ASHOKA

Ashoka Buildcon Limited

GREENHOUSE GAS (GHG)

EMISSIONS REPORT

FY 2025-26

Driving Low-Carbon Infrastructure Development

Scope 1 | Scope 2 | Scope 3

Ashoka Buildcon Limited

www.ashokabuildcon.com

GHG INVENTORY REPORT 2025-2026

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EXECUTIVE SUMMARY & GHG PERFORMANCE DASHBOARD (FY 2025–26)

Ashoka Buildcon Limited (ABL) continues to demonstrate strong commitment towards sustainability and climate action. During FY 2025–26, ABL has achieved a **significant reduction in greenhouse gas (GHG) emissions**, reinforcing its leadership in sustainable infrastructure development.

KEY PERFORMANCE HIGHLIGHTS-2025-2026

- **Total GHG Emissions: 57,387 tCO_2e**
- **Net Emissions: 54,334 tCO_2e**
- **Total Emission Reduction Achieved: 3,052.54 tCO_2e**
- **Reduction vs Previous Year: 13.41% ↓**

2-Year Performance (Major Achievement)

- FY 2023–24: **84,231 tCO_2e**
- FY 2024–25: **66,282 tCO_2e**
- FY 2025–26: **57,387 tCO_2e**
  → **Overall Reduction: ~35% ↓**

TOP CONTRIBUTOR TO REDUCTION

- **Solar Energy Projects:**
  → **3,004.68 tCO_2e reduction**
  → Contributing **~98% of total reduction**

TARGET vs ACHIEVEMENT STATUS

Parameter	Value
Reduction Target (2030)	25%
Achieved Reduction (FY 25–26)	~35%
Status	**Ahead of Target**

KEY INITIATIVES CONTRIBUTING TO REDUCTION

- Solar power generation across projects
- Electric vehicle deployment
- Biogas utilization for methane avoidance
- Reuse of milling material in road construction
- Adoption of energy-efficient technologies (Marini HMP)

STRATEGIC DIRECTION

ABL remains committed to further strengthening its sustainability performance through:

- Expansion of renewable energy capacity
- Increased electrification of fleet and machinery
- Advanced carbon reduction technologies
- Enhanced Scope 3 emission management

CONCLUSION

ABL's performance in FY 2025–26 reflects a **strong alignment with its long-term sustainability goals**, achieving measurable emission reductions and exceeding targets. The organization continues to move towards a **low-carbon and environmentally responsible future**, supported by robust systems and ISO 14064

CHAPTER 1: DESCRIPTION OF THE ORGANIZATION GOALS AND INVENTORY OBJECTIVES

1.1 PREFACE

Ashoka Buildcon Limited (ABL) is committed to sustainability and climate action. This Greenhouse Gas (GHG) Inventory Report for the Financial Year 2025–26 is prepared in accordance with the principles of ISO 14064-1:2018 (organizational GHG accounting) and ISO 14064-2:2019 (project-based GHG reductions).

This report serves as a key instrument for:

- **Quantifying and documenting** Scope 1, 2, and 3 emissions.
- **Identifying emission sources** to develop reduction strategies.
- **Supporting compliance** with international standards.
- **Facilitating third-party verification** under ISO 14064-3.

By accurately measuring and reporting our GHG emissions, ABL reinforces its commitment to transparency and continuous improvement while exploring opportunities for cost reduction and operational efficiency.

1.2 ABOUT ASHOKA BUILDCON LIMITED (ABL)

Company Name: Ashoka Buildcon Limited (ABL)
Industry: Infrastructure & Construction
Headquarters: Nashik, Maharashtra, India
Operations:

- Road construction and bridges projects
- Railway, Power transmission and distribution
- Commercial complex and residential Projects
- Renewable energy projects (including our solar plant)

Key Facts:

- **Experience:** Over 40 years in civil construction
- **Projects:** 60+ active projects across India
- **Sustainability Goals:**
    - Reduce carbon footprint through renewable energy and energy efficiency.
    - Leverage **solar power and biogas** to reduce Scope 2 and Scope 1 emissions, respectively.

ABL operates a **solar plant** to reduce grid electricity dependence (Scope 2) and a **biogas plant** to replace conventional fuel for canteen operations (Scope 1). These initiatives significantly contribute to emission reductions and sustainable operations.

ABL is renowned for delivering large-scale infrastructure projects through public-private partnerships (PPP) and is dedicated to advancing sustainable construction practices. Our registered corporate office is located at:

Ashoka Buildcon Limited (ABL)
Ashoka House, Ashoka Marg, Ashoka Nagar,
Nashik – 422 011, Maharashtra

Our operations also include renewable energy generation through our solar plant, which plays a pivotal role in reducing our reliance on grid electricity and lowering our Scope 2 emissions.

1.3 PURPOSE OF THE REPORT

The GHG Inventory Report has been prepared to address the following objectives:

- **Measure & Report:** Accurately quantify ABL's direct (Scope 1) and indirect (Scope 2 and Scope 3) GHG emissions.
- **Identify Sources:** Detail the major sources of emissions and outline opportunities for reduction.
- **Ensure Compliance:** Meet the requirements of ISO 14064-1:2018 and ISO 14064-2:2019, while preparing for third-party verification under ISO 14064-3.
- **Inform Stakeholders:** Provide clear data for internal decision-making, investor communication, regulatory compliance, and industry benchmarking.
- **Support Climate Goals:** Align with global sustainability targets and support our internal objective of achieving carbon neutrality.

The report highlights key initiatives such as our solar plant project that not only generate renewable energy but also serve as a model for emission reduction in our operations.

1.4 INDENTED USERS

This report is designed for a diverse group of stakeholders, ensuring that each receives relevant and actionable information on our GHG performance:

- **Senior Management:** To support strategic decision-making on carbon reduction initiatives.
- **Regulatory Authorities:** To comply with statutory and voluntary reporting requirements.
- **Certification Partner Global (CPG):** As independent third-party verification under ISO 14064-3.
- **Investors & Stakeholders:** To demonstrate our commitment to sustainable practices and long-term business viability.
- **Clients & Business Partners:** To align with sustainable infrastructure development goals and collaborate on green projects.

ABL reserves the right to control further dissemination. Any redistribution beyond the intended audience requires prior management approval.

1.5 DESCRIPTION OF THE REPORTING ORGANIZATION

Ashoka Buildcon Limited is one of India's largest highway developers, recognized for its excellence in PPP infrastructure projects spanning roads, bridges, and energy-related projects. Our focus on sustainability is reflected in our strategic initiatives, including:

- **Carbon Neutrality Goal:** Committed to reducing emissions by 25% by 2030.
- **Renewable Energy Initiatives:** Notably, our solar plant provides on-site renewable power, reducing reliance on grid-supplied electricity and lowering Scope 2 emissions.
- **Green Materials:** Adoption of eco-friendly construction materials.
- **Low-Emission Vehicles:** Transitioning to electric vehicles (EVs) for site operations.

Data Collection & Reporting Structure:

- **Scope 1 (Direct Emissions):** Data is collected at project sites and through the Corporate AMGPM Department using monthly diesel / petrol consumption records.
- **Scope 2 (Indirect Emissions):** Derived from electricity consumption data from offices and construction sites. Our solar plant contributes renewable energy, mitigating part of this consumption.
- **Scope 3 (Other Indirect Emissions):** Includes business travel data (air and rail)

In addition, information on GHG reduction initiatives such as the solar plant and biogas production is gathered and verified by our Corporate GHG Coordinators, reviewed by the Corporate HSE Head, and approved by the Director and CEO Projects.

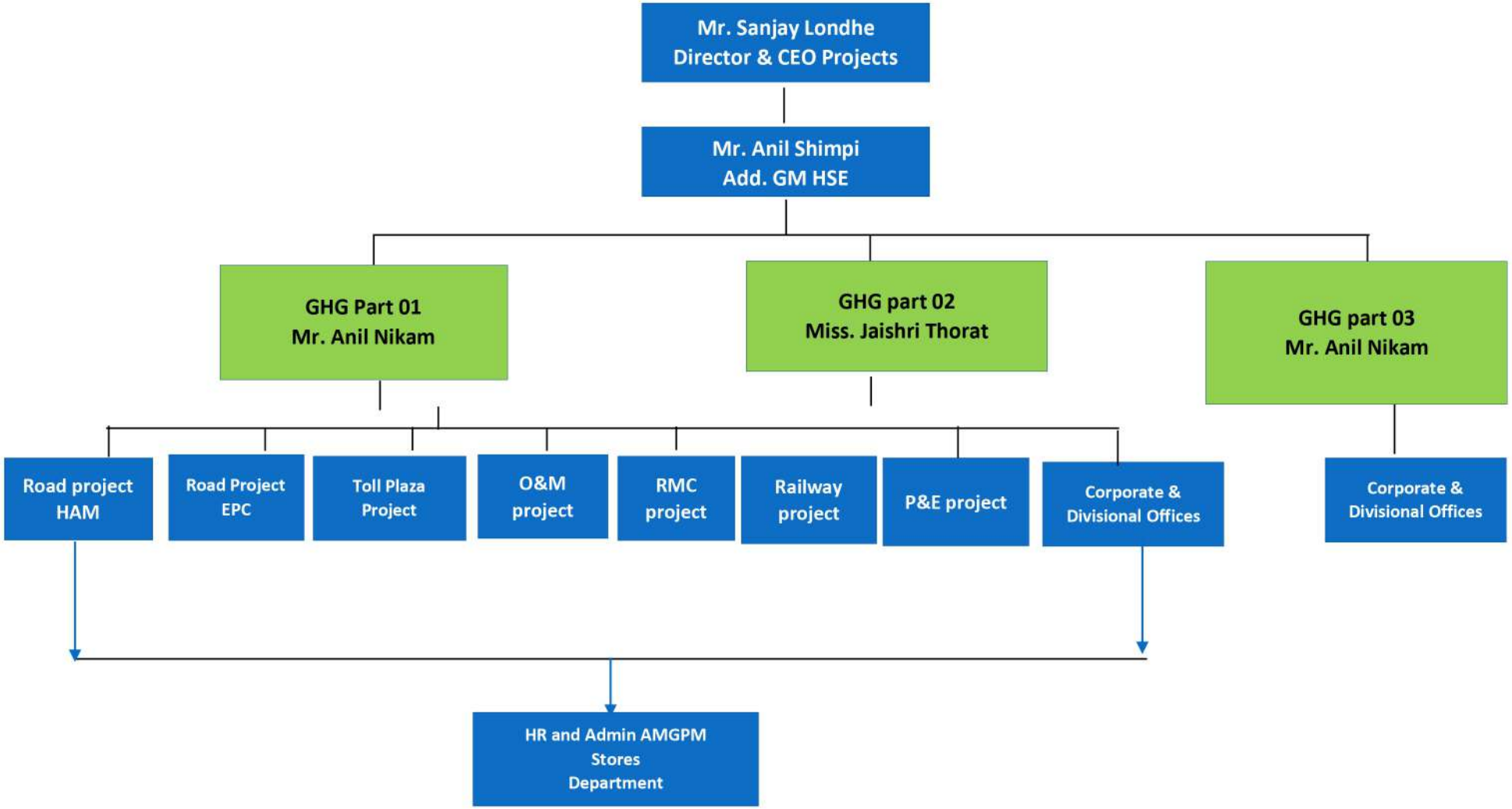
1.6 PERSON OR ENTITY RESPONSIBLE

The overall responsibility for the GHG inventory and report at ABL lies with a structured team:

- **GHG Reporting Coordinator:** [Anil Nikam] – Oversees data collection, emission quantification, and report preparation.
- **HSE & HSE Head:** [Anil Shimpi] – Provides oversight and ensures adherence to ISO standards.
- **Data Collection Team:** Includes Site HSE Officers, HR & Admin Officers, and Project Engineers responsible for gathering accurate data from all relevant sources, including solar plant performance metrics.

These roles collectively ensure the integrity, transparency, and accuracy of the GHG inventory.

Following is the GHG structures to coordinate the activities for GHG data collecting and report preparation



1.7 DISSEMINATION POLICY

ABL is committed to demonstrating its environmental leadership by transparently sharing its GHG performance:

- **Internal Dissemination:** The report is integrated into ABL's Sustainability Report and shared with senior management, employees, and business units.
- **External Dissemination:** Key findings are communicated to regulatory bodies, investors, and other stakeholders.
- **Controlled Distribution:** While the report is available to intended users, further dissemination requires prior approval to protect sensitive information and maintain data integrity.

Our corporate GHG policy reaffirms:

"ABL is committed to promoting and utilizing renewable energy sources while continually measuring, monitoring, and minimizing its GHG emissions through process improvements and enhanced carbon sinks."

1.8 REPORTING PERIOD AND FREQUENCY OF REPORTING

Reporting Period: April 1, 2025 – March 31, 2026.

Frequency: This GHG inventory is updated and reported on an annual basis, coinciding with ABL's financial reporting cycle.

Future Trends: Subsequent reports will track year-on-year trends to measure progress against reduction targets and support strategic decision-making.

1.9 DATA AND INFORMATION INCLUDED IN THE REPORT

This report, finalized on 15.04.2025, encompasses the following components:

- **Scope 1 – Direct Emissions:**
    - Emissions from fuel combustion in construction machinery and company-owned vehicles.
- **Scope 2 – Indirect Emissions:**
    - Emissions resulting from purchased electricity at construction sites and office premises.
- **Scope 3 – Other Indirect Emissions:**
    - Emissions from business travel (air and rail)
- **GHG Reduction Projects:**
    - Initiatives such as renewable energy projects, fuel efficiency improvements, and carbon offset programs.

Data Sources Include:

- Fuel records (diesel, petrol consumption logs).
- Electricity bills from offices and sites.
- Employee travel records.

The report details the methodologies, organizational boundaries, and assumptions used in quantifying the emissions, ensuring clarity and consistency throughout.

1.10 STATEMENTS BY THE ORGANIZATION ABOUT VERIFICATION.

For FY 2025–26, ABL's GHG inventory and report are subject to third-party verification by Certification Partner Global (CPG) in accordance with ISO 14064-3. The verification process includes:

- **Data Accuracy Checks:** Validation of fuel, electricity, and Scope 3 data.
- **Emission Factor Validation:** Confirmation of emission factors from recognized sources (IPCC, GHG Protocol, and national databases).
- **On-site and Off-site Audits:** Comprehensive inspections to verify the reliability and completeness of the reported data.

A limited level of assurance has been applied, ensuring that the GHG inventory and emission quantification meet ISO requirements and are materially accurate.

1.11 SCOPE AND OBJECTIVES OF GHG ACCOUNTING

Scope of GHG Accounting:

- Covers all direct (Scope 1) and indirect (Scope 2 and selected Scope 3) GHG emissions from ABL's operations.
- Includes removals associated with carbon offset initiatives.
- Encompasses emissions from over 60 active infrastructure projects.

Objectives:

- **Identify Major Emission Sources:** Pinpoint significant GHG emission points within operations.
- **Develop Reduction Strategies:** Formulate action plans to lower emissions across all scopes.
- **Ensure Compliance:** To fulfil the requirement of ISO 14064 and other global climate reporting requirements.
- **Support Carbon Neutrality:** Monitor the progress towards our long-term goal of reducing carbon emissions by 25% by 2030.
- **Inform Stakeholders:** Provide transparent, accurate data for internal and external decision-making.

1.12 SCOPE OF GHG INVENTORY AND REPORT AT ABL

The inventory and report cover the following emission categories:

A. Scope 1 – Direct GHG Emissions

- **Emission Sources:**

- Diesel combustion from heavy construction machinery.
- Fuel usage in company-owned vehicles.
- LPG usage at on-site facilities (e.g., canteens, welding operations).
- Biogas combustion for canteen operations.

B. Scope 2 – Indirect GHG Emissions from Energy Use

- **Emission Sources:**
  - Purchased electricity at construction sites and office locations.
  - Grid-supplied power used in auxiliary operations such as precast yards.
  - Renewable energy contributions from our solar plant, which mitigate the overall Scope 2 footprint.

