MANUAL OF INSTRUCTIONS FOR
GHG DATA COLLECTION

Workshop

Contents

Section 1: General Information and Operational Data

1. Introduction

The purpose of this **GHG Data Collection Template** is to facilitate Indian Railways in systematically documenting **greenhouse gas (GHG) emissions**. The collected data will contribute to measuring emissions from various sources, monitoring energy consumption, and supporting compliance with sustainability goals.

This document serves as a structured guide for personnel, ensuring that data is entered accurately and comprehensively.

2. General Guidelines

- All entries should be **accurate, current, and aligned with official records**.
- Enter numerical values in the **specified units** only.
- Fields marked as **mandatory** should be completed.
- If a particular data point is **not available (NA)**, it should be indicated appropriately rather than left blank.
- Data should be recorded in accordance with the **quarterly and annual reporting cycles**.
- For fields with **drop-down options**, users should select the most appropriate value from the list.
- If additional data types need to be included, users may add rows as required.

3. General Information Section

This section requires users to provide **fundamental location details**, encompassing financial and operational aspects.

Field Name	Description & Guidelines
Location Name	Specify the name of the workshop or production unit.
Location Type	Select the appropriate category from the dropdown (e.g., Workshop, Production Unit).
Address	Enter the complete address of the unit.
Product/Service Details	Please provide a brief overview of the products or services offered at this location, along with a description of the processes involved in their production or delivery.

Budget and Expenditure

Field Name	Description & Guidelines
Budget Allocation	Total Budget allocation to be reported including all departments
Annual Expenditure	Total expenditure to be reported including all departments

4. Contact Details Section

This section captures information about the key personnel responsible for data collection and verification.

Field Name	Description & Guidelines
Contact 1 (Location Head)	Provide the name, official email, and contact number of the location's head officer.
Contact 2 & 3 (Coordinator)	Include details of coordinators responsible for data entry, validation, and submission.

Contact Details	Name	Email	Phone/Mobile
Contact 1 (Location Head)			
Contact 2 (Coordinator)			
Contact 3 (Coordinator)			

5. Operational Data Section

This section records workforce details and locomotive operational data for both passenger and freight transportation.

5.1 Number of Employees

Users should enter the number of employees working in different capacities over the given fiscal years.

Field Name	Description & Guidelines
Permanent Employees	Employees who have a long-term service agreement with the railway and are entitled to job security, benefits, and pensions.

5.2 Production Data

Field Name	Description & Guidelines
Output (S1) (Mention type of Service here)	Repair / Refurbishment data e.g. No of Coaches, No of Locomotives, Wagons, No of wheels, Trainsets, etc.
Output (S2) (Mention type of Service here)	Repair / Refurbishment data e.g. No of Coaches, No of Locomotives, Wagons, No of wheels, Trainsets, etc.
Output (S3) (Mention type of Service here)	Repair / Refurbishment data e.g. No of Coaches, No of Locomotives, Wagons, No of wheels, Trainsets, etc.

Production Data	Description	UOM
Output (S1) (Mention type of Service here)	Repair / Refurbishment data e.g. No of Coaches, No of Locomotives, Wagons, No of wheels, Trainsets, etc.	Nos
Output (S2) (Mention type of Service here)	Repair / Refurbishment data e.g. No of Coaches, No of Locomotives, Wagons, No of wheels, Trainsets, etc.	Nos
Output (S3) (Mention type of Service here)	Repair / Refurbishment data e.g. No of Coaches, No of Locomotives, Wagons, No of wheels, Trainsets, etc.	Nos

6. Installed Renewable Energy Capacity in Railway facilities

Field Name	Description & Guidelines
Solar (Rooftop/ Ground mounted)	The installed capacity of solar power plants in kilowatt-peak (KWp), representing the maximum output under ideal conditions.
Wind	The installed wind power capacity in kilowatt-peak, reflecting the railway's wind energy generation potential
Volume of biogas produced	The volume of biogas produced per day, typically from organic waste eg. Food, Human bio waste, Garden waste
Any other type please add rows and mention with unit of measurement (UOM)	Any Other Type (Please Add Rows and Mention with UOM): A placeholder for additional renewable energy sources, specifying the unit of measurement (UOM).

