

# OIL AND GAS CARBON EMISSIONS DASHBOARD CARBON FOOTPRINT ANALYSIS AND REDUCTION RECOMMENDATIONS (2019 – 2023)

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## INTRODUCTION

The oil and gas industry is under significant pressure to reduce its carbon emissions in response to global climate change concerns. Many companies are now committed to achieving net zero carbon emissions. This document provides a detailed analysis of an oil and gas company's carbon footprint from 2019 to 2022, covering Scope 1, Scope 2, and Scope 3 emissions. The analysis identifies key emission sources, trends, and areas for potential reduction, offering insights to support the company's net zero objectives and sustainable practices.

NOTE: The Oil and Gas Company used in this project is an imaginary one. However, the emission sources represent the typical emission sources for an oil and gas company.

## OBJECTIVES

1. Analyze an Oil and Gas Company Carbon Emissions
2. Calculate the Baseline
3. Investigate and determine the most effective carbon reduction initiatives to help the client achieve Net Zero.
4. Communicate Findings and Recommendations through Dashboard.

## DEFINITION OF TERMS

1. **Scope 1 Emissions:** Direct greenhouse gas emissions from sources that are owned or controlled by the company, such as emissions from fuel combustion in company-owned vehicles and facilities.
2. **Scope 2 Emissions:** Indirect greenhouse gas emissions from the consumption of purchased electricity, heat, or steam, reflecting the emissions generated by the energy provider.
3. **Scope 3 Emissions:** All other indirect emissions not covered in Scope 2, which occur in the value chain of the company, including both upstream and downstream activities, such as emissions from the use of sold products and transportation.
  - a. **Upstream Emissions:** Indirect emissions from activities related to the production and supply chain before the company's operations, such as raw material extraction, purchased goods and services, and transportation to the company.

- b. Downstream Emissions: Indirect emissions occurring after the company's operations, including the use of sold products, product distribution, and waste disposal.

## METHODOLOGY

### 1. Data Collection and Preparation:

The data for this project was generated using generative AI, resulting in a dataset with 130 rows and 4 columns: "Emission Source," "Unit," "Emission," and "Data Year." To enhance the dataset, I manually inputted the scope for each emission source, expanding the dataset to 5 columns.

To further refine the data, I filtered out the Scope 3 emissions and categorized them into "Upstream" and "Downstream" categories. The data was then formatted using Power Query in Excel, facilitating easy visualization and analysis. This preparation ensures that the dataset is well-structured and ready for comprehensive analysis and reporting.

### 2. BaseLine Calculation:

Calculate the baseline emissions by summing up the emissions for each category (Scope 1, Scope 2, and Scope 3) for the initial year(2019).

BASELINE	
Data Year	2019
Scope	Sum of Emissions FOR 2019
1	3030000
2	1540000
3	6160000
Grand Total	10730000

## COMPETITORS ANALYSIS

Company	Scope 3 Emissions Reduction Target and actions
Baker Hughes	Baker Hughes is passionate about driving emissions reductions consistent with the 1.5°C temperature goal of the Paris Agreement, reaching net-zero operational emissions by 2050.
Shell	Shell has set a 'new ambition to reduce customer emissions' (Scope 3) by 15-20% by 2030 (ETS24,

	page 7, item 7)
ExxonMobil	ExxonMobil's 2021 Scope 3 emissions estimate is 530 million metric tons, with a focus on efficiency, renewable energy, and carbon capture to reduce product use emissions.
TotalEnergies	Reduce methane emissions from operated facilities by 50% between 2020 and 2025, and by 80% between 2020 and 2030
Chevron	Aims to reduce the carbon intensity of their upstream oil and gas production by 5-10% and the carbon intensity of their overall product mix by 10% by 2028, compared to 2016 levels

## ANALYSIS AND INSIGHTS

### Scope 3 Emissions Overview

The analysis of Scope 3 emissions revealed significant contributions from both upstream and downstream activities. The breakdown is as follows:

- **Upstream Emissions:** 13,290,000 tCO<sub>2</sub>
- **Downstream Emissions:** 11,340,000 tCO<sub>2</sub>