C. Scope 3 – Other Indirect GHG Emissions

- **Emission Sources:**
  - Business travel (employee flights and train travel).

This defined scope ensures that all significant emission sources are captured and reported in alignment with ISO 14064 standards, forming a robust foundation for our emission reduction initiatives and ongoing sustainability efforts.

CHAPTER 2: BOUNDARIES.

2.1 ORGANIZATION BOUNDARIES

Ashoka Buildcon Limited (ABL) follows the operational control approach to define its organizational boundary in accordance with ISO 14064-1:2018, Clause 5.2. Under this approach, ABL accounts for and reports GHG emissions from all operations over which it has the authority to introduce and implement operational policies.

Procedure for Defining Organizational Boundaries:

- **Identification of Entities:**
    - Compile a comprehensive list of all legal entities, joint ventures, subsidiaries, and facilities under ABL's operational control.
    - Classify these entities by their type (wholly owned, joint ventures, or leased facilities).
- **Assessment of Operational Control:**
    - Determine operational control based on ABL's ability to implement environmental policies and GHG-related initiatives.
    - Include an entity within the boundary if ABL has the authority to direct both financial and operational policies.
- **Documentation and Review:**
    - Maintain an up-to-date record of all facilities included within the organizational boundary.
    - Review this record on an annual basis to reflect any acquisitions, divestitures, or other operational changes.
- **Exclusion Justification:**
    - If any subsidiary or joint venture is excluded from the boundary, provide a documented justification based on materiality and the specific control structure.

This structured approach ensures that all significant operations under ABL's influence are accounted for in the GHG inventory, reinforcing the accuracy and integrity of the reporting process.

2.2 REPORTING BOUNDARIES

ABL categorizes its GHG emissions into three main scopes, in line with ISO 14064-1:2018, Clause 5.3:

- **Scope 1:** Direct emissions.
- **Scope 2:** Indirect emissions from purchased electricity.
- **Scope 3:** Other indirect emissions.

Procedure for Establishing Reporting Boundaries:

- **Scope 1 – Direct Emissions:**

- **Identification of Emission Sources:**
  - Include all direct emission sources such as fuel combustion in owned vehicles, generators, Dryer Burner System of Hot Mix Plant and process emissions from construction activities.
- **Data Collection:**
  - Gather activity data from fuel purchase records and equipment logs to quantify emissions accurately.

- **Scope 2 – Indirect Emissions from Electricity:**
  - **Identification of Locations:**
    - Identify all facilities and locations where electricity is purchased, including construction sites, offices, and auxiliary operations.
  - **Data Collection and Calculation:**
    - Obtain electricity consumption data from utility bills.
    - Apply both location-based and market-based emission factors as recommended by ISO 14064-1:2018.

- **Scope 3 – Other Indirect Emissions:**
  - **Identification of Relevant Categories:**
    - Determine the relevant Scope 3 categories based on ABL's business model. These include:
    - Business travel (air travel, train travel etc.).
  - **Data Collection:**
    - Collect supporting data from travel logs (tickets) to ensure comprehensive coverage.

- **Data Accuracy and Completeness:**
  - Categorize emission sources as per the GHG Protocol and ISO 14064-1:2018 guidelines.
  - Conduct periodic verification of all data sources to maintain high data quality and integrity.

- **Consolidation of Emissions:**
  - Aggregate emissions data from all identified sources to derive total emissions for each scope.
  - Clearly document and maintain transparency regarding any exclusions, assumptions, and estimation methods used.

2.3 PROJECT-SPECIFIC BOUNDARIES AND METHODOLOGIES

In addition to the organizational and reporting boundaries defined above, ABL applies the principles of ISO 14064-2:2019 to quantify, monitor, and report emission reductions at the project level. This is particularly relevant for initiatives like our solar plant, which contribute directly to GHG reduction goals.

Defining Project Boundaries:

- **Identification of Project Components:**
  - Clearly delineate the project's physical boundaries (e.g., the solar plant site).
  - Identify all components and activities directly associated with the project, including installation, operation, and maintenance phases.

- **Baseline Scenario:**
  - Establish a baseline scenario representing the 'business-as-usual' state without the project intervention.
  - Document the baseline data, assumptions, and emission factors used to calculate the expected GHG emissions in the absence of the project.

- **Quantification of Emission Reductions:**
  - Calculate the difference between the baseline scenario and actual emissions after project implementation.
  - Use standardized calculation methodologies, consistent with ISO 14064-2:2019, to ensure comparability and transparency.

Monitoring and Verification:

- **Data Collection:**
  - For the solar plant, collect performance data via online monitoring systems, including energy generated, operational uptime, and efficiency metrics.
  - Gather corresponding utility data for purchased electricity to assess the net impact on Scope 2 emissions.

- **Regular Reporting:**
  - Monitor the project's performance continuously and report emission reduction figures on an annual or project-specific cycle.
  - Update the baseline and project data as necessary to reflect any operational changes or improvements.

- **Third-Party Verification:**
  - The emission reductions from the project will be subject to independent verification under ISO 14064-3.
  - Verification includes reviewing the baseline scenario, emission reduction calculations, and on-site audits of the solar plant and other project components.

Integration with Organizational Reporting:

- **Consolidated Reporting:**
  - Emission reductions from the project (e.g., the solar plant) are aggregated with overall organizational GHG data.
  - Ensure clear segregation and transparent reporting of project-based reductions to demonstrate their contribution to the total GHG performance.

- **Documentation and Transparency:**
  - Maintain detailed records of methodologies, assumptions, and calculations.
  - Include supporting documentation and performance data in the appendices of the overall GHG report.

This project-specific section aligns with ISO 14064-2:2019 requirements and ensures that GHG reductions achieved through targeted initiatives are accurately quantified, monitored, and reported.

The details of organizational boundary of ABL having facilities that contain GHG sources are given below. These organizational units are segregated based on the operational[1] control criteria.


Scope 2
Scope 1
ROAD PROJECT
OFFICES
RAILWAY PROJECT
TOT PROJECT
SOLAR PROJECT
TOLL PLAZA PROJECT
RMC PROJECT
BIOGAS BOTTLING PLANT
CGD Projects
Scope 3
Business Travel

CHAPTER 3: QUANTIFIED GHG INVENTORY OF EMISSIONS AND REMOVALS.

3.1 DIRECT GHG EMISSIONS - SCOPE 1

Direct GHG emissions are generated from operations owned or controlled by ABL, including assets where ABL bears the fuel expense.

3.1.1 IDENTIFICATION OF SCOPE 1 SOURCES

The primary Scope 1 emission sources at ABL include:

Sr. No	Direct GHG Emission Source	Description
1	Vehicles (ABL Owned/Controlled)	Includes diesel and petrol-powered company vehicles.
2	Construction Machinery (ABL Owned / Controlled)	Excavators, dozers, graders, water pumps, mixers, pavers, cranes, etc.
3	Diesel Generators (DG Sets)	Generators used at construction sites and offices.
4	Biogas Plant	Biogas generated on-site from organic waste and used in canteen facilities.

3.1.2 DATA COLLECTION FOR SCOPE 1

- **Fuel Consumption Records:** Data from the SAP portal, site logbooks, and reconciliation sheets.
- **DG Set Logs:** Operating hours and fuel usage recorded at various sites.
- **Biogas plant Report:** Biogas plant production & usage records.

3.1.3 SCOPE 1 EMISSION CALCULATION

The emission calculation follows the formula:

$CO2e = \sum(\text{Fuel Consumption} \times \text{Emission Factor})$

Emission Factors Used

Fuel Type	CO_2 Emission Factor (kg/L or kg/kg)
Diesel	**2.64 kg CO_2/L**
Petrol	**2.27 kg CO_2/L**
Biogas	**0 (considered carbon-neutral under IPCC guidelines)**
LPG	**2.98 kg CO_2/kg**

Scope 1 Emission Calculation

- Diesel Consumption = **17,138,071.32 Litres**
  → Emissions = **45,307.02 tCO_2e**
- Petrol Consumption = **41,373.889 Litres**
  → Emissions = **93.95 tCO_2e**
- LPG Consumption = **137,752.02 kg**
  → Emissions = **410.50 tCO_2e**
- Biogas Usage
  → Emissions = **0 tCO_2e** (CARBON-NEUTRAL ASSUMPTION)

Total Scope 1 Emissions (including biogas adjustment):

☞ **45,811.47 tCO_2e**

3.2 INDIRECT GHG EMISSIONS -SCOPE 2

Scope 2 emissions are indirect emissions resulting from purchased electricity consumption.

3.2.1 IDENTIFICATION OF SCOPE 2 SOURCES

ABL sources electricity from various state electricity distribution companies across its operations:

Sr. No	Scope 2 GHG Source	Electricity Provider
1	Corporate Office (Nashik)	MSEDCL
2	Road Construction Projects	HESCOM, WBSEDCL, JBVNL, GSECL
3	Ready Mix Concrete (RMC) Plants	MSEDCL
4	Toll Operations	MSEDCL, MPPKVVCL, WBSEDCL, HESCOM, WESCO, CSPDCL
5	Road Maintenance (O&M)	MSEDCL, CSEDCL, MPPKVVCL, WBSEDCL, HESCOM, WESCO, CSPDCL
6	Power Projects	MSEDCL, JBVNL, NBPDCL, APDCL, AEPDS
7	Bio Green Projects	MSEDCL
8	Railway Projects	MPPKVVCL, JBVNL, APDCL, GSECL

3.2.2 DATA COLLECTION FOR SCOPE 2

- **Electricity Bills:** Obtained from state distribution companies.
- **Meter Readings:** Collected from each ABL facility.

3.2.3 SCOPE 2 EMISSION CALCULATION

The calculation uses the following formula:

$$CO2e = \sum(\text{Electricity Consumption} \times \text{Grid Emission Factor})$$

For this report, an emission factor of **0.727 tCO_2/MWh** (sourced from the CEA Database, 2025) is applied.

Scope 2 Emission Calculation

- Total Electricity Consumption = **15,210,965 kWh**
  (= **15,210.97 MWh**)
  → Emissions = **10,800 tCO_2e**
- Electricity Consumption for Electric Vehicles = **51,848.7 kWh**
  (= **51.85 MWh**)
  → Emissions = **36.81 tCO_2e**

Total Scope 2 Emissions:

☞ **10,836.81 tCO_2e**

3.3 INDIRECT GHG EMISSIONS – SCOPE 3

Scope 3 emissions include other indirect emissions that result from business travel and outsourced activities.

3.3.1 IDENTIFICATION OF SCOPE 3 SOURCES

Key Scope 3 emission sources for ABL include:

- **Business Travel:** Including train and flight travel.

3.3.2 DATA COLLECTION FOR SCOPE 3

Sr. No	Scope 3 GHG Source	Data Collection Method
1	Train and Flight Travel	Corporate administrative records, ticket receipts

3.3.3 SCOPE 3 EMISSION CALCULATION

Emissions are calculated using the formula:

$$CO2e = \sum(\text{Distance Traveled} \times \text{Mode-Specific Emission Factor})$$

For this assessment:

- Air Travel Emission Factor = **0.133 kg CO_2e/km**
- Train Travel Emission Factor = **0.0115 kg CO_2e/km**

Scope 3 Emission Calculation

- Domestic Flights = **1,759,415 km**
- International Flights = **3,787,527 km**
  → Combined Air Travel Emissions = **737,743.29 kg CO_2e**

- Train Travel = **84,833 km**
  → Emissions = **975.58 kg CO_2e**

Total Scope 3 Emissions

- Total = **738,718.87 kg CO_2e**
  ☞ **= 738.72 tCO_2e**

3.4 BIOGENIC GHG EMISSIONS

No biomass combustion activities occurred within ABL's operational boundary during the reporting period; hence, biogenic emissions are not applicable.

3.5 EXCLUSION OF ANY SIGNIFICANT GHG SOURCES OR SINKS

- **Exclusions:**
  - Emissions from third-party suppliers and contractor operations, where ABL does not have operational control.
  - Employee commuting is excluded from this report.
- **Sinks:**
  - No carbon sinks were identified within ABL's operational boundary during the reporting period.

3.6 GHG QUANTIFICATION PROCESS

ABL follows a systematic approach to quantifying GHG emissions in line with ISO 14064-1:2018:

3.6.1 IDENTIFICATION OF GHG SOURCES AND SINKS

ABL identifies its GHG sources using:

- Fuel purchase records.
- Electricity invoices.
- Business travel logs.

3.6.2 GHG QUANTIFICATION METHODOLOGY

- **Activity Data Multiplication:**
  The activity data (e.g., fuel consumption, electricity usage) is multiplied by the appropriate GHG emission or removal factors.
- **Emission Factor Sources:**
  Emission factors are obtained from recognized sources, including the IPCC Guidelines and the CEA Database.

3.6.3 SELECTION AND COLLECTION OF GHG ACTIVITY DATA

Sr. No	GHG Source Type	Data Collection Frequency
1	Vehicles/Machinery	Quarterly (via SAP, site logbooks)
2	Purchased Electricity	Quarterly (Utility bills)

3	Business Travel	Quarterly (Admin department)

3.6.4 SELECTION AND DEVELOPMENT OF GHG EMISSION FACTORS

ABL selects its emission factors from:

- **IPCC 2006 Guidelines**
- **CEA Database 2025**
- **GHG Protocol Cross-Sector Tools**

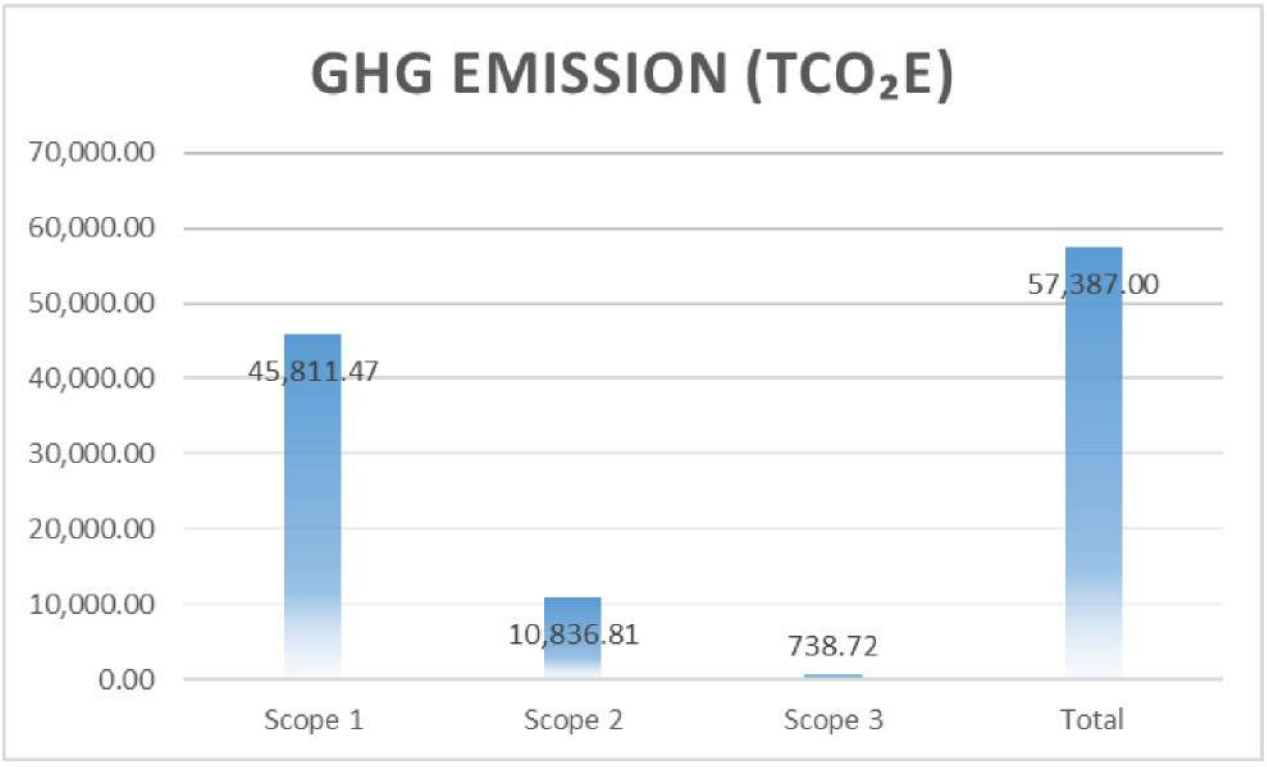
3.6.5 FINAL GHG EMISSION QUANTIFICATION

Calculations are performed using MS Excel-based tools following **ISO 14064-1** and **GHG Protocol** methodologies. The quantified emissions are summarized as follows:

GHG Emission Summary

Scope	Scope 1	Scope 2	Scope 3	Total
GHG Emission (tCO_2e)	45,811.47	10,836.81	738.72	57,387.00

The total GHG emissions for FY 2025–26 were quantified as **57,387 tCO_2e**, comprising **45,811.47 tCO_2e (Scope 1)**, **10,836.81 tCO_2e (Scope 2)**, and **738.72 tCO_2e (Scope 3)** emissions.



