GHG EMISSION REPORT

RAK GHANI

RAK GHANI GLASS LLC

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1. Executive Summary

Overview of Organization and Reporting Period

RAK Ghani Glass LLC, located in Ras Al Khaimah, UAE, manufactures glassware, glass bottles, and containers. This report covers the GHG emissions for the period January 2025 to December 2025, with 2025 as the baseline year, aligned with ISO 14064-1 and the GHG Protocol.

1.2 Key Emission Results

Category	Emissions (tCO_2e)	Remarks
Scope 1 Emissions	26,491	Direct emissions from furnace, fuel combustion, vehicles, etc.
Scope 2 Emissions	0	Captive energy consumption in RAK refers to electricity generated internally using natural gas-based power systems within the facility. This reduces reliance on grid electricity, improves operational efficiency and reliability, and lowers emissions compared to conventional fuels, while contributing to Scope 1 emissions and supporting the company's transition towards cleaner energy sources.
Scope 3 – Upstream	55,693.41	Raw materials, inbound logistics, etc.
Scope 3 – Downstream	6462.3	Distribution, product transport, end-of-life
Total Emissions	**88646.71**	Overall carbon footprint for reporting period

1.3 Highlights & Reduction Achievements

- High efficiency furnace operations reduced fuel intensity.
- Waste glass (cullet) reuse minimized raw material emissions.
- No Scope 2 emissions indicates energy self-generation or accounting under Scope 1.
- Logistics optimization reduced downstream emissions.

2. Introduction

2.1 Purpose of the Report

To quantify, manage, and disclose GHG emissions in accordance with international standards.

2.2 Intended Users

- Senior Management
- Customers and buyers
- ESG rating agencies
- Regulators and auditors
- Investors and stakeholders

2.3 Reporting Objectives

- Voluntary ESG disclosure
- Compliance with customer sustainability requirements
- Alignment with global sustainability frameworks

3. Organization Description

3.1 Company Profile

RGG Producing usp Type II & III Glass bottles in Amber/Flint colour used in pharma industry ranging from 10ml to 300ml.

3.2 Organizational Structure

The company operates under a management structure consisting of:

- Executive Management
- Production Department
- Quality Assurance
- Environment, Health & Safety (EHS)
- Procurement and Supply Chain
- Maintenance & Utilities

3.3 Operations, Facilities, and Boundaries

- Furnace-based glass manufacturing plant
- Raw material processing units
- Packaging & dispatch facility

3.4 Scope 3 Category Inclusion

Sl. No	Scope 3 Category	Included (Yes/No)	Justification
1	Purchased Goods & Services	Yes	Major raw materials like silica, soda ash, and packaging significantly contribute to emissions
2	Capital Goods	No	One-time investments; not significant for annual reporting period
3	Fuel- and Energy-Related Activities	Yes	Upstream fuel extraction and transport impacts considered relevant
4	Upstream Transportation & Distribution	Yes	Inbound logistics of raw materials contributes to emissions

5	Waste Generated in Operations	Yes	Includes disposal and treatment of industrial waste
6	Business Travel	Yes (Assumed)	Minor but included for completeness using estimated data
7	Employee Commuting	Yes (Assumed)	Estimated based on employee count and average travel distance
8	Upstream Leased Assets	No	No significant leased assets identified
9	Downstream Transportation & Distribution	Yes	Product delivery to customers is a key emission source
10	Processing of Sold Products	No	Glass products require minimal further processing
11	Use of Sold Products	No	Glass containers do not emit during use phase
12	End-of-Life Treatment of Sold Products	Yes	Includes recycling and disposal impacts of glass products
13	Downstream Leased Assets	No	Not applicable to business operations
14	Franchises	No	No franchise operations
15	Investments	No	Not material for current reporting scope

4. Reporting Boundary

4.1 Organizational Boundary

Operational Control Approach applied.

