



مؤسسة نفط
الشارقة الوطنية
SNOC

2021

SNOC GHG Annual Report



CEO's Message



We are a fossil fuel company in a country that is the third biggest member of OPEC, and based in the world's epicenter of fossil fuel production.

We believe the energy industry lies at the core of making Net Zero in the UAE and worldwide by 2050 possible – and proactively playing our role is non-negotiable. We are determined to make the next decades count as we strive to support the three Ps – people, planet, profit – while supporting energy security, a cornerstone of modern-day civilization. We believe that transparency and GHG performance reporting is the first highly necessary step in the net zero journey. We are committed to share our GHG performance transparently as we drive our journey towards our goal.

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Who are we?

Sharjah National Oil Corporation (SNOC) has a rich history that dates back to its establishment in 2010. As a state-owned company, SNOC has played a significant role in the development and management of oil & gas resources in the Emirate of Sharjah. Over the years, SNOC has evolved into a key player in the energy sector in the UAE, contributing to the growth and sustainability of the economy of Sharjah. The corporation has demonstrated a commitment to the efficient extraction of the Emirates' hydrocarbon resources, exploring new opportunities, and adopting innovative technologies to enhance operational efficiency and minimize environmental impact. SNOC has established strategic partnerships and collaborations with international stakeholders, utilizing their expertise to achieve the common goal of providing energy in an efficient, safe, and socially responsible manner. With a clear vision for the future, SNOC continues to adapt to evolving market dynamics, making substantial investments in sustainable energy solutions and embracing a diversified portfolio.

Introduction

SNOC is delighted to present this comprehensive report focusing on the **Green House Gases (GHG)** emissions of SNOC. This report aims to provide a transparent and detailed assessment of SNOC's GHG emissions inventory, highlighting the company's commitment to transparency, sustainability, and its target of achieving Net-Zero GHG emissions by 2032. Consequently, SNOC intends to make this report readily available to the general public. The methodology, information and data in this report has been verified by an independent third party, DNV Business Assurance Group AS, who has awarded this report an Independent Quality Assurance Statement provided as an attachment to this report.

In today's global landscape, addressing climate change and reducing GHG emissions have become imperative across various industries. SNOC, as a responsible energy provider, recognizes the importance of assessing and mitigating its GHG emissions to contribute to global sustainability goals. By proactively disclosing its GHG emissions, SNOC sets a high standard of transparency and accountability within the energy sector, showcasing its dedication to sustainable practices.

This report provides a comprehensive analysis of SNOC's GHG emissions, focusing on both direct and indirect emissions associated with the company's operations.

Aligned with the UAE's national commitment to a sustainable future, SNOC's pursuit of Net-Zero GHG emissions is fully in line with the UAE's broader goal of achieving Net-Zero emissions by 2050.

This assessment has been performed in accordance with Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, as well as other standards and guidelines applicable to the subject matter. SNOC has selected *2021 as the base year for reporting emissions*.

Emission Scopes Covered

SNOC currently focuses on reporting Scope 1 and Scope 2 emissions associated with its operations as defined by the GHG protocol which defines Scope 1 emissions as the direct emissions from owned or controlled sources while Scope 2 emissions are the indirect emissions from the generation of purchased energy. Scope 3 emissions encompass the indirect emissions that occur along the product and service value chain. Since Scope 3 is outside of SNOC's direct control and ownership and in addition to the challenges in reporting Scope 3 emissions in terms of data collection and certainties, and the risk of double counting with other parties, SNOC decided to exclude Scope 3 from the reporting for the time being.

Exclusions

This report excludes emissions caused by projects' construction activities carried out during 2021. Examples of these exclusion are emissions due to burning liquid fuel in vehicles or for power generation. This is due to the lack of available data. However, it is believed that the contribution of this data to the total GHG is minimal due to the limited scope of equipment burning liquid fuel in these projects in 2021.. Additionally, SNOC has acknowledged that this is an area of improvement and plans to include this in the reporting in the coming years.