CHAPTER 4: BASE-YEAR GHG INVENTORY

4.1 SELECTION AND ESTABLISHMENT OF BASE YEAR

ABL has selected a base year for GHG emissions inventory in line with ISO 14064-1:2018 and ISO 14064-2:2019 guidelines. The base year selection follows these principles:

- **Consistency:** Ensuring meaningful comparison of emissions over time.
- **Relevance:** Reflecting the organization's operational structure and emission sources.
- **Data Availability:** Ensuring completeness and reliability of historical data.
- **Comparability:** Facilitating trend analysis and target-setting.

ABL has historically reported GHG emissions since 2009. However, the base year for current GHG inventory tracking is **2009, e.g., 2008-09** to ensure alignment with current operational structure and data accuracy.

4.2 REVIEW OF BASE-YEAR GHG INVENTORY

A structured approach is used to review and update the base-year emissions inventory. The following conditions trigger base-year recalculations:

1. **Structural Changes:** Mergers, acquisitions, divestitures, or significant operational changes affecting emissions.
2. **Methodological Improvements:** Changes in calculation methodologies, emission factors, or data quality improvements.
3. **Scope Adjustments:** Addition of new emissions sources, such as last year's inclusion of **Scope 3 (Business Travel)**.

4.2.1 IMPACT OF SCOPE 3 ADDITION

In the previous reporting year, **Scope 3 emissions from Business Travel (Air and Train travel)** were incorporated into the inventory. This required recalculating base-year emissions to maintain comparability. The recalculation approach followed:

- **Step 1:** Identifying historical Scope 3 (Business Travel) data availability.
- **Step 2:** Applying consistent emission factors across the years.
- **Step 3:** Recalculating total GHG emissions for the base year, ensuring alignment with updated boundaries.

4.3 APPLICATION OF ISO 14064-2:2019 IN BASE-YEAR ASSESSMENT

ISO 14064-2:2019 emphasizes the importance of baselines in GHG projects. The base-year emissions act as a reference point to measure reduction efforts in ABL's **GHG mitigation projects**, such as:

1. **Biogas Utilization for Canteen Operations** – Reducing LPG dependency.
2. **Solar Power Integration** – Reducing Scope 2 emissions.
3. **Energy Efficiency Measures in Machinery & Equipment** – Lowering diesel consumption.

Baseline adjustments incorporate these factors by ensuring accurate accounting of **emission reductions** against the base year.

4.4 ONGOING BASE-YEAR REVIEW & ADJUSTMENTS

ABL commits to an **annual review** of the base-year inventory to account for:

- **New emission sources**
- **Organizational changes**
- **GHG mitigation initiatives**
- **Methodological refinements in ISO 14064-2:2019 compliance**

Any significant changes will trigger a documented recalculation and justification in future reports.

4.5 BASE-YEAR DATA COLLECTION AND SOURCES

The base-year data collection follows the **ISO 14064-2:2019** principle of **GHG project boundary integrity**. Key data sources include:

1. **Fuel consumption records** – Used for Scope 1 emissions quantification.
2. **Electricity bills from state electricity distribution companies** – Used for Scope 2 emissions quantification.
3. **Travel records (air and train travel invoices)** – Used for Scope 3 emissions quantification.

ABL maintains **audit-ready documentation** to support base-year data integrity, ensuring consistency and transparency.

4.5 BASE-YEAR GHG QUANTIFICATION METHODOLOGY

ABL follows a standardized approach to quantifying base-year GHG emissions in alignment with **ISO 14064-1:2018 and ISO 14064-2:2019**. The methodology ensures consistency, accuracy, and transparency in tracking emissions over time.

4.5.1 METHODOLOGY FOR BASE-YEAR EMISSIONS CALCULATION

The **GHG quantification formula** used for base-year emissions follows:

$$\text{GHG Emissions } (tCO_2e) = \sum(\text{Activity Data} \times \text{Emission Factor})$$

where:

- **Activity Data:** Fuel consumption (liters), electricity usage (MWh), and business travel distances (km)
- **Emission Factor:** Published factors from **IPCC, UNFCCC, CEA**, or other recognized sources

ABL applies the **same calculation methodology** for both base-year and current-year emissions to ensure comparability.

4.5.2 DATA SOURCES FOR BASE-YEAR QUANTIFICATION

ABL relies on historical records to quantify base-year emissions. The primary data sources include:

- **Fuel consumption records** from SAP portal, fuel logs, and reconciliation sheets
- **Electricity bills** from respective state electricity distribution companies
- **Business travel logs** for air and rail travel, collected from admin records

All data undergoes **verification and cross-checking** to ensure accuracy before inclusion in the inventory.

4.6 BASE-YEAR RECALCULATION POLICY

ABL follows **ISO 14064-1:2018 and ISO 14064-2:2019** guidelines to trigger recalculations of the base-year inventory when necessary. The base-year emissions are **recalculated** under the following conditions:

4.6.1 CONDITIONS FOR BASE-YEAR RECALCULATION

1. **Structural Changes:** Mergers, acquisitions, divestitures, or operational expansions that significantly impact emissions.
2. **Methodology Updates:** Changes in **GHG quantification methods**, emission factors, or standards affecting calculation accuracy.
3. **Scope Expansion:** Addition of new emission sources, such as **Scope 3 (Business Travel)** added last year.
4. **Data Quality Improvement:** Discovery of significant errors or omissions in historical data.

4.6.2 PROCEDURE FOR BASE-YEAR RECALCULATION

1. Identify the reason for recalculation.
2. Gather revised activity data for the affected emission sources.
3. Apply updated **emission factors** (if applicable).
4. Recalculate **Scope 1, Scope 2, and Scope 3** emissions based on the latest methodology.
5. Document the changes and ensure **third-party verification** of recalculated figures.

This policy ensures that ABL's emissions data remains **accurate, comparable, and aligned with evolving operational boundaries.**

4.7 BASE-YEAR VS. CURRENT-YEAR GHG EMISSIONS

The comparison of **base-year and current-year emissions** helps ABL track progress in **GHG reduction efforts**.

4.7.1 ANALYSIS OF CHANGES IN EMISSIONS

- **Scope 1:** Increase/decrease due to changes in fuel consumption, fleet size, or construction activities.
- **Scope 2:** Impact of energy efficiency measures or changes in grid electricity dependency.
- **Scope 3:** Newly added category from last year, reflecting business travel emissions.

This **trend analysis** informs ABL's sustainability strategy and future reduction plans.

CHAPTER 5: UNCERTAINTY

5.1 ASSESSING UNCERTAINTY

ABL acknowledges that **uncertainty** is inherent in GHG quantification and reporting. Uncertainty arises from **data collection, measurement errors, estimation techniques, and emission factors**. Identifying and managing these uncertainties is critical to improving the accuracy and credibility of the **GHG inventory**.

5.1.1 MAIN SOURCES OF UNCERTAINTY

The primary sources of uncertainty in ABL's GHG inventory include:

1. **Fuel Consumption Estimates:**
    - Inaccuracies in fuel logs maintained at sites.
    - Errors in fuel purchase records and reconciliation sheets.
    - Potential discrepancies in fuel density and emission factor variations.
2. **Electricity Metering Inaccuracies:**
    - Variability in **electricity meters** at different project sites.
    - Discrepancies in **state electricity board billing data**.
    - Delayed data reporting or misreporting due to manual entry errors.
3. **Emission Factor Uncertainty:**
    - Changes in **national or international emission factors** over time.
    - Variation in **calorific values of fuels** used in different locations.
4. **Scope 3 Data Collection Challenges:**
    - Business travel records (ticket invoices, trip distances) may have missing or estimated data.
    - Estimation of emissions based on third-party service providers.
5. **Operational and Reporting Gaps:**
    - Inconsistencies in project-wise data reporting.
    - Changes in operational boundaries that affect emission calculations.

5.1.2 METHODS FOR MANAGING AND REDUCING UNCERTAINTY

ABL applies the following measures to **minimize uncertainty**:

- **Verification and Cross-Checking:**
    - Fuel logs are cross-checked with invoices and procurement records.
    - Electricity consumption data is validated through **monthly meter readings and invoices**.
- **Standardization of Data Collection:**
    - All project sites follow a **uniform data collection template** to reduce errors.
    - Digital logging of fuel consumption in the **SAP portal** for better tracking.
- **Use of Conservative Assumptions:**
    - Where exact data is unavailable, ABL applies **conservative estimates** using industry-standard emission factors.
- **Third-Party Verification:**
    - The GHG inventory undergoes verification by **Certification Partner Global (CPG)** under **ISO 14064-3**.

5.2 MATERIALITY

Materiality is a **key principle** in GHG accounting that determines whether an error, omission, or misstatement in emissions data is **significant enough to impact decision-making**.

5.2.1 MATERIALITY THRESHOLD

ABL applies a **materiality threshold of 5%** for emission variations.

- **If discrepancies exceed 5%** of the total reported GHG emissions, the data is flagged for review and potential recalculation.
- If the error is **below 5%**, it is considered **immaterial** and does not necessitate recalculation.

5.2.2 APPLICATION OF MATERIALITY IN GHG ACCOUNTING

Materiality assessment is applied in:

- **Base-Year Recalculations:** Ensuring that changes in emission factors or methodologies do not exceed the 5% threshold before adjusting base-year values.
- **Data Corrections:** If discrepancies in fuel or electricity data exceed 5%, corrective actions are taken to validate and adjust figures.
- **Scope 3 Estimates:** Due to inherent uncertainties in business travel emissions, a **5% tolerance** is considered for variations in estimated distances.

5.2.3 ENSURING MATERIALITY COMPLIANCE

ABL ensures **materiality compliance** through:

- **Regular audits of fuel and electricity data.**
- **Independent verification of significant emission sources.**
- **Standardized data collection protocols** to minimize misstatements.

CHAPTER 6: GHG INFORMATION MANAGEMENT, CORE TEAM DEVELOPMENT, AND MONITORING PROCEDURES

ABL has implemented a structured **GHG information management and monitoring system** to ensure the **accurate quantification, reporting, and verification** of its greenhouse gas emissions. This system aligns with **ISO 14064-1:2018 and ISO 14064-2:2019**, ensuring compliance with best practices for GHG accounting, monitoring, and continual improvement.

6.1 GHG INFORMATION MANAGEMENT PROCEDURES

ABL follows a standardized approach for managing, recording, and verifying GHG emissions data across its operations. The **GHG information management system** ensures data integrity, consistency, and traceability through defined procedures, roles, and responsibilities.

6.1.1 DATA COLLECTION & RECORDING FRAMEWORK

ABL has developed a **centralized GHG data collection system** that consolidates emissions data from multiple sources, including fuel consumption, electricity usage, and business travel.

GHG Source	Data Collection Method	Frequency of Collection
Fuel consumption (Scope 1)	SAP-based fuel management system, reconciliation sheets	Continuous
Electricity consumption (Scope 2)	Smart meters, utility bills	Quarterly
Business travel (Scope 3)	Travel booking records, invoices	Quarterly

6.1.2 DATA VERIFICATION & QUALITY CONTROL

ABL ensures **data accuracy and reliability** through a structured verification mechanism:

- **Annual internal audits** are conducted to validate recorded fuel, electricity, and travel data.
- **Materiality threshold of ±5%**: Any discrepancies exceeding this limit trigger an internal review and corrective action.
- **Third-party cross-checks**: Data is verified against fuel supplier invoices, electricity bills, and external sources to ensure accuracy.

6.2 GHG CORE TEAM DEVELOPMENT

ABL has established a **dedicated GHG core team** responsible for implementing and maintaining the GHG inventory system.

6.2.1 ROLES & RESPONSIBILITIES OF THE CORE TEAM

The **GHG core team** is composed of key personnel from different departments to ensure an integrated approach to emissions management.

Team Member	Role & Responsibility
HSE Head	Overall responsibility for GHG reporting and compliance.
Admin Manager	Tracks electricity usage, identifies efficiency improvements.
AMGPM Manager	Monitors fuel consumption and vehicle emissions.
HR & Admin	Collects business travel data for Scope 3 calculations.
Internal Audit Team	Conducts periodic data verification and audits.

6.2.2 TRAINING & CAPACITY BUILDING

To strengthen ABL's GHG management capabilities, the core team undergoes regular training on:

- **ISO 14064-1:2018 & ISO 14064-2:2019 standards** for emissions accounting.
- **Emission factor calculations and carbon footprint analysis.**
- **New regulatory requirements and sustainability initiatives.**

6.3 GHG MONITORING & EMISSION TRACKING SYSTEM

ABL has developed a comprehensive **GHG monitoring system** to track emissions from fuel consumption, electricity usage, and other key sources.

6.3.1 KEY COMPONENTS OF THE MONITORING SYSTEM

1. **Automated Fuel Tracking System**
    - SAP-based fuel management system records consumption across all project sites.
    - Digital reconciliation of fuel logs with supplier invoices.
    - Monthly fuel reconciliation reports validate usage trends.
2. **Energy Monitoring via Smart Meters**
    - Electricity consumption at ABL facilities is measured using digital smart meters.
    - Monthly electricity bills from state distribution companies provide primary data.
    - Facility-wise energy trends are analyzed to identify efficiency improvements.
3. **Business Travel & Scope 3 Data Tracking**
    - Corporate administration department tracks air and rail travel records.
    - Distance-based methods are used for accurate Scope 3 emissions estimation.

6.4 GHG EMISSION REDUCTION STRATEGIES

ABL actively implements emission reduction measures to enhance energy efficiency, minimize fossil fuel dependence, and optimize business operations.

6.4.1 ENERGY EFFICIENCY MEASURES

- Upgrading to **fuel-efficient construction machinery** to lower diesel consumption.
- Conducting **energy audits at project sites** to reduce electricity waste.
- Implementing **LED lighting and smart metering** for improved energy efficiency.

6.4.2 RENEWABLE ENERGY INTEGRATION

- Expanding **solar power installations** at selected facilities.
- Increasing **biogas utilization for canteen operations**, reducing Scope 1 emissions.

6.4.3 SUSTAINABLE BUSINESS TRAVEL POLICIES

- Encouraging **rail travel over flights** for short business trips to reduce Scope 3 emissions.

6.5 GHG PERFORMANCE MONITORING & REPORTING

ABL ensures **transparent and continuous monitoring** of its emissions performance through structured reporting and compliance measures.

6.5.1 ANNUAL GHG INVENTORY REPORTS

- Reports are prepared following **ISO 14064-1:2018** standards.
- Covers **Scope 1, Scope 2, and Scope 3 emissions** based on real-time operational data.