4.2 Operational Boundary

- Fuel combustion (furnaces)
- Company vehicles
- Raw material supply chain
- Logistics and waste

4.3 Entities Covered

- Ras Al Khaimah manufacturing facility

5. Reporting Period

- Start Date: 01st January 2025
- End Date: 31st December 2025
- Reporting Frequency: Annual

6. GHG Accounting Methodology

Standards Followed

The inventory was prepared according to:

- ISO 14064-1:2018 – Greenhouse Gas Quantification and Reporting
- GHG Protocol Corporate Accounting and Reporting Standard

Calculation Approach

Emissions were calculated using the formula:

GHG Emissions = Activity Data × Emission Factor

Examples:

- Fuel consumption × emission factor
- Electricity consumption × grid emission factor
- Waste quantity × waste treatment factor

Tools Used

- Excel-based GHG calculation sheets
- Standard emission factor databases

7. Emission Sources Identification

Direct Sources

- Furnace fuel combustion
- Diesel generators
- Company vehicles
- Refrigerant leakage

Indirect Sources

- Raw materials (silica, soda ash)
- Transportation
- Waste disposal

8. GHG Scope Classification

Category	2025 (tCO_2e)	Target 2026	Target 2030
Scope 1 – Direct Emissions	26,491	~5% reduction through furnace efficiency improvement, fuel optimization, and enhanced preventive maintenance (≈ 25,200 tCO_2e)	25–30% reduction from 2025 baseline through waste heat recovery, fuel switching, and process optimization (≈ 19,000–20,300 tCO_2e)
Scope 2 – Indirect Emissions (Electricity)	0	Maintain zero emissions through continued onsite power generation and energy efficiency	Maintain zero emissions
Scope 3 – Upstream Emissions	55693.41	3–5% reduction through sustainable sourcing, increased cullet usage, and supplier engagement (≈ 6,500–6,600 tCO_2e)	20–25% reduction through low-carbon logistics and customer collaboration (≈ 2,750–2,950 tCO_2e)
Scope 3 – Downstream Emissions	6462.3	3–5% reduction through transport route optimization and improved load efficiency (≈ 3,250–3,300 tCO_2e)	20–25% reduction through low-carbon logistics and customer collaboration (≈ 2,750–2,950 tCO_2e)
Total GHG Emissions (All Scopes)	**88646.71**	~5% overall reduction through operational efficiency and supply chain improvements (≈ 35,000–36,000 tCO_2e)	30–40% overall reduction aligned with long-term decarbonization pathway (≈ 22,800–26,500 tCO_2e)

8.1 Note for the Report

Base Year Selection

The base year for RAK Ghani Glass LLC's GHG emissions reporting is 2025. This year has been selected as it marks the beginning of formal emissions tracking and allows for consistent data collection, enabling accurate comparisons for future emissions reductions and sustainability performance assessments.

9. GHG Data Collection & Quality

Data Sources

- Fuel records
- Production data
- Procurement logs

Data Management

Data is collected by the EHS Department and validated by Operations and Finance teams.

Data Quality Principles

- Accuracy
- Completeness
- Consistency
- Transparency

10. GHG Scope Classification

10.1 Scope 1 – Direct Emissions (26,491 tCO_2e)

Sources Included

- Fuel combustion in glass melting furnaces, boilers, and DG sets
- Company-owned vehicles (diesel/petrol consumption)
- Process emissions from glass manufacturing
- Fugitive emissions (refrigerants, gas leakages)

Scope 1 – Gas-wise Emissions

Gas Type	Emissions (tCO_2e)	Contribution (%)	Key Sources
CO_2	25,166	95%	Furnace fuel combustion, process emissions
CH_4	795	3%	Incomplete combustion from fuel use
N_2O	530	2%	High-temperature combustion processes
Total	**26,491**	**100%**	—

Scope	2025 (tCO_2e)
Scope 3 (Upstream)	55693.41
Scope 3 (Downstream)	6462.3
Total Scope 3	**62155.71**

11. Emission Factors: Sources

Source	Reference
Combustion	IPCC Guidelines
Transport	DEFRA
Materials	GHG Protocol databases

Units used: kg CO_2e per unit activity

12. Calculation Results

12.1 Total GHG Emissions

Total GHG Emissions – Source	Scope	2025 (tCO_2e)
Direct Emissions (Fuel Combustion & Process)	Scope 1	26,491
Indirect Emissions (Electricity)	Scope 2	0
Upstream Emissions	Scope 3	55693.41
Downstream Emissions	Scope 3	6462.3
Total Emissions (All Scopes)	—	**88646.71**

12.2 Emission Breakdown by source

Source	% Contribution
Scope 1	29%
Scope 3	71%

12.3 Emission Intensity Indicators

- Production capacity is 120 T / day
- Production capacity is 43800 T / year
- Total GHG emission is **88646.71**
- **The GHG intensity is 2.024 tco2 Per Tonne**

13. Base Year & Trend Analysis

2025 will serve as the base year, given that it marks the start of formal emissions reporting.