### Key Contributors

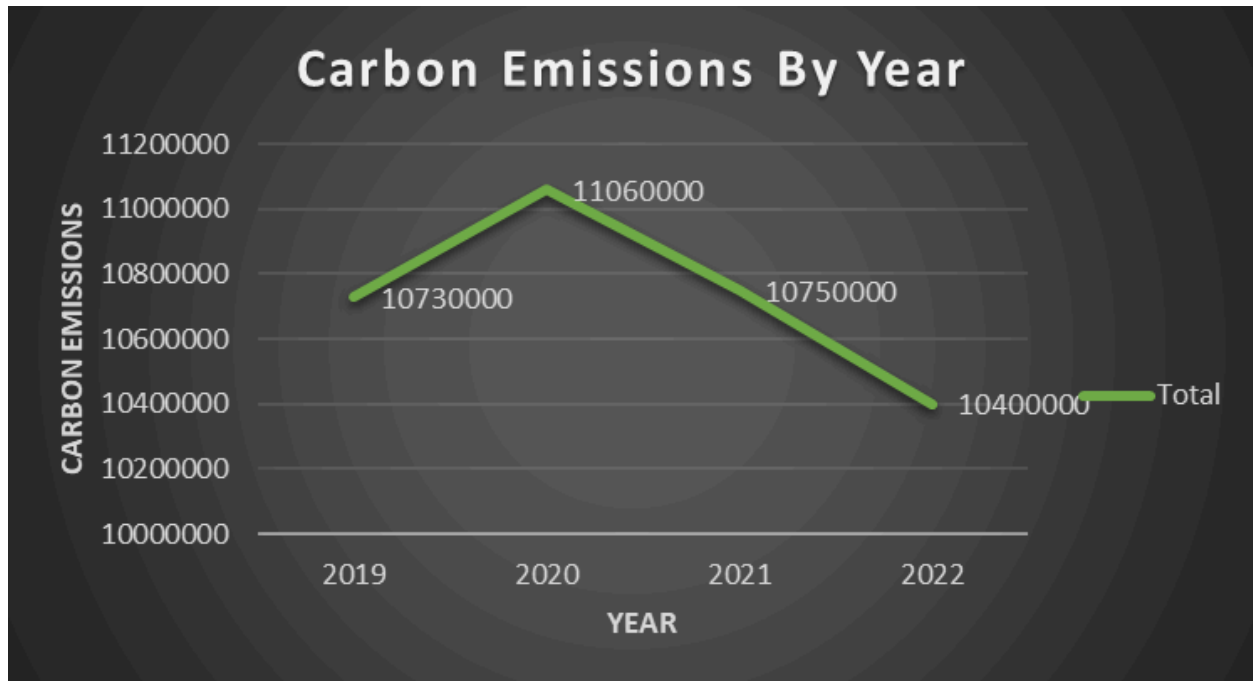
The primary source of emissions in both categories is from "purchased goods and services," indicating that the procurement and supply chain activities are major contributors to the company's carbon footprint.

### Recommendations

1. **Optimize Supply Chain:**
  - Engage suppliers in emission reduction.
  - Promote sustainable sourcing.
2. **Collaborate with Suppliers:**
  - Improve supplier energy efficiency.
  - Encourage renewable energy adoption.
3. **Invest in Technology:**
  - Adopt low-carbon technologies.
  - Support eco-friendly manufacturing.

#### 4. Monitor and Report:

- Implement a robust emissions tracking system.
- Use data insights for continuous improvement.



#### Observation from Chart

1. Baseline Emissions (2019): The carbon emissions for 2019 are 10,730,000 units.
2. Peak Emissions (2020): There was an increase in emissions in 2020, peaking at 11,060,000 units.
3. Decline in Emissions (2021-2022): Emissions started to decrease in 2021, dropping to 10,750,000 units, and further declined in 2022 to 10,400,000 units.