Description of SNOC Operation

SNOC owns and operates four different gas fields: Sajaa, Kahaif, Moveyeid, and Mahani. The fields to boost the production from the wells, multiple compression units are used. The production from the fields is received in the Sajaa gas processing plant, located in the Sajaa industrial area in Sharjah. The following operations are carried out in the Sajaa plant:

- Separation
- Gas compression
- Condensate stabilization
- Solid desiccant dehydration

- NGL fractionation
- LPG blending & loading
- Amine sweetening
- Glycol dehydration
- Gas injection compression
- Water disposal (evaporation pond)
- Flares

Additionally, SNOC owns and operates an LPG export terminal, and condensate export terminal, both located in Hamriyah Free Zone. Figures 1 and 2 show an overview of the SNOC-operated assets.

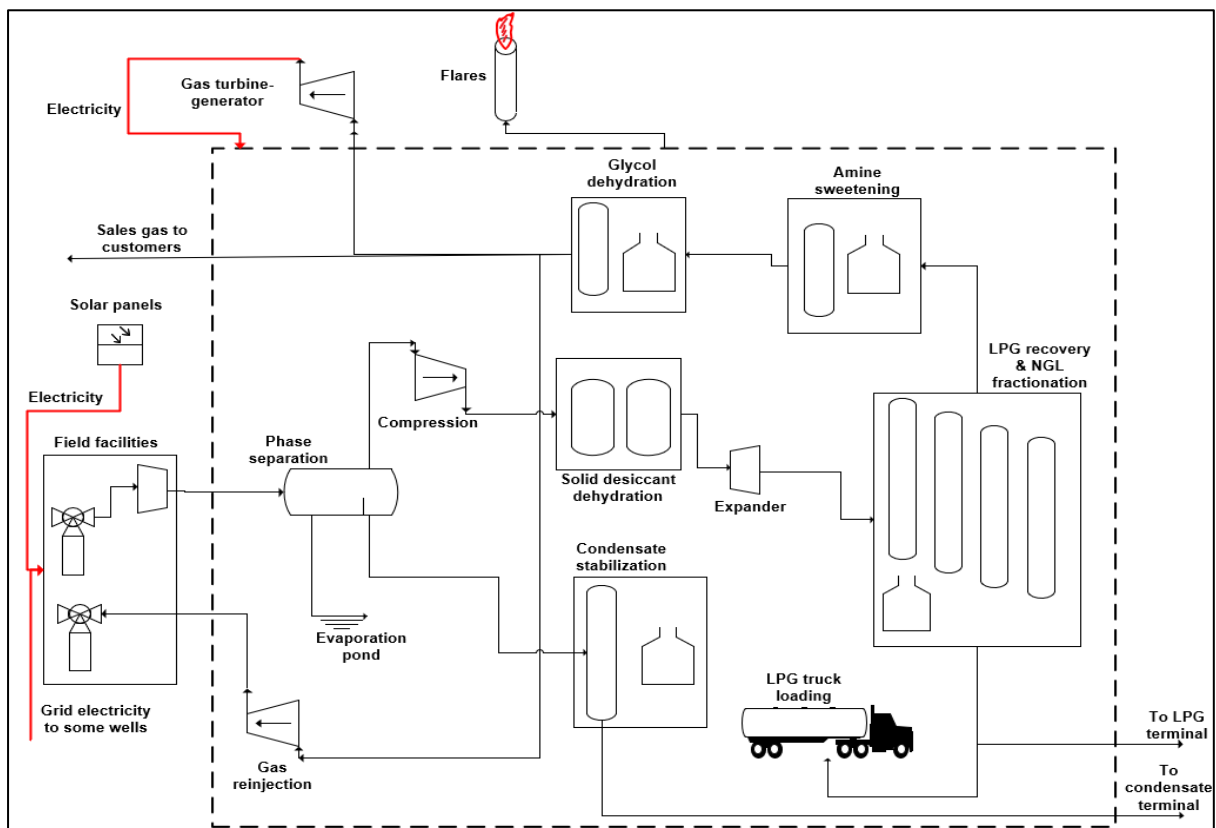


Figure 1: Overview of assets owned and operated by SNOC (field and Sajaa plant)

