

# **Wrong direction - Equinor charts course away from Paris Alignment**

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**Investor Briefing: Analysis of Equinor's 2025 Energy Transition Plan and international upstream portfolio; co-filed shareholder resolution at 2025 Annual General Meeting**

## Executive summary

Despite the formal expectation of its majority shareholder - the Norwegian government - that Equinor “sets targets and implements measures to reduce greenhouse gas emissions in both the short and long term in line with the Paris Agreement,”<sup>1</sup> the company is not moving towards Paris alignment.

Equinor’s strategy includes sanctioning further oil and gas projects, principally outside of Norway. Yet there are already enough sanctioned oil and gas projects globally to consume the remaining Paris-aligned carbon budget – which means there is no room for new oil and gas developments in line with the Paris Agreement.

Equinor’s international projects have a history of chronic financial underperformance. In the context of a forecast peak in oil and gas demand, international production growth is an increasingly high-risk strategy.

Minority shareholders have raised concerns about the inconsistency between Equinor’s oil and gas expansion plans and the expectations of its majority shareholder. A shareholder resolution asking the Board to assess and explain this inconsistency has been co-filed at the 2025 AGM.

Equinor can course correct. Ceasing international oil and gas developments would significantly improve the alignment of Equinor’s strategy with the goals of the Paris Agreement. Based on the sustained financial underperformance of its international segment, this may also increase shareholder value.

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1. Minutes of Annual General Meeting, 10 May 2023 at point 9, Statement of the Ministry of Trade, Industry and Fisheries read by the company's Chair at the Equinor's 2023 AGM.

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# Key findings

- Equinor’s majority owner – the Norwegian government – expects Equinor to be Paris-aligned. However, Equinor is moving away from, not towards Paris alignment:
  - The remaining carbon budget (RCB) shows there is no room for new oil and gas developments in line with the Paris Agreement – which means Equinor’s plans to increase international production by 40% between 2024 and 2030 can not be Paris-aligned.
  - Equinor’s net carbon intensity (NCI) ambitions<sup>2</sup> are too timid to be Paris-aligned and have recently been weakened further. Its plans to meet its NCI targets are not convincing.
- Equinor’s sanctioned international oil and gas projects have not been value accretive. Our modelling shows that Equinor’s international projects have consumed ~\$100 billion<sup>1</sup> of capex, but delivered a negative \$3.6 billion Net Present Value (NPV)
- Like the rest of the oil and gas sector, Equinor’s total shareholder returns (TSR) chronically underperform the broader equities market. In the context of a forecast peak in oil and gas demand, international production growth is an increasingly high-risk strategy.
- We found that Equinor’s new international projects are, on average, not low-cost, with over 70% of global unsanctioned oil and gas supply having a lower break-even price.
- Equinor has claimed to be ‘improving’ and ‘optimising’ its international portfolio since 2013. Since this time, its returns have deteriorated. Its claims of strong future returns in the international business should be viewed sceptically.
- Ceasing international development could move Equinor towards the Paris alignment that its majority owner expects without materially risking shareholder value.

1. All references to currencies are US\$ unless otherwise stated.  
2. Equinor has climate ‘ambitions’ – a lesser commitment than a target.

# Equinor's lack of Paris alignment

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**The remaining carbon budget (RCB) shows there is no room for new oil and gas developments in line with the Paris Agreement – which means Equinor's plans to increase international production can not be Paris-aligned.**

**Equinor's net carbon intensity ambitions are too timid to be Paris-aligned and have recently been weakened further. It's plans to meet its NCI targets are not convincing.**