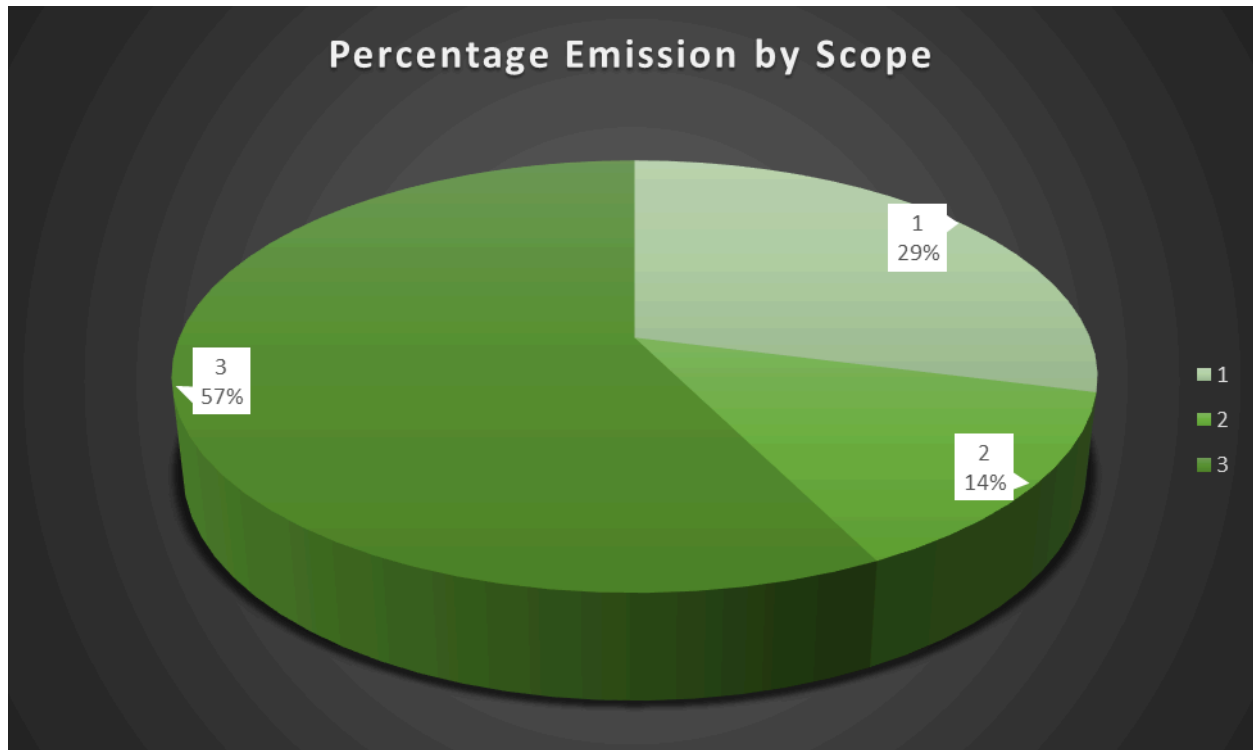
#### Analysis

- Increase in 2020: The rise in emissions in 2020 could be attributed to increased production or operational activities, possibly driven by higher demand or less stringent environmental regulations during that year.
- Decline Post-2020: The consistent decline in emissions from 2021 to 2022 indicates efforts to reduce carbon footprint. This could be due to the implementation of new technologies, improved efficiency, or a shift towards more sustainable practices.

#### Recommendations

1. Sustained Emission Reduction: Continue investing in and implementing energy-efficient technologies and practices to sustain the reduction trend.

2. Renewable Energy: Increase the use of renewable energy sources to further reduce reliance on fossil fuels and cut down Scope 2 emissions.
3. Carbon Capture and Storage: Explore and invest in carbon capture and storage (CCS) technologies to mitigate emissions from operations.
4. Monitoring and Reporting: Maintain transparent and rigorous monitoring and reporting of emissions to track progress and identify areas for improvement.
5. Stakeholder Engagement: Engage with stakeholders, including investors, customers, and regulatory bodies, to align on emission reduction goals and strategies.



#### Observations From Chart

1. Scope 1 Emissions: Contribute 29% of the total emissions.
2. Scope 2 Emissions: Account for 14% of the total emissions.
3. Scope 3 Emissions: Constitute the largest portion, at 57% of the total emissions.

#### Analysis

- High Scope 3 Emissions: The majority of emissions come from Scope 3, which includes indirect emissions from the use of the company's products and other value chain activities. This suggests that the company's downstream activities, such as product usage, are the primary contributors to its carbon footprint.

