

MIDOR REFINERY

Organizational GHG Inventory

Operational Control Approach

BASE YEAR 2025

ISO 14064-1:2018 | GHG Protocol Corporate Standard

01 Executive Summary

As one of Egypt's leading petroleum refineries, MIDOR Refinery recognizes the critical importance of measuring and managing our greenhouse gas emissions. This Carbon Footprint Report establishes our baseline for effective climate action, documenting our 2025 emissions across all three scopes.

The report provides a comprehensive account of MIDOR's GHG emissions, encompassing our direct emissions from refinery operations, indirect emissions from purchased electricity, and selected value chain emissions from employee commuting and the use of our sold petroleum products.

Reporting Period: From January 1st to December 31st, 2025, covering GHG emissions from our main refinery operations. The analysis and calculations are based on the GHG Protocol, the Intergovernmental Panel on Climate Change (IPCC) Guidelines, and ISO 14064-1:2018 standards.

Our inventory follows the **operational control** consolidation approach, accounting for 100% of emissions from facilities under MIDOR's operational control. This includes all process units, utilities, storage facilities, flare systems, and on-site mobile equipment within the refinery boundary.

Total GHG emissions for 2025: 37.05 million tCO₂e, distributed across our three reporting scopes. The inventory demonstrates the typical emission profile for petroleum refineries, where downstream product combustion (Scope 3 Category 11) represents the largest share, while operational emissions (Scopes 1 and 2) remain material for our direct climate impact management.



Our operational carbon footprint (Scopes 1+2 combined) totals 2.05 million tCO₂e, representing approximately 5.5% of our total inventory. This includes emissions from stationary combustion in fired heaters and boilers, process emissions from hydrogen production and catalyst regeneration, fugitive emissions from storage tanks and equipment leaks, mobile combustion from on-site vehicles, and purchased electricity from MIDELEC and the National Grid.

We have established two key intensity metrics: **702 tCO₂e per kiloton of crude processed** and **0.031 tCO₂e per GJ of fired duty**. These benchmarks will enable year-over-year performance tracking and industry comparison as we implement our decarbonization roadmap.

REPORTING PERIOD

01/01/2025



31/12/2025

37.05

Million tCO₂e
Total Footprint

2.05

Million tCO₂e
Operational
(Scope 1+2)

Our Commitment

MIDOR is committed to transparently measuring, reporting, and reducing our carbon footprint through energy efficiency, renewable energy,

02 INTRODUCTION

02.01 BACKGROUND

MIDOR Refinery is one of Egypt's major petroleum refining facilities, processing approximately 160,000 barrels per stream day (BPSD) of crude oil. Located on the Mediterranean coast, the refinery produces a diverse slate of petroleum products including LPG, gasoline, jet fuel, diesel, fuel oil, petroleum coke, and sulfur.

This report represents MIDOR's inaugural comprehensive greenhouse gas inventory, establishing 2025 as our baseline year for climate action. As a responsible corporate citizen and key player in Egypt's energy sector, we recognize our obligation to measure, disclose, and manage our environmental impact.

The refinery complex comprises multiple processing units including crude/vacuum distillation (U_01, U_17), catalytic reforming (U_04 CCR/Platformer), hydrotreating units (U_02/03, U_08, U_18-21), hydrogen production via steam methane reforming (U_09, U_21), delayed coking (U_11), sulfur recovery (U_13, U_22), and comprehensive utilities and storage infrastructure.

02.02 BOUNDARIES

This report covers MIDOR's operations under the **operational control** consolidation approach, including all facilities within the refinery fence line. Our first year inventory quantifies emissions across:

- **Scope 1:** Direct emissions from combustion, processes, fugitives, and mobile sources
- **Scope 2:** Indirect emissions from purchased electricity (MIDELEC and National Grid)
- **Scope 3:** Selected categories - Employee commuting (Cat. 7) and Use of sold products (Cat. 11)

Following GHG Protocol guidelines, we calculated emissions for Scopes 1, 2, and selected Scope 3 categories using a significance analysis. Future inventories may expand Scope 3 coverage based on materiality assessments and data availability improvements.

02.03 METHODOLOGY

All collected and analyzed data follows the GHG Protocol Corporate Standard and ISO 14064-1:2018 guidelines. Emission factors are sourced from IPCC AR6 (2021), API Compendium, US EPA, and site-specific measurements where available.