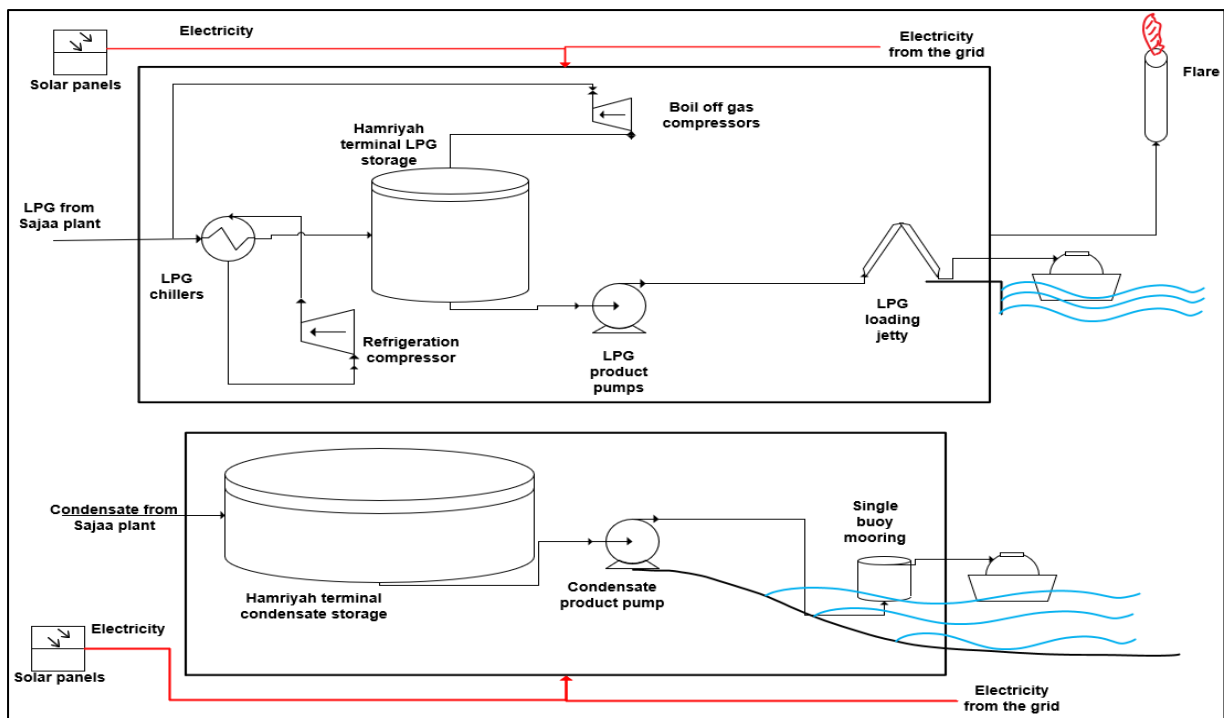


Figure 2: Overview of assets owned and operated by SNOC (LPG and Condensate Terminals)

Historically, SNOC has been significantly ahead in reducing emissions by strategically eliminating the use of high-emission fuels, such as diesel, in its equipment. The company has successfully opted to the utilization of a cleaner fuel option, which is sales gas, across its operations. This has contributed to a substantial elimination of potential GHG emissions. However, in certain situations, where emergency operations or test runs are essential, SNOC still relies on diesel fuel for specific equipment, including fire water systems and backup generators. By limiting the usage of diesel to these critical emergency scenarios, SNOC effectively balances the need for operational readiness with its commitment to emissions reduction and environmental responsibility.

Other than hydrocarbon production, SNOC has expanded its business into gas storage. SNOC has converted one of its depleted Gas fields, Moveyeid Gas Field, into a gas storage field where gas is injected during low power generation demand season, and withdrawn during high power generation demand seasons. Under the gas storage scope, SNOC operates gas turbine driven compressors, gas engine driven compressors, and a relief system. The gas storage asset is dealt with as a separate business unit, and thus have its own emission intensity reported. The gas storage facility injects gas from multiple sources in Moveyeid Gas Field, including SNOC wells and gas from other sources (i.e., purchased from other parties).

The emission intensity is reported per unit of MBOE of well production for emissions of **all assets excluding the gas storage asset**. This value is referred to as **upstream emission intensity**. The **gas storage emission intensity** is reported per unit of MBOE of injected gas. This value is referred to as **downstream emission intensity**. No scope 2 emissions are associated with the gas storage facility.

