Shan Poornam Sdn. Bhd.

A Cenviro Associate

201201027020 (1011510-A)

# 2023 Greenhouse Gas Inventory Report

July 2024

Plot 34 (No.1479), Lorong Perusahaan Maju 6,
Kawasan Perindustrian Perai, Fasa 4,
13600 Perai, Penang, Malaysia

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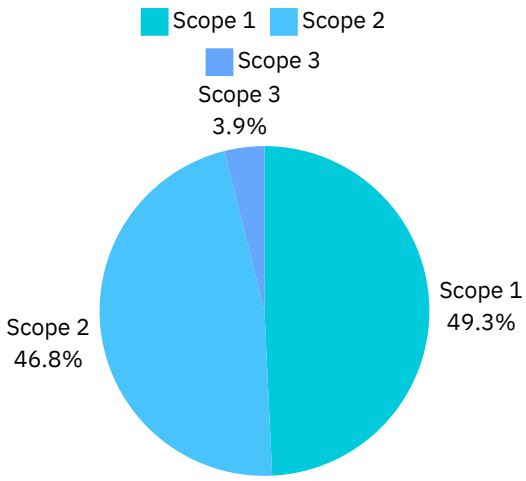
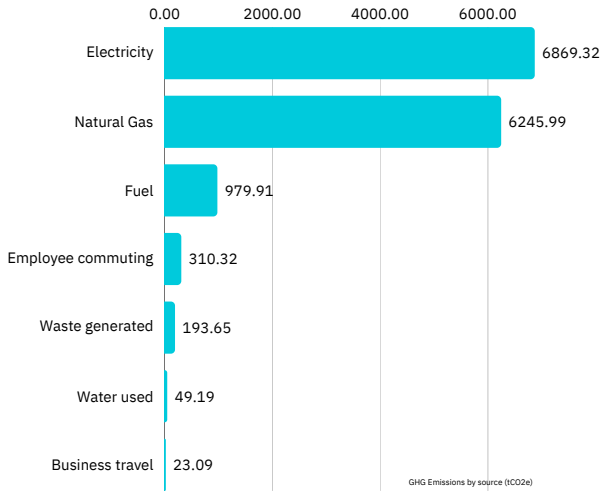
# Executive summary

This GHG Inventory Report provides a comprehensive overview of the greenhouse gas emissions for Shan Poornam Sdn. Bhd. for the year 2023. The inventory is built according to the GHG Protocol Corporate Accounting and Reporting Standard. The report quantifies emissions from Scope 1, Scope 2 and Scope 3 sources, offering insights into the company's carbon footprint and identifying key areas for emissions reduction. Total 2023 GHG Emissions for Shan Poornam: 14,671.47 metric tonnes of $CO_2$ equivalent ($tCO_2e$).

| Emission Generating Activity | Unit | Emissions | Source (%) | Scope (%) |
|---|---|---|---|---|
| **Scope 1: Direct GHG emissions** | | | | |
| Fuel Consumption | tCO2e | 979.91 | 6.68 | |
| Natural Gas Consumption | tCO2e | 6,245.99 | 42.57 | |
| Total Scope 1: | tCO2e | 7,225.90 | | 49.25 |
| **Scope 2: Electricity indirect GHG emissions** | | | | |
| Electricity Use | tCO2e | 6,869.32 | 46.82 | |
| Renewable Energy (RE) | tCO2e | 0.00 | | |
| Total Scope 2: | tCO2e | 6,869.32 | | 46.82 |
| **Scope 3: Other indirect GHG emissions** | | | | |
| Purchased Water | tCO2e | 49.19 | 0.34 | |
| Waste Generated | tCO2e | 193.65 | 0.86 | |
| Business travel | tCO2e | 23.09 | 0.03 | |
| Employee commuting | tCO2e | 310.32 | 1.50 | |
| Total Scope 3: | tCO2e | 576.25 | | 3.93 |
| Grand Total: | tCO2e | 14,671.47 | 100.00 | 100.00 |



# 1.0 Introduction

2023 Greenhouse Gas (GHG) Emissions Inventory Report for Shan Poornam Sdn. Bhd. (SP) is prepared by Galaxy Tech Solutions (KL) Sdn. Bhd. (Consultant). This report reflects the commitment to environmental accountability and is a key component of SP's strategy for sustainable operations.

SP has undertaken a comprehensive assessment of its Scope 3 GHG emissions for the first time, covering the period from January 1, 2023, to December 31, 2023. This report includes a detailed analysis of both direct and indirect emissions across its operations, ensuring a thorough understanding of the organization's environmental impact.

The aim of this report is dual: to transparently communicate SP's GHG emissions to stakeholders and to align these findings with the company's environmental policies. In doing so, SP demonstrates its dedication to environmental stewardship and responsible corporate practice.

The assessment is conducted in accordance with the GHG Protocol Corporate Accounting and Reporting Standard (GHG Protocol) [1], ensuring that the methodology and reporting approach meet international standards.

To set the foundation for SP's GHG emissions management sources of emissions from Scope 1, 2, and selected 3 included In the 2023 GHG Inventory. Through this report, a clear and accurate picture of SP's GHG emissions is provided, setting the foundation for ongoing environmental management and improvement.

