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GHG EMISSION REPORT

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1. Executive summary

Overview of organization and reporting period

VKEPL is an engineering and contracting firm operating in India that provides on-site engineering, construction and related contractor services and integrates Environmental, Social and Governance (ESG) principles into operations. This report covers the 12-month reporting period April 2024 – March 2025 (assumed; see Assumptions). Activity data and calculations were taken from the submitted GHG data collection and calculation file.

Key emission results (summary)

- **Total GHG emissions (CO_2e): 2,665.7 tCO_2e** (total of Scope 1 + Scope 2 + Scope 3 upstream + Scope 3 downstream).
- **By scope:**
  - Scope 1 (direct): **18.4 tCO_2e** (diesel).
  - Scope 2 (indirect electricity): **12 tCO_2e**.
  - Scope 3 (upstream): **2,635.1 tCO_2e** (materials, commuting, waste, travel, water, etc.).
  - Scope 3 (downstream): **0.26 tCO_2e** (finished goods transport).

Highlights & reduction achievements

- The bulk of the footprint (≈99%) is in Scope 3 upstream (raw materials and construction-related materials). This identifies the supply chain and materials as priority areas for reduction.
- On-site emissions (Scope 1 + Scope 2) are comparatively small (≈1.1% of total), indicating opportunities to target supplier engagement, material selection and transport optimization for the most impact.

2. Introduction

Purpose of the report

This report documents the GHG inventory for VKEPL for the reporting period, following ISO 14064-1 and the GHG Protocol. It is intended to present transparent, auditable emissions for internal management, stakeholder disclosure, and to support any regulatory, customer, or voluntary reporting needs.

Intended users

Management, Board, customers and clients requesting emissions data, supply chain partners, potential verifiers, and external stakeholders (investors, regulators).

Reporting objectives

- Provide an auditable inventory consistent with ISO 14064-1 and GHG Protocol standards.
- Identify emission hotspots and inform reduction strategy and targets.
- Satisfy voluntary/customer reporting requirements and prepare for potential third-party verification.

3. Organization description

Company profile

VKEPL (Vastu Kirti Engg Pvt Ltd) — engineering & contracting services in India (detailed company profile maintained by management).

Organizational structure

Company functions included in this report: Project delivery/operations (construction sites), corporate office operations, transport/logistics for materials and site transfers. (Full org chart should be appended to internal records.)

Operations, facilities, and boundaries

Covered entities: Corporate office and project sites active during the reporting period. Emissions from owned/leased buildings, owned fuel use, business travel and project-related materials and waste are included as per sections below.

4. Reporting boundary

Organizational boundary

Reporting follows **Operational control** approach (emissions from operations where VKEPL has control are included). If Equity or other approach is desired, adjustments must be made.

Operational boundary

- Included: Direct GHG emissions from on-site fuel (diesel), purchased electricity, upstream and downstream Scope 3 categories identified in the file (materials, transport, commuting, business travel, waste, water).
- Excluded: Any out-of-scope entities not under operational control or for which no data were available (documented in Assumptions).

Entities and locations covered

All Indian sites and offices for which activity data were provided in the uploaded dataset.

5. Reporting period

Start date & end date

Assumed April 2024 – March 2025 (please confirm if you require fiscal year or alternate period). This assumption was used because the uploaded dataset did not explicitly state the period.

Frequency of reporting

Annual reporting (once per 12-month period). Company may opt for quarterly internal updates.

6. GHG accounting methodology

Standards followed

- ISO 14064-1:2018 (Organization level GHG inventories) — methodology and reporting principles.
- GHG Protocol Corporate Standard for classification and scope approach.

Calculation approach

Activity data × emission factor approach. For each source: Activity units (litres, kWh, km, tonnes, kg) × emission factor (kg CO_2e/unit) = emissions. Aggregation to tCO_2e. This method was used in the provided calculations.

Tools or software used

Calculations were performed in spreadsheet format (source file provided). For future reporting use, recommend using a centralized GHG inventory tool (or maintained workbook) with version control.