6.5.2 REGULAR PERFORMANCE REVIEWS

- **Biannual reviews** are conducted to assess progress against reduction targets.
- **Deviations trigger corrective actions**, ensuring continuous improvement.

6.5.3 THIRD-PARTY VERIFICATION & COMPLIANCE

- **ABL's GHG inventory is independently verified by Certification Partner Global (CPG)** under ISO 14064-3.
- Compliance with **national and international climate reporting frameworks** is ensured.

CONCLUSION

ABL's **GHG information management, core team development, and monitoring procedures** ensure accurate tracking, verification, and reduction of emissions. Through a combination of **digital monitoring, team capacity building, and emission reduction strategies**, ABL continues to enhance its sustainability efforts and align with international climate action commitments.

CHAPTER 7: GHG REDUCTION INITIATIVES & CARBON OFFSETTING

7.1 INTRODUCTION

Ashoka Buildcon Limited (ABL) is committed to reducing its carbon footprint through innovative environmental initiatives and sustainable practices. This chapter highlights key actions taken by ABL to minimize greenhouse gas (GHG) emissions, improve resource efficiency, and contribute to climate change mitigation.

The primary GHG reduction strategies adopted by ABL include:

- **Use of alternative materials** (e.g., fly ash and pond ash)
- **Afforestation and tree plantation programs**
- **Energy-efficient lighting and electrical equipment**
- **Recycling and reuse of milling material**
- **Implementation of advanced asphalt production technology**
- **Topsoil conservation and sustainable land use**

7.2 ENVIRONMENTAL RESOURCE MANAGEMENT

7.2.1 SOLAR ENERGY PROJECTS – GHG REDUCTION EVIDENCE

Installed Capacity: 3,011 kW
Emission Reduction Achieved: 3,004.68 tCO_2e

Solar Power Projects – Detailed GHG Reduction Summary

Sr. No.	Project Name	Data Period	Installed Capacity (kW)	Generation (kWh)	Emission Reduction (tCO_2e)
1	AHBL	April 2025 to Nov. 2025	40	24,298.00	17.25
2	ABDTL		27	11,182.95	7.94
3	ADKTL Dulhagori Toll Plaza		52	21,787.00	15.47
4	Debra New Toll Plaza		48	35,832.00	25.44
5	ABE All Buildings	April 2025 to March-2026	58	29,766.00	21.13
6	AUS School (Wadala)		140	74,012.00	52.55
7	ABL Arjun Nagar School		2520	47,192.00	33.51
8	Chandashi School		50	136,857.00	97.17
9	ABS (Rane Nagar)		30	107,923.00	76.63
10	Sinnar Solar Plant		46	3,743,089.00	2,657.59
		Total	3011	**4,231,938.95 kWh**	**3,004.68 tCO_2e**

Solar energy installations across ABL projects have significantly reduced dependency on grid electricity, thereby lowering Scope 2 emissions.

"Solar energy initiatives have emerged as the backbone of ABL's decarbonization strategy, contributing nearly the entire share of emission reductions in FY 2025–26."

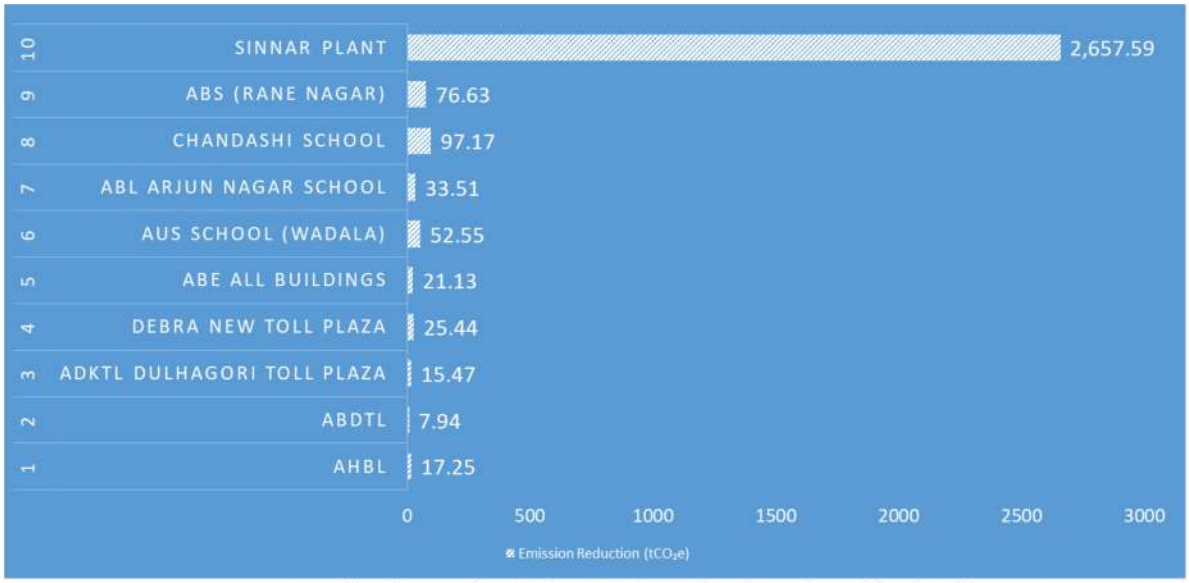
PERFORMANCE SUMMARY / IMPACT

The solar power installations across various ABL project locations have contributed significantly to reducing greenhouse gas emissions.

- Total installed capacity of **3,011 kW** generated **over 4.23 million kWh of clean energy**
- This resulted in a total reduction of **3,004.68 tCO_2e**, making solar energy the **largest contributor (~98%)** to overall emission reduction
- The **Sinnar Plant alone contributes ~88% of total solar reduction**, indicating a major shift towards renewable energy-driven operations.

Environmental & Sustainability Benefits

- Significant reduction in **Scope 2 emissions** through use of renewable solar energy
- Reduction in **carbon footprint and air pollution**, supporting climate change mitigation
- Decreased dependency on **fossil fuel-based electricity**
- Generation of **clean and sustainable energy**, promoting efficient resource utilization
- Improved **energy efficiency and long-term operational cost savings**
- Strengthens ABL's commitment towards a **low-carbon and sustainable future**



"Project-wise Solar GHG Reduction Contribution"

7.2.2 SOLAR-BASED HIGH MAST LIGHTING REPLACING DIESEL HIGH MAST

ABL has replaced conventional **diesel-operated mobile lighting towers** with **solar-based mobile lighting towers** at project sites to reduce fuel consumption and associated emissions.

Control Measure Implemented

- Deployment of **solar-powered mobile lighting towers** at construction sites
- Replacement of **diesel generator-based lighting systems**
- Utilization of **renewable solar energy for night-time illumination**

Performance Summary / Impact

The transition to solar-based lighting towers has significantly reduced dependency on diesel and improved energy efficiency.

- Elimination of **diesel consumption** for lighting purposes
- Reduction in **GHG emissions and air pollutants**
- Lower **operational and maintenance costs**
- Noise-free and eco-friendly lighting solution

Environmental & Sustainability Benefits

- Reduction in **Scope 1 emissions** by eliminating diesel usage
- Decrease in **air pollution (CO_2, NOx, PM emissions)**
- Promotion of **renewable energy utilization** at project sites
- Reduction in **noise pollution** compared to DG-based systems
- Improved **energy efficiency and sustainability performance**
- Supports ABL's transition towards **clean and green construction practices**

7.2.3 SOLAR-BASED LIGHTING AT LABOUR CAMPS

ABL has implemented **solar-based lighting systems at labour camps** to reduce electricity consumption and promote the use of renewable energy in day-to-day operations.

Control Measure Implemented

- Installation of **solar-powered bulbs/lights** in labour camps
- Replacement of **grid electricity and conventional lighting systems**
- Utilization of **renewable solar energy for lighting purposes**

Performance Summary / Impact

The use of solar-based lighting has improved energy efficiency and reduced dependency on conventional power sources.

- Reduction in **electricity consumption** at labour camps
- Decrease in **indirect GHG emissions (Scope 2)**
- Reliable lighting solution in **remote or low-power availability areas**
- Lower operational cost due to reduced electricity usage

Environmental & Sustainability Benefits

- Promotion of **renewable energy usage** at site level
- Reduction in **carbon footprint and electricity demand**
- Decrease in dependency on **fossil fuel-based power sources**
- Improvement in **living conditions and safety at labour camps**
- Supports ABL's commitment towards **sustainable and inclusive development**

7.2.4 ELECTRIC VEHICLES (EV)

Electric Vehicle Deployment – GHG Reduction Evidence

Total Distance Covered: 345,658 km
Emission Reduction Achieved: 25.41 tCO_2e

Performance Summary / Impact

Electric vehicles have reduced fossil fuel consumption and contributed to cleaner transportation within operations.

- Total distance of **345,658 km** covered using electric vehicles
- Achieved emission reduction of **25.41 tCO_2e** through replacement of conventional fuel vehicles
- Supports transition towards **low-emission and sustainable mobility solutions**

Environmental & Sustainability Benefits

- Reduction in **Scope 1 emissions** by minimizing diesel/petrol consumption
- Decrease in **air pollution and greenhouse gas emissions**
- Promotes adoption of **clean and green transportation systems**
- Lower **noise pollution**, improving site environmental conditions
- Reduced **operational and maintenance costs** compared to conventional vehicles
- Supports ABL's transition towards a **low-carbon mobility ecosystem**

"Deployment of electric vehicles reducing emissions by 25.41 tCO_2e through sustainable mobility."

7.3 WASTE MANAGEMENT & RECYCLING INITIATIVES

7.3.1 BIOGAS PLANT

Biogas Utilization – GHG Reduction Evidence

Emission Reduction Achieved: 22.00 tCO_2e

Performance Summary / Impact

Biogas plant operations help in methane avoidance and convert organic waste into clean energy.

- Achieved emission reduction of **22.00 tCO_2e** through controlled biogas utilization
- Reduction of **methane emissions**, which have a higher global warming potential than CO_2
- Effective conversion of organic waste into **renewable energy source**

Environmental & Sustainability Benefits

- Significant reduction in **methane emissions** (high-impact greenhouse gas)
- Promotes **waste-to-energy conversion**, reducing environmental pollution
- Supports **sustainable waste management practices**
- Reduces dependency on conventional fossil fuels
- Encourages **circular economy approach** through resource recovery
- Contributes to ABL's commitment towards a **low-carbon and sustainable future**

"Biogas plant at Talawade contributing to methane avoidance and reduction of 22.00 tCO_2e."

7.3.2 UTILIZATION OF FLY ASH AND POND ASH, GGBS, SLAG AGGREGATE

Fly ash, pond ash, **Ground Granulated Blast Furnace Slag (GGBS)**, and **slag aggregates** utilization is a key strategy for reducing emissions and conserving natural resources in ABL's road construction projects. In compliance with **G.S.R. 285(E) dated 22nd April 2021** and **IRC SP 58:2018**, ABL incorporates these industrial by-products in embankment and construction activities to minimize the use of virgin materials such as soil, cement, and natural aggregates.

The utilization of **GGBS as a partial replacement for cement** and **slag aggregates as an alternative to natural aggregates** further contributes to reducing embodied carbon emissions and promotes sustainable construction practices.

SUMMARY OF UTILIZATION – FY 2025-2026

Category	Road Projects
Fly Ash Utilized (MT)	**36658.64 MT**
GGBS	**51636358.105**
Slag Aggregate	**53236**

Performance Summary / Impact

The use of fly ash, pond ash, GGBS, and slag aggregates has significantly reduced the need for conventional construction materials.

- Large-scale utilization of **industrial by-products** in construction activities
- Reduction in consumption of **cement, soil, and natural aggregates**
- Lower **embodied carbon emissions** associated with material production and transportation

Environmental & Sustainability Benefits

- Reduction in **GHG emissions** by minimizing use of carbon-intensive materials like cement
- Conservation of **natural resources** such as soil and aggregates
- Productive utilization of **industrial waste**, reducing landfill burden
- Supports **circular economy practices** through reuse and recycling
- Reduction in environmental pollution associated with waste disposal
- Enhances long-term **sustainability of infrastructure projects**

7.3.3 REUSE OF MILLING MATERIAL

Reusing milling material from existing road surfaces is a key sustainable practice that reduces dependency on virgin aggregates and minimizes emissions associated with material processing and transportation.

GHG REDUCTION FROM MILLING MATERIAL – FY 2025-2026

Milling Machines Material - MT	**179562.967**

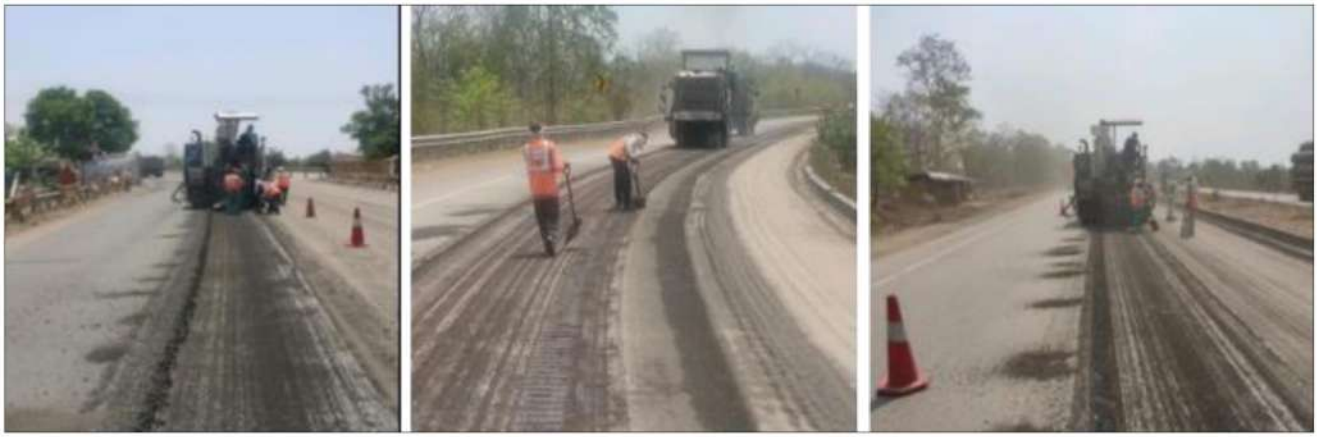
Performance Summary / Impact

The reuse of milling material has contributed significantly to reducing environmental impact in road construction activities.

- Reuse of **179,562.967 MT** of milling material across projects
- Reduction in requirement of **new aggregates and raw materials**
- Lower fuel consumption in **crushing and Hot Mix Plant (HMP) operations**
- Decrease in emissions from **material transportation and processing**

Environmental & Sustainability Benefits

- Reduction in **GHG emissions** by minimizing energy-intensive material production
- Conservation of **natural resources** such as aggregates and soil
- Decrease in **fuel consumption** and associated emissions
- Promotion of **circular economy practices** through reuse of materials
- Reduction in **construction waste generation**
- Supports sustainable and cost-effective **infrastructure development**



Images: Recycled milling material at project sites.

7.4 ENERGY-EFFICIENT HMP (MARINI + ADVANCED TECHNOLOGIES)

7.4.1 USE OF ENERGY-EFFICIENT HOT MIX PLANT (HMP) – MARINI TECHNOLOGY

ABL has adopted advanced **Marini Asphalt Plant technology** along with innovative asphalt solutions such as **Thiopave and Evotherm technologies**, enhancing energy efficiency, improving material performance, and significantly reducing emissions compared to conventional hot mix plants.

GHG REDUCTION FROM MARINI HMP – FY 2025–2026

Parameter	Value	Parameter	Value	Parameter	Value
Diesel Consumption (Litres)	**1,295,449.92**	CO_2 Emission Factor	**0.002644**	CO_2 Emissions (tCO_2e)	**3.43 MT**

Performance Summary / Impact

- Up to **30% reduction in carbon emissions** compared to conventional HMPs
- Approximately **50% reduction in VOC emissions**
- Improved **fuel efficiency** and optimized energy consumption
- Enhanced process control for **consistent and high-quality production**
- Capability to utilize **high RAP content**, reducing virgin material demand

Recycling & Production Capabilities

- **Recycling Capability:** Up to **45–50% RAP utilization**
- Supports **Warm Mix Asphalt (WMA)**
- Enables **Cold Mix and high-performance asphalt production**
- Promotes **resource efficiency and circular economy practices**

Advanced Sustainable Technologies

1. Thiopave Technology (Sulphur-Modified Asphalt)

- Enhances asphalt performance and durability
- Reduces dependency on conventional bitumen
- Improves resistance to rutting and cracking
- Contributes to **lower lifecycle emissions**

2. Evotherm Technology (Warm Mix Asphalt Technology)

Environmental Advantage

- Significant reduction in **stack emissions** compared to conventional HMA
- Lower production temperatures → reduced fuel consumption and emissions

Technology Details

- **Chemical Additive Package**
- Dosage: **0.5% – 1%**
- Delivered as a **high-residue emulsion**

Environmental & Sustainability Benefits

- Reduction in **Scope 1 emissions** through lower fuel consumption
- Decrease in **CO_2, VOCs, NOx, and particulate emissions**
- Improved **energy efficiency in asphalt production**
- Lower **carbon footprint of construction activities**
- Enhanced **material durability**, reducing maintenance frequency
- Promotion of **recycling and sustainable material usage**
- Adoption of **innovative and cleaner construction technologies**

7.5 FIBER REINFORCEMENT POLYMER (FRP) BARS

7.5.1 USE OF FIBER REINFORCEMENT POLYMER (FRP) BARS – GHG REDUCTION EVIDENCE

ABL has adopted **Fiber Reinforcement Polymer (FRP) bars** as an alternative to conventional steel reinforcement in selected infrastructure applications. FRP bars are corrosion-resistant, lightweight, and offer enhanced durability, making them a sustainable solution for long-term construction performance.

Performance Summary / Impact

- Use of **FRP bars reduces dependency on conventional steel reinforcement**
- Enhanced durability and corrosion resistance increase **structure lifespan**
- Reduction in **maintenance and repair requirements** over the lifecycle
- Lower overall environmental impact due to **extended service life**

Environmental & Sustainability Benefits

- Reduction in **lifecycle GHG emissions** due to lower maintenance and replacement needs
- Decreased consumption of **steel**, which is energy-intensive and carbon-heavy
- Improved **resource efficiency** through longer-lasting materials
- Resistance to corrosion reduces **material degradation and waste generation**
- Supports adoption of **innovative and sustainable construction materials**
- Contributes to development of **durable and low-carbon infrastructure**

Use of FRP bars enhancing durability and reducing lifecycle emissions in infrastructure projects.

7.6 SOIL EROSION PROTECTION – GEO-SYNTHETIC SOLUTIONS

ABL implements **geo-synthetic materials** for soil erosion control and slope stabilization in infrastructure projects to ensure long-term durability and environmental protection.

Control Measure Implemented

- Use of **geo-synthetic materials (geotextiles / erosion control mats)** for slope protection
- Application in **embankment dressing and exposed soil areas**
- Prevention of soil displacement due to **rainfall, runoff, and wind erosion**

Performance Summary / Impact

Geo-synthetic solutions have significantly improved soil stability and reduced environmental degradation across project sites.

- Effective control of **soil erosion and surface runoff**
- Enhanced **slope stability and structural integrity**
- Reduction in maintenance requirements and material loss

Environmental & Sustainability Benefits

- Prevention of **soil erosion and land degradation**
- Conservation of **natural soil resources**
- Support for **vegetation growth and ecological restoration**
- Reduction in sediment runoff into nearby **water bodies**
- Improved durability leading to **lower lifecycle environmental impact**
- Promotes sustainable and environmentally responsible **infrastructure development**

Topsoil conservation and reuse supporting sustainable land management and plantation activities across project sites.

7.7 AIR POLLUTION CONTROL MEASURES

ABL ensures effective air pollution control measures across all project sites in compliance with regulatory requirements and environmental standards.

Control Measure Implemented

- **Stack height of Diesel Generator (DG) sets** is provided as per **State Pollution Control Board (SPCB) norms**

Performance Summary / Impact

Proper stack height ensures safe dispersion of emissions generated from DG sets, thereby minimizing localized air pollution impact.

- Controlled release and dispersion of emissions into the atmosphere
- Reduction in **ground-level concentration of pollutants**
- Compliance with statutory environmental requirements

Environmental & Sustainability Benefits

- Reduction in **air pollution impact** on surrounding environment
- Prevention of **health hazards** due to controlled emission dispersion
- Compliance with **environmental regulations and standards**
- Improved **air quality management at project sites**
- Supports responsible and sustainable **construction practices**

DG stack height maintained as per SPCB norms ensuring proper emission dispersion and air pollution control.

7.8 DUST SUPPRESSION MEASURES

ABL implements effective dust control measures across project sites to minimize air pollution and ensure a safe working environment.

Control Measure Implemented

- Regular **water sprinkling at work sites and haul roads** for dust suppression

Performance Summary / Impact

Water sprinkling helps in controlling dust generated during construction activities, especially from vehicle movement and material handling.

- Reduction in **airborne dust particles (PM levels)**
- Improved **visibility and working conditions** at site
- Minimization of dust dispersion to surrounding areas

Environmental & Sustainability Benefits

- Reduction in **air pollution and particulate matter (PM10/PM2.5)**
- Improvement in **air quality** at project locations
- Protection of **worker health and nearby communities**
- Compliance with **environmental norms and dust control guidelines**
- Supports sustainable and responsible **construction practices**

"REGULAR WATER SPRINKLING SIGNIFICANTLY REDUCES DUST EMISSIONS, IMPROVING AIR QUALITY AND ENSURING A SAFER AND HEALTHIER WORK ENVIRONMENT."

7.9 WASTE WATER TREATMENT AT RMC PLANT

ABL ensures effective treatment and reuse of wastewater generated from Ready-Mix Concrete (RMC) plants and transit mixers through a structured sedimentation system.

Control Measure Implemented

- Wastewater generated from **RMC plant operations and transit mixers** is collected and treated in **sedimentation tanks**
- Treated water is **reused for dust suppression and site activities**

Performance Summary / Impact

The treatment and reuse of wastewater has significantly reduced water consumption and environmental impact.

- Effective treatment of wastewater through **sedimentation process**
- Reduction in **fresh water consumption** by reuse of treated water
- Prevention of **untreated discharge into the environment**

Environmental & Sustainability Benefits

- Conservation of **water resources** through reuse and recycling
- Prevention of **soil and water pollution** from untreated wastewater
- Reduction in **freshwater demand** for construction activities
- Promotion of **sustainable water management practices**
- Improved **site environmental compliance and hygiene**
- Supports ABL's commitment towards **resource efficiency and sustainability**

"Treatment and reuse of wastewater at RMC plants significantly conserve water resources while preventing environmental pollution."

7.10 DEPLOYMENT OF BS-VI COMPLIANT VEHICLES AT SITE

ABL ensures the use of **BS-VI compliant vehicles** across project sites to reduce vehicular emissions and improve air quality in line with national environmental standards.

Control Measure Implemented

- Deployment of **BS-VI compliant vehicles** for transportation and site operations
- Gradual replacement of older vehicles with **low-emission BS-VI vehicles**

Performance Summary / Impact

The use of BS-VI vehicles has contributed to reducing emissions from transportation activities at project sites.

- Significant reduction in **vehicular emissions** compared to older BS-IV vehicles
- Improved **fuel efficiency and engine performance**
- Lower emission of harmful pollutants such as **NOx, particulate matter (PM), and CO_2**

Environmental & Sustainability Benefits

- Reduction in **air pollutants (PM, NOx, CO)** improving air quality
- Lower **greenhouse gas emissions** from transportation activities
- Compliance with **latest emission norms and environmental regulations**
- Supports transition towards **cleaner and more efficient transportation systems**
- Enhances **environmental performance of project operations**
- Contributes to ABL's commitment towards a **low-emission and sustainable future**

7.11 ORGANIC WASTE TO COMPOST MACHINE

ABL has implemented **organic waste composting systems** to convert canteen and biodegradable waste into useful compost, promoting sustainable waste management practices at project sites.

Control Measure Implemented

- Installation of **organic waste to compost machines** at canteen / camp areas
- Conversion of **food waste and biodegradable waste into compost**
- Utilization of compost for **plantation and landscaping activities**

Performance Summary / Impact

The composting initiative has effectively reduced organic waste disposal and promoted resource recovery.

- Reduction in **organic waste sent to landfill**
- Conversion of waste into **useful manure for plantation**
- Improvement in **waste management efficiency at site**

Environmental & Sustainability Benefits

- Reduction in **methane emissions** from decomposing organic waste
- Promotion of **waste-to-resource (circular economy) practices**
- Improvement in **soil quality** through use of compost
- Reduction in **environmental pollution and landfill burden**
- Supports sustainable and eco-friendly **site management practices**
- Enhances ABL's commitment towards **resource efficiency and sustainability**

7.12 SOLID WASTE MANAGEMENT – GHG REDUCTION & ENVIRONMENTAL EVIDENCE

ABL has established **Waste Management Parks** at camp areas, office locations, and labour camps to ensure proper handling, segregation, and disposal of solid waste in an environmentally responsible manner.

Control Measure Implemented

- Development of **Waste Management Parks** at:
  - Camp areas
  - Office locations
  - Labour camps
- Segregation of waste into **biodegradable and non-biodegradable categories**
- Promotion of **reuse and recycling practices**

Performance Summary / Impact

The implementation of structured waste management systems has improved site cleanliness and reduced environmental impact.

- Organized collection and disposal of **solid waste at designated locations**
- Reduction in **open dumping and uncontrolled waste disposal**
- Improved **hygiene and housekeeping standards** across project sites

Environmental & Sustainability Benefits

- Reduction in **environmental pollution** due to proper waste handling
- Promotion of **waste segregation, recycling, and reuse practices**
- Prevention of **soil and water contamination**
- Improvement in **site hygiene and worker health conditions**
- Supports **circular economy principles**
- Strengthens ABL's commitment towards **sustainable waste management practices**

7.13 TREE PLANTATION INITIATIVE

ABL actively undertakes afforestation programs along highways and project sites to enhance CO_2 sequestration, reduce air pollution, and improve biodiversity.

1. **Tree Plantation Strategy:**
   1. First row: Small to medium-sized ornamental trees.
   2. Subsequent rows: Larger shade-bearing species.
   3. Medians: Dwarf shrubs to reduce glare at night.

TREE PLANTATION SUMMARY – FY 2025-2026

Division	No. of Trees Planted
O&M	71,580
Road Projects	1,19,567
Power and railway Project	260
Total	1,91,407

Performance Summary / Impact

The large-scale plantation drive has contributed significantly to environmental improvement and long-term carbon reduction.

- Total of **1,91,407 trees planted** across various project locations
- Enhances **carbon sequestration capacity** over the lifecycle of trees
- Improves **air quality and ecological balance** in surrounding areas

Environmental & Sustainability Benefits

- Natural **CO_2 absorption (carbon sequestration)** reducing atmospheric greenhouse gases
- Improvement in **air quality** by filtering pollutants and dust
- Enhancement of **biodiversity and ecological balance**
- Prevention of **soil erosion** and improvement in land stability
- Contribution to **climate change mitigation and green infrastructure development**
- Supports ABL's commitment towards a **sustainable and environmentally responsible future**

7.14 ENERGY EFFICIENCY & EMISSION REDUCTION

7.14.1 USE OF ENERGY-SAVING ELECTRICAL PRODUCTS

ABL promotes energy efficiency by implementing LED and CFL lighting systems across its offices and project sites. Awareness training is also conducted to encourage energy conservation and sustainable practices among employees.

ENERGY-EFFICIENT LIGHTING SUMMARY – FY 2025-2026

Division	Total LED/CFL Installed
Office	520
Road Project (EPC)	234
SPV (O&M & Toll)	314
HAM	2100
Power & Energy Projects	772
Railway Projects	324
Total	**4264**

Performance Summary / Impact

The implementation of energy-efficient lighting has contributed to reducing electricity consumption across ABL operations.

- Installation of **4,264 LED/CFL units** across various divisions
- Reduction in overall **electricity consumption**
- Lower indirect emissions (**Scope 2 emissions**) from grid electricity usage
- Promotion of energy conservation through **awareness and training initiatives**

Environmental & Sustainability Benefits

- Reduction in **indirect GHG emissions (Scope 2)** through lower electricity usage
- Improved **energy efficiency** across offices and project sites
- Decrease in **carbon footprint and operational energy demand**
- Longer lifespan of LED lighting reduces **waste generation and maintenance needs**
- Supports adoption of **energy-efficient and sustainable technologies**
- Contributes to ABL's goal of **reducing environmental impact and promoting sustainability**

7.15 RAINWATER HARVESTING

ABL promotes sustainable water management by implementing **rainwater harvesting systems** at project sites, plant areas, and camp locations to conserve water and recharge groundwater resources.

Control Measure Implemented

- Collection of rainwater through **rooftop and surface runoff systems**
- Storage in **harvesting pits / tanks** for reuse
- Recharge of **groundwater through percolation pits and recharge wells**

Performance Summary / Impact

Rainwater harvesting systems have significantly contributed to water conservation and reduced dependency on external water sources.

- Reduction in **freshwater consumption** at project sites
- Improvement in **groundwater recharge levels**
- Utilization of harvested water for **site activities such as sprinkling and cleaning**

Environmental & Sustainability Benefits

- Conservation of **natural water resources**
- Reduction in **groundwater depletion**
- Decrease in dependency on **external water supply**
- Prevention of **water runoff and soil erosion**
- Supports sustainable and efficient **water management practices**
- Enhances ABL's commitment towards **long-term environmental sustainability**


Rain Water Harvesting: Recharge Pit

7.16 CONCLUSION

ABL's proactive and structured approach towards GHG reduction and sustainability reflects its strong commitment to climate action and responsible infrastructure development. The implementation of renewable energy, energy-efficient technologies, sustainable materials, waste management practices, and environmental protection measures has resulted in measurable emission reductions and improved resource efficiency.

These initiatives collectively contribute to lowering the organization's carbon footprint while enhancing operational efficiency and environmental stewardship across all project sites.

ABL's sustainability efforts are aligned with the principles of **ISO 14064-1:2018**, supporting transparency, accuracy, and continuous improvement in GHG management. The organization remains committed to further strengthening its climate strategy in line with India's long-term carbon neutrality goals.

"ABL continues to move towards a low-carbon, resource-efficient, and environmentally sustainable future through innovation, technology adoption, and responsible practices."

CHAPTER 8: GHG EMISSION SUMMARY & DECLARATION

8.1 FINAL GHG EMISSION SUMMARY (FY 2025-26)

ABL has demonstrated a **consistent and significant reduction in greenhouse gas (GHG) emissions over the last three financial years**, reflecting the effectiveness of its sustainability initiatives and carbon management strategies.

The total GHG emissions have reduced from **84,231 tCO_2e in FY 2023–24 to 57,387 tCO_2e in FY 2025–26**, indicating a **strong downward trend**.

