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Assessing the oil & gas sector's carbon footprint

TotalEnergies, Repsol are standard setters in European IOC's transformation

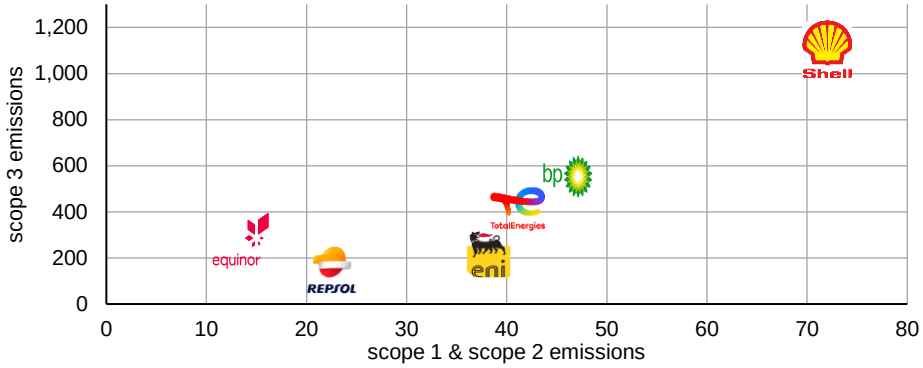
Achieving climate neutrality targets by 2050 depends on action by industries with a heavy environmental footprint such as oil and gas. The industry's sustainability commitments aim primarily to reduce carbon intensity in their own operations, but it is the consumption of the energy products that the industry supplies which is responsible for 85% of the sector's overall carbon footprint. Our analysis shows that planned capital expenditures of the six largest European integrated oil and gas companies (IOCs) to reduce their carbon emissions are a small proportion of their windfall gains from high oil and gas prices as Russia's war in Ukraine has shaken up energy markets.

The integrated oil and gas (O&G) industry is responsible for more than a half of global carbon emissions related to energy use. Around 90% of these emissions occur from the use of hydrocarbon products1. Driven by growing societal concerns, stakeholder's activism, evolving policies and regulations, O&G companies are bound to make their business models less carbon intensive through better management and ultimately reduction of their direct and indirect contributions to carbon emissions.

More IOCs are committing to achieve net-zero targets by 2050 through emission-reduction goals. Cost-effective solutions to bring down emissions of supplied oil and gas include improvements in energy efficiency and development of additional carbon sinks, such as carbon capture and storage capacities (CCS). Other measures will include investment in forests and regenerative agriculture, reduction of flaring and venting of CO_2, minimisation of methane emissions and, most importantly, replacement of O&G by sustainable energy production.

Figure 1 provides an overview of the carbon footprint of the European oil and gas majors, where so-called scope-1 and scope-2 emissions data are taken from companies' sustainability reports. For scope-3 emissions, the methodologies applied to calculate up- and downstream exposures often differ substantially across companies. To ensure comparability throughout the sample, we use a uniform emission volume of 402 kg of CO_2 per barrel of hydrocarbon production (boe)[2]. The results confirm that own emissions from producing and distributing fossil fuels and related energy products is minor compared with the combustion of the fuels by the industry's customers. Thus, the ambitions of corporates to support the transition require dedicated focus on reducing sales of oil & gas rather than just investing in more sustainable drilling and transportation.

Figure 1: Carbon footprint of European Oil and Gas companies, 2020



Source: Scope ESG Analysis

[1] https://cdn.cdp.net/cdp-production/cms/reports/documents/000/003/858/original/CDP_Oil_and_Gas_Executive_Summary_2018.pdf?1541783367

[2] Emission factor is calculated as an average across 5 companies, where information on scope 3 use-phase emissions and daily hydrocarbon production were available.