SCOPE 3 CATEGORIES IN THIS INVENTORY



Cat. 7
Employee
Commute
30,000
tCO₂e



Cat. 11
Use of Sold
Products
34,970,000
tCO₂e

Gases Quantified: Our inventory covers carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), with all emissions expressed as CO₂ equivalent using global warming potentials from IPCC's Sixth Assessment Report (AR6, 100-year horizon).

Gas	GWP (AR6)	Primary Sources
CO ₂	1	Combustion, processes
CH ₄	27.9	Fugitives, wastewater
N ₂ O	273	Combustion, wastewater

02.04 BASE YEAR

2025 is established as MIDOR's GHG inventory base year. This baseline will serve as the reference point for tracking our decarbonization progress and will be recalculated if structural changes, boundary modifications, or significant methodology improvements exceed a 5% materiality threshold.

Base Year Locked: 2025

All future inventories will compare against this baseline to track performance trends and reduction

initiatives.

03 MIDOR AT A GLANCE

Site Overview



MIDOR Refinery geographical footprint and site layout

160,000

BPSD
Crude Throughput

8+

Main Products
LPG to Coke

2

Electricity
Suppliers

Refinery Complexes & Process Units

Crude/Vacuum

U_01, U_17
Primary fractionation

Catalytic Reforming

U_04 CCR Platformer
Octane enhancement

Hydrotreating

U_02/03, U_08, U_18-20
Sulfur removal

H₂ Production

U_09, U_21 SMR
Steam methane reforming

Delayed Coking

U_11 (incl. Cell 3)
Bottom upgrading

Sulfur Recovery

U_13, U_22 SRU
Claus + tail gas

Utilities

U_37 Boilers
Steam, power, cooling

Flare & Offsites

Flare system, tanks
Safety relief, storage

Operational Characteristics

MIDOR processes approximately **160,000 BPSD of crude oil**, equivalent to ~2.92 million tons annually. The refinery configuration includes deep conversion units (delayed coker) enabling high-value product yields.

Energy requirements are met through refinery fuel gas (RFG) produced internally, supplemented by fuel oil and diesel

where needed. Electricity is sourced primarily from MIDELEC with National Grid backup.

The site operates **365 days per year** with planned maintenance turnarounds typically every 4-5 years. Process control is managed via distributed control system (DCS) with PI data historian for continuous monitoring.

Main Product Slate

Product	Markets
LPG	Domestic & Regional
Gasoline	Domestic
Jet Fuel/Kerosene	Exported
Diesel (ULSD)	Domestic (portion exported)
Fuel Oil	Industrial/Marine
Petroleum Coke	Industrial
Sulfur	Industrial/Fertilizer
Asphalt	Domestic

04 PRINCIPLES & GOVERNANCE

Inventory Principles (ISO 14064-1 & GHG Protocol)

1. RELEVANCE

All significant emission sources identified and included. Boundary reflects operational control and material activities.

2. COMPLETENESS

All Scope 1 sources included. Scope 2 covers all electricity. Scope 3 includes Cat. 7 & 11.

3. CONSISTENCY

Methods and boundaries defined for multi-year tracking. Recalculation policy established.

4. ACCURACY

Data from calibrated meters, DCS/PI, lab analysis, invoices. Uncertainty assessed per category.

5. TRANSPARENCY

All methods, data sources, EFs, assumptions, and exclusions documented and disclosed.

Roles & Responsibilities

Role	Responsibility
Inventory Manager	Overall coordination, compilation, reporting
Process Engineers	Activity data collection from units
Laboratory	Fuel composition analysis (GC, calorific)
Maintenance	Refrigerant tracking, LDAR program
Procurement	Electricity invoices, fuel purchases
HSE Department	QA/QC, regulatory compliance
Management	Review, targets, approval, disclosure

Data Flow: Activity data → Unit engineers → Centralized database → Emission calculations → QC review → Management approval → External reporting

Quality Assurance / Quality Control

- ✓ **Meter Calibration:** All flow meters and analytical instruments on annual calibration schedule with certificates retained
- ✓ **Data Validation:** Cross-checks between DCS, PI historian, and manual logs for consistency
- ✓ **Calculation Review:** Independent verification of emission factors and formulas by second engineer
- ✓ **Peer Review:** Internal technical review before finalization, documented sign-offs
- ✓ **Change Control:** Documented process for methodology or boundary changes with justification
- ✓ **Archiving:** All source data, calculations, and supporting documents retained for 7 years