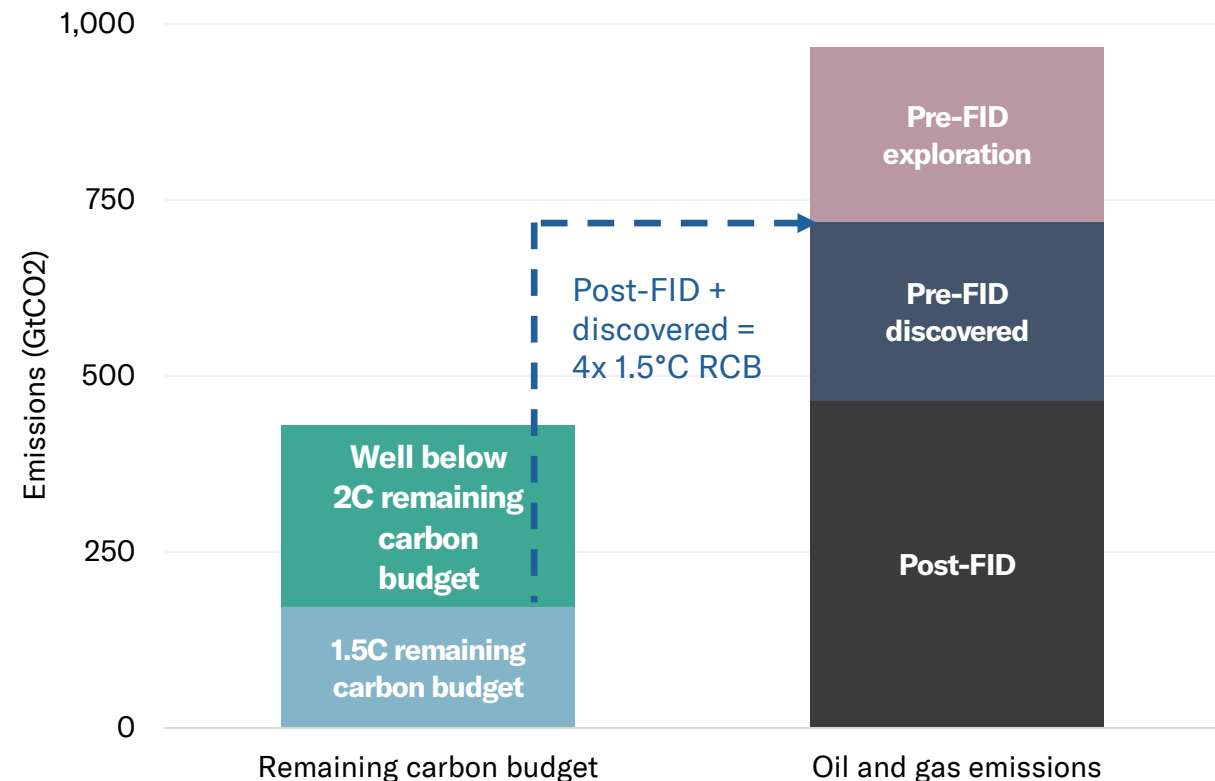
# There is insufficient remaining carbon budget (RCB) for new fossil fuel projects to be developed

The global oil and gas sector already has enough projects operating or under construction to consume all of the remaining 1.5°C and well-below 2°C carbon budgets (see chart).

When adding discovered projects, the oil and gas sector consumes more than four times the remaining 1.5°C carbon budget.

As such, there is no room for new oil and gas developments in line with the Paris Agreement.

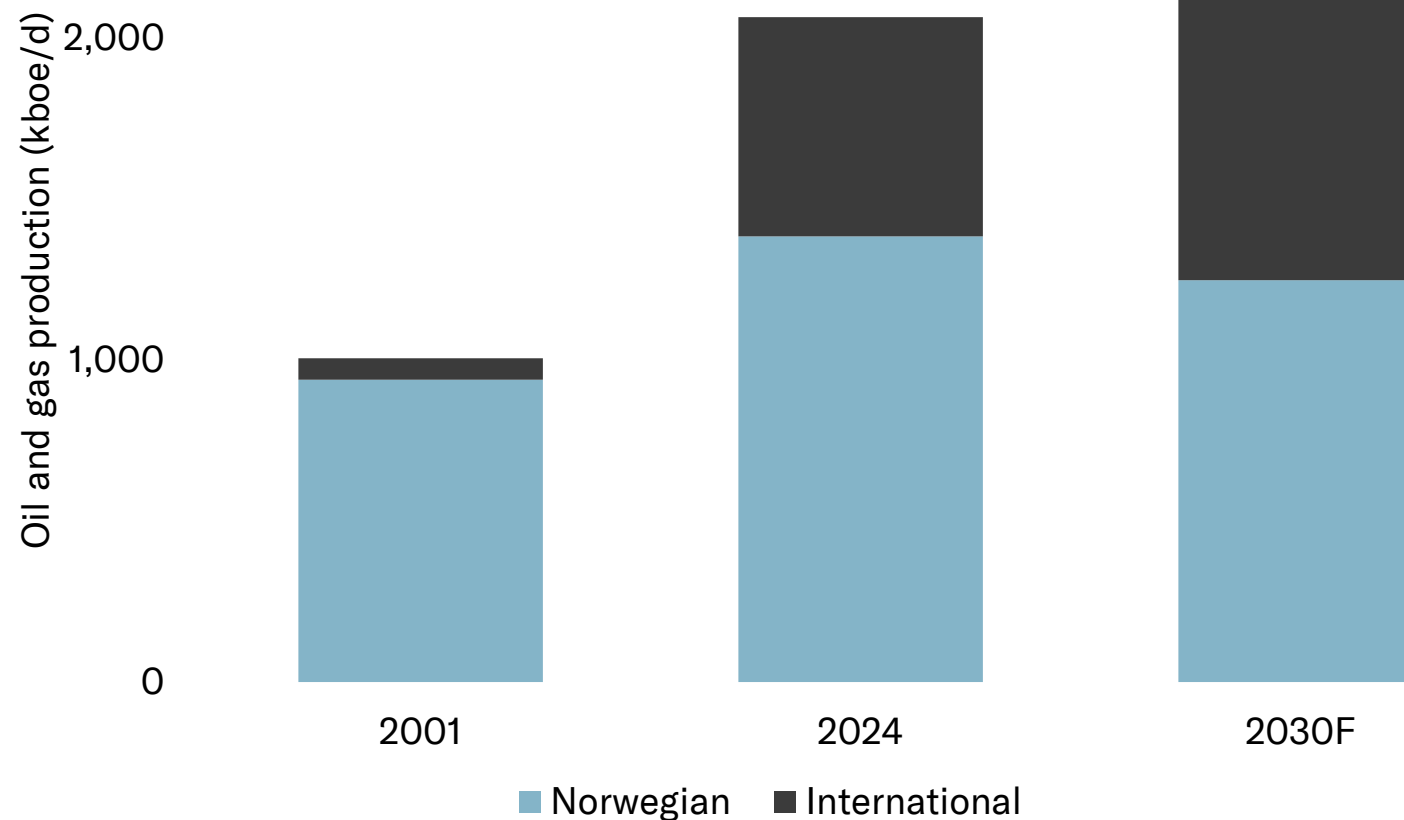
Existing oil and gas projects exhaust remaining Paris-aligned carbon budgets<sup>1,2</sup>