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European oil and gas industry's net-zero commitment

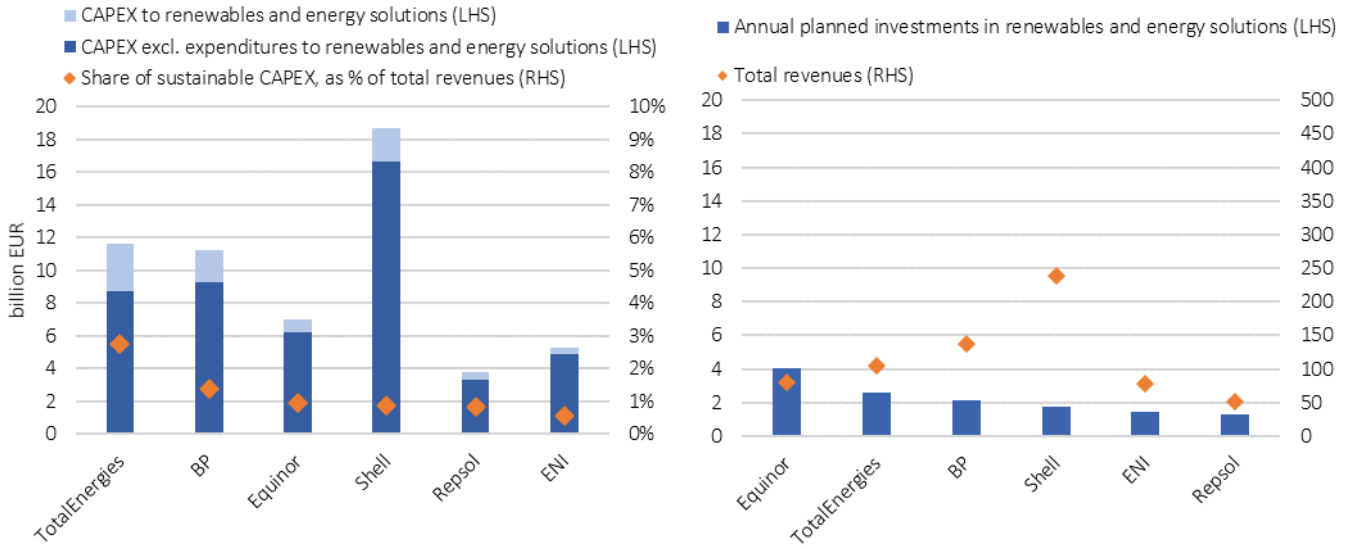
Sector faces regulatory pressure given Europe's climate goals

On a path towards becoming climate neutral by 2050, Europe has revised its intermediate objective to cut greenhouse gas emissions (GHG) from 40% to at least 55% by 2030 compared to 1990 level. The main measures to reach this goal include improvements in energy efficiency and an increase of the share of renewables in the region's energy mix3. Today, oil and gas remain the most important energy sources for the European economy4, leaving the industry the focus of initiatives such as carbon pricing.

Capital expenditure on transition contrast with booming revenues

However, the industry's investment plans to finance the transition lack ambition in the context of currently high revenues from elevated energy prices and despite favourable financial incentives to invest into carbon-saving technology, such as gradually withdrawing from oil & gas and shifting business models towards renewable energy. Recently updated investment strategies by Equinor ASA and BP PLC display their greater ambitions until 2026, but sustainable investment as a share of revenues remains below 2.5% a year on a constant-revenue basis. Not only that, but the split between investments on oil and gas versus sustainability-focused investment (such as biomass, renewables, or e-fuels) indicates that new business will grow only slowly. Overall, it represents only 14% on average of total capital expenditure among Europe's O&G majors.

Figure 2: Current and planned capital expenditure of European IOCs
in billion EUR



Notes: numbers correspond to the latest 2021 data.

Investment plans represent companies' announced expenditures for renewables and energy solution for period from 2021/2022 to 2025/2026. For more details see appendix I.

Intensity-based targets remain modest

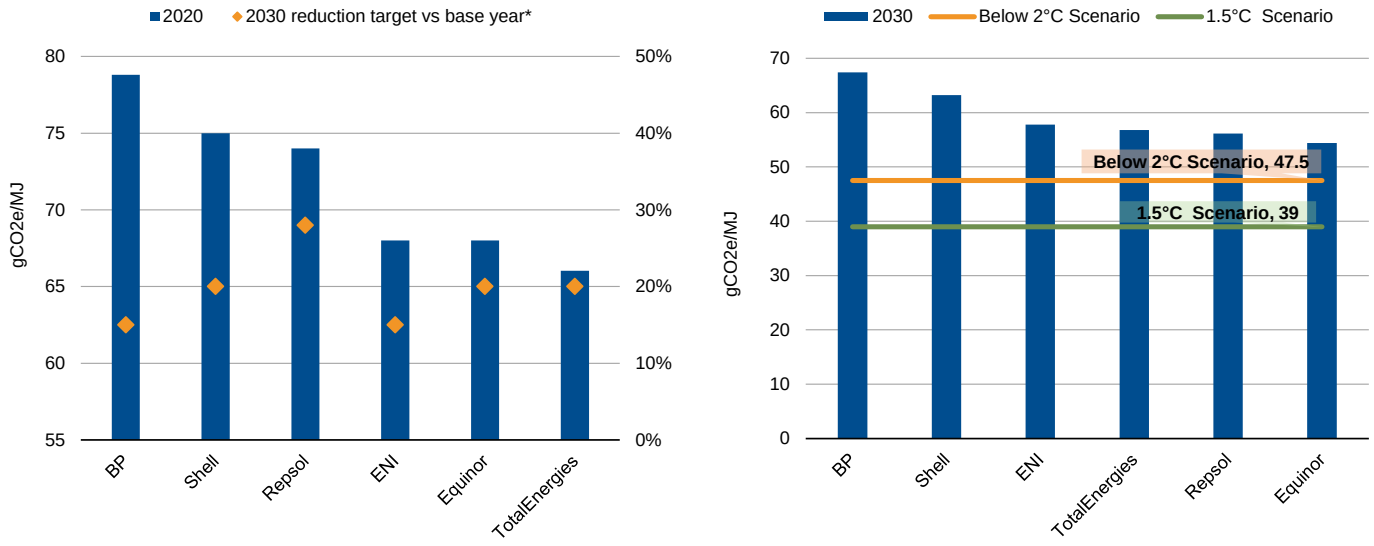
No intensity-based target reaches 1.5°C pathway

A common feature of short- and long-term O&G company strategies is the reduction of carbon intensity from use of sold products. Carbon intensity is a measure of the volume of greenhouse gas (GHG) emissions in CO_2 equivalents (such as methane and carbon dioxide) per unit of energy (MJ) or barrel of oil and gas (boe) produced. According to a study from the Transition Pathway Initiative (TPI), the carbon intensity of energy products

[3] https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2030-climate-energy-framework_en
[4] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview#:~:text=Renewable%20energies%20accounted%20for%20the,renewable%20waste%20(2.2%20%25).

sold must meet a threshold below 39 gCO2e/MJ target by 2030 to become aligned with the 1.5°C pathway. Targets set by European IOC companies range from around 15% to 30% against a defined base year, with a long-term goal to achieve carbon neutrality (**Figure 3**). However, even the most ambitious companies are far from reaching the required 'net zero' pathway with existing intensity targets.

Figure 3: Carbon intensities of the energy products
in billion EUR



*Base year: BP - 2019, Shell – 2016, Repsol – 2016; TotalEnergies – 2015, ENI – 2018; Equinor – 2016

Source: Scope ESG Analysis

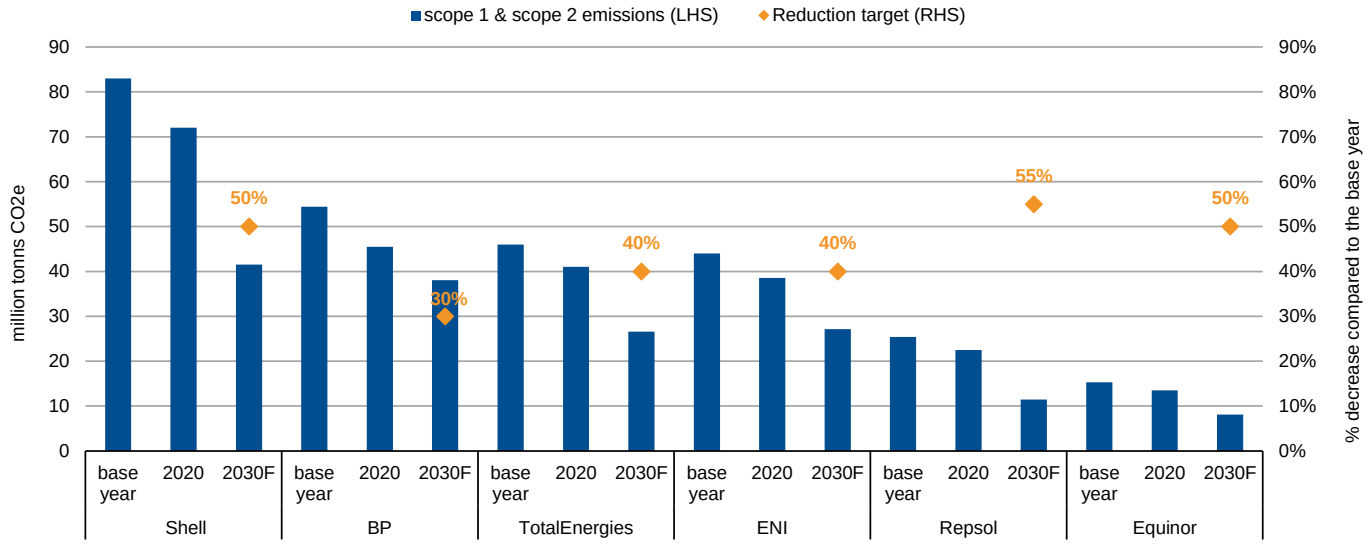
Absolute emission reduction targets

Major focus on scope-1 and scope-2 emissions targets

Intensity-based targets, however, do not convey companies' ambitions to reduce absolute emissions, as they may increase with growing hydrocarbon production, even if average carbon intensity falls. In other words, an O&G company with an intensity target may even increase oil and gas sales if it manages to raise the efficiency of the energy products and/or increases the share of renewable energy sales by a higher margin than revenues from oil and gas. Hence, absolute reduction targets are the relevant metrics to assess a company's contribution to climate goals.

Figure 4 shows reported scope-1 and scope-2 emissions and estimated future emissions, based on the quantitative reduction strategies by the O&G companies. Frequently reported metrics refer to activities resulting from the production and processing (combustion, flaring, venting and fugitive) – the so-called direct scope-1 emissions, as well as emissions from the generation of electricity, purchased heating and cooling for own use (scope-2 emissions). Overall, the announced targets range from 30% to 55% reduction in net or gross scope-1 and -2 emissions. Shell PLC reported the highest volumes of emissions associated with own production, processing, and logistics. The company also aims to reduce its absolute net scope-1 and -2 emissions by 50% compared 2016, which corresponds to a reduction of around 41m tonnes of CO_2. Repsol SA and Equinor have the lowest emissions reported among the six European IOCs but have relatively ambitious emissions-reduction targets. **Appendix II** provides a detailed overview of the companies' climate goals.

Figure 4: Reported absolute scope 1 & scope 2 emissions and reduction targets



Notes: ENI targets 100% reduction of the upstream emissions, which correspond to appx. 40% reduction in total scope 1 & 2 emissions compared to the base year.
Source: Scope ESG Analysis

Focus on materiality

Inconsistent tracking of emissions from sold products

The reality is that scope-1 and scope-2 emissions represent less than 20% of the total emissions in the sector. Most of the oil and gas emissions stem from the use of sold products (Category 11 in the scope 3 definition from GHG Protocol) such as burning of oil and gas by households and companies (gasoline, diesel, fuel oil etc.). Measuring GHG emissions, which occur outside the company's direct control, requires an understanding of final product use and applying a commonly accepted reporting methodology. However, GHG reporting methodologies differ across companies.

We use a consistent approach to measure IOCs' scope-3 carbon footprint. Based on the reported data on scope-3 emissions across five companies and their volumes of daily hydrocarbons production, we calculated an average downstream emission factor for oil production (402 kg of CO_2/boe). This emission factor is in line with existing literature on carbon footprint from oil production (IEA – 405 CO_2/boe[5]).

Lack of transparency in carbon reduction strategies

IOCs often disclose aggregated objectives, which do not allow to distinguish between different emission scopes (1-3) or they report emission targets only as part of a general net-zero ambition strategy for 2050. One positive example is TotalEnergies SE which has set a target to reduce scope-3 emission in Europe by 30% compared with 2015 (see **Figure 5**). Other companies refer to scope-1, scope-2, scope-3 net reduction objectives, but with a strong focus on reductions in direct controlled emissions (Eni SpA, Repsol SA). In this study, we only take explicit targets for scope-1 and -2 emissions into account and use the residual to proxy scope-3 emission targets.

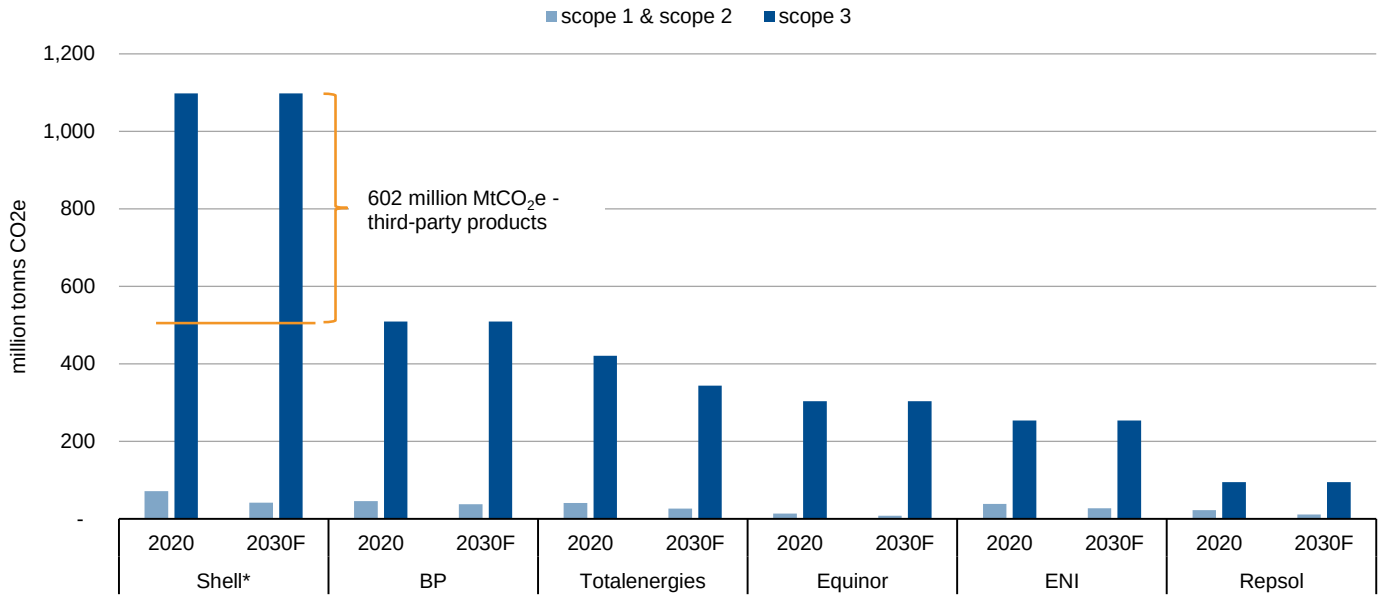
Figure 5 shows the current and estimated future carbon footprint of the European O&G majors. Scope-1 and scope-2 emissions account for little more than 10% of the overall carbon emissions. We assume that the hydrocarbon production remains unchanged from the year 2020. Also, reduction targets are only considered if the company discloses absolute carbon reduction objectives.

[5] https://iea.blob.core.windows.net/assets/4315f4ed-5cb2-4264-b0ee-2054fd34c118/The_Oil_and_Gas_Industry_in_Energy_Transitions.pdf

Absolute emissions also driven by third-party sales

O&G companies also report additional sales of oil and gas purchased from third parties. For instance, Shell discloses additional emissions from the products purchased from third parties for resale. The footprint of other companies may thus be underreported due to lack of data on volumes and associated emissions from sales of third-party products. **Figure 5** shows additional emissions from third-party product sales. With the highest volume of daily hydrocarbon production, Shell and BP have the largest absolute carbon footprint from the use of sold products, followed by TotalEnergies, Equinor, ENI and Repsol in descending order. More importantly, only one of the six IOCs, namely TotalEnergies, has defined an explicit quantitative reduction target for scope-3 emissions.

Figure 5: Current and future carbon footprint of the European oil and gas majors



Notes: *Shell's footprint includes emissions associated with the sales of third-party products

Source: Scope ESG Analysis

Scope's impact assessment of the oil & gas industry

Scope's impact rating is forward-looking

We use a proprietary rating approach to assess the social impact of a corporate's activities, which is based on three pillars: sector, company, and management assessment. The sector analysis incorporates a full life-cycle analysis to identify the most important and sector-relevant positive and negative externalities on society. Secondly, the company assessment identifies company-specific impacts. Finally, the assessment of a management's sustainability strategy incorporates the medium-term objectives (up to 10 years) by explicitly including the expected path of impact dynamics into the rating rationale. Thereby, Scope's ESG impact rating not only reflects current impacts but also the future transition of business models. The outcome is a monetised evaluation of net contributions or costs as a share of company revenues by business segment.

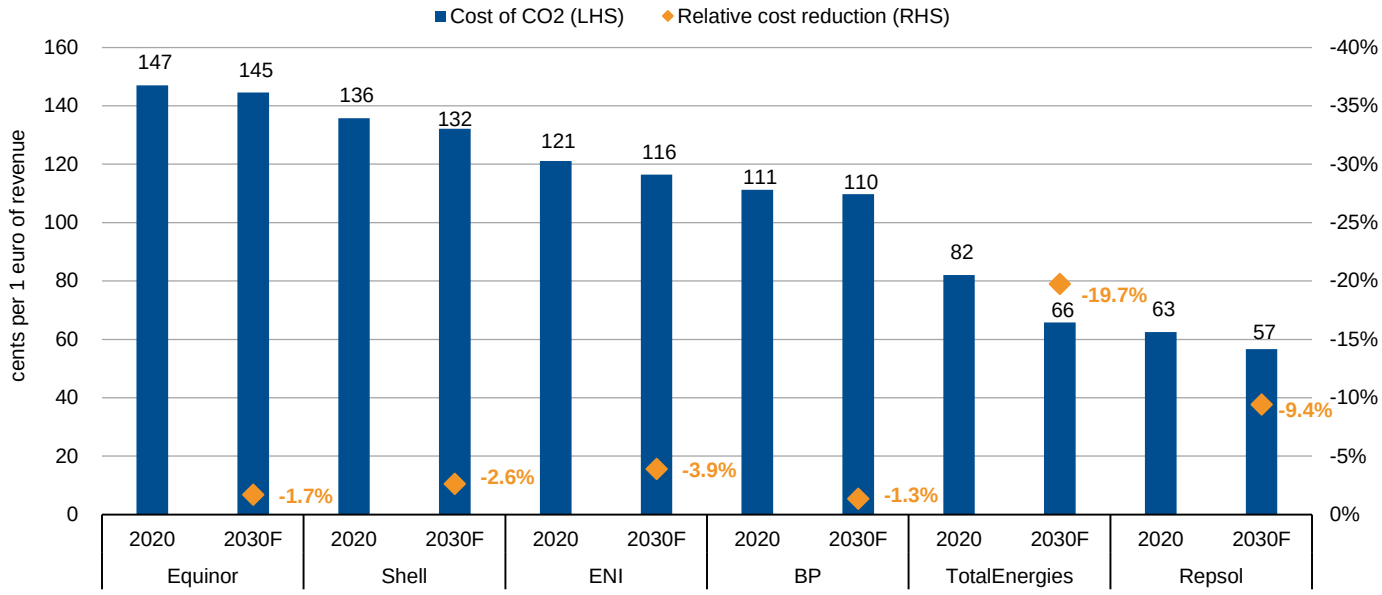
CO_2 emissions are O&G sector's main negative externality

For the oil and gas industry, we identify CO_2 emissions as the by far most significant negative externality through the combustion of energy products in final consumption. With an assumed social cost of carbon of 186 EUR/t of CO_2 equivalent, we derive the monetised impact of the European IOCs on society. Based on the communicated strategies, we also incorporate a 10-year horizon strategy to reduce CO_2 emissions along the entire value chain into our forward-looking assessment.

The bar chart below shows the estimated external cost of carbon emissions for the six European IOCs expressed in cents per euro of revenue. Overall estimated cost for each

company exceeds 60 euro cents, placing oil and gas industry at the bottom of Scope's indicative ESG Impact Rating scale (**see Appendix III**).

Figure 6: Cost of CO2 emissions of the European O&G majors



Source: Scope ESG Analysis

Other externalities

Oil and gas production and distribution processes also exert adverse impacts on nature and its habitats. Landscape fragmentation, habitat loss and degradation occur mainly due to carbon emission and air pollution. These external effects are captured in the social costs of carbon and air pollution or are non-material if compared to scope-3 emissions. Other often-used ESG indicators such as expenses for job training or equal pay are either non-material (i.e. below one cent of euro per euro of revenue) or not considered as externalities (wage payments, provision of mobility solutions). The exclusion of wage payments as an externality is crucial because it represents a major share of corporate expenses. However, under Scope's rating methodology, wages do not fit to the definition of externalities as a contractual agreement between employer and employees which not automatically serves greater society.

ESG Impact Transformation Grid

ESG ITG helps judge corporate sustainability ambitions

The ESG Impact Transformation Grid (ESG ITG) provides an intra-sector assessment of corporate ESG impacts. While the overall rating reflects a composition of absolute and relative impacts of a corporation, the ESG ITG provides an overview how the company positions itself relative to competitors in the industry. Impact investors can better understand how ambitious a company is irrespective of absolute impacts. The ESG ITG distinguishes between four types of companies.

First, latecomers who are positioned at the lower end of the distribution of current impacts and whose management shows only limited ambitions to address existing impact costs and/or to improve towards more positive enabling or mitigating contributions. Secondly, transformation laggards are those whose current impacts are well-balanced within the industry, but whose management lacks a competitive strategy to address future impacts. The transformation leader has a low current impact relative to the sector, with an ambitious strategy towards transforming the existing business models towards greater sustainability. Finally, the standard setter is at the forefront of the industry in terms of current impacts and contributions and also leads the way in future transformation.

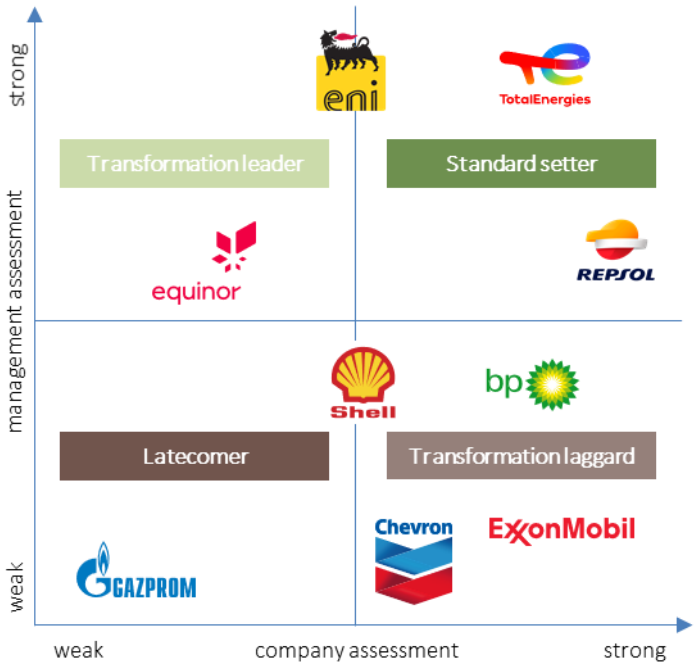
Accordingly, standard setters are usually at the technological edge of sustainable innovations and set the pace the rest of the sector.