03 SCOPE 1 — Direct Emissions

Scope 1 by Category

1,800,000

tCO₂e — Total Scope 1 Emissions

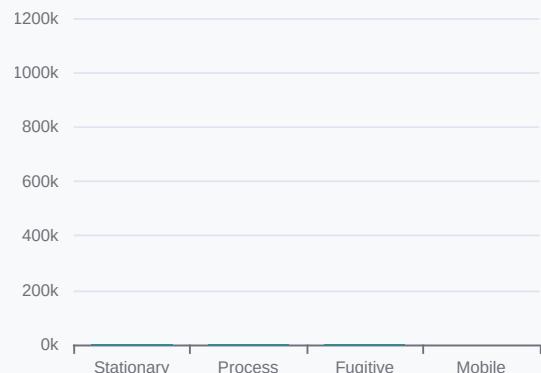
65%

Stationary Combustion
1,170,000 tCO₂e

18%

Process Emissions
324,000 tCO₂e

Scope 1 Emissions by Category



12%

Fugitive Emissions
216,000 tCO₂e

5%

Mobile Combustion
90,000 tCO₂e

S₂ SCOPE 2 — Purchased Electricity

250,000

tCO₂e — Total Scope 2 (Location-Based)

Scope 2 by Supplier

Supplier	Consumption (MWh)	Emissions (tCO ₂ e)	%
MIDELEC	363,636	200,000	80%
National Grid	83,333	50,000	20%

 **Note:** Emission factors are location-based placeholders. Actual supplier-specific EFs to be obtained from MIDELEC and Egyptian grid authorities.

S₃ SCOPE 3 — Value Chain Emissions

35,000,000

tCO₂e — Total Scope 3 (Categories 7 & 11)

Category Breakdown

30,000

tCO₂e | Cat. 7 Employee Commute

34,970,000

tCO₂e | Cat. 11 Use of Sold Products

Category 11: Product-Level Emissions

Product	Emissions (tCO ₂ e)	% of Cat. 11
Diesel/Gasoil	12,239,500	35.0%
Gasoline	10,491,000	30.0%
Jet Fuel/Kerosene	5,245,500	15.0%
Fuel Oil	3,497,000	10.0%
LPG	2,797,600	8.0%
Petroleum Coke	699,400	2.0%

Category 11 emissions represent the combustion of refined products sold by MIDOR and consumed by end users. This is inherent to the refining business model and represents the largest share of our total inventory. Diesel and gasoline together account for 65% of product-use emissions.

Context: Scope 3 Cat. 11 accounts for 94.4% of MIDOR's total footprint, typical for petroleum refineries where downstream product combustion dominates.

04 Mitigation Roadmap — Pathway to 2030

Strategic Initiatives 2025-2030

2025

Energy Management System (ISO 50001)

Implement certified EMS to systematically monitor and optimize energy consumption. Establish baseline and identify 5-10% savings opportunities.

2026

Solar PV Installation (5 MW)

Rooftop and ground-mounted solar on warehouses, admin buildings, parking. **Impact:** ~8,000 tCO₂e/year reduction (Scope 2)

2027

Waste Heat Recovery

Heat exchangers to recover waste heat from flue gases for preheating. **Impact:** ~12,000 tCO₂e/year reduction (Scope 1)

2028

Fleet Electrification

Replace diesel forklifts/vehicles with electric alternatives. **Impact:** ~3,000 tCO₂e/year reduction (Scope 1)

2029

LDAR Enhancement Program

OGI cameras, quarterly surveys, rapid repair. **Impact:** ~5,000 tCO₂e/year reduction (fugitive CH₄)

2030

Real-time Emissions Monitoring (CEMS)

Continuous monitoring on major stacks integrated with DCS for real-time tracking and optimization.

28,000

tCO₂e/year
Total Reduction Potential

~1.4%

of Scope 1+2 Baseline
(by 2030)

Investment Areas

Energy Efficiency

Renewable Energy

Process Optimization

Fugitive Reduction

Long-Term Vision

Beyond 2030, MIDOR will explore hydrogen fuel transition, carbon capture (CCUS), renewable PPAs, circular economy initiatives, and AI-driven process optimization.