GHG emitters

GHG emissions can be attributed to combustion reactions or venting of process gasses. The GHG emissions due to combustion from SNOC-owned assets can be categorized as follows:

- 1) Stationary combustion including:
 - a. Fired heaters
 - b. Gas engines
 - Reciprocating compressors
 - c. Gas turbines
 - Centrifugal compressors
 - d. Flares
 - e. Diesel engines
 - Fire water pumps
- 2) Mobile combustion including:
 - a. Gasoline vehicles
 - b. Diesel vehicles

Additionally, GHG emissions from non-combustion sources are accounted for, such as hydrocarbon vents, leaks, as well as refrigerants that are used in SNOC-owned assets (R-407C, R-410A, and R-134a).

Ozone-depleting substances (ODS) are not used within SNOC facilities and hence are not contributing to SNOC's GHG emissions.

SNOC is not involved in any carbon-credit trading scheme as of 2021. However, SNOC understands that there could be a potential drive to have a presence in the carbon-credit market in the future in order to achieve the Net-Zero target.

SNOC Assets Emission Reduction History

In the assets' original operation in the early 1980s, the gas produced was flared almost entirely as the operating company's goal was maximizing the production of condensate only. In 1986, the flaring was

reduced after the commissioning of the LPG recovery and NGL fractionation facilities. In 1994, gas re-injection unit was commissioned, which eliminated the vast majority of flaring. Between 1998 and 2003, flare meters were installed to monitor and optimize the flare volumes. An additional 70% reduction in remaining flare volumes and 88% reduction in methane emissions were achieved. More efforts were also put into optimizing fuel gas consumption.

In 2019, SNOC commissioned a solar farm for LPG and condensate terminals, sized to cover around 15% of the power requirement for the terminals.

SNOC does not use any gasses that are considered ozone-depleting substances (ODS). Refrigerants that are used in SNOC-owned assets include R-407C, R-410A, and R-134a which have GWP effect but are not ODS.

Organization Boundary

The emissions reported in this report are based on the basis of operational control. This includes emissions from:

- Field facilities (e.g., wellheads and their associated drilling, hydraulic workover and well interventions activities, field compression, utilities,...etc)
- Sajaa gas processing facilities
- LPG terminal
- Condensate terminal
- Head Offices including their electricity consumption and vehicles use

GHG Performance

SNOC showed in 2021 that it was steadfastly committed to minimizing emissions while maintaining production continuity. Recognizing the importance of its position as the main energy provider in Sharjah, SNOC made an effort to strike a balance between operational flexibility and environmentally friendly practices by utilizing solar power production, reduction in flaring, and optimizing assets performance.

In 2021, the combined scope 1 and scope 2 emissions were 287.8 ktCO₂e, where scope 2 emissions contributed around 1.13 ktCO₂e (less than 1% of combined Scopes 1 & 2). The low scope 2 emissions are because around 93.7% of the combined scope 1 and 2 emissions are caused by the Sajaa gas processing plant and the Sajaa field compression stations, which are not supplied by power through

the grid. **25.3 ktCO₂e of scope 1 & 2 emissions were caused by the gas storage facility, with 263.0 ktCO₂e being caused by the remaining assets.**

Around 8.5% of the Scope 1 emissions were produced as a result of power generation in a gas-turbine-driven generator located in the Sajaa plant. While SNOC has no alternative available at the moment, there are plans in place to supply power from cleaner sources in the future.

While the Sajaa Gas Plant has cut down the emissions caused by flaring by more than 99% since the 1980s, still around 11.4% of the Scope 1 emissions are caused by flaring activities in 2021. It is worth mentioning that the 11.4% is not all caused by actual gas burning activities. It is caused by actual gas burning (7.0% of total Scope 1 emissions), and the CO₂ removed at the sweetening unit and vented through the flares (4.4% of total Scope 1 emissions). SNOC will continue to strive to cut down the flaring emissions further by continuously implementing stricter procedures that prioritize reducing environmental damage over production enhancement.

The upstream emission intensity for the year 2021 was 62.4 tCO₂/MBOE produced, and the downstream emission intensity was 10.0 tCO₂/MBOE injected.