7. Emission sources identification

List of included direct and indirect sources

- **Scope 1 (Direct):** Diesel for internal operations (site equipment, on-site generators).
- **Scope 2 (Indirect):** Purchased electricity (kWh).
- **Scope 3 (Upstream & Downstream):** Purchased goods & services (raw materials and project materials), bricks, waste (office & project), water use, employee commuting, business travel (air), transport of raw materials to customers, finished goods dispatch.

Mapping of emission sources in facilities

- Corporate office: electricity, office waste, water, commuting, small materials.
- Project sites: diesel consumption, large material usage (tons), construction waste, transport.

Scope categorization

Assigned following GHG Protocol category guidance (Scopes 1, 2, and 3 categories as provided).

8. GHG scope classification & detailed sources

8.1 Scope 1 — Direct emissions

- **Stationary combustion:** Diesel used on-site (6,860 L/year) → **18.4 tCO_2e**.
- **Mobile combustion / company vehicles:** (If present, included in diesel figure or reported separately if vehicle fuel tracked.)
- **Fugitive/process emissions:** Not reported / not applicable / no refrigerant or process emissions reported in dataset.

8.2 Scope 2 — Indirect energy emissions

- **Purchased electricity:** 14,619 kWh × 0.82 kg CO_2e/kWh = **11,986 kg CO_2e ≈ 12 tCO_2e**.

8.3 Scope 3 — Other indirect emissions (selected categories)

From the provided calculations (upstream + downstream categories):

- Purchased raw materials (project-related): 2,798 tons → **2,518.2 tCO_2e**.
- Office raw materials / small items: 0.188 t → **0.169 tCO_2e**.
- Bricks: 260,000 units → **0.312 tCO_2e**.
- Employee commuting (road): 79,143 km → **9.5 tCO_2e**.
- Business air travel: 47,248 km → **7.46 tCO_2e**.
- Waste (office & construction): office 0.384 tCO_2e; construction 99.7 tCO_2e.
- Water consumption (119 kL): **0.041 tCO_2e**.
- Transport of raw materials to customers and finished goods dispatch: small values included in Scope 3 upstream and downstream totals.

9. GHG data collection & quality

Data sources & collection method

- Fuel volumes (litres): fuel purchase/consumption logs.
- Electricity (kWh): utility bills / meter readings.
- Material tonnages: procurement records / project material delivery notes.
- Transport distances (km): travel logs, expense claims, or estimated routing distances.
  All activity figures and calculation worksheets are in the uploaded file.

Accuracy, completeness & reliability

- On-site fuel and electricity come from invoices (high confidence).
- Material tonnages for project materials are from procurement records (medium–high confidence).
- Commuting and some transport distances are based on estimates/claims (lower confidence); these should be improved by staff surveys or telematics for the next cycle.

Data management procedure & controls

- Recommended: central spreadsheet with clear versioning, source document links, sign-off by department owners, and periodic internal audit. Maintain raw backups of invoices, delivery notes and travel logs.

10. Emission factors

Source of emission factors used in calculations

The dataset applies emission factors (examples shown): diesel 2.68 kg CO_2e/L; electricity 0.82 kg CO_2e/kWh; brick factor 1.2 kg CO_2e per 1,000 bricks; road transport 0.12 kg CO_2e/km; air travel 0.158 kg CO_2e/km; waste factor 0.717 kg CO_2e/kg; water 0.344 kg CO_2e/kL; raw material factors 0.9 tCO_2e/ton for some material categories. These factors were used as in the uploaded calculations.

Units and justification

All emission factors are expressed in kg or t CO_2e per unit activity. For formal reporting, each factor should be referenced to a recognized source (IPCC, DEFRA, GHG Protocol databases, national factors or India-specific grid factors). Maintain a reference table (Appendix) with exact source, year and URL for each factor.