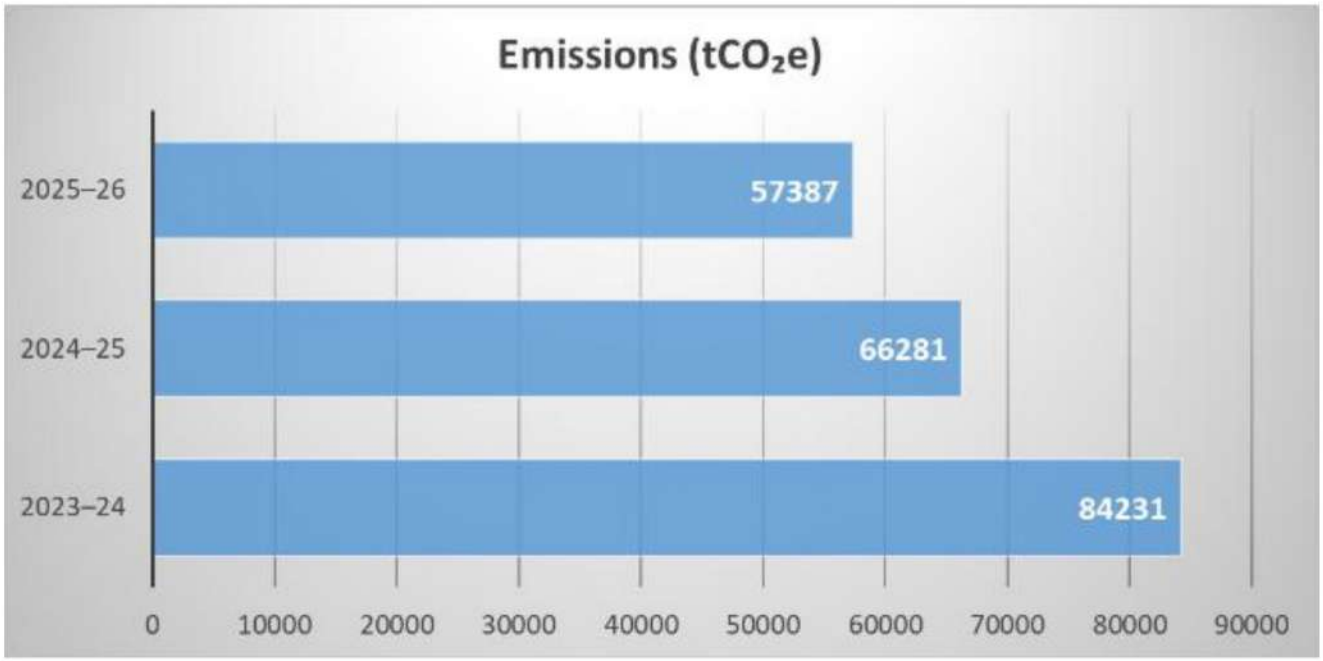
Trend Summary:

Year	Total Emissions (tCO_2e)	Emission Reductions (tCO_2e)	Net Emissions (tCO_2e)	Reduction vs Previous Year (%)
2023–24	84,231.80	3,560.00	80,671.80	—
2024–25	66,281.92	3,488.33	62,793.59	**21.31% ↓**
2025–26	57,387.00	3,052.54	54,334.46	**13.41% ↓**

This reduction trend is primarily attributed to:

- Increased adoption of **solar renewable energy**
- Implementation of **energy-efficient technologies**
- Gradual transition towards **electric mobility (EVs)**
- Improved **resource optimization and operational efficiency**

The consistent decline in emissions highlights ABL's commitment to achieving its long-term sustainability targets and transitioning towards a **low-carbon operational model**.



8.2 ACHIEVED GHG REDUCTIONS & IMPACT OF INITIATIVES

ABL has undertaken multiple emission reduction projects to minimize its environmental footprint. The impact of these initiatives is summarized in **Table 2** below:

TABLE 2: ACHIEVED EMISSION REDUCTIONS (FY 2025-26)

The ABL has implemented multiple sustainability initiatives during FY 2025–26 to reduce greenhouse gas (GHG) emissions. The quantified emission reductions achieved are summarized below:

Emission Reduction Summary

Sr. No.	Initiative	Reduction (tCO_2e)
1	Solar Power Generation	**3,004.68**
2	Electric Vehicles (Net Reduction)	**25.41**
3	Biogas Methane Avoidance (Talawade Plant)	**22.00**
4	Reuse of Milling Material	**0.45**
	Total Reduction Achieved	**3,052.54**

During FY 2025–26, the ABL achieved a total GHG emission reduction of **3,052.54 tCO_2e** through implementation of renewable energy, cleaner technologies, and resource optimization initiatives.

Key Highlights

- Solar energy projects contributed the highest reduction of **3,004.68 tCO_2e**.
- Deployment of electric vehicles resulted in a net reduction of **25.41 tCO_2e** by reducing fossil fuel consumption.
- Biogas utilization at Talawade plant helped avoid methane emissions, contributing **22.00 tCO_2e** reduction.
- Reuse of milling material minimized raw material usage and associated emissions.

8.3 GHG PERFORMANCE AGAINST TARGETS

Ashoka Buildcon Limited (ABL) has established clear sustainability goals to reduce its greenhouse gas (GHG) emissions in alignment with global climate commitments and internal environmental objectives.

The organization has set a target to achieve **25% reduction in GHG emissions by the year 2030**, using FY 2023–24 as the reference baseline.

Target vs Achievement Summary

Parameter	Value
Baseline Year	FY 2023–24
Baseline Emissions	84,231 tCO_2e
Target Reduction	25% by 2030
Target Emissions Level	~63,173 tCO_2e
Current Emissions (FY 2025–26)	57,387 tCO_2e
Total Reduction Achieved	~35%
Status	**Ahead of Target**

PERFORMANCE EVALUATION

ABL has already achieved approximately **35% reduction in GHG emissions within two years**, which **exceeds the planned target of 25% reduction by 2030**.

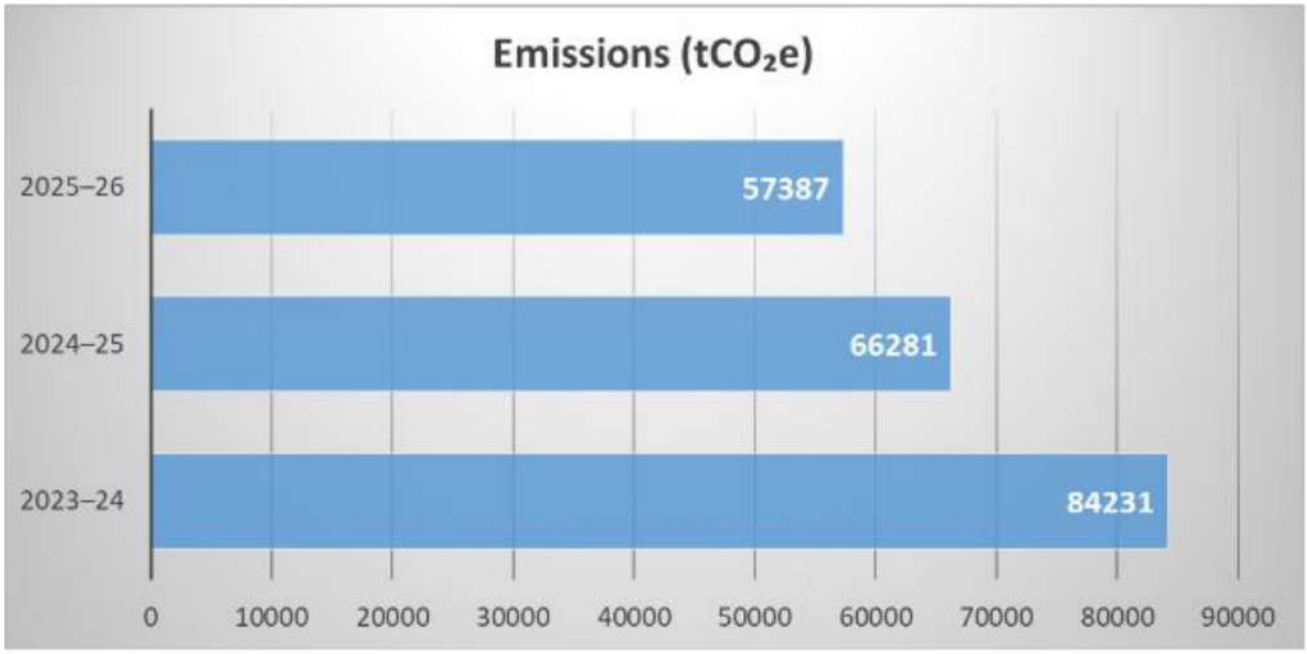
This outstanding performance has been driven by:

- Large-scale adoption of **solar renewable energy**
- Transition towards **electric vehicles (EVs)**
- Implementation of **energy-efficient technologies**
- Continuous monitoring and optimization of energy consumption

KEY INSIGHT

ABL has not only met but **surpassed its long-term emission reduction target well ahead of schedule**, demonstrating strong environmental governance and proactive sustainability leadership.

"Target vs Achieved GHG Emissions"



8.3 DECLARATION ON GHG EMISSION REDUCTION

ABL acknowledges that the increasing complexity of infrastructure projects results in rising GHG emissions. However, through strategic interventions such as **renewable energy adoption, energy efficiency improvements, and waste-to-energy projects**, ABL has successfully reduced its operational carbon footprint.

Statement of Commitment:

"Ashoka Buildcon Limited is dedicated to measuring, monitoring, and minimizing its greenhouse gas (GHG) emissions. The company remains committed to continuous improvement in its carbon management strategies and will actively invest in low-carbon technologies, energy efficiency measures, and renewable energy sources to drive sustainability in its operations."

8.4 FUTURE GHG REDUCTION ROADMAP

Looking ahead, ABL aims to further enhance its GHG reduction strategies by:

- Expanding **solar energy installations** across project sites.
- Increasing **electrification of fleet and machinery**.
- Investing in **carbon capture and utilization technologies**.
- Conducting **energy audits** to identify additional reduction opportunities.
- Strengthening **supply chain engagement** to reduce Scope 3 emissions.

These measures align with ABL's sustainability vision and contribute towards India's **Net-Zero Emission Targets**.

8.5 AWARDS & RECOGNITION

Ashoka Buildcon Limited (ABL) has been consistently recognized for its excellence in sustainability, environmental management, and HSE performance across various prestigious national and international platforms.

Major Awards & Achievements

Year	Award Name	Category / Focus	Project / Recognition	Certificate Attached
2026	Dun & Bradstreet	ESG	Ashoka Buildcon Limited Recognized as India's Leading ESG Entity by Dun & Bradstreet	

Year	Award Name	Category / Focus	Project / Recognition	Certificate Attached
2025	Gold – Green Highways Category	Environment /Sustainability	NH-161 Kandi–Ramsanpalle	
2025	Best HSE Skill Development Program – Gold	HSE / Environment	Western Crossfield Taxiways	
2025	Best Implementation of HSE Practices – Gold	HSE / Environment	Fintech Digital Institute	

Year	Award Name	Category / Focus	Project / Recognition	Certificate Attached
2024	Best Company in Roads & Highways	Infrastructure / Sustainability	CIA World Infrastructure Awards	
2024	Build India Infra – Sustainability	Sustainability	Narmada Extradosed Bridge	
2024	Platinum – Best HSE Practices	Sustainability & Best Practices	Company-wide	

Year	Award Name	Category / Focus	Project / Recognition	Certificate Attached
2023	Most Admired Company (Infrastructure)	Corporate Sustainability	Times Infra Focus	
2023	Construction Health & Safety Awards	Environment & Safety	Panagarh Palashit	
2022	Best Employee Training Campaign Award	Safety / Env. Awareness	Panagarh Palshit	
2022	Best Worker Safety Measures Award	Worker Protection (Env/Safety)	RVNL Package 1 Jharkhand	

These awards highlight ABL's strong commitment towards:

- Sustainable infrastructure development
- Environmental protection and climate responsibility
- Excellence in Health, Safety, and Environment (HSE) practices
- Continuous improvement in organizational sustainability performance

8.5 CONCLUSION

Ashoka Buildcon Limited (ABL) has demonstrated a strong commitment towards sustainability by achieving significant reductions in greenhouse gas emissions through structured initiatives and continuous improvement.

The organization has successfully reduced emissions by approximately **35% over the last two years**, exceeding its planned targets well ahead of schedule. Key initiatives such as **solar energy adoption, electric mobility, and energy-efficient technologies** have played a critical role in this achievement.

With a robust monitoring system aligned with ISO 14064 standards and supported by third-party verification, ABL ensures transparency, accuracy, and reliability in its GHG reporting.

ABL remains committed to further reducing its environmental footprint and contributing towards a **low-carbon and sustainable future**.

ANNEX 1: GHG CALCULATION METHODOLOGIES (UPDATED WITH EV METHODOLOGY)

1.1 GHG CALCULATION APPROACH

ABL follows the **GHG Protocol** and **ISO 14064-1:2018 & ISO 14064-2:2019** methodologies for quantification and reporting of greenhouse gas emissions.

The calculation approach includes:

- **Activity Data × Emission Factors = GHG Emissions**
- Direct (Scope 1) and indirect (Scope 2 & Scope 3) emissions are quantified based on defined organizational and operational boundaries
- Global Warming Potential (GWP) values are considered as per **IPCC guidelines**
- All emissions are reported in **tonnes of CO_2 equivalent (tCO_2e)**

1.2 SCOPE 1, 2 & 3 EMISSION CALCULATION FORMULAS

1. **SCOPE 1 (DIRECT EMISSIONS)**

    - **Fuel Combustion:** Emissions = Fuel Consumed × Emission Factor
    - **Biogas Plant Methane Avoidance:** Emissions Reduced=Baseline Emissions−Project Emissions

1. **SCOPE 2 (INDIRECT EMISSIONS FROM ELECTRICITY)**
    - **Emissions =** Electricity Consumed × Grid Emission Factor

2. **SCOPE 3 (OTHER INDIRECT EMISSIONS)**
    - **Air Travel:** Emissions= Flight Distance × Air Travel Emission Factor
    - **Train Travel:** Emissions= Train Distance × Train Travel Emission Factor

1.3 ELECTRIC VEHICLE (EV) EMISSION CALCULATION METHODOLOGY

1.3.1 Methodology for Calculation of EV Emissions

CO_2 emissions from electric vehicles (EVs) have been calculated under **Scope 2 (Indirect Emissions from Electricity Consumption)** in accordance with the principles of the **GHG Protocol** and **ISO 14064**.

Since direct electricity consumption data for vehicle charging was not available, emissions have been estimated based on **distance travelled (km)** using an average energy consumption approach.

1.3.2 Assumptions Used

Parameter	Value	Source / Justification
Energy Consumption Factor	**0.15 kWh/km**	Derived from OEM data (e.g., Tata Nexon EV, Tiago EV, MG ZS EV) and ARAI ranges (140–180 Wh/km); adopted as conservative fleet average
Grid Emission Factor	**0.710 kg CO_2/kWh**	Central Electricity Authority (CEA) – CO_2 Baseline Database
GHG Scope	**Scope 2**	Indirect emissions from electricity consumption

1.3.3 Calculation Formula

Step 1: Electricity Consumption

Electricity (kWh)= Distance (km)× 0.15

Step 2: CO_2 Emissions

CO2 (kg)= Electricity (kWh)×0.710

Step 3: Conversion to Tonnes

CO2 (tCO2)= CO2 (kg) / 1000

1.3.4 Approach & Justification

- The energy consumption factor of **0.15 kWh/km** represents a conservative fleet-average value considering variations in vehicle models, driving conditions, load conditions, and auxiliary consumption.
- Although ARAI-certified values for certain EV models are lower (~0.118 kWh/km), a higher value has been adopted to **avoid underestimation of emissions**.
- The grid emission factor has been selected as per the latest available data published by the **Central Electricity Authority (CEA), Government of India**.