 Reduction estimates are preliminary. Detailed engineering and business case analyses will refine projections before implementation.

05 BOUNDARIES

Organizational Boundary

OPERATIONAL CONTROL

MIDOR accounts for 100% of GHG emissions from operations over which it has full authority to introduce and implement policies

Operational Boundary: Scope Inclusion

Category	Sources	Status
Stationary Combustion	Heaters, boilers, incinerators	✓
Flaring	Continuous and emergency flare	✓
Process Emissions	H ₂ prod, catalyst regen, SRU	✓
Fugitive	Tanks, loading, wastewater, refrigerants	✓
Mobile Combustion	On-site vehicles (diesel)	✓
Purchased Electricity	MIDELEC + National Grid	✓
Scope 3 Cat. 7	Employee commuting	✓
Scope 3 Cat. 11	Use of sold products	✓

Exclusions & Rationale

- ✗ **Biomass CO₂:** Minimal to zero biomass use; if present in future, will be separately tracked per ISO 14064-1
- ✗ **Scope 3 (other categories):** Categories 1-6, 8-10, 12-15 not yet quantified; future inventories may expand coverage
- ✗ **Downstream leased assets:** MIDOR does not lease assets to third parties
- ✗ **Land use change:** No land use change activities within reporting period

⚠ Exclusions list subject to annual review. Any material category excluded must be justified based on relevance and materiality thresholds.

06 METHODS & FACTORS

GHG Gases & Global Warming Potentials

Gas	Formula	GWP (AR6)	Sources
CO ₂	CO ₂	1	Combustion, processes
Methane	CH ₄	27.9	Combustion, fugitives
Nitrous Oxide	N ₂ O	273	Combustion, wastewater
HFCs	Various	100s-1000s	Refrigerants

Key Equations

Stationary Combustion:

$$CO_2 = Fuel \times Carbon_fraction \times (44/12) \times Oxidation$$

$$CH_4 = Fuel \times EF_CH4 \times GWP(27.9)$$

$$N_2O = Fuel \times EF_N2O \times GWP(273)$$

Scope 2:

$$Emissions = \sum(MWh_supplier \times EF_supplier)$$

Scope 3 Cat 11:

$$Emissions = \sum(Product_sold \times Use-phase_EF)$$

Quantification Methods Register

Source	Method	Data Source	EF Reference
Fuel Gas	Carbon balance	DCS + GC	Site-specific
Fuel Oil/Diesel	Consumption × EF	Invoices	API/IPCC
Flaring	Flow + DRE	Flow meter	EPA AP-42
H ₂ Production	Mass balance	H ₂ meter	Stoichiometry
Tanks	EPA TANKS	Throughput	EPA/API
Loading	AP-42 factors	Volumes	EPA AP-42
Wastewater	IPCC guidelines	COD/BOD	IPCC 2006
Refrigerants	Mass balance	Maintenance logs	AR6 GWPs
Electricity	Consumption × Grid EF	Invoices	Supplier/Grid avg
Sold Products	Sales × Combustion EF	Sales data	IPCC/EPA

Emission Factor Status

Source	EF Value	Unit	Status
Fuel Gas CO ₂	Site-specific	kg/Nm ³	TO BE MEASURED
Diesel CO ₂	74.1	kg/GJ	✓ IPCC
MIDELEC Grid	0.55	tCO ₂ e/MWh	PLACEHOLDER
Gasoline (use)	69.3	kg/GJ	✓ IPCC

07 INTENSITIES & TRENDS

Carbon Intensity Metrics

702.05

tCO₂e per kiloton of crude processed
(Scope 1+2 / Crude throughput)

0.0308

tCO₂e per GJ of fired duty
(Scope 1 / Total fired duty)

Baseline Year & Multi-Year Tracking

2025 = BASE YEAR

All future inventories will compare against this baseline

Future Trend Analysis

As MIDOR develops a time-series dataset (2025, 2026, 2027...), the following trend analyses will be included:

- Absolute emissions trends by scope and category
- Intensity metric trends (both crude-based and energy-based)
- Correlation with production changes, efficiency projects, mitigation initiatives
- Benchmarking against peer refineries and industry averages

Data Quality Improvement

Year-over-year, MIDOR will refine data collection methods, reduce uncertainties, and expand monitoring coverage (real-time flare meters, LDAR programs, CEMS).