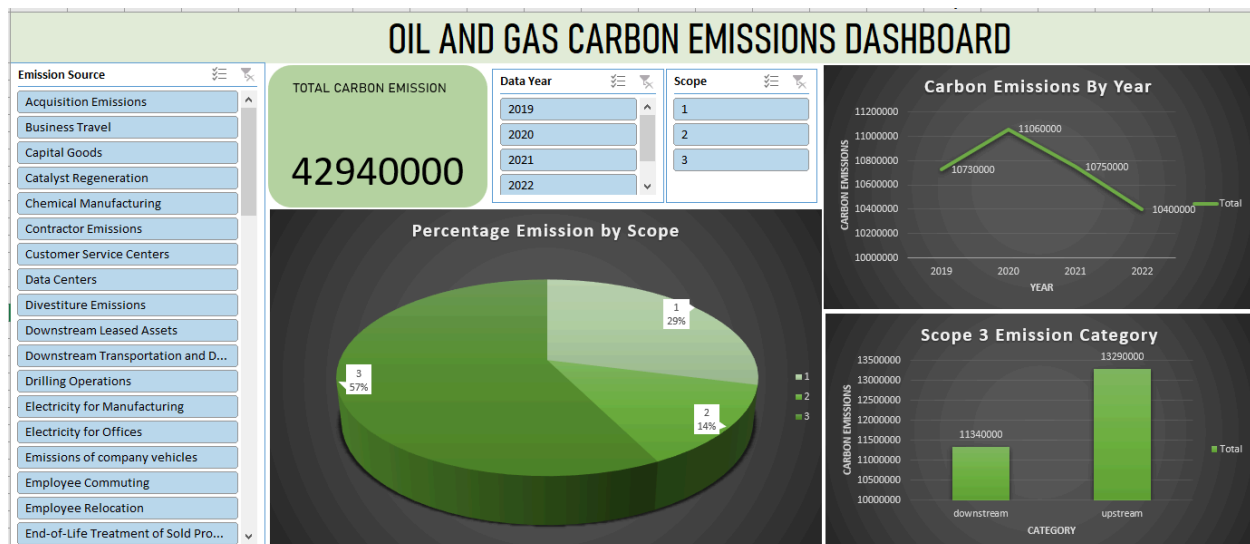
- **Moderate Scope 1 Emissions:** Direct emissions from company operations are significant but less than half of Scope 3 emissions, indicating that operational efficiency improvements can have a substantial impact.
- **Lower Scope 2 Emissions:** Emissions from purchased energy are the smallest segment, reflecting either a smaller energy footprint or relatively clean energy sourcing.

## Recommendations

1. **Focus on Reducing Scope 3 Emissions:** Implement strategies to mitigate downstream emissions. This can include enhancing product efficiency, promoting sustainable use practices, and working with customers and suppliers to reduce their carbon footprints.
2. **Enhance Operational Efficiency:** Continue to reduce Scope 1 emissions by investing in cleaner technologies, improving operational processes, and optimizing resource use.
3. **Renewable Energy Adoption:** Further reduce Scope 2 emissions by increasing the share of renewable energy in the company's energy mix, which can lower indirect emissions from purchased energy.
4. **Collaborative Efforts:** Engage with stakeholders across the value chain to develop comprehensive emission reduction plans, ensuring that both upstream and downstream partners contribute to overall emission reductions.

By targeting the highest emission areas and leveraging collaboration, the company can effectively move towards its net-zero carbon emission goal.

## DASHBOARD



## Key Initiatives for Oil and Gas Companies to Consider

1. **Adoption of Renewable Energy Sources:**

Action: Invest in and integrate renewable energy sources such as wind, solar, and biofuels into operations.

Impact: Reduces Scope 2 emissions by lowering dependence on fossil fuels for energy needs.

## 2. Enhancement of Energy Efficiency:

Action: Implement advanced technologies and practices to optimize energy use in extraction, refining, and distribution processes.

Impact: Lowers Scope 1 emissions by improving operational efficiency and reducing waste.

## 3. Carbon Capture and Storage (CCS):

Action: Develop and deploy CCS technologies to capture CO<sub>2</sub> emissions from industrial sources and store them underground.

Impact: Mitigates Scope 3 emissions by capturing emissions from end-use products and reducing overall carbon footprint.