# 2.0 Scope

## 2.1 Organizational Description

Shan Poornam Sdn Bhd (SPSB) is a leading regional player in industrial waste management, licensed by Malaysia's Department of Environment (DOE). Specializing in both hazardous and non-hazardous waste, SPSB is distinguished as the first DOE-authorized facility for processing metal chips and items contaminated with spent coolant (Schedule Waste Code 422).

An associate of Cenviro—a Khazanah Nasional Berhad subsidiary—SPSB operates advanced facilities across four locations, using ECO Green Technology. Together, these sites process over 5,000 metric tonnes of diverse industrial waste monthly, including electronic waste, solvents, spent acids, alkaline solutions, sludge, dross, and non-ferrous metals.

Founded in 1960 as a waste collection and timber trading center, SPSB pioneered recycling in Malaysia long before it gained prominence in the 1990s. The company has since expanded its operations,

cementing its role as a key player in hazardous and non-hazardous waste processing. In 1996, it became the first DOE-licensed company to manage metal chips and coolant-contaminated articles, reflecting its commitment to environmental stewardship and industry leadership.

GHG Manager - Mr. Teoh Yik Then sustainability.enquiry@ensspm.com
Consultant - Mr. Ildar Usmanov 010 765 5180

| Organization | Address | Division | Type of Business | Employee |
|---|---|---|---|---|
| Shan Poornam Metals Sdn Bhd (SPM) | Plot 34, 204 (No.1479), Lorong Perusahaan Maju 6, Kawasan Perindustrian Perai, Fasa 4, 13600 Perai, Penang, Malaysia. | Headquarter (HQ)<br>Aluminum division<br>Platinum Group Metals (PGM)<br>SPM 2: Plot 204 LMW | Management of industrial waste (mainly solutions and solids) including processing and recovery manufacturing of finished goods like Gold, Silver, Platinum, Palladium and Ruthenium | 647 |
| Shan Poornam Global Sdn Bhd (SPG) | No.1472, Lorong Perusahaan Maju 6, Kawasan Perindustrian Perai, Fasa 4, 13600 Perai, Penang, Malaysia. | Copper Line<br>Nickel line<br>Solvent Process<br>PGM<br>Drossing<br>WWTP | Management of industrial waste (mainly solutions and sludges) including processing and recovery | 31 |
| Shan Poornam Green Tech Sdn Bhd (SPGT) | Plot 204, Lorong Perusahaan Maju 6, Kawasan Perindustrian Perai, Fasa 4, 13600 Perai, Penang, Malaysia. | ITAD Copper Melting | Household & Commercial E-Waste | 105 |
| Shan Poornam Metals (Selangor) Sdn Bhd (SPMS) | No.13A, Jalan Bestari 2A/KU7, Taman Perindustrian Kapar Bestari, 42200 Klang, Selangor, Malaysia. | SPMS<br>Cenviro Recycling and Recovery | Collection of household and commercial waste | 14 |
| Shan Poornam Metals (Johor) Sdn Bhd (SPMJ) | No. 39, Jalan Murni 4, Taman Perindustrian Murni Senai, 81400 Senai, Johor Bahru, Malaysia. | Partial waste recovery | Collection and recycling of scraps | 7 |
| Shan Poornam Metals (Sarawak) Sdn Bhd (SPMSw) | Lot 728, Block 8, Demak Laut Industrial Estate Phase 3, Jalan Bako, Muara Tebas Land District, 93050 Kuching, Sarawak, Malaysia. | Copper line<br>Nickel line<br>Dismantling & segregation of waste | Collection of household and commercial waste | 12 |

## 2.2 GHG Accounting Standards

For the completion of the corporate GHG inventory, the consulting firm aligns its quantification and reporting approach with the GHG Protocol Corporate Standard methodology.

The GHG Protocol Corporate Standard provides a comprehensive global framework for measuring and managing greenhouse gas (GHG) emissions, ensuring alignment with the following key principles:

- Relevance: Reflect the company's GHG emissions accurately for decision-making.
- Completeness: Account for all GHG emission sources within the inventory boundary.
- Consistency: Use consistent methodologies for meaningful year-over-year comparisons.
- Transparency: Disclose assumptions, methodologies, and data sources clearly.
- Accuracy: Ensure the GHG data is accurate and minimizes uncertainties.

## 2.3 Organizational Boundaries

Shan Poornam Sdn. Bhd. (SP) defines its organizational boundary using the equity share approach. This method involves accounting for GHG emissions based on the proportion of equity ownership in each subsidiary. Under this approach, SP includes the emissions from its subsidiaries according to its ownership percentage, ensuring a comprehensive and accurate representation of the company's carbon footprint. SP has complete operational control over the following subsidiaries, which are included in the GHG Inventory:

| Subsidiary | Ownership | Inclusion |
|---|---|---|
| Shan Poornam Metals Sdn. Bhd. (SPM) | 100% | Shan Poornam Metals Sdn. Bhd. (SPM) has equity share in the following subsidiaries, which are included in the GHG Inventory:<br>• Shan Poornam Green Tech Sdn. Bhd. (SPGT): 100% ownership.<br>• Shan Poornam Metals (Johor) Sdn. Bhd. (SPMJ): 100% ownership.<br>• Shan Poornam Metals (Selangor) Sdn. Bhd. (SPMS): 100% ownership.<br>• Shan Poornam Metals (Sarawak) Sdn. Bhd. (SPMSW): 70% ownership. |
| Shan Poornam Global Sdn. Bhd. (SPG) | 100% | Shan Poornam Global Sdn. Bhd. (SPG) has 30% equity shar in:<br>• Shan Poornam Metals (Sarawak) Sdn. Bhd. (SPMSW) |

By adopting the equity share approach, SP ensures that its GHG Inventory accurately reflects the emissions from its entire operational structure, including both wholly-owned and partially-owned subsidiaries. This comprehensive accounting method aligns with best practices in GHG reporting, providing a clear and precise picture of the company's environmental impact.