Source: Rystad Energy, ACCR analysis

1. Lamboll, R.D., Nicholls, Z.R.J., Smith, C.J. et al. Assessing the size and uncertainty of remaining carbon budgets. *Nat. Clim. Chang.* 13, 1360–1367 (2023). <https://doi.org/10.1038/s41558-023-01848-5>. The remaining carbon budget (RCB) is adjusted to reflect the start of 2025, based on 2023 emissions data from the 2024 World Energy Outlook and [estimated 2024 emissions from Carbon Brief analysis](#).
2. Schleussner, CF., Ganti, G., Rogelj, J. et al. An emission pathway classification reflecting the Paris Agreement climate objectives. *Commun Earth Environ* 3, 135 (2022). <https://doi.org/10.1038/s43247-022-00467-w>. The justification for using the 90th percentile stems from the interpretation of the Paris Agreement's "well below 2°C" objective as a significant strengthening of the earlier "below 2°C" goal, aligning it with the IPCC's calibrated uncertainty language where "very likely" corresponds to a ≥90% probability.

# Despite the insufficient remaining carbon budget, Equinor plans to increase international oil and gas production by 40% between 2024 and 2030<sup>1</sup>



1. [2025 Capital Markets Update](#) (slide 35). The previous target was a 15% increase ([2024 Capital Markets Update](#) slide 9).

# Equinor's Net Carbon Intensity (NCI) ambitions cover more than 90% of the company's emissions – but this approach lacks scientific credibility and is not Paris-aligned