14. Uncertainty Assessment

Sources

- Scope 3 estimations
- Emission factor variability

Method

- ±5–10% uncertainty range

Confidence Level

- ~90%

15. Data Quality Assessment

The data quality for GHG emissions is assessed based on accuracy, completeness, and reliability. Data is collected through internal monitoring systems, ensuring high confidence. Cross-checks are performed regularly to validate emission factors, and procedures are in place to maintain data consistency. The quality rating for activity data and emission factors is high.

16. GHG Reduction Initiatives

Implemented

- Furnace efficiency optimization
- Preventive maintenance
- Cullet reuse program
- Logistics route optimization

Future Goals

- Waste heat recovery
- Renewable electricity sourcing
- Fuel switching study
- Supplier engagement program

17. Conclusions

RAK Ghani Glass reports a moderate-to-high carbon footprint, primarily from furnace operations. Strong Scope 1 management and effective recycling are key achievements. Future focus includes reducing fuel use, addressing Scope 3 emissions, setting science-based targets, increasing renewable energy adoption, and improving Scope 3 data accuracy for better emissions management and sustainability performance.

18. Appendices

18.1 Activity Data Summary Table (Reporting Year: 2025)

Sl. No	Parameter	Reporting Period Data	Unit	Scope
1	Natural Gas Consumption (Furnace Operations)	23,842	tCO_2e	Scope 1
2	Diesel Consumption (DG Sets & Equipment)	1,325	tCO_2e	Scope 1
3	LPG / Other Fuel Consumption	795	tCO_2e	Scope 1
4	Process Emissions (Carbonates Decomposition)	529	tCO_2e	Scope 1
5	Purchased Electricity Consumption	0	tCO_2e	Scope 2
6	Upstream Transportation & Raw Materials	55693.41	tCO_2e	Scope 3
7	Downstream Distribution (Logistics)	6462.3	tCO_2e	Scope 3
Total	**Overall GHG Emissions**	**88646.71**	**tCO_2e**	**All Scopes**

This table summarizes the activity data for **2025** with parameters, their corresponding emissions, units, and scope.

18.2 RAK Ghani Glass – Emission Factor References

Category	Source	Application
Scope 1 – Fuel Combustion	IPCC 2006 / 2019 Refinement	Furnace, DG sets, vehicles
Process Emissions	IPCC Guidelines	Glass manufacturing process
Scope 2 – Electricity	Not Applicable	Captive power; emissions included in Scope 1
Transportation	DEFRA 2024	Logistics and distribution
Waste Management	IPCC / EPA	Waste disposal and treatment
Purchased Materials	DEFRA / Ecoinvent	Raw materials (Scope 3)
Business Travel & Commuting	DEFRA	Employee travel emissions
GWP Values	IPCC AR5	Conversion to CO_2e

18.3 Definitions & Abbreviations Table

Term / Abbreviation	Definition
CO_2e	Carbon dioxide equivalent
GHG	Greenhouse gases including CO_2, CH_4, N_2O, HFCs
Scope 1	Direct GHG emissions from owned or controlled sources
Scope 3	Other indirect value chain emissions
GWP	Global Warming Potential (100-year)
tCO_2e	Metric tonnes of carbon dioxide equivalent
ISO 14064-1	Organizational GHG quantification standard
GHG Protocol	Global corporate GHG accounting framework
IPCC	Intergovernmental Panel on Climate Change
DEFRA	UK emission factor database
IEA	International Energy Agency

18.4 Reference Standards Used

The RAK Ghani Glass LLC GHG emissions inventory has been prepared in alignment with internationally recognized standards and guidelines to ensure consistency, transparency, and accuracy:

- **ISO 14064-1:2018 – Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals ISO 14064-1:2018 Overview & Purchase Link**

  https://www.iso.org/standard/66453.html

- **GHG Protocol – Corporate Accounting and Reporting Standard (Revised Edition, 2004)**

  https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

- **IPCC Guidelines for National Greenhouse Gas Inventories (2006, Volume 2: Energy & Volume 5: Waste)**

  https://www.ipcc-nggip.iges.or.jp/public/2006gl/

- **DEFRA / BEIS Greenhouse Gas Conversion Factors for Company Reporting (UK, Latest available) UK Government GHG Conversion Factors**

  https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting

- **IPCC Global Warming Potentials (GWP) – AR5/AR6 Values (100-year time horizon) IPCC GWP Values**

  https://www.ipcc.ch/report/ar5/wg1/

- **GHG Protocol Scope 3 Standard (2011) GHG Protocol Scope 3 Standard PDF**

  https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf