# *CARBON NEUTRALITY OF OIL MAJORS – CURRENT STATUS, TARGETS, AND ECONOMIC RATIONALE*

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## Overview

Following the Paris Agreement and its climate goals, oil companies have faced increased pressure from stakeholders to act on environmental issues. This paper quantifies the emissions of the eight oil majors, investigates their commitments for emission reductions, and models the impact of a potential carbon price on their profitability and market capitalization. Preliminary analysis shows that between 2011 and 2020, all oil majors have reduced their scope 1 and 2 emissions and intensity. Furthermore, two-thirds of the oil majors have committed to becoming net-zero emission businesses in the long term. A strong influence of the companies' region of incorporation is observed, with European oil companies implementing pathways towards carbon neutrality faster, whereas American oil companies remaining laggards in terms of GHG reductions, commitments to sustainability and the energy transition. Finally, the paper seeks to quantify that this commitment towards emissions reduction is pursued following an economic rationale: the potential introduction of a carbon price of USD 50 per tonne, USD 100 per tonne, or USD 250 per tonne to the emissions of oil majors could reduce their profitability significantly, thus impacting their market capitalization.

## Methods

Based on a detailed literature review, the following hypotheses are formulated and will be tested through the outlined methodology:

Hypothesis 1a: Oil Majors are reducing their Scope 1 and 2 Global GHG emissions over the last ten 10-year period (2011 to 2020).

In order to test this hypothesis, it is proposed to establish the scope 1 and scope 2 Global GHG emissions by the eight oil majors both in terms of total number of scope 1 and scope 2 GHG emission and in terms of GHG intensity per MBOE from 2011 to 2020. The total number of GHG emissions of the respective oil major and the associated GHG intensity per MBOE (based on the total production of oil and gas) will be calculated as follows and assessed for every year in the evaluation period:

(1) Total Number of GHG Emissions = $\sum$ Scope 1 Emissions + Scope 2 Emissions

(2) GHG intensity per MBOE = (Total Number of GHG Emissions × 1000) / (Production in MMBOE)

Hypothesis 2a: European Oil Majors are achieving higher reductions in their Scope 1 and 2 Global GHG emissions over the last ten 10-year period (2011 to 2020) compared to American Oil Majors.

To examine this hypothesis, the average reduction in GHG emission and GHG intensity over the last ten 10-year period (2011 to 2020) by all European Oil Majors is compared to average reduction in GHG emission and GHG intensity by all American Oil Majors. Thus, earlier research findings that show an effect of the companies' region of incorporation on energy transition efforts will be tested to assess whether European oil companies are implementing pathways towards carbon neutrality faster than American oil companies.

Hypothesis 3a: Oil Majors are showing commitment to climate change actions and long-term carbon neutrality.

To assess this hypothesis, the published Environmental, Social, and Governance (ESG) and carbon neutrality targets by the oil majors are empirically evaluated and discussed to determine their overall commitment to becoming net-zero emission businesses in the long term. Particularly it will be assessed whether oil majors have committed to Scope 1 and 2 Net Zero Emission Targets and Scope 3 Reduction Targets; have specific renewable electricity targets in place; have established energy efficiency policies; have announced emission reduction initiatives; have set up climate change policies; and have discussed the risks of climate change and have started to address its mitigations. A "yes" to the majority of these questions would provide support for the above stated hypothesis 3a.

Hypothesis 4a: The Oil Majors' commitment towards emissions reduction is pursued following an economic rationale.

To test this hypothesis, the impact of the potential introduction of different sets of carbon prices on the oil majors' cost position, Earnings before Interest, Taxes, Depreciation, and Amortization (EBITDA), and market capitalization is modelled. For the purpose of this analysis, it is assumed that the impact of a CO2 price is tied to direct (scope 1 and 2) emissions, that costs for such emissions will be borne by the emitter (i.e., the oil companies), that buying CO2 permits is the chosen market responses by the oil companies (or that alternative responses such as investing in lower emissions businesses and switching to carbon neutral technologies would lead to similar costs), and that the timing of the application of the carbon tax is in line with the IEA Net Zero by 2050 Roadmap. Furthermore, Earnings before Interest, Taxes, Depreciation, and Amortization (EBITDA), the standard multiple for valuations, is used as a proxy for profitability to better compare across the oil majors as this metric is normalized for differences in capital structure and taxation. EBITDA multiples generally tend to yield better estimates than EBIT multiples. The impact on profitability and market capitalization is modelled as follows:

(3) Cost Impact = Total GHG Emissions Scope 1 and Scope 2 × Carbon Price

(4) Adjusted EBITDA = EBITDA (5-year average) - Cost Impact

*(5)* Revised Market Cap = Adjusted EBITDA × EBITDA Multiple

## Results

Preliminary analysis shows support for most of the hypotheses. Detailed results will be presented at the conference.

## Conclusions

This paper aims to quantify the GHG emissions of the eight oil majors – Royal Dutch Shell, ExxonMobil, Chevron, TotalEnergies, BP, Eni, Petrobras, and Equinor – to ascertain whether oil majors are reducing their Scope 1 and 2 Global GHG emissions over the last ten 10-year period, and to assess the commitments the eight oil majors have announced to reduce these in future. Furthermore, the paper set out to model the impact of different sets of carbon dioxide prices on the profitability and market capitalization of the oil majors, to determine whether the oil majors' commitment towards emissions reduction is pursued following an economic rationale. The majority of hypotheses found support by preliminary empirical analysis. Further research may focus on how oil companies should reach carbon neutrality over time, assessing the trade offs between divesting, reducing existing emissions, and developing less carbon intensive businesses. GHG reductions need to be assessed within several oil business-related activities (drilling, flaring, production, venting, processing, and liquefaction) while also considering the special challenges different regions face. Overall, the energy transition towards carbon neutrality may represent the biggest challenge in the corporate strategy of oil majors and deserves further research.

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