1.3.5 EV Emission & Reduction Summary (FY 2025–26)

- Total Distance Travelled = **345,658 km**
- Estimated Electricity Consumption = **51,848.7 kWh**
- EV Emissions (Scope 2) = **36.81 tCO_2e**

Avoided Emissions (Baseline – ICE Vehicles)

- Avoided Emissions = **62.22 tCO_2e**

Net GHG Reduction from EV **25.41 tCO_2e**

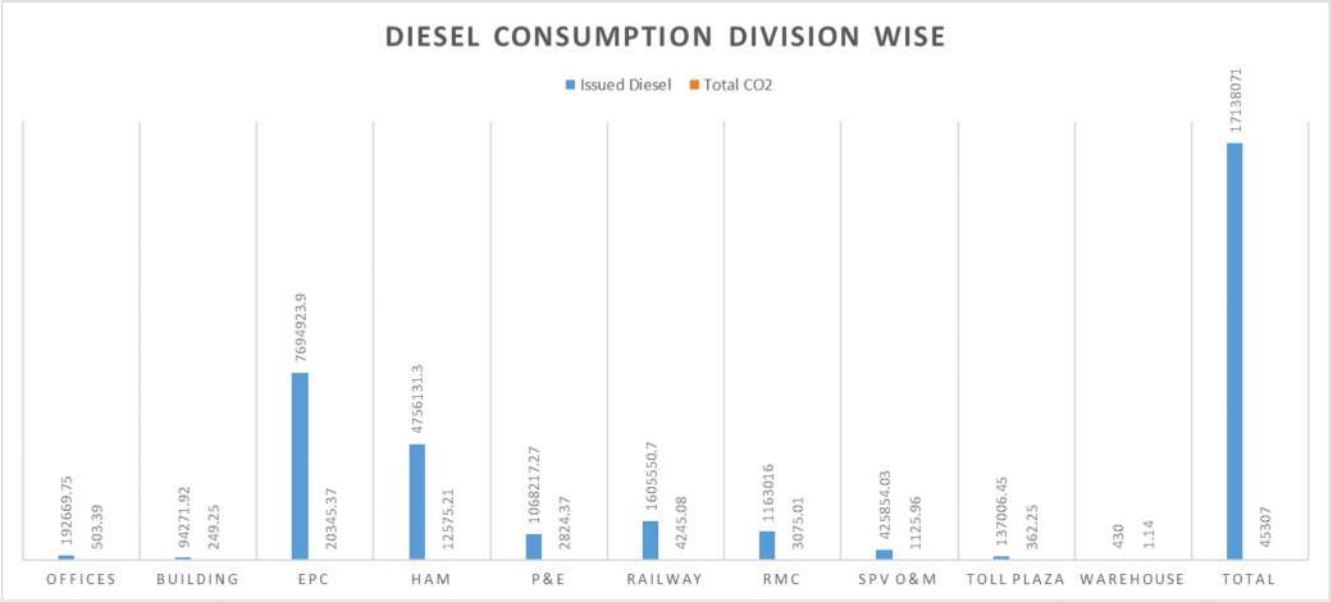
Electric vehicle emissions are accounted under Scope 2 (electricity consumption), while avoided emissions are estimated using baseline emission factors for conventional internal combustion engine vehicles. Net reduction is reported under GHG reduction initiatives.

ANNEX 2: ACTIVITY DATA & EMISSION FACTORS

2.1 FUEL CONSUMPTION RECORDS (FY 2025-26)

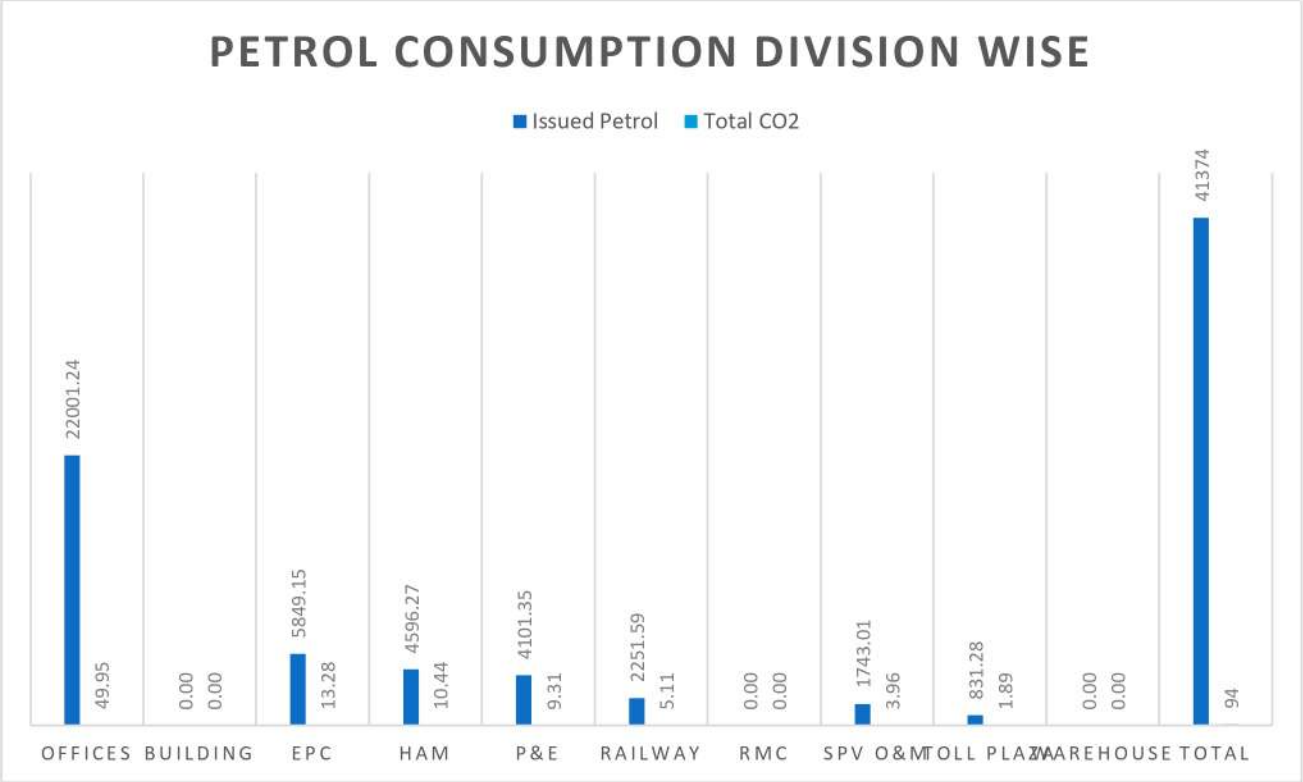
2.1.1 Diesel Consumption Division wise

Division	Issued Diesel	Total CO2
Offices	192669.75	503.39
Building	94271.92	249.25
EPC	7694923.90	20345.37
HAM	4756131.30	12575.21
P&E	1068217.27	2824.37
Railway	1605550.70	4245.08
RMC	1163016.00	3075.01
SPV O&M	425854.03	1125.96
Toll Plaza	137006.45	362.25
Warehouse	430.00	1.14
Total	**17138071**	**45307**



2.1.2 Petrol Consumption Division wise

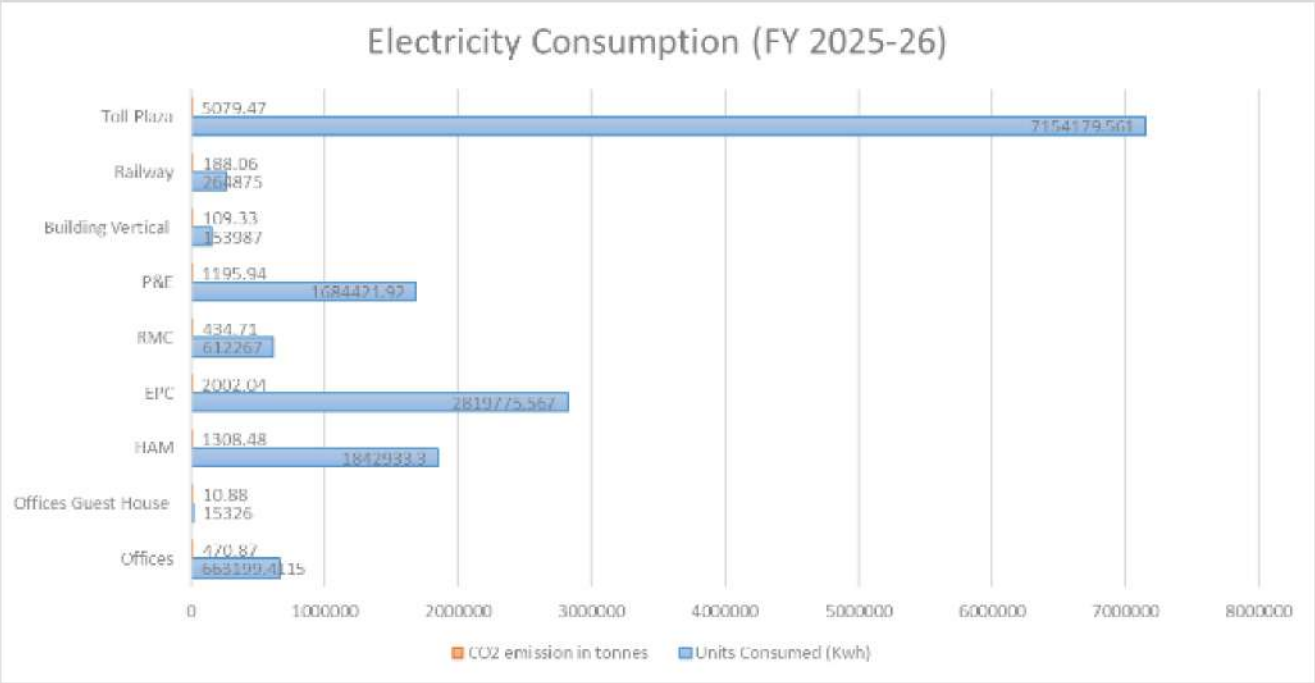
Division	Issued Petrol	Total CO2
Offices	22001.24	49.95
Building	0.00	0.00
EPC	5849.15	13.28
HAM	4596.27	10.44
P&E	4101.35	9.31
Railway	2251.59	5.11
RMC	0.00	0.00
SPV O&M	1743.01	3.96
Toll Plaza	831.28	1.89
Warehouse	0.00	0.00
Total	41374	94



2.2 ELECTRICITY CONSUMPTION (FY 2025-26)

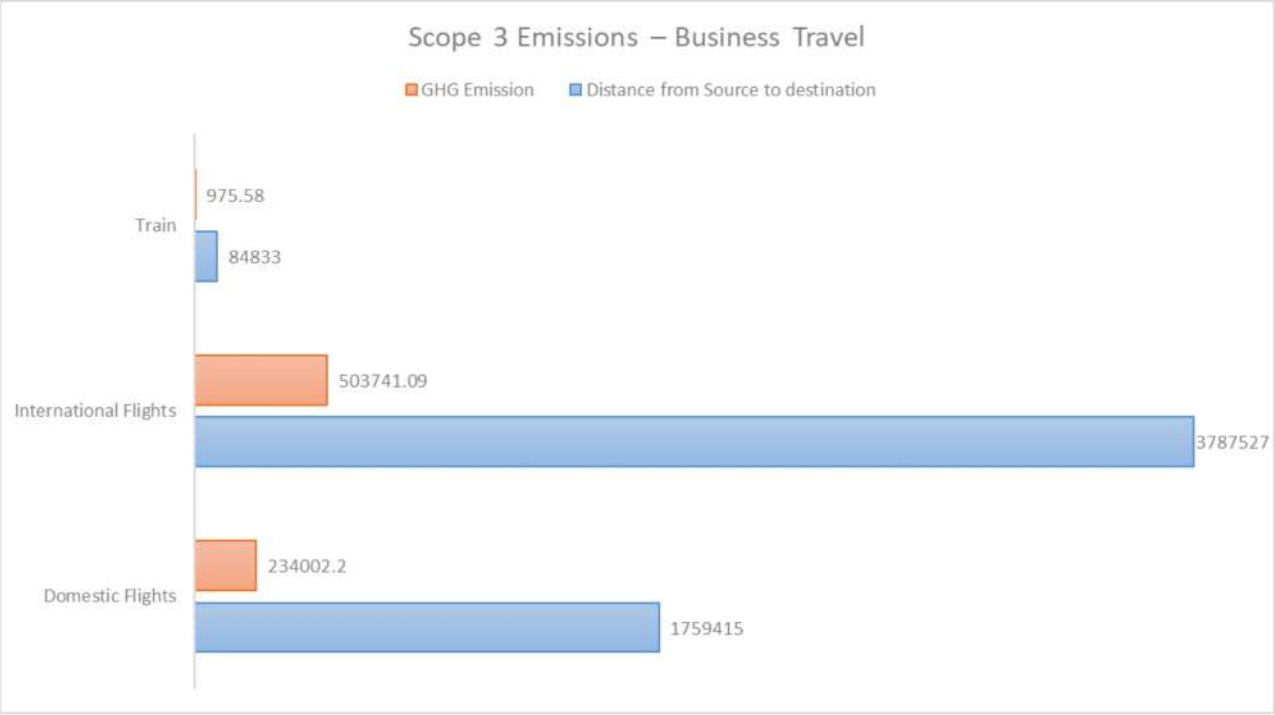
2.2.1 ELECTRICITY CONSUMPTION

Divisions	Units Consumed (Kwh)	CO_2 emission in tonnes
Offices	663199.4115	470.87
Offices Guest House	15326	10.88
HAM	1842933.3	1308.48
EPC	2819775.567	2002.04
RMC	612267	434.71
P&E	1684421.92	1195.94
Building Vertical	153987	109.33
Railway	264875	188.06
Toll Plaza	7154179.561	5079.47
Total	**15210964.76**	**10799.78**



2.3 SCOPE 3 EMISSIONS – BUSINESS TRAVEL (FY 2025-26)

Flight Type	Distance from Source to destination	GHG Emission
Domestic Flights	1759415.00	234002.20
International Flights	3787527.00	503741.09
Train	84833.00	975.58
Total	5631775.00	738718.87



ANNEX 3: GHG VERIFICATION STATEMENT

- **Verification Body: Certification Partner Global (CPG)**
- **Verification Standard: ISO 14064-3:2019**
- **Findings:**
  - GHG inventory follows ISO standards
  - No material misstatements
  - Improvements in data collection observed

Statement:

"THIS VERIFICATION CONFIRMS THAT THE GHG INVENTORY OF ABL MEETS ISO 14064-1:2018 & 14064-2:2019 REQUIREMENTS AND IS ACCURATE WITHIN THE MATERIALITY THRESHOLD OF 5%."

ANNEX 4: GHG REDUCTION INITIATIVES – DETAILED DATA

This annex provides detailed data on GHG reduction projects implemented by ABL.

4.1 BUNDLED METHANE AVOIDANCE – BIOGAS PLANT (TALAWADE, NASHIK)

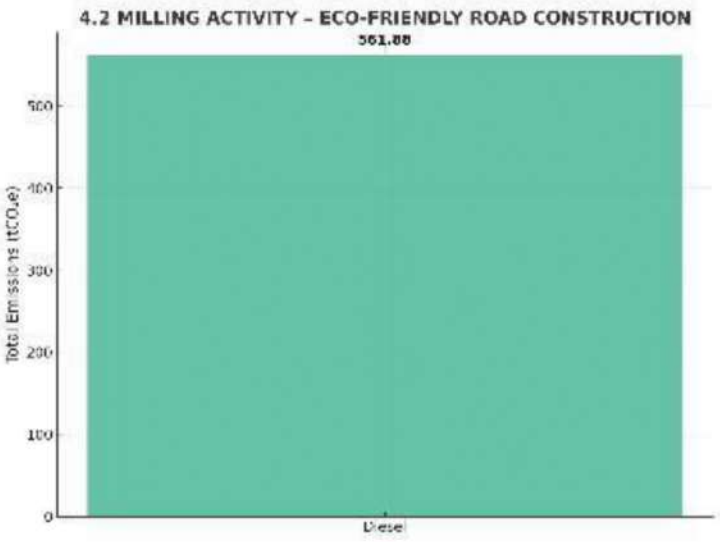
- **Description:** ABL's biogas plant treats **1T of food waste & cow dung daily**, reducing methane emissions from landfill decomposition.
- **Methodology:** Avoidance of landfill methane emissions using **IPCC & BARC-approved techniques**.
- **Impact:** Methane destruction and renewable biogas utilization for canteen operations.