11. Calculation results

11.1 Total GHG emissions (by scope)

Scope	Emissions (tCO_2e)
Scope 1 (diesel)	18.4
Scope 2 (electricity)	12.0
Scope 3 — Upstream	2,635.1
Scope 3 — Downstream	0.26
Total	**2,665.7**

Gas-wise breakout for Scope 1

All Scope 1 emissions arise from diesel combustion: **Diesel (CO_2e)** = **18.4 tCO_2e**. (CH_4/N_2O were not separately reported in the dataset; if required, apply IPCC default GWP multipliers and fuel emission split.)

11.2 Emission breakdown by source (top contributors)

- **Top contributor:** Purchased raw/project materials — **2,518.2 tCO_2e** (≈94.4% of total).
- Construction waste (indirect): **99.7 tCO_2e**.
- Employee commuting and travel combined ≈ **16.96 tCO_2e**.

11.3 Emission intensity indicators

Where activity data are incomplete (e.g., employees), assumptions were made (see next section). Using the assumption of **40 employees** for the reporting period (please confirm the actual headcount), the intensity indicators are:

- **Total CO_2e per employee:** 2,665.7 tCO_2e ÷ 40 = **66.64 tCO_2e / employee / year**. *(*Assumption)
- **CO_2e per ton of raw material used:** 2,665.7 tCO_2e ÷ 2,798 tons raw material = **0.95 tCO_2e / ton material**. (Useful for project comparison.)

Note: Both intensity indicators require confirmation of employee count and production/throughput measures for accuracy.

12. Base year & trend analysis

Base year selection & justification

No explicit prior year data were provided. For trend analysis and target setting, select a base year (e.g., 2024 as base year) or use a multi-year average where data are available. Using a single year (2024) as base is acceptable when historical data are limited, but future years should aim to build a time series.

Historical comparison & adjustments

If organizational boundary changes or acquisitions occur, normalize emissions (e.g., intensity metrics) and apply recalculation rules per ISO 14064-1.

13. Uncertainty assessment

Sources of uncertainty

- Emission factors (e.g., grid emission factor variability).
- Estimated activity data (commuting distances, some material transport distances).
- Assumptions on material emission factors (0.9 tCO_2e/ton used generically).

Method used to estimate uncertainty

Qualitative rating per source (high/medium/low) and quantitative ±% ranges where applicable. For example: electricity and fuel invoices (±5%); estimated commuting (±30%); material factors (±10–30% depending on specificity).

Confidence level

Overall inventory confidence: **medium**. Highest confidence for Scope 1 & 2; lower confidence for some Scope 3 components.

14. Data quality assessment

Quality rating for activity data & emission factors

- Scope 1 fuel (diesel): **High** (invoice-based).
- Scope 2 electricity: **High** (utility bills).
- Scope 3 material tonnages: **Medium** (procurement/delivery records).
- Commuting & some transport distances: **Low–Medium** (estimates / assumptions).

Cross-checks & validations

- Reconcile fuel and electricity totals with financial/operational records.
- Request supplier life-cycle data for high-impact materials to improve accuracy.

15. GHG reduction initiatives (recommended & in progress)

Because the majority of emissions are Scope 3 (materials), the priority is upstream engagement and material choices:

Immediate / near term (0–2 years)

1. **Supplier engagement:** Request supplier EPDs (Environmental Product Declarations) or carbon intensity data. Prioritize lower-carbon materials and local suppliers to reduce transport emissions.
2. **Material optimization:** Redesign to reduce material quantities (value engineering) and substitute with lower-carbon alternatives where feasible.
3. **Construction waste management:** Improve on-site waste segregation, reuse and recycling to reduce waste emissions.
4. **Travel & commuting:** Promote teleconferencing, optimize travel plans, encourage carpooling and public transport; consider a commuting survey to refine data.
5. **Energy efficiency:** Upgrade lighting/office equipment, regular maintenance of generators and equipment to reduce diesel consumption.

Medium term (2–5 years)

6. **Supply chain decarbonization:** Contract clauses for low-carbon materials, prefers suppliers with verified emissions.
7. **Renewable electricity:** Procure renewable electricity (PPA or Renewable Energy Certificates) to reduce Scope 2 and optionally claim residual mix per applicable guidance.
8. **Fleet electrification:** Where company vehicles exist, plan phased electrification.