7. Waste management

Field Name	Description & Guidelines
Installed capacity of Effluent Treatment Plant	The maximum amount of industrial wastewater that can be treated per day.

Installed capacity of Sewage Treatment Plant	The maximum amount of sewage that can be treated per day.
Volume of recycled water	The total amount of treated water that is reused per day.
Installed Capacity (Waste treatment facility for Bio toilets / Food Waste/Organic waste)	The capacity of waste treatment facilities for biodegradable waste, measured in kilograms.

Installed Renewable Energy Capacity in Railway facilities	Definition	UOM	FY 2021-22	FY 2022-23	FY 2023-24	Q1 (Apr'24-June'24)	Q2 (July'24-Sept'24)	Q3 (Oct'24-Dec'24)
Solar (Rooftop/ Ground mounted)	The installed capacity of solar power plants in kilowatt-peak (KWp), representing the maximum output under ideal conditions.	(KWp)						
Wind	The installed wind power capacity in kilowatt-peak, reflecting the railway's wind energy generation potentia	(KWp)						
Volume of biogas produced	The volume of biogas produced per day, typically from organic waste eg. Food, Human bio waste, Garden	(m³)/ day						
Any other type please add rows and mention with unit of measurement (UOM)	Any Other Type (Please Add Rows and Mention with UOM): A placeholder for additional renewable energy sources, specifying the unit of measurement (UOM).							
Waste management	**Definition**	**UOM**	**FY 2021-22**	**FY 2022-23**	**FY 2023-24**	**Q1 (Apr'24-June'24)**	**Q2 (July'24-Sept'24)**	**Q3 (Oct'24-Dec'24)**
Installed capacity of Effluent Treatment Plant	The maximum amount of industrial wastewater that can be treated per day.	(KL/ day)						
Installed capacity of Sewage Treatment Plant	The maximum amount of sewage that can be treated per day.	(KL/ day)						
Volume of recycled water	The total amount of treated water that is reused per day.	(KL/ day)						
Installed Capacity (Waste treatment facility for Bio toilets / Food Waste/Organic waste)	The capacity of waste treatment facilities for biodegradable waste, measured in kilograms.	Kgs						

Section 2: GHG Data Collection Scope-wise and Fuel Data (Production Units)

1. Scope 1 – Stationary Combustion

This section records data on fuel combustion in stationary equipment.

Field Name	Description & Guidelines
Gen Sets / Power plants	
Fuel used in power backup generators to support Railway facilities (DG or Gas Gen Sets)	Fuel used in power backup generators refers to diesel, gasoline, or other energy sources consumed by standby generators to provide emergency or auxiliary power in Workshops including buildings, Residential societies, Hospitals, Schools, Guest house and other locations This ensures uninterrupted operations.
Equipment / operations	
Fuel combustion in other Stationery Equipments_Boilers	Fuel combustion in stationary equipment refers to the consumption of fuels such as diesel, petrol, LPG, furnace oil, and other energy sources in fixed machinery and devices. This includes boilers, furnaces, incinerators, cookstoves, and other stationary equipment used for heating, industrial processes, and operational needs.
Fuel combustion in other Stationery Equipments_Furnaces	
Fuel combustion in other Stationery Equipments_Incinerators	
Fuel combustion in other Stationery Equipments_Cooking	
Fuel combustion in any other Stationery Equipments	

2. Scope 1 – Mobile Combustion

This section records fuel consumption in transport vehicles and mobile equipment.

Field Name	Description & Guidelines
Fuel Combustion in Vehicles and Mobile Equipment	The combustion of fuel in mobile equipment and vehicles, such as forklifts, motorized trolleys, fuel-powered transport vehicles, cranes, tankers, mobile cleaning units, portable generators, fire-fighting trucks, and other mobile machinery including transport vehicles e.g. Bus,Car etc

Provide the fuel type and quantity (UOM) for each category. If any additional fuel use case exists, add rows and specify details.

3. Scope 1 - Fugitive emissions (Refrigerant leakage)

This section tracks refrigerant leakage and fire extinguisher emissions.

3.1 Fugitive Emissions (Refrigerant Leakage)

Field Name	Description & Guidelines
Annual refrigerant refill (make up) in RMPU	Annual refrigerant refill (make-up) in RMPU (Roof Mounted Package Unit) in coaches refers to the process of replenishing refrigerant lost due to leakage or regular operation in the air conditioning systems of railway coaches.
Annual refrigerant refill (make up) in Centralised HVAC systems	Annual refrigerant refill (make-up) in centralized HVAC systems installed in office buildings, auditoriums, and cinema halls refers to the process of replenishing refrigerant lost due to leakage or normal operation.
Annual refrigerant fill (make up) in Standalone systems (e.g. Window ACs, Split ACs, VRF Systems)	Annual refrigerant refill (make-up) in standalone systems, such as Window Acs,split ACs and VRF (Variable Refrigerant Flow) systems, refers to the process of replenishing refrigerant lost due to leakage or regular operation.

3.2 Fugitive Emissions (CO2 Fire Extinguishers)

Field Name	Description & Guidelines
Fire Extinguisher refill- for all locomotive purposes: only CO2 type	This refers to the refilling data for all CO_2-based fire extinguishers installed in locomotives, coaches, and wagons. It specifically includes only CO_2-type extinguishers and excludes all non-CO_2 variants.
Fire Extinguisher refill- for all non-locomotive purposes: only CO2 type	This refers to refilling data for all CO2 based fire extinguishers installed in in Workshops including buildings, Residential societies, Hospitals, Schools, Guest house and other locations. Non CO2 type should not be included

3.3 Fugitive Emissions (SF6 Leakage)

Field Name	Description & Guidelines
SF6 refilling data	This refers to the complete refill of SF6 (Sulfur Hexafluoride) gas in equipment such as circuit breakers, switchgear, or transformers.
Total Quantity of circuit breaker in the electrical transmission and distribution systems	This refers to the total number of circuit breakers in the railway's electrical infrastructure that use SF6 gas. Data to Provide: The total count of circuit breakers that contain SF6.
Total Quantity of circuit breaker in the electrical transmission and distribution systems	This refers to the total number of circuit breakers in the railway's electrical infrastructure that use SF6 gas. Data to Provide: The total count of circuit breakers that contain SF6.
Total Quantity of circuit breaker in the electrical transmission and distribution systems	This refers to the total number of circuit breakers in the railway's electrical infrastructure that use SF6 gas. Data to Provide: The total count of circuit breakers that contain SF6.

4. Scope 1 – Process Emissions

This section records GHG emissions from industrial processes.

Field Name	Description & Guidelines
Acetylene Gas - Welding & Metal Fabrication	This refers to the use of acetylene gas in welding and metal fabrication activities
LPG - Consumption in gas cutters	LPG gas used in metal cutting process
Any other GHG gas emissions in processes- e.g. CO2 as blanketing	Any other GHG gas emission during the process refers to the release of gases like Carbondioxide(CO2), Methane(CH4), Nitrous Oxide(N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3) during industrial processes. These gases, though less common than CO2, have a much higher Global Warming Potential (GWP) and contribute significantly to climate change.

5. Scope 1 – Waste Treatment Onsite

This section captures waste treatment activities.

Field Name	Description & Guidelines
Process Effluent (ETP)	This refers to wastewater treated from Industrial processes from Workshops
Domestic effluent / Sewage (STP)	This refers to wastewater generated from domestic use in the Workshop, such as Washing, Toilets, kitchens etc. including buildings, Residential societies, Hospitals, Schools, Guest house and other locations
Select Solid Waste Type (Onsite Treatment Only)	Describe about the facility of onsite Solid waste treatment and select waste type (only waste treated by Railways to be included, Waste handed over to 3rd party should not be included)

Scope 1 - Waste Treatment Onsite			
Waste Water Treatment	**Definition**	**Treatment method or technology (briefly explain)**	**Quantity (UOM)**
Process Effluent (ETP)	This refers to wastewater treated from operational processes within Indian Railways, such as train washing , or other operations. Data to Provide: Details of the t treatment method or technology used to treat process effluent		KL
Domestic effluent / Sewage (STP)	This refers to wastewater generated from domestic activities , such as station toilets, kitchens, staff quarters, and other residential areas. Data to Provide: Details of the treatment method or technology used to treat domestic effluent/ sewage		KL
Solid Waste Treatment Onsite	**Waste type**	**Treatment method or technology (briefly explain)**	**Quantity (U**
Definition	Describe about the facility of onsite Solid waste treatment and select waste type (only waste treated by Railways to be included, Waste handed over to 3rd party should not be included)		
Solid waste			Kg
Solid waste			Kg
Solid waste	Chemical Waste		Kg
Solid waste	Construction and Demolition (C&D) Waste E-Waste (Electronic Waste)		Kg
Copy to include more rows	Food waste Hazardous Waste Municipal Solid Waste (MSW) Non Hazardous Waste /Mixed waste Paper waste		Kg

Specify treatment method or technology briefly.

Specify waste type from the drop-down menu

6. Scope 2 – Electricity

This section records electricity consumption details.

Field Name	Description & Guidelines
Electricity consumption for Workshop	Electricity consumed in Workshop
Electricity consumption other than Workshop	Electricity consumed in buildings, Residential societies, Hospitals, Schools, Guest house and other locations
Purchase of RECs	No of Renewable energy certificates purchased in the year

7. Scope 2 – Land Related

This section refers to Land Type cleared for Railway work / Laying track or infrastructure development

Field Name	Description & Guidelines
Forest land/Planted land	Land covered by natural forests or planted trees that is cleared for railway projects.
Grassland	Land covered by grasses or shrubs that is cleared for railway projects.
Cropland	Agricultural land used for growing crops that is cleared for railway projects.
Wetland	Land saturated with water, such as marshes or swamps that is cleared for railway projects.

7.1 Tree Plantation

Field Name	Description & Guidelines
Area of Tree Plantation during the year	Land covered by natural forests or planted trees that is cleared for railway projects.
Total number of trees planted during the year	Land covered by grasses or shrubs that is cleared for railway projects.
Area of Tree Plantation (Cumulative)	Agricultural land used for growing crops that is cleared for railway projects.
Total number of trees planted (Cumulative)	Land saturated with water, such as marshes or swamps, that is cleared for railway projects.

Specify area (hectares, acres) and number of trees planted (Nos).

Section 3: Potential Carbon offset Projects for Indian Railways

1. General Information

This section captures basic details related to the projects undertaken for GHG reduction.

Field Name	Description & Guidelines
Type of location	Select the appropriate option from the drop-down menu (e.g., Division, Other, PU, Workshop, Zone).
Name of location	Enter the name of the railway station, workshop, depot, or facility.
Address	Enter the full postal address, including city, state, and PIN code.
Contact 1 (Location Head)	Provide the name, official email, and contact number of the location's head officer.
Contact 2 & 3 (Coordinator)	Include details of coordinators responsible for data entry, validation, and submission.

Select the type of location from the drop-down menu.

2. Project Categories

To streamline data entry and classification, projects fall under specific categories based on their emission reduction strategies. The table below provides a reference for defining and categorizing projects.

Type of Project	Definition	Example
Energy Efficiency	Projects aimed at reducing energy consumption without compromising service quality.	Retrofitting buildings with LED lighting, implementing energy-efficient HVAC systems.
Renewable energy	Projects generating energy from renewable sources like wind, solar, and hydro to reduce reliance on fossil fuels.	Solar photovoltaic (PV) farms, wind energy projects
Electrification	Transitioning from fossil fuel-based systems to electrical systems	Electrification of devices, replacing diesel generators
Fuel Switch	Substituting higher-carbon fuels with lower-carbon or renewable alternatives.	Switching from coal to natural gas or biomass etc
Wastewater Treatment	Treating wastewater to improve water quality and reduce methane emissions from anaerobic decomposition.	Anaerobic digesters for treating sewage, generating biogas from treated wastewater.
Waste Management (Waste Processing)	Projects that improve waste handling, recycling, or conversion of waste into usable products or energy.	Composting waste, waste-to-energy incineration projects, Biogas generation projects.
Materials		
Plantation	Projects involving afforestation, reforestation, or agroforestry to enhance carbon sequestration.	Planting trees in degraded lands, mangrove restoration projects.
Biogas Generation	Capturing and utilizing methane from organic waste to produce biogas for energy or fuel.	Biogas plants using waste for electricity generation or used as alternative fuel
Biofuel	Producing liquid fuels from organic materials for use reducing dependence on fossil fuels.	Producing biodiesel from used cooking oil
Battery Energy Storage System (BESS)	Systems that store energy from renewable sources or grid electricity for use during peak demand or outages.	Lithium-ion battery systems integrated with solar PV installations for energy storage.

	Capturing kinetic energy during braking and converting it into usable electricity, reducing energy consumption in transport systems.	Regenerative braking systems in electric trains
Regenerative Braking		

3. Completed Projects (2021-2025)

Field Name	Description & Guidelines
Type of Project	Select the type of project from the dropdown menu (Energy Efficiency, Renewable Energy, etc.).
Project Name & Operation	Provide a brief description of the project and its function.
Status	Select the current status of the project from the dropdown (Completed, Ongoing, or Planned).
PO Placed (Month, Year)	Specify the month and year when the purchase order was placed from the drop-down menu.
Commissioning (Month, Year)	Enter the month and year when the project was commissioned from the drop-down menu.
Investment Made (INR)	Total capital investment in the project.
Annual Cost Savings (INR)	Expected financial benefits from project implementation.
Payback Period (Years)	Time required for cost recovery.
Annual GHG Emission Reductions (Tons of CO_2e)	Estimated emissions reduction from the project.
Annual Energy Savings	Provide energy savings and specify the unit (kWh, MJ, etc.).
Annual Savings in Water or Materials	Specify the water or material savings, mentioning the relevant unit (Liters, Kg).
Reduction in Waste	Provide the estimated waste reduction details.
Comments / Remarks	Any additional information regarding the project, including clarifications if required.

Only for Renewable Energy Projects	
Type of Project	Select the renewable energy type (Solar PV, Wind, Hydro, etc.).
Capacity (MW/kWp)	Mention the installed capacity of the renewable energy system.
Quantity of Annual Energy Generated (kWh/MWh)	Specify the expected energy generation per year.

4. Planned Projects (2025 Onwards till 2040)

Field Name	Description & Guidelines
Type of Project	Select the type of project from the dropdown menu (Energy Efficiency, Renewable Energy, etc.).
Project Name & Operation	Provide a brief description of the project and its function.
Status	Select the current status of the project from the dropdown (Completed, Ongoing, or Planned).
Start Date & Month	Provide the planned start date of the project.
Commissioning (Month, Year)	Enter the month and year when the project will be commissioned from the drop-down menu.

Investment Made (INR)	Estimated investment for the project.
Annual Cost Savings (INR)	Expected financial benefit upon project completion.
Payback Period (Years)	Estimated time required for cost recovery.
Annual GHG Emission Reductions (Tons of CO₂e)	Projected emissions reduction potential.
Annual Energy Savings	Expected energy savings with specified unit (kWh, MJ).
Annual Savings in Water or Materials	Expected resource conservation and savings.
Reduction in Waste	Estimated waste minimization.
Comments / Remarks	Any additional information regarding the project, including clarifications if required.
Only for Renewable Energy Projects	
Type of Project	Select the renewable energy type (Solar PV, Wind, Hydro, etc.).
Capacity (MW/kWp)	Mention the installed capacity of the renewable energy system.
Quantity of Annual Energy Generated (kWh/MWh)	Specify the expected energy generation per year.