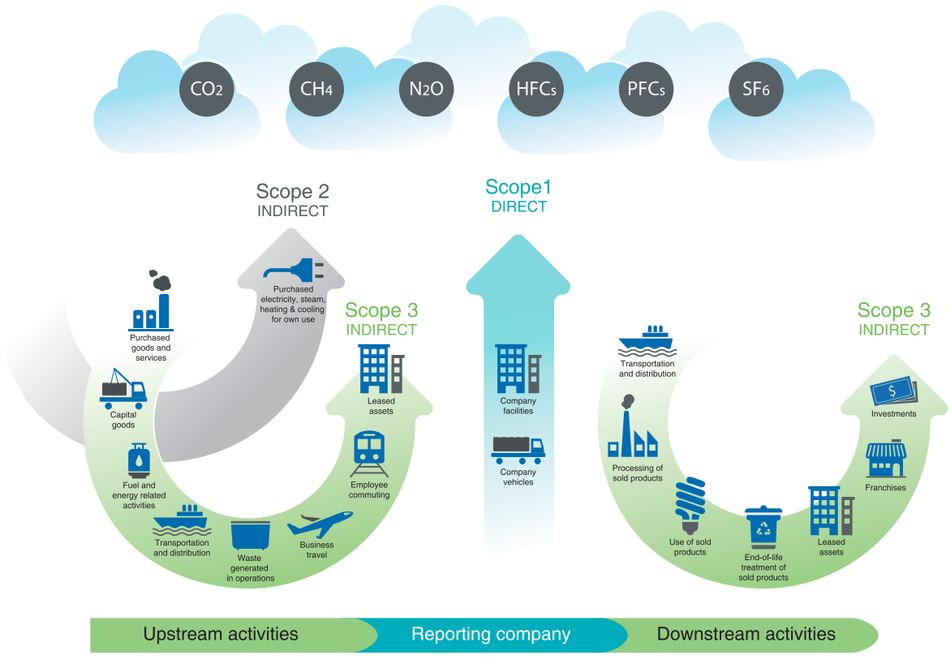
It is recommended that the company include additional areas to the overall emissions inventory, including Teddy Exports Unit 2, the school and creche to get a more wholistic understanding of the organisation's footprint. For the next inventory, the company may also choose to set itself an emissions target.

Auroville Consulting, which put together this report, can help Teddy Exports understand its carbon and the sources to make informed decisions on mitigating the carbon. Some of the practices that Teddy Exports would require to undertake on a regular basis are the following:

- Preparing annual emissions inventories.
- Setting a science-based target.
- Implementing data collection systems where required for improving accuracy.
- Identifying and implementing mitigation measures.
- Compensating emissions through offsetting programs.
- Reporting progress to stakeholders.
- Evaluating carbon strategy.

Annexure A – Methodology

Figure 6: Overview of scopes and emissions across a value chain



For all emission sources, GHG emissions are estimated by multiplying activity data by an emission factor associated with the activity that is being measured. Activity data is a quantitative measure of an activity during a given period of time that results in GHG emissions (e.g., litres of diesel used, kilometres driven, and tonnes of waste sent to landfill). An emission factor is a measure of the mass of GHG emissions relative to a unit of activity. For example, data on electricity consumed to power a factory, measured in kilowatt-hours (kWh), is multiplied by the emission factor for electricity (kgCO2/kWh) to estimate the total amount of GHG emissions.

Each GHG has different characteristics, the two most prominent ones for the purpose of measuring them are: the amount of heat it absorbs and its lifespan. This is measured by the Global Warming Potential (GWP) which describes the warming potential of one unit of a given GHG relative to carbon dioxide.

Emissions from each activity are reported in metric tonnes of GHGs emitted as well as their carbon dioxide equivalent (CO2e). CO2e is a universal unit that simplifies the accounting process by producing a single number to describe the impact of all the greenhouse gases; this is done by using the GWP of each GHG.

Annexure B – References

The sources of emission factors used to derive the Teddy Exports emissions inventory are listed below.

Table 2: Sources of emission factors

SL No.	Emission factory Category	Reference
1	Diesel	India GHG Program – India specific road transport emissions (2015)
2	LPG	The data taken from UK Government GHG Conversion Factors 2016 for Company Reporting.
3	Electricity	Electricity emission factor CEA report 2016
4	Cardboard and paper	UK Government GHG Conversion Factors 2016 for Company Reporting.
5	Plastics	UK Government GHG Conversion Factors 2016 for Company Reporting.
6	Chemicals	UK Government GHG Conversion Factors 2016 for Company Reporting.
7	Natural Fibre	Cotton lifecycle assessment and Carbon footprint of Jute papers from ResearchGate.
8	Synthetic Fibre	Cotton lifecycle assessment and Carbon footprint of Jute papers from ResearchGate.
9	Steel	Cbalance white paper – Overview of Indian Steel sector (Jan 2013)
10	Two and four-wheeler transportation	IPCC derived value based on mileage
11	Bus	UK Government GHG Conversion Factors 2016 for Company Reporting.
12	Ship	Emissions from India's transport sector: State wise synthesis paper by IISC
13	Freight	India GHG Program - Road transport technical paper 2015

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