Long term

Set science-based targets (SBTi) or internal targets to reduce absolute or intensity-based emissions — especially focused on the material supply chain.

16. (renumbered) Monitoring, verification & improvement plan

- **Monitoring:** Maintain centralized data system, monthly reconciliation of fuel and electricity, and project level material capture.
- **Verification:** Prepare for third-party verification per ISO 14064-3. Create documentation pack (invoices, delivery notes, travel records, calculation files).
- **Continuous improvement:** Annual review, update emission factors to latest published sources, and refine Scope 3 data collection (supplier questionnaires).

17. Conclusions

Summary of GHG performance

- Total footprint for the reporting year is 2,665.7 tCO_2e. Scope 3 upstream is the dominant source.

Success & opportunities

- **Strength:** Low on-site emissions; clear opportunity to reduce upstream/material emissions through supply chain measures.
- **Opportunity:** Supplier engagement, material substitution, and waste management will deliver the highest reductions.

Plan for next reporting period

- Confirm/replace assumptions (reporting period, employee count).
- Implement supplier data capture for top 10 materials (by tonnage/emissions).
- Run a commuting survey and capture project transport telematics where possible.
- Consider target setting (e.g., 10–20% reduction in supplier-related emissions over 3–5 years depending on interventions).

18. (numbering continued) Recommendations for target setting

- Use baseline year (2024) for initial target setting.
- Consider intensity target (e.g., tCO_2e per ton of project material or per project) in addition to absolute target to account for growth.
- For credibility, develop a roadmap to align with SBTi guidance (if pursuing formal SBTi approval).

19. Appendices

Appendix A — Activity data & calculation summary (from uploaded file)

(abridged table — full spreadsheet is in the uploaded workbook). All figures taken from the provided GHG calculation file.

Source	Activity	Unit	Emission factor	Emissions (tCO_2e)
Diesel (Scope 1)	Diesel for internal operations	6,860 L	2.68 kg CO_2e / L	18.4
Electricity (Scope 2)	Purchased electricity	14,619 kWh	0.82 kg CO_2e / kWh	12.0
Raw materials (upstream)	Project materials	2,798 ton	0.9 tCO_2e / ton	2,518.2
Office raw materials	188 kg	0.9 tCO_2e / ton (0.0009 t/kg)	0.169	
Bricks	260,000 nos	1.2 kg / 1000 bricks	0.312	
Employee commuting	79,143 km	0.12 kg CO_2e / km	9.5	
Business air travel	47,248 km	0.158 kg CO_2e / km	7.46	
Waste — office	535 kg	0.717 kg CO_2e / kg	0.384	
Waste — construction	139 ton	0.717 tCO_2e / ton	99.7	
Water	119 kL	0.344 kg CO_2e / kL	0.041	
Raw material transport	2,880 km	0.12 kg / km	0.346	
Finished goods dispatch	2,160 km	0.12 kg / km	0.259	
Total				**2,665.7**

Appendix B — Emission factor references (recommended)

(For formal reporting, replace the generic factors below with exact references and versions used in calculations.) Example authoritative sources to cite: IPCC Guidelines, DEFRA/BEIS emission factors, GHG Protocol emission factor database, India Central Electricity Authority / national grid emission factor publications, and supplier EPDs.

Appendix C — Definitions & abbreviations

- GHG = Greenhouse Gas
- CO_2e = Carbon dioxide equivalent
- tCO_2e = metric tonnes CO_2e
- Scope 1, 2, 3 as per GHG Protocol.

Appendix D — Assumptions & limitations

1. **Reporting period assumed**: 1 Jan 2024–31 Dec 2024 because data file did not specify period.
2. **Employee count assumed for intensity calculation**: **40 employees** (user must confirm actual headcount).
3. **Emission factors & source detail**: The file used generic factors; for verification and higher confidence, each factor should be traced to a published source and replaced by country-specific or product-specific factors where available.

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