Figure 3 provides a pie chart showcasing the proportionate contribution of various emitter categories to Scope 1 emissions of total upstream and downstream business units as a percentage.

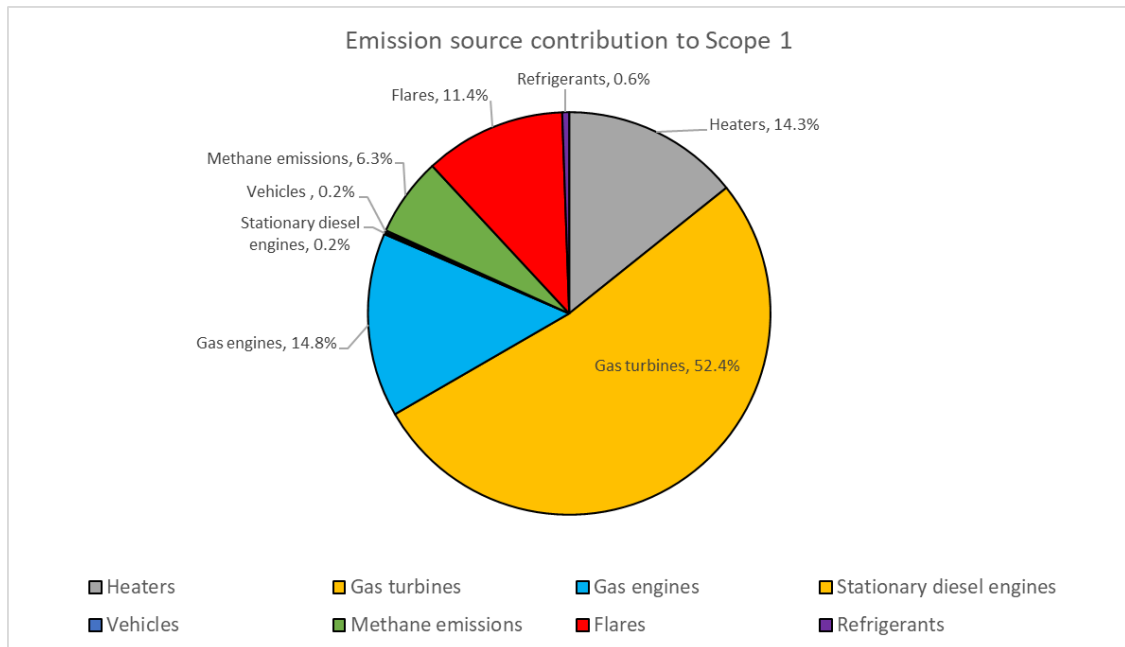


Figure 3: Contribution of the different types of GHG emitters to scope 1 emissions of total upstream and downstream units

The reported Methane emissions encompass the following sources which complies with IPCC reporting requirements:

- 1) Cold vents
- 2) Leaks from compressor seals
- 3) Online analyzer vents
- 4) Glycol dehydrator vents
- 5) fugitive leaks

The **total methane emissions** in 2021 were estimated **around 18.2 ktCO₂e**. Moreover, the fugitive leaks figure is an estimation based on a desktop study conducted with limited data. The estimated **fugitive leaks** figure is **around 10.2 ktCO₂e**, which contributes to around 3.5% of the scope 1 emissions (56% of total Methane emissions).

In 2021, a total of **450.9 MWh** of electricity was produced from the solar farms for LPG and condensate terminals. This resulted in offsetting around **227.9 tCO₂e** of emissions that would have otherwise been a result of importing power from the grid.

No direct emissions were caused by usage of fire extinguishers in 2021.

The instruments used for monitoring the GHG emissions performance are subject to calibration performed by SNOCs team, with a well-kept record of calibration certificates for the calibration tools. In case of any reported suspicion of false instrument readings, the instrument is quickly calibrated by the maintenance department.

Discussion of Uncertainties

The GHG protocol defines three types of uncertainties: scientific, parameter, and model uncertainties.

The uncertainties in GHG emissions estimation in this report could stem from two primary factors: metering errors and limited availability of data for certain emitters, which contribute to “parameter uncertainty”. The parameter uncertainty is the cumulative uncertainty at each component of the metering and calculations methodologies. SNOC acknowledges the importance of continually improving estimation and measurement accuracy and is continuously implementing the required measures to ensure limiting uncertainty in the reported figures.