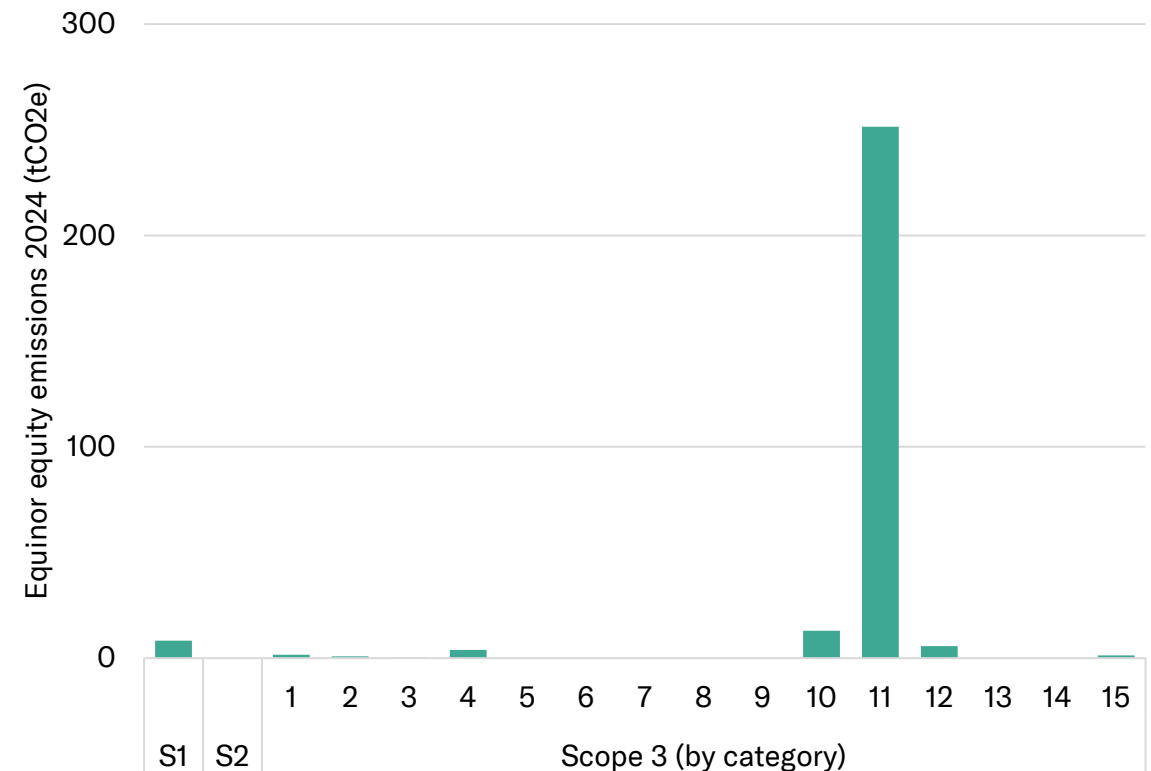
A scientifically credible climate performance metric should be based on absolute emissions rather than emissions intensity, because climate change is caused by absolute emissions, irrespective of emissions intensity.

Nevertheless, NCI is Equinor's only metric that includes the emissions associated with the use of its sold product (Categories 10, 11 and 12), which comprise 94% of Equinor's 2024 emissions.<sup>1</sup>

Equinor's 2022 Energy Transition Plan (ETP) noted that its NCI ambitions fall short of the International Energy Agency's Paris-aligned trajectory.<sup>2</sup> Equinor subsequently weakened its NCI ambitions.

**While Equinor's scope 1 emissions are well managed, they are also immaterial.**

## 97% of Equinor's emissions are scope 3 emissions<sup>1</sup>



1. Equinor 2024 Annual Report, p. 117.  
2. Equinor, Energy Transition Plan, 2022, p. 12.



# The 2025 Energy Transition Plan (ETP) weakens Equinor's approach to reducing emissions even further

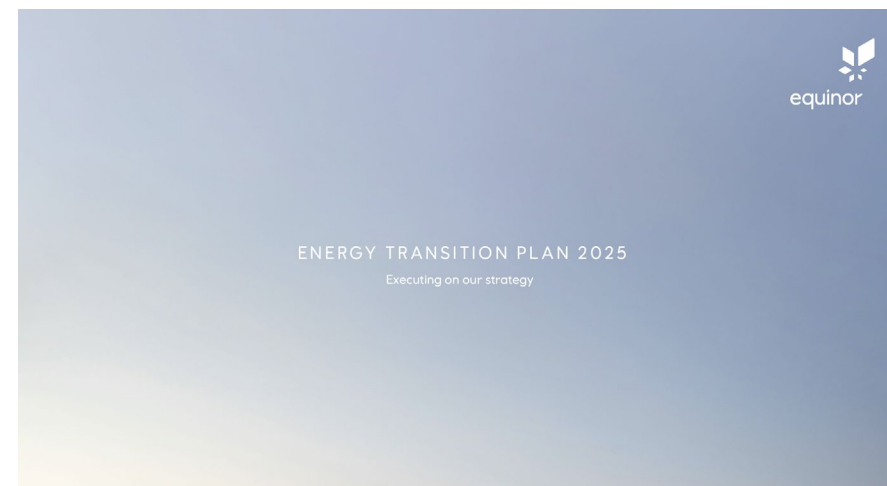
Equinor's 2025 ETP makes several changes to its climate targets. The most material change is a **reduction of its NCI ambitions**, which are now:

- 15-20% by 2030 – down from 20%
- 30-40% by 2035 – down from 40%

It also weakened its renewables ambition and removed its low carbon capex and hydrogen production ambitions.