TotalEnergies, with the second-lowest cost and most ambitious strategy, is positioned as a standard setter in the transformation grid. Repsol's lowest monetised cost of CO_2 emissions compared to the peers and relatively ambitious strategy positions it in the same upper ESG ITG quadrant. Shell is positioned at the lower end of the ESG ITG due to relatively high carbon footprint and lack of ambitious management strategy to address climate changes. ENI is a transformation leader given its clear, sustainability-driven strategy despite an otherwise poorer profile compared with BP and the two standard setters. The recently updated ambitious sustainability investment strategy and emission reduction targets allows Equinor to also be defined as a transformation leader, while showing the second-highest current cost from emissions after Gazprom.

Russia's Gazprom is a latecomer, with the heaviest carbon footprint and no quantified transition strategy. In general, US companies are lagging behind Europe on this front.

The ITG includes a global set of companies, accounting for their current footprints and quantified transition strategies where available.

Figure 7: Transformation Grid: Oil and Gas majors



Source: Scope ESG Analysis

Final remarks

O&G companies remain laggards in transformation

European integrated oil and gas companies have committed to various climate targets on the way towards net-zero by 2050. To accelerate the transition, all major companies have set targets to reduce the carbon intensities of energy products and absolute emissions from own operations (scope 1 and scope 2). At the same time, companies' sustainability strategies focus primarily on reduction targets for directly controlled emissions rather than the most important emissions occurring from the use of sold products (downstream Scope 3). The latter is especially important for capital expenditures. In other words, the

industry continues to predominantly rely on sales of oil and gas products in the foreseeable future.

International scope-3 disclosure requirements hit the IOC sector

At the same time, the industry feels increasing regulatory pressure to disclose scope-3 emissions in Europe (built in the Corporate Sustainability Reporting Directive (CSRD)), while the United States are set to follow suit as recently announced by the Securities and Exchange Commission (SEC). Together with increasing investor attention, the IOC sector remains among the most challenged on the path to net zero gaols.

Appendix I: Low-carbon investment plans of the European Oil and Gas majors

Company	Investment goal	Source
BP	$3-4 billion per year in 2025; at least $5 billion per year in 2030	BP Annual Report and Form 20-F 2021
Shell	$2-3 billion on average each year	Shell Sustainability Report 2020
TotalEnergies	$2.6 - 3.2 billion per year for the period 2022-2025	Total Universal Registration Document 2020
Equinor	Over $23 billion towards 2026	Equinor Sustainability Report 2021
ENI	€5.7 billion in the four-year period 2021-24	Eni for 2020 – Carbon neutrality by 2050
Repsol	€6.5 billion between 2021 and 2025	Repsol Integrated management report 2021

Source: Scope ESG Analysis GmbH

Appendix II: Short-term carbon emissions reduction targets set by the European Oil and Gas majors

2030 carbon emissions reduction targets	BP	Shell	TotalEnergies	Equinor	ENI	Repsol
Net carbon intensity	15%	20%	20%	20%	15%	28%
Scope 1 & scope 2 emissions	30% - 35% (net)	50% (net)	40% (net)	50% (net)	upstream net zero (net carbon footprint upstream)	55%
Scope 3 emissions	35% - 40% (in upstream combustion emissions)	-	30% (in Europe only)	Part of net-zero ambition in 2050	-	-
Net scope 1 + 2 + 3 emissions	-	-	Worldwide reduction in absolute emissions	-	35%	30%
Net zero by 2050	✓	✓	✓	✓	✓	✓
Base year	2019	2016	2015	2016	2018	2016

Notes: percentage values represent reduction targets against base year

Source: Scope ESG Analysis GmbH

Appendix III: Scope's ESG Indicative Impact Rating Assignment

Indicative Rating	Externality range in cents per EUR of revenue
AAA	>+60
AA	+41 / +60
A	+16 / +40
BBB	-14 / +15
BB	-15 / -40
B	-41 / -60
C	<-60

Source: Scope ESG Analysis GmbH

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