## 2.4 Operational Boundaries

For each entity, the operational boundaries are based on operational control. GHG emissions reported from all operations where the entity has the authority to introduce and implement its operating policies. These emissions include both direct (Scope 1) and indirect (Scope 2 and Scope 3) emissions.

Scope 1: Direct GHG emissions:

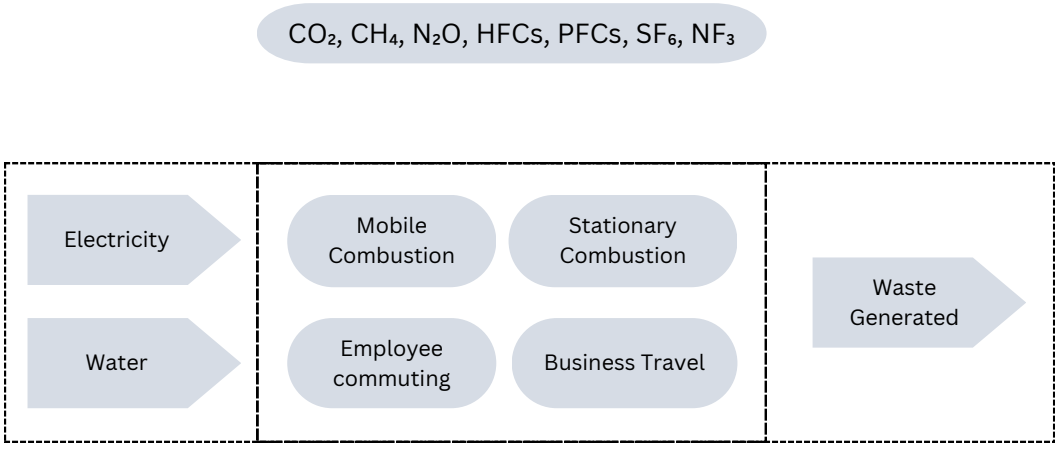
- Fuel Combustion: Emissions from the combustion of fuel by company-owned and controlled vehicles.
- Natural Gas Combustion - Emissions from the combustion of natural gas by company-owned and controlled furnaces.

Scope 2: Electricity indirect GHG emissions:

- Purchased Electricity: Emissions from the generation of electricity that is purchased from the grid and used in manufacturing facilities and office buildings.
- Exported Renewable Energy: Exported energy generated by solar panels to the electricity grid.

Scope 3: Other indirect GHG emissions:

- Category 1 - Purchased goods and services: Emissions related to the procurement of water for operational use.
- Category 5 - Waste Generated in Operations: Emissions from the treatment and disposal of waste generated by manufacturing processes.
- Category 6 - Business Travel: Emissions from business-related travel.
- Category 7 - Employee commuting: Emissions from the transportation of employees between their homes and their worksites



| # | Activity | Generated GHG | Sources of emissions |
|---|---|---|---|
| Scope 1: Direct GHG emissions | | | |
| 1 | Fuel consumption (Petrol, Diesel) | $CO_2$, $CH_4$, $N_2O$ | On-road and Off-road transport |
| 2 | Natural Gas consumption | $CO_2$, $CH_4$, $N_2O$ | Furnaces |
| Scope 2: Electricity indirect GHG emissions | | | |
| 3 | Electricity consumption | $CO_2$, $CH_4$, $N_2O$ | Power and lighting |
| Scope 3: Other indirect GHG emissions | | | |
| 4 | Purchased goods, services | $CO_2$, $CH_4$, $N_2O$ | Purchased water |
| 5 | Waste generated in operations | $CO_2$, $CH_4$, $N_2O$ | General and Scheduled waste |
| 6 | Business travel | $CO_2$, $CH_4$, $N_2O$ | Transport (Business) |
| 7 | Employee commuting | $CO_2$, $CH_4$, $N_2O$ | Transport (Commuting) |

## 2.5 Greenhouse Gases Included in the Report

The GHG inventory for SP encompasses a comprehensive analysis of all relevant greenhouse gases (GHGs) covered by the Kyoto Protocol in tonnesof CO2e and defined by the GHG Protocol Corporate Standard.

- Carbon Dioxide ($CO_2$): Emissions from the combustion of fossil fuels in company-owned vehicles and on-site energy production.
- Methane ($CH_4$): Emissions resulting from waste management practices and any other relevant sources within the operational boundary.
- Nitrous Oxide ($N_2O$): Emissions arising from fuel combustion and other operational activities.
- Hydrofluorocarbons (HFCs): Emissions from the use of refrigerants in cooling and air conditioning systems.
- Perfluorocarbons (PFCs): Emissions associated with specific manufacturing processes, if applicable.
- Sulfur Hexafluoride ($SF_6$): Emissions from electrical equipment and other relevant uses.
- Nitrogen Trifluoride ($NF_3$): Emissions from industrial processes, if relevant.

The Consultant has quantified emissions from each relevant GHG using the best available data and methodologies.

## 2.6 Global Warming Potential (GWP)

In this GHG inventory report for SP, Global Warming Potential (GWP) values are utilized, to convert emissions of various greenhouse gases into a common unit of $CO_2$-equivalents ($CO_2e$). This standardization facilitates the comparison and aggregation of the overall climate impact of different GHGs.

The GWP values used in this report are sourced from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) [2].

## 2.7 Exclusions and Limitations

In preparing this GHG inventory, the consultant has identified certain emission sources that are excluded from the quantification and reporting due to specific constraints and considerations. These exclusions are detailed below:

- Fugitive Emissions from Cooling Systems: The maintenance services for the air conditioning systems are outsourced. The service providers do not maintain accurate and complete records of the quantity of refrigerant gases topped up during service visits. Consequently, these emissions are excluded from the GHG inventory due to the lack of reliable data.

- Business travel: In the 2023 GHG Inventory report, data related to business travel was limited to the board of directors. For the 2024 GHG Inventory report, we recommend expanding the scope to include business travel activities across all levels of the organization. This comprehensive approach will provide a more accurate and holistic view of the company's travel-related emissions, enhancing the precision and reliability of the GHG inventory.

SP is committed to improving data accuracy and completeness in future inventories and will continually review and update its GHG reporting practices.

## 2.8 Reporting period and Base year

The reporting period in this report spans from January 1, 2023, to December 31, 2023. Since 2023 is the first year for which accurate and complete activity data for all the subsidiaries is available it is set as a base year.

The base year recalculation policy establishes guidelines for recalculating the base year greenhouse gas (GHG) emissions to ensure consistency and comparability over time. SP will initiate a recalculation of the base year emissions if changes result in a cumulative impact of 5% or more on the total GHG emissions. This threshold ensures that only significant changes trigger a recalculation, maintaining the integrity and relevance of the GHG inventory.

# 3.0 Emission calculations

## 3.1 Methodology

Quantifying GHG emissions includes the data collection process and the application of documented emission factors. The quantification equation is as below:

***Emissions of $CO_2$ ($tCO_2e$) = Activity data x Emission factor***

For each of the emission generating activities included in this report, calculations have been made to 2 decimal places in units of metric tons of $CO_2$-equivalent unless otherwise noted. The activity data, its sources, and the emission factors used in the GHG emissions calculation are summarized in the subsequent sections of this report.

Direct Emissions (Scope 1):
To quantify GHG emissions from mobile combustion, data was collected on fuel consumption measured in liters (L). The emission factors from the GHG protocol tool for mobile combustion were applied [3]. Electricity grid emissions factors and average electrical vehicle (EV) energy consumption were applied to quantify emissions from EVs [4]. Average petrol consumption for a hybrid vehicle (HV) was applied [5].

To quantify GHG emissions from stationary combustion, data was collected on gas consumption measured in cubic meters (m3). The emission factors for $CO_2$, $CH_4$, and $N_2O$ from GHG protocol tool for stationary combustion were applied [6]. $CH_4$ and $N_2O$ emissions were converted to $CO_2$-equivalents using their Global Warming Potentials (GWPs), ensuring comprehensive and accurate reporting of the organization's GHG emissions from mobile combustion sources.

Scope 2 - Indirect Emissions from Imported Energy (Scope 2):
Based on the total electricity consumption collected measured in kilowatt-hours (kWh), a Location location-specific emission factors were applied [7]. These emission factors, expressed in kg $CO_2e$ per kWh, reflect the carbon intensity of the electricity grid specifically in Peninsular and Sarawak region.

Other Indirect Emissions (Scope 3):
Based on the total water consumption measured in cubic meters ($m^3$), emission factors expressed in kg $CO_2$ per $m^3$ derived from the carbon intensity associated with the production and supply of billed water consumption by a water supply entity in Malaysia [8].

Based on the weight of both scheduled (hazardous waste) and general waste sent to waste management service providers, Emission factors were derived from carbon intensity data of Malaysia's leading integrated waste management company [9] , and the UK's Department for Environment, Food & Rural Affairs [10] were applied to quantify emissions from waste.

To quantify GHG emissions from business travel, the organization collected all business-related air travel records. This includes details of each flight such as departure and destination airports, flight distance, and class of travel (e.g., economy, business). The International Civil Aviation Organization (ICAO) GHG calculator [11] was utilized.

To quantify GHG emissions from business travel by road and employee commuting, the GHG Protocol tool was applied. The distance traveled (in kilometers) for each trip was obtained from travel logs, vehicle odometers, or Google Maps.

## 3.2 Activity data and Data collection

The activity data for the SP 2023 GHG Inventory report is comprehensive and well-documented. SP is in the process of enhancing its data recording policies to ensure even greater accuracy in future reporting. The table below outlines the numerical details associated with the activity data that has been used by the quantifier in the 2023 GHG Inventory.

| Emission Generating Activity | Data format | Unit | Activity Data | Source |
|---|---|---|---|---|
| *Scope 1: Direct GHG emissions* | | | | |
| Petrol consumption | Spreadsheet | Liters (l) | 326,372 | Purchasing Invoices |
| Diesel consumption | Spreadsheet | Liters (l) | 46,892 | Purchasing Invoices |
| Natural Gas | Spreadsheet | Cubic meters ($m^3$) | 3,296,379 | Purchasing Invoices |
| *Scope 2: Electricity indirect GHG emissions* | | | | |
| Electricity Use: Peninsular | Spreadsheet | Kilowatt-hours (kWh) | 9,053,254 | Electricity Bills |
| Electricity Use: Sarawak | Spreadsheet | Kilowatt-hours (kWh) | 35,095 | Electricity Bills |
| *Scope 3: Other indirect GHG emissions* | | | | |
| Purchased Water | Spreadsheet | Cubic meters ($m^3$) | 87,530 | Purchasing Invoices |
| Scheduled waste | Spreadsheet | Ton (t) | 343 | DOE Website / Consignment Notes |
| General waste | Spreadsheet | Ton (t) | 129 | Purchasing Invoice, Weight by average/trip |
| Business travel (Road) | Spreadsheet | Kilometers (km) | 19,244 | Purchasing Invoices, Employee mileage claims |
| Business travel (Air) | Spreadsheet | Flight/Class/Pax | - | Purchasing Invoices, |
| Employee commuting: Passengers car (Petrol) | Spreadsheet | Kilometers (km) | 928,852 | Survey/Internal records |
| Employee commuting: Passengers car (Diesel) | Spreadsheet | Kilometers (km) | 22,246 | Survey/Internal records |
| Employee commuting: Passengers car (Hybrid) | Spreadsheet | Kilometers (km) | 10,896.00 | Survey/Internal records |
| Employee commuting: Passengers car (EV) | Spreadsheet | Kilometers (km) | 11,350.00 | Survey/Internal records |
| Employee commuting: Motorcycles (Petrol) | Spreadsheet | Kilometers (km) | 248,383 | Survey/Internal records |
| Employee commuting: Shuttled bus (Diesel) | Spreadsheet | Kilometers (km) | 68,408 | Survey/Internal records |

## 3.3 Emission Factors

When used in a corporate greenhouse gas inventory, emission factors specify the amount of greenhouse gas emissions that are generated per a single unit of a specific activity. Greenhouse gas inventory quantifiers source emission factors from well-recognized agencies and their publications when completing greenhouse gas inventories.

| Emission Generating Activity | Emission Factor (EF) | Source of information |
|---|---|---|
| Direct GHG Emissions (Scope 1) | | |
| Fuel consumption | Described in the Methodology | World Resources Institute (2015). GHG protocol tool for mobile combustion. Version 2.6. |
| Natural Gas consumption | Described in the Methodology | World Resources Institute (2015). GHG protocol tool for stationary combustion. Version 4.1. |
| Indirect GHG Emissions (Scope 2) | | |
| Electricity Use | 0.758 $kgCO_2e$/kWh<br>0.198 $kgCO_2e$/kWh | Suruhanjaya Tenaga Malaysia (Peninsular/ Sarawak) |
| Indirect GHG Emissions (Scope 3) | | |
| Purchased Water | 0.562 $kgCO_2/m^3$ | Air Selangor 2023 SR (Carbon Emissions Intensity - per m3 of water billed) |
| Scheduled waste | 0.369 tCO2e/t | Cenviro 2023 SR ( Carbon Emissions Intensity - per ton waste treated at WMC) |
| General waste | 520.335 $kgCO_2e/t$ | Defra 2023 (Commercial and Industrial waste - Landfill) |
| Business travel (Road) | As described in the Methodology section | World Resources Institute (2015). GHG protocol tool for mobile combustion. Version 2.6. |
| Business travel (Air) | As described in the Methodology section | International Civil Aviation Organization (ICAO) Carbon Emissions Calculator (ICEC) |
| Employee commuting | Described in the Methodology | World Resources Institute (2015). GHG protocol tool for mobile combustion. Version 2.6. |

# 4.0 Managing uncertainty

Managing uncertainties is a crucial aspect of GHG emissions reporting. SP is committed to ensuring the accuracy and reliability of its GHG inventory. This section outlines the approach to identifying, assessing, and managing uncertainties in the GHG data and reporting process.

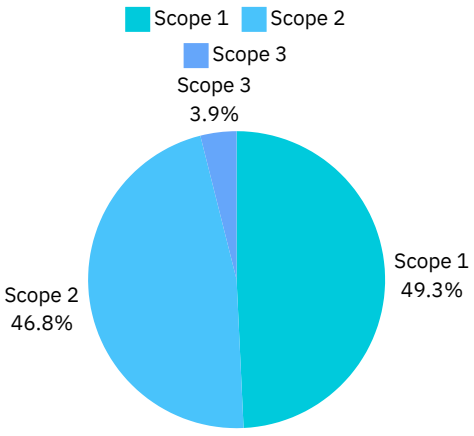
For this report, activity data is collected with a high level of certainty from reliable sources such as third-party metered invoices, utility bills, and purchase invoices. Emission factors are sourced from credible and recognized sources, minimizing the need for estimation. Consequently, the uncertainty level of our GHG inventory is low.

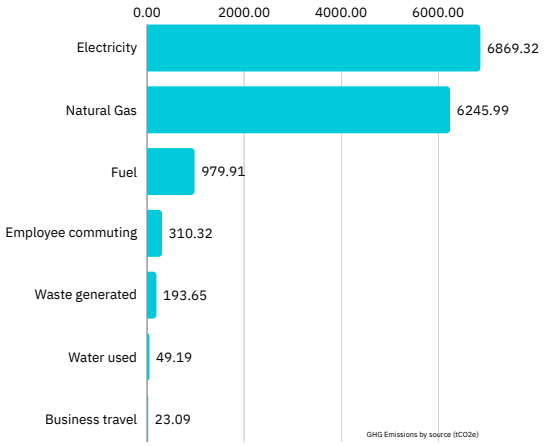
# 5.0 GHG Inventory Results

This section provides a detailed breakdown of GHG emissions for the organization, categorized by emission generating activities and scopes. The GHG emissions for six entities (SPM, SPGT, SPMS, SPMJ, SPMSw, and SPG) have been accurately quantified and categorized in line with the GHG Protocol Standard. The GHG emissions assessment provides a comprehensive breakdown of emissions across three scopes: direct emissions (Scope 1), indirect emissions from imported energy (Scope 2), and other indirect emissions (Scope 3). The total GHG emissions for the reporting period amount to 14,671.47 tonnes of $CO_2$ equivalent ($tCO_2e$).

| Emission Generating Activity | Unit | SPM | SPG | SPGT | SPMS | SPMJ | SPMSw | **Total:** | Source (%) | Scope (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Scope 1: Direct GHG emissions | | | | | | | | | | |
| Fuel Consumption (Diesel) | tCO2e | 555.32 | 224.38 | 0.00 | 46.09 | 28.12 | 19.46 | **873.37** | 5.95 | |
| Fuel Consumption (Petrol) | tCO2e | 87.15 | 0.00 | 0.00 | 19.38 | 0.00 | 0.00 | **106.54** | 0.73 | |
| Natural Gas Consumption | tCO2e | 5,258.27 | 216.13 | 771.59 | 0.00 | 0.00 | 0.00 | **6,245.99** | 42.57 | |
| Total Scope 1: | tCO2e | 5,900.75 | 440.51 | 771.59 | 65.47 | 28.12 | 19.46 | **7,225.90** | | 49.25 |
| Scope 2: Electricity indirect GHG emissions | | | | | | | | | | |
| Electricity Use | tCO2e | 4,026.69 | 821.14 | 1,941.36 | 51.85 | 21.32 | 6.95 | **6,869.32** | 46.82 | |
| Renewable Energy (RE) | tCO2e | | | 0.00 | | | | **0.00** | | |
| Total Scope 2: | tCO2e | 4,026.69 | 821.14 | 1,941.36 | 51.85 | 21.32 | 6.95 | **6,869.32** | | 46.82 |
| Scope 3: Other indirect GHG emissions | | | | | | | | | | |
| Purchased Water | tCO2e | 15.04 | 21.01 | 10.04 | 2.00 | 0.85 | 0.25 | **49.19** | 0.34 | |
| Waste Generated (Scheduled) | tCO2e | 20.33 | 51.12 | 55.28 | 0.00 | 0.00 | 0.00 | **126.73** | 0.86 | |
| Waste Generated (General) | tCO2e | 4.28 | 10.32 | 31.73 | 15.20 | 3.30 | 2.08 | **66.92** | 0.46 | |
| Business travel (Road) | tCO2e | 1.40 | 0.16 | 0.27 | 2.69 | 0.00 | 0.05 | **4.57** | 0.03 | |
| Business travel (Air) | tCO2e | 15.86 | 0.21 | 1.29 | | | 1.15 | **18.52** | 0.13 | |
| Employee commuting: Personal car | tCO2e | 168.01 | 19.06 | 5.36 | 14.69 | 1.63 | 11.82 | **220.57** | 1.50 | |
| Employee commuting: Personal motorcycle | tCO2e | 15.95 | 11.67 | 3.67 | 0.00 | 0.00 | 0.00 | **31.30** | 0.21 | |
| Employee commuting: Shuttled bus | tCO2e | 38.60 | 3.22 | 7.12 | 0.00 | 0.00 | 0.00 | **48.94** | 0.33 | |
| Employee commuting: Personal car (diesel) | tCO2e | 4.70 | 0.00 | 1.52 | 0.00 | 0.00 | 0.00 | **6.22** | 0.04 | |
| Employee commuting: Personal car (hybrid) | tCO2e | 1.68 | | | | | | **1.68** | 0.01 | |
| Employee commuting: Personal car (electric) | tCO2e | 1.62 | | | | | | **1.62** | 0.01 | |
| Total Scope 3: | tCO2e | 287.47 | 116.76 | 116.29 | 34.59 | 5.78 | 15.36 | **576.25** | | 3.93 |
| Grand Total: | tCO2e | **10,214.91** | **1,378.42** | **2,829.25** | **151.90** | **55.22** | **41.76** | **14,671.47** | 100.00 | 100.00 |

Breakdown of SP's 2023 Greenhouse Gas Emissions by Categories and Sources



The total GHG emissions for the reporting period amounted to 14,671.47 tCO2e, comprising emissions across Scope 1 (direct emissions), Scope 2 (indirect emissions from electricity use), and Scope 3 (other indirect emissions). Here's a detailed breakdown of the data:

Scope 1: Direct GHG Emissions (49.25% of total emissions)

Scope 1 emissions are from sources directly owned or controlled by the organization, including fuel and natural gas consumption. The total Scope 1 emissions were 7,225.90 tCO2e, accounting for 49.25% of total emissions. The breakdown is as follows:

- Fuel Consumption (Diesel): Emissions from diesel fuel use amounted to 873.37 tCO2e (5.95% of total emissions), with the highest contribution from the SPM site (555.32 tCO2e).
- Fuel Consumption (Petrol): Petrol consumption contributed 106.54 tCO2e (0.73%), with SPM being the main contributor.
- Natural Gas Consumption: Natural gas consumption was the largest source of Scope 1 emissions, generating 6,245.99 tCO2e (42.57%). The highest emissions came from the SPM site (5,258.27 tCO2e).