Month	Baseline Emissions (tCO_2e)	Project Emissions (tCO_2e)	Emission Reduction (tCO_2e)
Apr-24	1.00	8.41	-7.41
May-24	0.00	2.94	-2.94
Jun-24	0.01	3.77	-3.76
Jul-24	0.01	2.02	-2.01
Aug-24	0.01	1.89	-1.88
Sep-24	0.01	2.23	-2.22
Oct-24	0.01	2.77	-2.76
Nov-24	0.00	2.47	-2.47
Dec-24	0.00	2.59	-2.59
Jan-25	0.00	1.57	-1.57
Feb-25	0.00	0.00	0.00
Mar-25	0.00	0.00	0.00
Total	1.05	30.66	-29.61

4.2 MILLING ACTIVITY – ECO-FRIENDLY ROAD CONSTRUCTION

- **Description:** ABL adopted the **milling technique** for road construction using **10 milling machines**, reducing transportation emissions and aggregate extraction impacts.
- **Methodology:** Reduction in fuel consumption & hazardous waste generation.

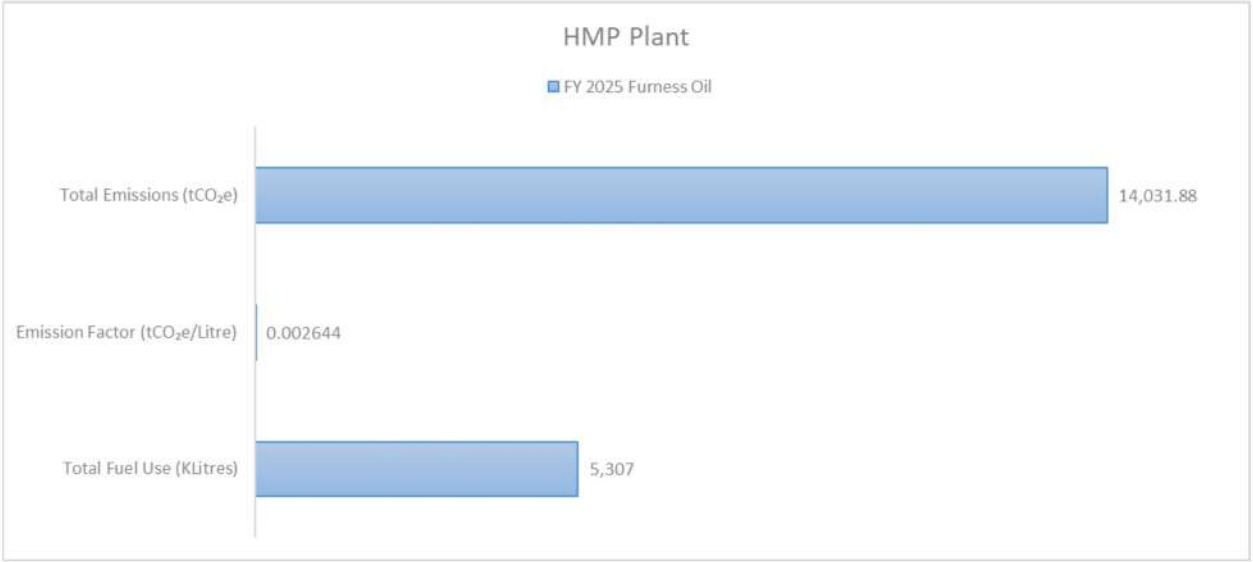
Fuel Type	Total Fuel Use (Litres)	Carbon Emission Factor (tCO_2e/Litre)	Total Emissions (tCO_2e)
Diesel	212,512	0.002644	561.88



4.3 HMP PLANT – NEW TECHNOLOGY (MARINI MAKE ASPHALT PLANT)

- **Description:** ABL upgraded its **Hot Mix Plant (HMP) technology** to a **Marini make asphalt plant**, reducing fuel consumption by **25%** compared to conventional HMPs.
- **Impact:** Lower energy use, reduced CO_2 emissions, and increased recycling of asphalt.

Year	Fuel Type	Total Fuel Use (Litres)	Emission Factor (tCO_2e/Litre)	Total Emissions (tCO_2e)
FY 2025	Furness Oil	5,307,066	0.002644	14,031.88

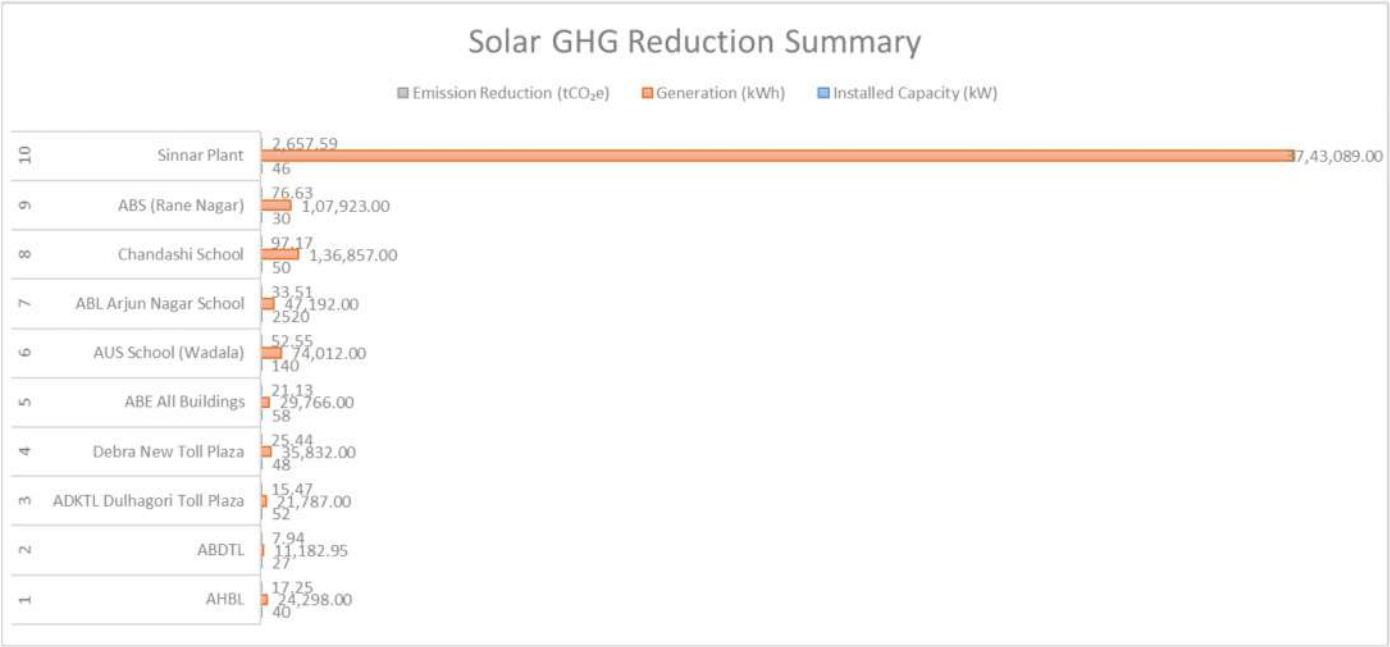


4.4 SOLAR PROJECTS – RENEWABLE ENERGY ADOPTION

- **Description:** ABL implemented **solar power generation** at various project sites, reducing reliance on grid electricity.
- **Impact:** Reduction in **Scope 2 emissions** due to grid displacement.

Solar GHG Reduction Summary

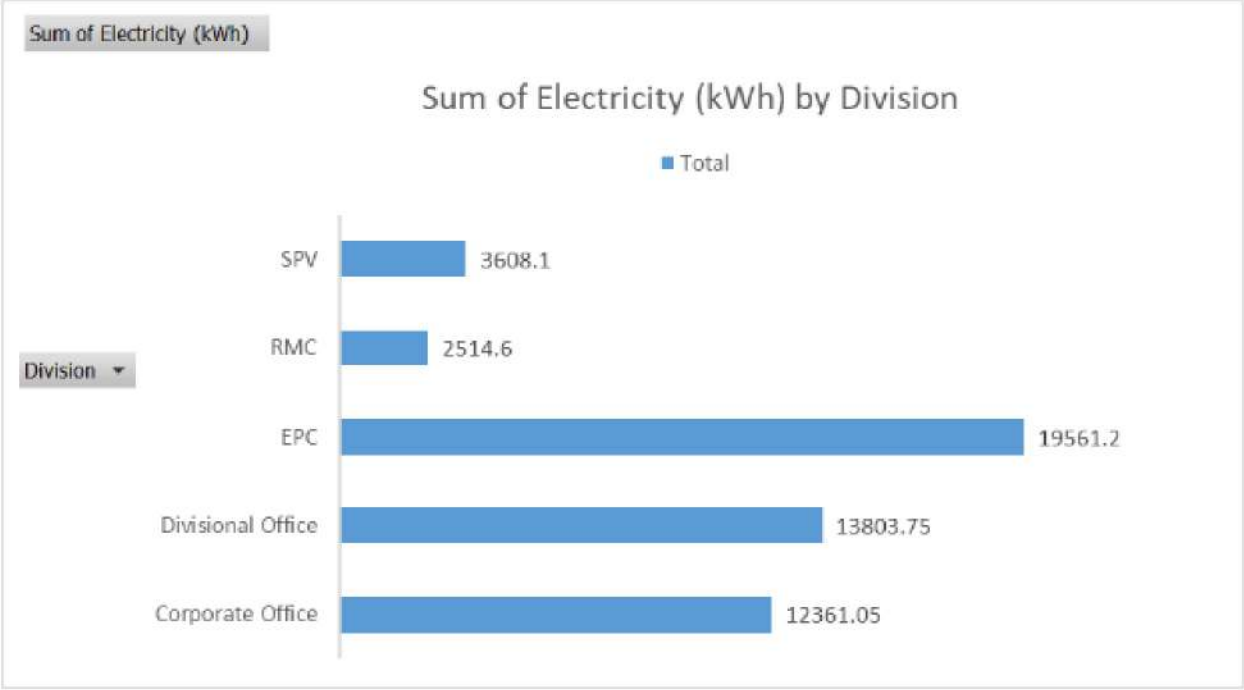
Sr. No.	Project Name	Installed Capacity (kW)	Generation (kWh)	Emission Reduction (tCO_2e)
1	AHBL	40	24,298.00	17.25
2	ABDTL	27	11,182.95	7.94
3	ADKTL Dulhagori Toll Plaza	52	21,787.00	15.47
4	Debra New Toll Plaza	48	35,832.00	25.44
5	ABE All Buildings	58	29,766.00	21.13
6	AUS School (Wadala)	140	74,012.00	52.55
7	ABL Arjun Nagar School	2520	47,192.00	33.51
8	Chandashi School	50	136,857.00	97.17
9	ABS (Rane Nagar)	30	107,923.00	76.63
10	Sinnar Plant	46	3,743,089.00	2,657.59
	Total	**3,011 kW**	**4,231,938.95 kWh**	**3,004.68 tCO_2e**



4.5 USE OF ELECTRICAL VEHICLES FOR OFFICIAL PURPOSES

- **Description:** ABL introduced **electric vehicles (EVs)** for corporate & project site use, replacing diesel vehicles and reducing direct emissions.
- **Impact:** Reduced operational carbon footprint.

Sr. No	Division	Name of Project	Total KM	Electricity (kWh)	CO_2 (tCO_2)
1	Corporate Office	Ashoka House	82407.00	12361.05	8.78
2	Divisional Office	Delhi Office	92025.00	13803.75	9.80
3	RMC	Bhaktipark	16764.00	2514.60	1.79
4	EPC	NH-32	63983.00	9597.45	6.81
5	EPC	Bankot	64977.00	9746.55	6.92
6	SPV	Dhankuni–Kharagpur NH-6	24054.00	3608.10	2.56
7	EPC	Kundalika creek Bridge	1448.00	217.20	0.15
		Total	**345658.00**	**51848.70**	**36.81**



CONCLUSION

ABL achieved a **total reduction of 36.81 tCO_2e** in FY 2025-2026 through these initiatives.

ANNEX 5: BASE-YEAR RECALCULATION JUSTIFICATIONS

ABL follows a **Base-Year Recalculation Policy** for:

- Structural changes in the organization
- Changes in methodology or emission factors
- Addition of new Scope 3 categories (e.g., **Business Travel added in 2023**)

ANNEX 6: ISO 14064-1 & 14064-2 COMPLIANCE CHECKLIST

ISO 14064 Clause	**Report Section**	**Compliance**
4.1 Organizational Boundaries	Chapter 2	Yes
5.3 Emission Factors	Annex 2	Yes
6.4 Uncertainty & Materiality	Chapter 5	Yes
7.1 GHG Management	Chapter 6	Yes

APPENDIX A: REFERENCES FOR GHG EMISSION FACTOR CALCULATIONS

This appendix provides the sources and references used for determining GHG emission factors in ABL's GHG inventory calculations, ensuring alignment with internationally recognized methodologies.

A.1 REFERENCES FOR FUEL-BASED EMISSION FACTORS

1. **Carbon Content in Fuels:** Derived from **Table 1.3, Chapter 1, Volume 2** of the **IPCC Guidelines for National GHG Inventories (2006)**.
2. **Oxidation Factor:** Default values taken from **Table 1.4, Chapter 1, Volume 2** of the **IPCC Guidelines for National GHG Inventories (2006)**.
3. **Net Calorific Value (NCV):** Based on **Table 1.2, Chapter 1, Volume 2** of the **IPCC Guidelines for National GHG Inventories (2006)**.
4. **IPCC GHG Inventory Guidelines:** The full **IPCC Guidelines for National GHG Inventories (2006)** report can be accessed at:
   🔗 http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

A.2 REFERENCES FOR FUEL DENSITY, NATIONAL GRID EMISSION FACTORS, AND DEFAULT EMISSION FACTORS

5. **Country-Specific Emission Factors:** Since no official country-specific emission factors are available, **default IPCC carbon emission factors** are used for calculations.
6. **Grid Emission Factor (India):**
   - **Baseline database for the Indian Power Sector (Version 18.0) - December 2022** published by the **Central Electricity Authority (CEA)**, Government of India.
   - The latest **CO_2 Emission Factors (tCO_2/MWh)** for different grid regions are used for Scope 2 calculations.
   - CEA Database available at: 🔗 https://cea.nic.in/wp-content/uploads/baseline/2025/12/User_Guide_V_21.0.pdf

A.3 REFERENCES FOR SCOPE 3 EMISSION FACTORS (BUSINESS TRAVEL & TRANSPORT)

8. **GHG Emission Factor for Business Travel:** Sourced from the **GHG Protocol (WRI_Transport_Tool_v2.6)**, which provides internationally recognized methodologies for transport emissions calculations.
   - **Includes emission factors for:**
     - Passenger vehicles
     - Rail transport
     - Air travel (short-haul, medium-haul, and long-haul flights)
     - Public transport modes
   - **GHG Protocol Transport Calculation Tool:** 🔗 https://ghgprotocol.org/transport

A.4 Additional References

9. **GHG Reporting Standards & Verification Guidelines:**
   - **ISO 14064-1:2018** (GHG inventories and reporting)
   - **ISO 14064-2:2019** (GHG projects and reductions)
   - **ISO 14064-3:2019** (GHG verification and validation)
10. **Emission Factor for Renewable Energy Generation:**

- **Solar & Biogas Emission Reductions:** Methodology follows IPCC Guidelines and CDM methodologies for methane avoidance and renewable electricity generation impact.

CONCLUSION

This updated reference section ensures that ABL's GHG inventory calculations align with the latest emission factors, national datasets, and international best practices. Let me know if you need any further refinements