Additionally, the fugitive leaks figure is based on a desktop study with limited data available. This is classified under the “model uncertainty” type. This type relates to uncertainty in the model of estimation. The fugitive emissions figure is expected to be the highest contributor to the uncertainty in estimated total emissions; as it is based on a guessed estimate for the number of leaking components, in addition to ‘leaker emission factors’ obtained from the Oil and Gas Methane Partnership (OGMP) technical guidance which are generic for the industry.

As of the current case, the figures presented have not been audited and confirmed by a third party which is planned for future reports.

NO_x and SO_x

NO_x and SO_x are primarily caused by the combustion of fuels. SO_x are only emitted if the fuels contain sulfur content. The primary fuel used in SNOC processes is fuel gas which is sourced from clean gas with sales gas quality specifications with approximately 0.0 – 16.0 ppm of H₂S. Liquid fuels contribute to a much lesser extent, as they’re only used for vehicles and to run emergency equipment.

In 2021, the estimated NO_x emissions figure is 1,815.1 Mt, while the estimated SO_x emissions figure is 223.1 Mt.

Emissions Summary

Table 1 summarizes the requirements of GRI reporting for GHG emissions.

Table 1: Summary of GHG data with respect to GRI requirements

GRI Disclosure	2021 Actual figure	Page number(s)
305-1 Direct GHG emissions (scope 1) (ktCO ₂ e)	287.8	8
305-2 Energy indirect GHG emissions (scope 2) (ktCO ₂ e)	1.13	8
305-3 Other indirect GHG emissions (scope 3)	Not reported	-
305-4 upstream & downstream GHG emission intensity (tCO ₂ /MBOE)	62.43 ^a & 10.0 ^b	9
305-5 Reduction of GHG emissions (ktCO ₂ e)	0.228 ^b	10
305-6 Emissions of ozone-depleting substances (ODS)	0.0 ^c	7
305-7 NO _x /SO _x , and other significant area emissions (Mt)	1,815.1/223.1	11

a. Intensity excluding emissions from the gas storage facility, and reported per unit of MBOE produced from the wells

b. Intensity from emissions caused by the gas storage facility only, and reported per unit of MBOE injected

c. Emissions offset by the solar power produced

d. No ODS are used in SNOC assets

Glossary

CO ₂ e	CO ₂ Equivalent
GHG	Green House Gases
GRI	Global Reporting Initiative: an international independent standards organization.
GWP	Global Warming Potential
ktCO ₂ e	Thousands Metric Tons of CO ₂ Equivalent
LPG	Liquified Petroleum Gases
MBOE	Thousands of barrels of equivalent oil
NGL	Natural Gas Liquids
ODS	Ozone Depleting Substances
tCO ₂ e	Metric Tons of CO ₂ Equivalent. Metric ton is defined as 1000 kilograms.

Independent Greenhouse Gas Assurance Statement

Independent Greenhouse Gas Assurance Statement

Introduction

DNV Business Assurance Group AS – Dubai Branch ('DNV') has been commissioned by SHARJAH NATIONAL OIL CORPORATION ('the Company' or 'SNOC') to carry out independent verification of Scope 1 and Scope 2 Greenhouse Gas (GHG) Inventory (the 'GHG Inventory') for its SNOC Head Offices, Sajaa Gas Processing Plant, LPG Terminal and Condensate Terminal in Hamriyah for the year 2021 (the period from 01st January 2021 to 31st December 2021).

SHARJAH NATIONAL OIL CORPORATION has prepared its GHG Inventory in accordance with the requirements of the Greenhouse Gas Protocol and ISO 14064-1. The limited level verification was carried out as per DNV Verisustain™ Protocol that is customized engagement was performed based on principles of completeness, accuracy, and reliability and this verification applies a ±5% materiality threshold towards errors and omissions based on DNV Verisustain.