Calculation Details

Intensity 1:
 $(1,800,000 + 250,000) \text{ tCO}_2\text{e} \div 2,920 \text{ kton crude} = 702.05 \text{ tCO}_2\text{e/kton}$

Intensity 2:
 $1,800,000 \text{ tCO}_2\text{e} \div 58,400,000 \text{ GJ} = 0.0308 \text{ tCO}_2\text{e/GJ}$

⚠ Denominators are dummy values. Actual crude throughput and fired duty must be obtained from refinery operating reports and DCS.

08

BASE YEAR & RECALCULATION POLICY

Base Year Selection

2025

MIDOR's inaugural GHG inventory base year

Rationale

- First comprehensive GHG inventory year
- Typical operational year at ~160,000 BPSD
- Complete data collection systems in place
- No major structural changes during year
- Full documentation and supporting evidence available

Significance Threshold

5%

Materiality threshold for base year recalulation triggers

Recalculation Triggers

Trigger	Description	Threshold
Structural Change	Merger, acquisition, divestiture, closure	>5%
Boundary Change	Change in control, facility add/removal	>5%
Method Change	Updated EFs, improved measurement	>5%
Data Error	Significant error discovered in base year	>5%
Policy Update	New GWPs, regulatory requirement	As required

Recalculation Process

- Identify trigger event & assess materiality
- Document reason for recalculations
- Recalculate base year with updated data/methods
- Recalculate all subsequent years for consistency
- Disclose in report with clear explanation
- Archive both original and recalculated
- Obtain management approval

09 UNCERTAINTY & QUALITY

Quantitative Uncertainty Estimates

Category	Emissions (tCO ₂ e)	Uncertainty ($\pm\%$)	Lower	Upper
Stationary Combustion	1,170,000	$\pm 8\%$	1,076,400	1,263,600
Process Emissions	324,000	$\pm 12\%$	285,120	362,880
Fugitive Emissions	216,000	$\pm 30\%$	151,200	280,800
Mobile Combustion	90,000	$\pm 10\%$	81,000	99,000
Scope 1 TOTAL	1,800,000	$\pm 10\%$	1,620,000	1,980,000
Scope 2 Electricity	250,000	$\pm 5\%$	237,500	262,500
Scope 3 Cat. 11	34,970,000	$\pm 15\%$	29,724,500	40,215,500

⚠️ Uncertainty values are illustrative. Actual uncertainty should be calculated using IPCC Tier 1/2 methods, Monte Carlo simulations, or manufacturer specifications.

Data Quality Improvement Roadmap

Priority	Action	Target	Impact
High	Increase fuel gas GC frequency	Stationary	$\pm 8\% \rightarrow \pm 5\%$
High	Install/calibrate flare meters	Flaring	Replace estimation
High	LDAR program with OGI	Fugitives	$\pm 30\% \rightarrow \pm 15\%$
Medium	TANKS modeling (EPA)	Tank fugitives	Site-specific EFs
Medium	Refrigerant tracking system	HFC leaks	Accurate mass balance
Low	Wastewater CH ₄ measurement	Wastewater	Replace IPCC defaults
High	Obtain supplier-specific grid EFs	Scope 2	Replace placeholders

A APPENDIX A: GLOSSARY & ABBREVIATIONS

API: American Petroleum Institute

AR6: IPCC Sixth Assessment Report (2021)

BPSD: Barrels Per Stream Day

CCR: Continuous Catalyst Regeneration

CEMS: Continuous Emissions Monitoring System

CH₄: Methane

CO₂: Carbon Dioxide

CO₂e: Carbon Dioxide Equivalent

DCS: Distributed Control System

DEFRA: UK Dept for Environment, Food & Rural Affairs

DRE: Destruction and Removal Efficiency

EF: Emission Factor

EPA: U.S. Environmental Protection Agency

GC: Gas Chromatography

GHG: Greenhouse Gas

GJ: Gigajoule

GWP: Global Warming Potential

HFC: Hydrofluorocarbon

IPCC: Intergovernmental Panel on Climate Change

ISO 14064-1: GHG inventory standard

ISO 14069: GHG guidance standard

kton: Kiloton (1,000 metric tons)

