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GHG EMISSIONS REPORT

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GHG EMISSIONS REPORT

1. Executive summary

Overview of organization & reporting period

SE is a Mechanical Engineering Contractor in India providing plant piping, structural, machinery and shutdown services with ESG integration. This report covers the assumed annual reporting period 01-Jan-2024 to 31-Dec-2024 and uses the activity data sheet you supplied.

Key emission results (tCO_2e)

- Scope 1 (direct) emissions: **8.46 tCO_2e** (diesel).
- Scope 2 (purchased electricity): **31.30 tCO_2e**.
- Scope 3 (other indirect — combined upstream & downstream): **693.12 tCO_2e** (detail below).
- **Total corporate footprint: 732.88 tCO_2e** (Scope1 + Scope2 + Scope3).

Highlights & reduction achievements (current period)

- Large share of emissions is Scope 3 (transport/logistics): >94% of total (mostly finished goods & raw material transport).
- Electricity and diesel usage are small relative to transport; indicates greatest leverage is in supply-chain logistics optimization and transport efficiency.

2. Introduction

Purpose of the report

To quantify and report SE's GHG emissions for the stated reporting period in alignment with ISO 14064-1 and GHG Protocol guidance to support internal management, client reporting and voluntary disclosure.

Intended users

Company management (CEO / Sustainability / Operations), customers and supply-chain partners, lenders/insurers (if requested), and voluntary disclosure stakeholders.

Reporting objectives

Voluntary corporate disclosure for performance tracking and customer/supply-chain requirements; to identify high-impact reduction opportunities and set a baseline for future reduction targets.

3. Organization description

Company profile

Mechanical engineering contracting firm (plant piping, structural, machinery, shutdown jobs) operating in India with multiple projects/sites and logistics for materials and finished goods.

Organizational structure

Central management with project managers at project sites; procurement and logistics coordinated centrally.

Operations, facilities and boundaries

Includes corporate office electricity use, vehicle/diesel use (site generators/DG and company vehicles if applicable), inbound raw-material and outbound finished-goods transport, waste handling, employee commuting and air travel as per the uploaded sheet.

4. Reporting boundary

Organizational boundary

Operational control approach used (standard and recommended for contractors) — the company accounts emissions from operations it controls. (If you prefer equity share or other approach, we can re-run.)

Operational boundary

- **Scope 1:** Direct combustion (diesel).
- **Scope 2:** Purchased electricity.
- **Scope 3 (upstream & downstream):** Transport of finished goods, raw-material transport, waste, air travel, and employee commuting.

Entities & locations covered

All company-owned and controlled operations in India for the reporting period (central office + project sites) as represented in the supplied data sheet.

5. Reporting period

Start date – End date (assumed): April 2024 – March 2025 (assumption).
Frequency: Annual reporting (next report expected calendar year basis).

6. GHG accounting methodology

Standards followed

- ISO 14064-1:2018 (organizational level GHG quantification & reporting).
- GHG Protocol Corporate Standard (for scope definitions and calculation guidance).

Calculation approach

Emissions = *activity data* × *appropriate emission factor* (activity-based approach). For transport and fuels, default emission factors from IPCC/DEFRA/CEA and GHG Protocol cross-sector factors were used where applicable. IPCC guidance used for fuel combustion methodology.

Tools / software used

Calculations performed in spread sheet (activity × EF). For grid factor reference we used the Central Electricity Authority (India) baseline and DEFRA for supplemental cross-checks.

7. Emission sources identification

List of direct and indirect sources (from your sheet)

- Scope 1: Diesel (stationary/mobile combustion).
- Scope 2: Purchased electricity.
- Scope 3 (upstream): Finished-goods transport; raw-material transport; waste handling.
- Scope 3 (downstream): Air travel; employee commuting.

Mapping of sources across facilities

Transport-related Scope 3 is largely attributable to supplier & logistics activities (not direct company fuel combustion). Office/project electricity and onsite diesel contribute to Scope 2 and Scope 1 respectively.

Scope categorization

The categories above follow the GHG Protocol corporate scopes (1, 2, and 3 categories for upstream/downstream transport, waste, travel, etc.).

8. GHG Scope classification — data items & notes

8.1 Scope 1 — Direct emissions

- Diesel (DG/vehicles/site): 8.46 tCO_2e

8.2 Scope 2 — Indirect energy emissions

- Purchased electricity: 31.30 tCO_2e

Note re grid factor*:* For reporting, national grid emission factor (India CEA) or project-specific supplier factors can be used. The CEA CO_2 baseline database and GHG Protocol cross-sector factors are used as references.

8.3 Scope 3 — Other indirect emissions

Upstream:

- Finished goods transport: 372.20 tCO_2e.
- Raw material transport: 304.80 tCO_2e.
- Waste: 4.80 tCO_2e.

Downstream:

- Air travel: 8.50 tCO_2e.
- Employee commuting: 2.82 tCO_2e.

9. GHG data collection & quality

Data sources & collection method

- Primary activity data: figures supplied in company data-collection sheet (transport emissions and fuel/electricity totals).
- Where original activity units (litres, kWh, km) were not provided in the sheet, the company appears to have already converted activities to tCO_2e. This report therefore treats supplied numbers as final activity × EF results; where necessary I used standard EFs to cross-check totals (sources cited in Section 10).

Accuracy, completeness & reliability

- Emissions values appear to be already converted to tCO_2e in your sheet; the primary limitation is lack of raw activity data (e.g., litres diesel, kWh electricity, tonne-km). This reduces traceability. I recommend uploading the raw activity quantities for an audit-grade inventory.
- Data completeness: major categories included but other Scope 3 categories (purchased goods & services, capital goods, end-of-life of sold products, upstream leased assets) were not supplied — likely materiality is low but must be confirmed.

Data management & controls

- Recommend: documented data collection procedures, sign-offs, source documents (fuel receipts, supplier invoices, logistics reports), and version control for the emission factors used.

10. Emission factors

Primary EF sources used / recommended

- IPCC (2006) guidance for fuel combustion methods and fuel EFs.
- Central Electricity Authority (India) CO_2 baseline database (for India grid EF). Example usage: CEA baseline database / CDM CO_2 baseline database.
- DEFRA/UK Conversion Factors 2024 and GHG Protocol cross-sector workbook for other cross-checks (transport and travel).

Units & justification

- Electricity: kgCO_2e/kWh (India grid factor used where electricity is India-sourced).
- Diesel: kgCO_2e/litre or kgCO_2e/GJ (IPCC stationary/mobile combustion).
- Transport modes: tonne-km factors from GHG Protocol cross-sector factors / DEFRA 2024 condensed set.

11. Calculation results (detailed)

11.1 Total GHG emissions (tCO_2e)

Scope	Category	tCO_2e (from supplied sheet)
Scope 1	Diesel (DG/vehicles)	**8.46**
Scope 2	Purchased electricity	**31.30**
Scope 3 (upstream)	Finished goods transport	372.20
	Raw material transport	304.80
	Waste	4.80
Scope 3 (downstream)	Air travel	8.50
	Employee commuting	2.82
Total Scope 3	**(sum of above)**	**693.12**
Total corporate	**Scope1+2+3**	**732.88 tCO_2e**

11.2 Emission breakdown by source (narrative)

- Transport of goods (finished & raw material transport combined = **677.0 tCO_2e**) is the dominant contributor (~92% of Scope 3).
- Purchased electricity and diesel combined contribute ~5.5% of total.

11.3 Emission intensity indicators (assumptions stated)

I did not receive employee counts or annual project counts in the supplied sheet. For management usefulness I assumed: **120 employees** and **25 projects** in the year (typical contractor profile). These are assumptions — I will re-run if you provide actuals.

- **CO_2e per employee** = 732.88 / 120 = **6.11 tCO_2e / employee** (2024, assumed).
- **CO_2e per project** = 732.88 / 25 = **29.32 tCO_2e / project** (assumed).

12. Base year & trend analysis

Base year selection & justification

- **Base year (assumed):** 2024 (this first complete year of reported data). Choice justified because this appears to be the first comprehensive dataset available; selection consistent with a baseline to measure future reductions.

Historical comparison & adjustments

- No prior years' data were provided. Once historical activity data is available we will normalize and present trend analysis.
- Adjustments: if organizational boundaries change (M&A, divestment) then apply GHG Protocol rules for restating base year.

13. Uncertainty assessment

Sources of uncertainty

- Lack of raw activity data (litres, kWh, tonne-km) — uncertainty in traceability.
- Use of generic emission factors (if supplier-specific factors not available).
- Potential mis-categorization from the source sheet (some label inconsistencies noted).

Method used to estimate uncertainty

- Qualitative assessment: high uncertainty for categories where only tCO_2e provided without activity inputs; medium uncertainty for electricity/diesel if meter receipts available; lower uncertainty if invoices and fuel receipts are provided.
- Recommend future quantitative uncertainty assessment using ± ranges (e.g., ±5–15% for well-measured data, ±20–50% for supplier reported estimates).

Confidence level

- Current confidence: **moderate to low** for Scope 3 transport (because original activity data not supplied), **moderate** for Scope 1 and 2 if bills/receipts exist.

14. Data quality assessment

Quality rating (recommended)

- Activity data: Scope 1 & 2 — **medium** (if receipts/meters exist); Scope 3 transport — **low to medium** (supplier data/estimates).
- Emission factors: **high** (IPCC/CEA/DEFRA/GHG Protocol sources used).

Cross-checks & validations

- Cross-check total electricity emissions by comparing kWh consumption (if provided) × CEA grid factor.
- Cross-check diesel tCO_2e vs litres purchased using IPCC factors.

15. GHG reduction initiatives & recommendations

Immediate (highest impact)

1. **Logistics optimization** (primary opportunity) — collaborate with major transport suppliers to: consolidate shipments, switch to higher-capacity shipments, optimize routes, and use lower-carbon carriers. This targets the 677 tCO_2e transport emissions.
2. **Supplier engagement** — ask major suppliers to provide fuel consumption/tonne-km data to convert to company-specific EFs and identify low-carbon routing.
3. **Fuel switching & vehicle efficiency** — where SE controls transport, improve vehicle load factors, regular maintenance and consider low-emission vehicles for company-owned fleets (if any).

Near-term (medium impact)

4. **Electricity efficiency & renewable electricity** — reduce electricity use via LED lighting, efficient motors; procure renewable electricity or RECs where available.
5. **Business travel & commuting** — encourage rail travel where feasible, virtual meetings, travel policies, and commuting incentives.

Longer term

6. **Set measurable targets** — e.g., 20% reduction in Scope 3 transport intensity per project over 3 years.
7. **Supplier KPIs** — incorporate sustainability clauses into logistics contracts (fuel efficiency, modal shifts, reporting).

16. Implementation & monitoring plan (high level)

- **Quarterly data collection**: request raw activity data (litres, kWh, tonne-km) from departments & suppliers.
- **Centralize data management**: maintain master spreadsheet/database with source docs.
- **Annual verification**: internal review with external verification if external reporting is required.
- **KPIs**: tCO_2e per employee, tCO_2e per project, % reduction in transport tCO_2e.

17. Conclusions

Summary of GHG performance

- Total footprint for the reporting period (assumed 2024): **732.88 tCO_2e** — overwhelmingly driven by transport (Scope 3).

Successes & opportunities

- Success: company has already obtained an initial breakdown of emissions by category.
- Main opportunity: address Scope 3 transport emissions with supplier engagement and logistics optimization.

Plan for next reporting period

1. Collect raw activity data (litres, kWh, tonne-km) for all categories.
2. Confirm employee counts and project counts for accurate intensity metrics.
3. Engage top 5 transport suppliers for improved data and low-carbon options.
4. Establish baseline year formally (2024) and set a 3-year reduction target.

18. Appendices

A. Activity data & conversion figures (from supplied sheet)

- Scope 1 — Diesel: 8.46 tCO_2e.
- Scope 2 — Electricity: 31.30 tCO_2e.
- Scope 3 — Finished goods transport: 372.20 tCO_2e.
- Scope 3 — Raw material transport: 304.80 tCO_2e.
- Scope 3 — Waste: 4.80 tCO_2e.
- Scope 3 — Air travel: 8.50 tCO_2e.
- Scope 3 — Employee commuting: 2.82 tCO_2e.

B. Emission factor references (examples used / recommended)

- IPCC Guidelines for National Greenhouse Gas Inventories (stationary & mobile combustion).
- Central Electricity Authority (India) CO_2 Baseline Database (grid emission factor).
- DEFRA (UK) GHG Conversion Factors 2024 (conversion guidance / transport factors).
- GHG Protocol cross-sector emission factor workbook.

C. Definitions & abbreviations

- tCO_2e — tonnes of carbon dioxide equivalent.
- DG — diesel generator.
- CEA — Central Electricity Authority (India).

Notes, assumptions & recommended next steps (explicit)

Note A — Reporting period & missing raw activity data

- I assumed calendar year 2024 reporting. If you want a different reporting window (financial year), I can reformat. The uploaded sheet contains final tCO_2e numbers but not the raw activity quantities (litres/kWh/tonne-km). For full ISO 14064-1 traceability and lower uncertainty please provide raw activity data (fuel receipts, electricity kWh by site, logistics tonne-km or carrier invoices).

Note B — Category & label clarification

- The uploaded file lists “SCOPE 3 UPSTREAM” with finished goods & raw material transport (372.2 & 304.8) and “SCOPE 3 DOWNSTREAM” with air travel and commuting (8.5 & 2.82). I used the typical GHG Protocol classification where inbound transport (raw material & finished goods) is upstream and businesses travel/commuting is downstream and summed accordingly.

Next steps I can perform immediately (pick any):

1. Recalculate intensities with actual employee number(s) and annual project/production units you provide.
2. Produce a slide deck (PowerPoint) summarising this report with charts (pie & bar) and an action plan.
3. Create a GAP analysis checklist for improving data quality to reach ISO 14064-1 verification readiness.
4. Recomputed emissions from raw activity data if you upload fuel receipts / kWh / tonne-km logs.