Scope 2: Indirect GHG Emissions from Electricity Use (46.82% of total emissions)

Scope 2 emissions, comprising indirect emissions from purchased electricity, totaled 6,869.32 $tCO_2e$, accounting for 46.82% of total emissions. Renewable energy (RE) generation is reported separately in this report and is not included in the Scope 2 calculation. All Scope 2 emissions are attributed to electricity purchased from the grid.

- Electricity Use: The largest contributor to Scope 2 emissions was the SPM site with 4,026.69 tCO2e. This represents the highest share of emissions from electricity use across the sites.

Scope 3: Other Indirect GHG Emissions (3.93% of total emissions)

Scope 3 emissions arise from sources not directly controlled by the organization, such as water use, waste management, business travel, and employee commuting. The total Scope 3 emissions were 576.25 tCO2e, making up 3.93% of the total emissions. Key contributors include:

- Purchased Water: Water consumption contributed 49.19 tCO2e (0.34%), with SPG being the largest contributor.
- Waste Generated (Scheduled and General): Combined waste emissions totaled 193.65 tCO2e (1.32%), with the largest contributions from SPGT.
- Business Travel (Road and Air): Business travel resulted in 23.09 tCO2e (0.16%), primarily from air travel (18.52 tCO2e).
- Employee Commuting: The largest Scope 3 emission source was employee commuting, contributing 310.33 tCO2e (2.11%), with SPM accounting for most of this (168.01 tCO2e).

Site-Specific Emissions Breakdown

- SPM: The largest contributor, generating 10,214.91 tCO2e (69.63% of total emissions), primarily from natural gas consumption and electricity use.
- SPG: Emissions totaled 1,378.42 tCO2e (9.39%), with significant contributions from electricity use and waste management.
- SPGT: Emissions were 2,829.25 tCO2e (19.28%), with major contributions from electricity and waste.
- SPMS: Emissions were 151.90 tCO2e (1.04%), mostly from electricity use.
- SPMJ: Emissions were 55.22 tCO2e (0.38%), with contributions primarily from electricity and employee commuting.
- SPMSw: Emissions were 41.76 tCO2e (0.28%), mostly from electricity and employee commuting.

The total GHG emissions across all scopes and sites for the reporting period is 14,671.47 tCO2e. The majority of emissions come from:

- Scope 1: 49.25% (natural gas and fuel consumption),
- Scope 2: 46.82% (electricity use),
- Scope 3: 3.93% (waste, water, business travel, and employee commuting).

This data highlights that the organization's largest emissions sources are natural gas consumption and electricity use across its sites, particularly at the SPM location.

**Carbon Intensity per Tonne of Waste Managed by Shan Poornam Group**

To calculate carbon intensity per tonne of waste managed by the group, the total GHG emissions from the 2023 GHG Inventory (14,671.47 tCO2e) and the total waste managed (40,974 metric tonnes) was used.

$$\text{Carbon Intensity (tCO2e/t)} = \frac{14,671.47\,\text{tCO2e}}{40,973.98\,\text{t}} \approx 0.358\,\text{tCO2e/t}$$

This means that for every metric tonne of waste managed by the SPSB, approximately 0.358 tonnes of CO2e are emitted.

Conclusion:
The total waste managed by the SPSB in 2023 amounted to 40,974 tonnes, and the carbon intensity per tonne of waste managed is 0.358 tCO2e/t. This value is based on the quantified sources of emissions in the 2023 GHG Inventory.

However, it is important to note that this carbon intensity parameter may change once the GHG inventory becomes more comprehensive, particularly with the inclusion of additional Scope 3 emissions. As more indirect emission sources are quantified, the overall emissions and, consequently, the carbon intensity per tonne of waste managed are likely to adjust accordingly.

**Renewable Energy Contribution**

The organization generated and consumed 223,813 kWh of renewable energy (solar) on-site. This renewable energy use resulted in zero emissions, effectively reducing the organization's reliance on grid electricity. Additionally, 19,908 kWh of solar energy was exported to the grid (15.09 $tCO_2e$) demonstrating the organization's contribution to renewable energy generation. Despite this, Scope 2 emissions remain high due to the significant reliance on grid electricity.

# 6.0 Emissions reduction

Given the significant sources of emissions identified, the following initiatives are recommended to reduce our carbon footprint:

1. Natural Gas Consumption

- Invest in advanced furnace technologies that have higher thermal efficiency and lower energy consumption.
- Regular maintenance and upgrades to existing furnaces to ensure they operate at peak efficiency.
- Use the recovered heat for generating steam or electricity, reducing the need for additional energy input.
- Renewable Natural Gas (RNG): Investigate the feasibility of using RNG, which is produced from organic waste materials, as a replacement for conventional natural gas; Partner with waste-to-energy facilities to secure a steady supply of RNG.
- Hydrogen Fuel: Explore the use of hydrogen as a clean alternative to natural gas. Hydrogen can be produced using renewable energy sources and used in high-temperature processes.

2. Process Optimization

- Material Pre-Treatment: Implement pre-treatment processes such as shredding or drying waste materials before they enter the furnaces to reduce the energy required for melting.
- Process Control and Automation: Utilize advanced process control systems to optimize furnace operations and reduce energy consumption.
- Process Control and Automation: Implement real-time monitoring and data analytics to continuously improve operational efficiency.