LDAR: Leak Detection and Repair

LHV: Lower Heating Value

LPG: Liquefied Petroleum Gas

Mt: Million metric tons (Megatons)

MWh: Megawatt-hour

N₂O: Nitrous Oxide

OGI: Optical Gas Imaging

PI: OSIsoft PI System

PPA: Power Purchase Agreement

QA/QC: Quality Assurance/Quality Control

Scope 1: Direct GHG emissions

Scope 2: Indirect emissions from purchased energy

Scope 3: Other indirect value chain emissions

SMR: Steam Methane Reforming

SRU: Sulfur Recovery Unit

tCO₂e: Metric tons CO₂ equivalent

ULSD: Ultra-Low Sulfur Diesel

B APPENDIX B: EQUATIONS & EMISSION FACTORS

Detailed Equations

Stationary Combustion (Fuel Gas):

$CO_2 = Fuel_volume \text{ (Nm}^3\text{)} \times Carbon_content \text{ (kg C/Nm}^3\text{)} \times (44/12) \times Oxidation_factor$
Where: Carbon_content from GC analysis, Oxidation_factor = 0.995

$CH_4 = Fuel_volume \times EF_CH_4 \text{ (kg CH}_4/\text{Nm}^3\text{)} \times GWP(27.9)$
 $N_2O = Fuel_volume \times EF_N_2O \text{ (kg N}_2O/\text{Nm}^3\text{)} \times GWP(273)$

Flaring:

$CO_2 = Flare_gas_volume \times Carbon_content \times (44/12) \times DRE$
 $CH_4_slip = Flare_gas_volume \times CH_4_fraction \times (1 - DRE) \times GWP(27.9)$
Where: DRE = 0.999 (99.9%)

Storage Tank Losses (API):

$Breathing_losses = V_vapor \times \rho_vapor \times N_cycles$
 $Working_losses = (Throughput / Turnover) \times \rho_vapor \times (1 - \eta_control)$

Emission Factor Reference Table

Source	EF	Unit	Reference	Status
Fuel Gas CO ₂	Site-specific	kg/Nm ³	Lab GC	TO BE MEASURED
Fuel Gas CH ₄	0.00001	kg/Nm ³	API	DEFAULT
Fuel Gas N ₂ O	0.000001	kg/Nm ³	IPCC 2006	DEFAULT
Fuel Oil CO ₂	77.4	kg/GJ	IPCC 2006	DEFAULT
Diesel CO ₂	74.1	kg/GJ	IPCC 2006	✓ IPCC
Natural Gas CO ₂	56.1	kg/GJ	IPCC 2006	✓ IPCC
Gasoline (use)	69.3	kg/GJ	IPCC 2006	✓ IPCC
Diesel (use)	74.1	kg/GJ	IPCC 2006	✓ IPCC
Jet Fuel (use)	71.5	kg/GJ	IPCC 2006	✓ IPCC
LPG (use)	63.1	kg/GJ	IPCC 2006	✓ IPCC
Pet Coke (use)	97.5	kg/GJ	IPCC 2006	✓ IPCC

C APPENDIX C: ACTIVITY-TO-METHOD MAPPING

Cross-reference between emission activities (from MIDOR activities.xlsx) and quantification methods applied.

Activity	Sub-Activity	Method	Data Source	Classification
Heaters/boilers fuel gas	U_01 heater	Carbon mass balance	DCS + GC	Stationary Combustion
Heaters/boilers fuel gas	U_17 heater	Carbon mass balance	DCS + GC	Stationary Combustion
Incinerator	U_13 firing	Carbon mass balance	DCS + GC	Stationary Combustion
Flare	Header reading	Flow + DRE 99.9%	Flow meter	Stationary Combustion
H ₂ production	U_09	Process mass balance	H ₂ meter + NG	Process Emission
H ₂ production	U_21	Process mass balance	H ₂ meter + NG	Process Emission
Catalyst regeneration	U_04 CCR	Coke burn-off calc	Catalyst circulation	Process Emission
Storage tanks	Crude tanks	EPA TANKS / API Ch7	Tank dimensions	Fugitive Emission
Storage tanks	LPG tanks	EPA TANKS / API Ch7	Tank dimensions	Fugitive Emission
Wastewater	U_54/55	IPCC wastewater method	Flow, COD/BOD	Fugitive Emission
Refrigerants	All AC units	Mass balance	Maintenance logs	Fugitive Emission
Mobile diesel	Forklifts	Consumption × EF	Fuel receipts	Mobile Combustion
Electricity	MIDELEC	MWh × Grid EF	Invoices	Scope 2
Electricity	National Grid	MWh × Grid EF	Invoices	Scope 2
Employee commute	-	Distance × Mode EF	Admin data (Ayman)	Scope 3 Cat. 7
Sold products	Gasoline	Sales × Use EF	Commercial data	Scope 3 Cat. 11
Sold products	Diesel	Sales × Use EF	Commercial data	Scope 3 Cat. 11

⚠ Complete mapping includes all 48 activities from MIDOR activities.xlsx. Any activity classified as "pending" requires method assignment before final calculation.

D APPENDIX D: DATA SOURCES & QC CHECKS

Data Source Register

Data Type	Source System	Responsible Party	Frequency
Fuel gas flow rates	DCS / PI Historian	Process Engineers	Continuous
Fuel gas composition	Laboratory GC	Laboratory	Weekly (min)
Fuel oil/diesel	Tank levels + invoices	Procurement	Monthly
Electricity	Utility invoices	Procurement	Monthly
Product sales	Commercial invoices	Commercial Dept	Monthly
Flare gas flow	Flare header meter	Process Engineers	Continuous
Refrigerant inventory	Maintenance logs	Maintenance	Quarterly
Mobile fuel	Vehicle logs	Fleet Manager	Monthly

QC Checks Performed

- ✓ **Mass Balance:** Total crude vs products + losses (~±2% closure expected)
- ✓ **Energy Balance:** Fuel consumed vs heater/boiler duty (thermal efficiency check)
- ✓ **YoY Comparison:** Flag any category change >20% for investigation
- ✓ **Peer Review:** Calculations independently verified by second engineer
- ✓ **Instrument Calibration:** All critical meters calibrated annually (certificates on file)
- ✓ **Data Completeness:** Check for missing months or gaps in time-series data

Document Retention

All supporting documentation archived for minimum 7 years:

- Activity data files (DCS exports, PI queries, invoices)
- EF references (journal articles, EPA docs, API guides)
- Calculation spreadsheets with version control
- QC checklists and peer review sign-offs
- Meeting minutes and management approvals

E APPENDIX E: FUTURE ASSURANCE PLACEHOLDER

Assurance Levels (ISO 14064-3)

LIMITED ASSURANCE

Verifier confirms no material misstatements found (negative assurance)

REASONABLE ASSURANCE

Verifier provides positive confirmation inventory is free of material misstatement (higher rigor)

Benefits of External Assurance

✓ Enhanced Credibility: Stakeholder confidence (investors, customers, regulators)

✓ Data Quality: Identification of improvement opportunities

✓ Compliance: Voluntary/mandatory reporting schemes (CDP, EU ETS if applicable)

✓ Market Readiness: Preparation for carbon markets or border adjustment mechanisms

Placeholder for Verification Statement

[THIRD-PARTY VERIFICATION STATEMENT]

Example Content:

"[Verifier Name], an independent verification body accredited to ISO 14065, was engaged by MIDOR Refinery to provide limited assurance over its GHG inventory for the year 2025. Based on our procedures, nothing has come to our attention that causes us to believe that the GHG statement is not prepared, in all material respects, in accordance with ISO 14064-1:2018 and the GHG Protocol Corporate Standard."

Report Prepared By

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QA/QC Review

Standards & Methodology

Conformance

This inventory conforms with:

- ISO 14064-1:2018 — Organization-level GHG quantification and reporting
- GHG Protocol Corporate Standard — WRI/WBCSD
- IPCC AR6 — Global warming potentials (100-year)

How to Update This Report

1. Update "MIDOR activities.xlsx" with 2026 activity data
2. Replace placeholder emission factors with actual values
3. Obtain real electricity grid EFs from MIDELEC
4. Regenerate data.js using Python allocation script
5. Update year references (2025 → 2026) in HTML
6. Print to PDF and distribute

Base Year 2025

All future inventories will compare against this baseline

2025

Document Version 1.0 | Generated November 2025