Minor improvements have been made to the definition and breadth of other ambitions, including:

- updating the scope 1 and 2 emissions in its NCI target to be equity, rather than operational emissions
- making its marine transport ambitions simpler and more consistent
- removing the distinction between Norwegian and international operations for its scope 1 and 2 ambitions.



# If Equinor continues investing in new oil and gas projects, even its weakened 2035 NCI ambition may not be met. But if new fossil fuel developments are constrained - it's possible.

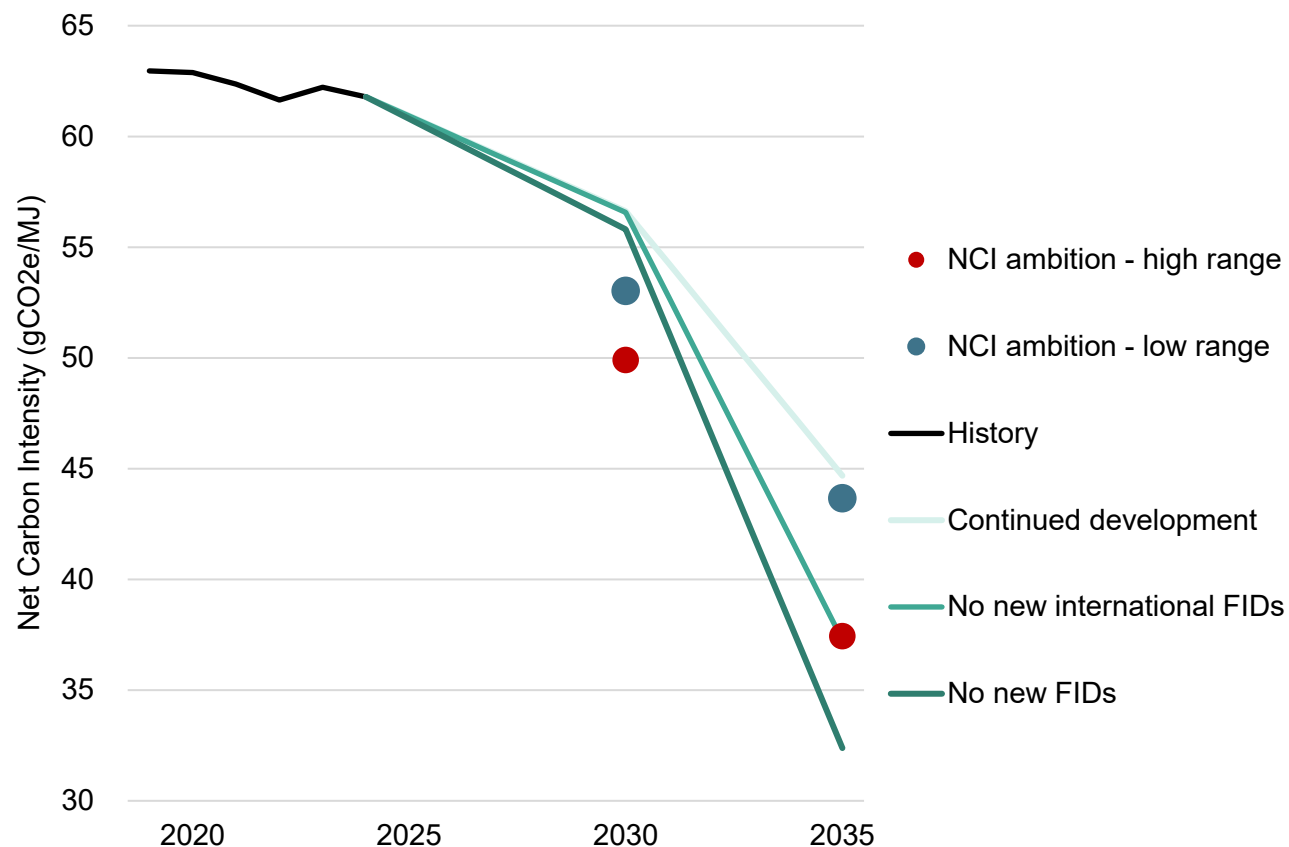
**We find that Equinor's current strategy puts its NCI ambitions at risk, but constraining new fossil fuel developments makes reaching the target possible.**

Our model assumes that Equinor:

- steeply reduces its scope 1 and 2 emissions
- does not increase gas power generation, use more offsets, or include customer emissions reductions
- rebaselines its target based on its current portfolio, in accordance with the GHG Protocol.

With continued fossil fuel development, achieving the 40% NCI reduction ambition would require an additional 30 MtCO<sub>2</sub>e of emissions reductions in Equinor's value chain (or an equivalent amount of zero emission energy production).