SHARJAH NATIONAL OIL CORPORATION is responsible for the collection, analysis, aggregation, preparation (conversion factors, assumptions, methodology, calculations), and presentation of GHG Emissions as part of its GHG disclosures. Our responsibility is to perform a limited assurance engagement concerning the company's data for the year 2021 and to issue an assurance report and a statement that includes our conclusion to the management of SHARJAH NATIONAL OIL CORPORATION.

The verification engagement is based on the assumption that the data provided to us is complete, sufficient, true, and free from material misstatements. DNV disclaims any liability or co-responsibility for any decision a person or entity would make based on this verification statement. The verification was carried out in November 2023 by a team of qualified sustainability and GHG assessors.

Scope, Boundary, and Limitations of Verification

The scope of work agreed upon with the Company includes verification of its GHG Inventory as below:

- Direct GHG emissions (Scope 1 emissions) covering fossil fuels (natural gas, diesel, and gasoline) used for SNOC's owned stationary and mobile equipment, flaring and cold vents, refrigerant leaks from refrigeration loop at processing facility and HVAC system and fugitive leaks from flanges valves etc.
- Indirect GHG emissions (Scope 2 emissions) arising from the consumption of purchased electricity.

The operational boundary selected for reporting and the consolidation approach is based on operational control criterion and includes SHARJAH NATIONAL OIL CORPORATION offices based in Emirate of Sharjah in addition to the field, gas processing plant and terminals. For all sites, we did not come across any limitations to the agreed scope of work.

Verification Methodology

The verification was conducted by DNV in accordance with the requirements as set out in DNV VeriSustain for a limited level of verification while adopting a risk-based approach toward the selection of samples for assessing the robustness of the underlying data management system, information flow, and controls. Physical site visits are carried out for UAE sites in line with DNV’s audit methodology. We carried out the following activities:

- Desk review of the Company’s Energy and GHG emissions data for year 2021 for all the sites as mentioned above.
- Review of the GHG data management system used to generate, aggregate, and report GHG emission data, as well as assessment of the completeness, accuracy, consistency, and reliability of the data.
- Sample-based review of the standard operating procedures in place for collection of data pertaining to GHG emission, as well as associated emission factors and calculation methodologies.
- Interaction with key managers and data owners to review data collection and consolidation systems of the Company including reviews of emission factors and assumptions used for calculations.
- Review of the consolidated GHG Scope 1 and 2 emissions with the sustainability and process engineering representatives of SNOC.

Conclusion

Based on our verification methodology and scope of work agreed upon, nothing has come to our attention to believe that the GHG emissions as brought out in the table below are not materially correct and is not a fair representation of the Direct/Scope 1 and Indirect/Scope 2, of SHARJAH NATIONAL OIL CORPORATION Company’s GHG Inventory during year 2021 for SHARJAH NATIONAL OIL CORPORATION Company offices based in Sharjah.

GHG Emissions	2021
Scope 1	287.8 ktCO ₂ e.
Scope 2	1.13 ktCO ₂ e.
Total Emissions (tCO₂e)	288.93 ktCO₂e.

Statement of Competence and Independence

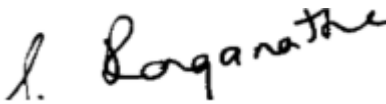
DNV applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2015 - Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

We have complied with the DNV Code of Conduct¹ during the assurance engagement and maintain independence where required by relevant ethical requirements as detailed in DNV VeriSustain. This engagement work was carried out by an independent team of sustainability assurance professionals. DNV was not involved in the preparation of any statements or data included in the Report except for this GHG Assurance Report, Assurance Statement, and Management Report. DNV maintains complete impartiality toward stakeholders interviewed during the assurance process. DNV did not provide any services to SNOC and its subsidiaries

¹ The DNV Code of Conduct is available on request from www.dnv.com

in the scope of assurance during 2021 that could compromise the independence or impartiality of our work.

For DNV Business Assurance Group AS – Dubai Branch,

 Ranganathan Seshan Lead Verifier DNV Business Assurance India Private Limited, India.	Sandeep Lele Project Manager DNV Business Assurance Group AS – Dubai Branch	Tushar Chaudhari Technical Reviewer DNV Business Assurance India Private Limited, India.
Goutam Banik, Verifier DNV Business Assurance India Private Limited, India.		

Dubai, UAE, November 24, 2023.

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