3. Renewable Energy Integration

- On-Site Renewable Energy: Continue exploring solar panels option to generate renewable energy on-site. This can significantly reduce reliance on grid electricity.
- Green Energy Procurement: Purchase renewable energy credits (RECs) or enter into power purchase agreements (PPAs) with renewable energy providers to offset the plant's electricity consumption.

4. Fuel Consumption

- Maintenance Programs: Implement regular vehicle maintenance programs to ensure engines are running efficiently and to reduce fuel consumption.
- Eco-driving Training: Provide training for drivers on eco-driving techniques, which can significantly reduce fuel consumption and emissions.
- Route Optimization: Use route optimization software to plan the most efficient routes for delivery and service vehicles, reducing unnecessary mileage.

5. Employee Engagement and Training

- Energy Awareness Programs: Conduct regular training sessions for employees on energy-saving practices and the importance of reducing energy consumption. Encourage employee suggestions for improving energy efficiency and reward successful initiatives.
- Operational Best Practices: Develop and implement standard operating procedures (SOPs) that incorporate best practices for energy efficiency and waste reduction.

6. Policy Review and Update

- Regular Policy Updates: Regularly review and update policies to reflect best practices in waste management, energy use, and vehicle fleet management, ensuring they align with the latest environmental standards.
- Supplier Engagement: Collaborate with suppliers to reduce emissions from purchased goods and services. Focus on sustainable sourcing practices and packaging reduction to minimize the environmental impact of procurement activities.

By implementing these comprehensive mitigation initiatives, SP can significantly reduce its GHG emissions. These efforts not only contribute to environmental sustainability but also enhance operational efficiency and cost savings. Investing in renewable energy, optimizing processes, and engaging employees in sustainability practices are key strategies for achieving long-term emission reductions.

# 7.0 Future Reporting

To enhance the depth and transparency of its GHG inventory, SP is recommended to expand data collection and reporting efforts to include additional sources of Scope 3 emissions. The following improvements proposed by the consultant to be implemented:

*Purchased Goods and Services (Procurements)*: Detailed Tracking: Develop a more detailed tracking system for all purchased goods and services to capture the emissions associated with their production and transportation.

*Inbound and Outbound Logistics*: Logistics Emissions Tracking: Implement systems to track emissions from inbound and outbound logistics, including the transportation of raw materials to the organization's facilities and the distribution of finished products to customers.

*Business travel*: For the 2024 GHG Inventory report, we recommend expanding the scope to include business travel activities across all levels of the organization. This comprehensive approach will provide a more accurate and holistic view of the company's travel-related emissions, enhancing the precision and reliability of the GHG inventory.

To support these improvements, SP suggested to develop an integrated data management system that consolidates GHG emissions data from various sources, enabling efficient data collection, analysis, and reporting. To facilitate this, it is necessary to provide regular training to employees involved in data collection and GHG reporting to ensure consistency and accuracy.

Finally, regular internal audits and third-party verification of GHG data ensure accuracy and completeness. This includes revision of the activity data against utility bills, fuel purchase records, and other relevant documents.

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# Exhibit

## Activity data per entity

| Emission Generating Activity | Unit | SPM | SPG | SPGT | SPMS | SPMJ | SPMSw | Total: |
|---|---|---|---|---|---|---|---|---|
| Scope 1: Direct GHG emissions | | | | | | | | |
| Fuel Consumption (Diesel) | l | 207,520 | 83,851 | | 17,222 | 10,507 | 7,272 | 326,372 |
| Fuel Consumption (Petrol) | l | 38,360 | | | 8,532 | | 0 | 46,892 |
| Natural Gas Consumption | m3 | 2,775,098 | 114,065 | 407,216 | | | 0 | 3,296,379 |
| Scope 2: Electricity indirect GHG emissions | | | | | | | | |
| Electricity Use | kWh | 5,312,258 | 1,083,300 | 2,561,167 | 68,400 | 28,129 | 35,095 | 9,088,349 |
| Renewable Energy (RE) | kWh | | | 223,813 | | | 0 | 223,813 |
| Scope 3: Other indirect GHG emissions | | | | | | | | |
| Purchased Water | m3 | 26,766 | 37,379 | 17,860 | 3,559 | 1,516 | 450 | 87,530 |
| Waste Generated (Scheduled) | t | 55 | 139 | 150 | | | 0 | 343 |
| Waste Generated (General) | t | 8 | 20 | 61 | 29 | 6 | 4 | 129 |
| Business travel (Road) | km | 5,886 | 660 | 1,149 | 11,322 | | 227 | 19,244 |
| Employee commuting: Personal car | km | 707,514 | 80,267 | 22,564 | 61,879 | 6,870 | 49,758 | 928,852 |
| Employee commuting: Personal motorcycle | km | 126,621 | 92,616 | 29,147 | | | | 248,383 |
| Employee commuting: Shuttled bus | km | 53,955 | 4,496 | 9,956 | | | | 68,408 |
| Employee commuting: Personal car (diesel) | km | 16,798 | | 5,448 | | | | 22,246 |
| Employee commuting: Personal car (hybrid) | km | 10,896 | | | | | | 10,896 |
| Employee commuting: Personal car (electric) | km | 11,350 | | | | | | 11,350 |