**Equinor's strategy puts its NCI ambitions at risk<sup>1</sup>**



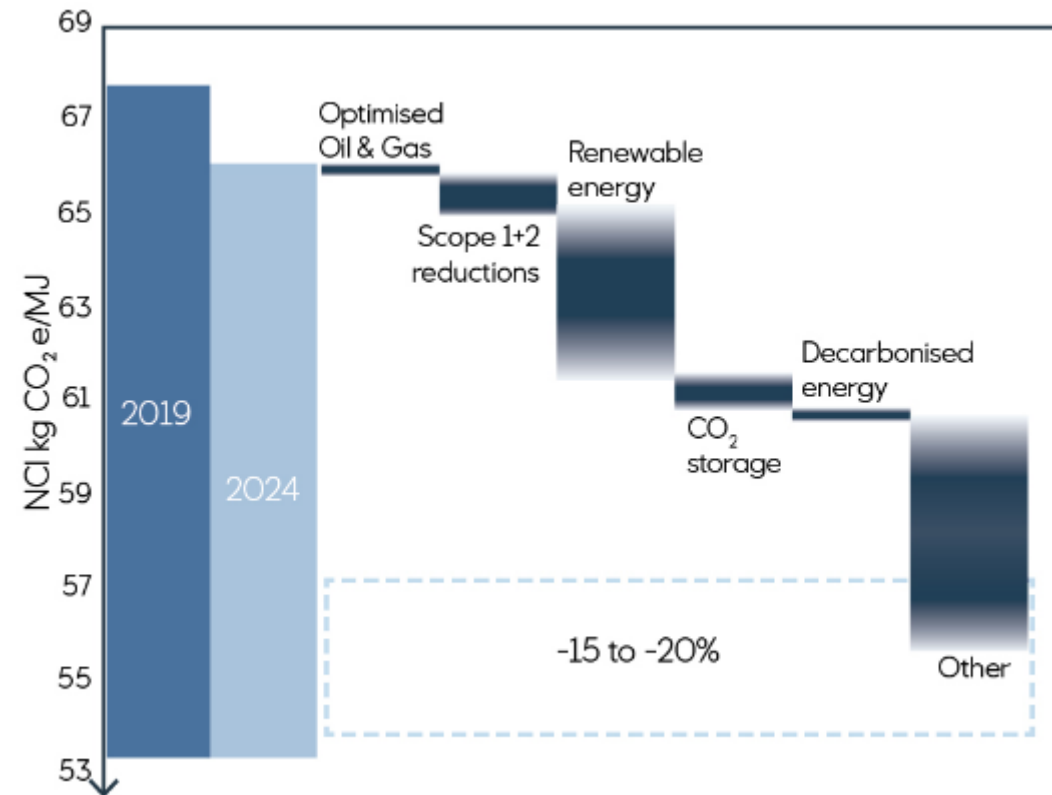
1. Company disclosures, Rystad Energy data, ACCR analysis. Rebaselining to the existing portfolio as per the GHG Protocol requirements introduces small differences to disclosed historic NCI values. Our model otherwise reconciles to Equinor's disclosed NCI values +/- 2%.

# Equinor recently disclosed its plan for meeting its 2030 NCI ambition, but the plan does not appear robust – raising doubts about its achievability

In its most recent Annual Report, Equinor disclosed a plan with six components for meeting its 2030 NCI ambition. The largest component is ‘Other’, which comprises:

- increased use of oil and gas for non-energy purposes, for which the IEA projects just a 2% increase by 2030<sup>2</sup>
- offsets, which should not be a material source of emissions reduction, as acknowledged by Equinor in its scope 1 and 2 ambitions<sup>3</sup>
- potential organic and inorganic opportunities, over which investors have little insight. Counting divestments as reductions would also breach the GHG Protocol.

Equinor’s disclosed plan to meet its 2030 NCI ambition<sup>1</sup>



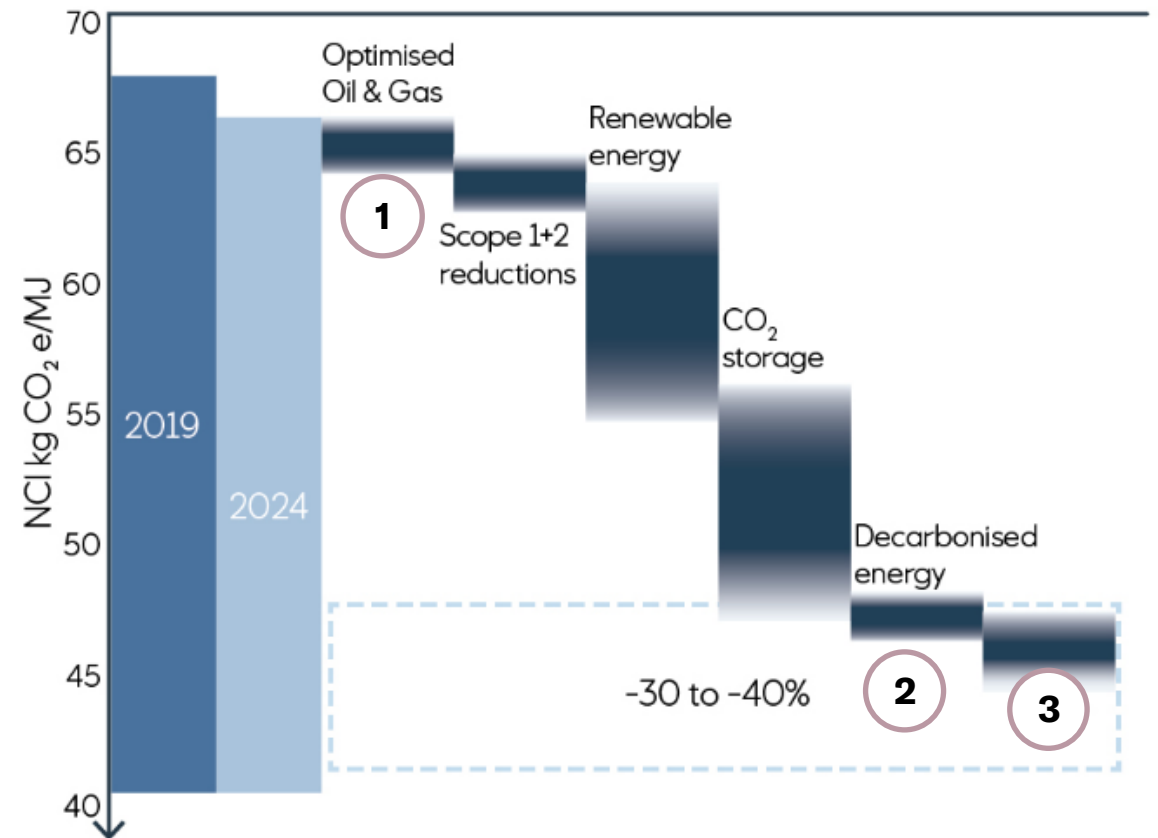
1. Equinor, 2024 Annual Report, p. 113.  
2. The IEA’s Announced Pledges Scenario, which most closely aligns with Equinor’s oil price assumption.  
3. Equinor does not commit to limiting the use of offsets in its plans to reduce its NCI.

# Equinor's pathway for meeting its 2035 NCI ambition also raises questions. However, given the weakened target, reaching this ambition could be feasible

Equinor's plan to meet its weakened 2035 NCI target is ambiguous and appears to introduce integrity risks:

- 1 The "Optimised O&G portfolio" appears to refer to divestment, which:
  - transfers rather than reduces emissions
  - would breach the GHG Protocol<sup>1</sup> if counted as a reduction.
- 2 "Decarbonised energy" seems to refer to blue hydrogen or gas power with CCS, which would require Equinor to exceed or double count its CCS target.
- 3 "Other" – see prior slide.

Equinor's illustrative pathway for meeting its 2035 NCI ambition



1. [The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard](#), pp. 34-39.

## What could Paris alignment look like for Equinor?

Equinor has an opportunity to take **material steps towards Paris alignment** by changing its portfolio and strategy.

Previous ACCR analysis<sup>1</sup> found that Equinor could take material steps towards Paris alignment by:

1. Stopping exploration of new oil and gas reserves worldwide
2. Halting development of pre-FID fossil fuel projects outside of the Norwegian Continental Shelf (NCS).

**Stopping exploration and development of international projects would avoid 81% of the emissions from Equinor's unapproved projects. Additionally, analysis suggests this would not materially dilute shareholder value.**

However, becoming Paris-aligned would also require Equinor to stop developing Norwegian fossil fuel projects and develop a strategy around winding down some operating assets.

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1. ACCR analysis, [Equinor's challenge: which way to Paris?](#)

# **Equinor's sanctioned international oil and gas projects have not been value accretive**

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**Our modelling shows that Equinor's international projects have consumed ~\$100 billion of capex, but delivered a negative Net Present Value (NPV).**

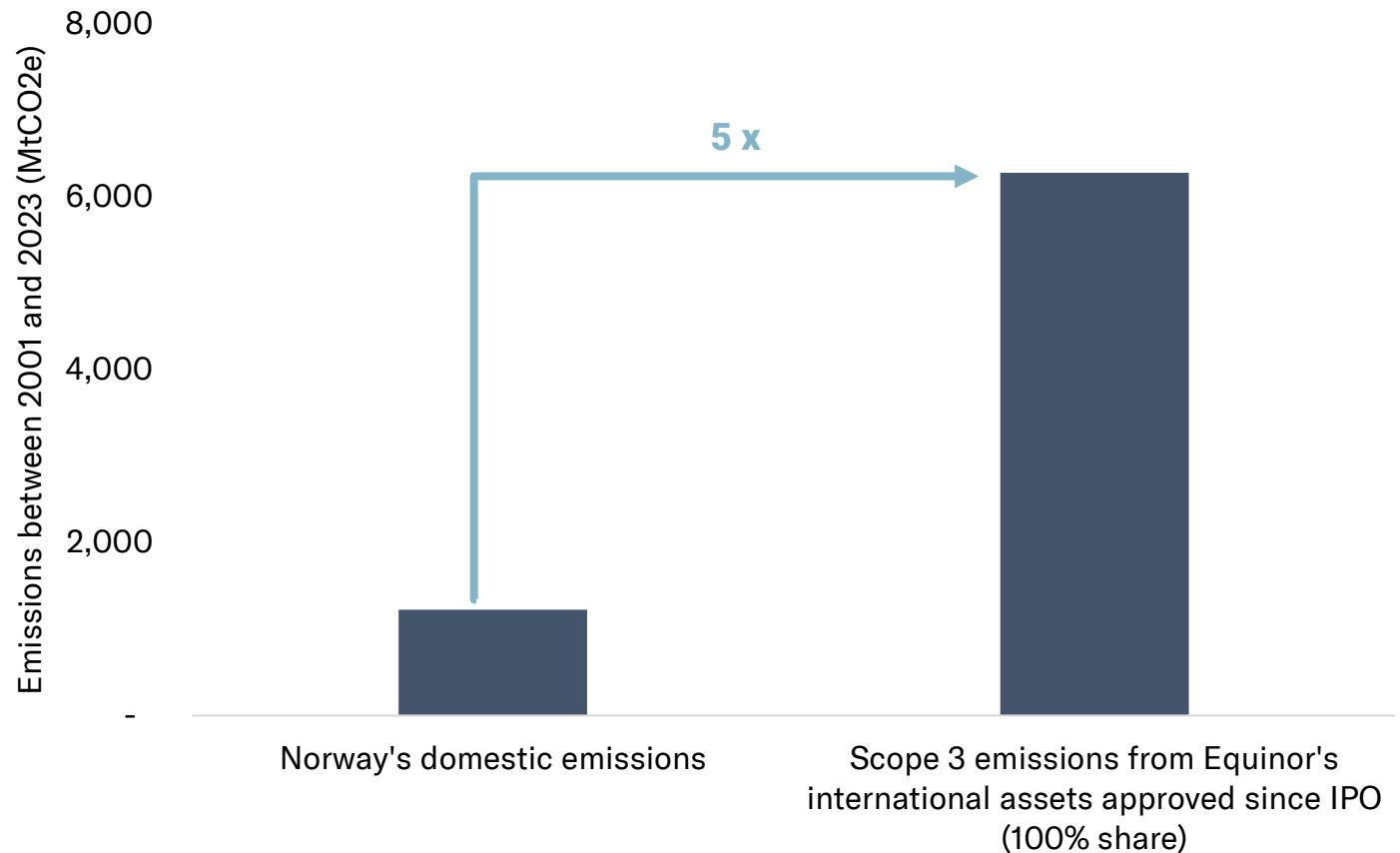
# Since IPO in 2001, Equinor's approved international O&G assets have emitted five times Norway's total domestic emissions

## Equinor's international assets have contributed significantly to climate change.

Between 2001 and 2023, they were responsible for 6.3 GtCO<sub>2</sub>e (gross) of emissions - more than five times the total domestic emissions of Norway during the same period.

These assets are forecast to emit a further 13 GtCO<sub>2</sub>e of scope 3 emissions by the end of the century.

Not developing any more international projects is a large source of low-cost abatement.



Source: Rystad Energy, [Statistics Norway](#), ACCR analysis

# Equinor's international projects have not created value: Discounted Cash Flow (DCF) analysis

**Equinor's oil and gas projects outside of Norway are not generating positive Net Present Value (NPV).**

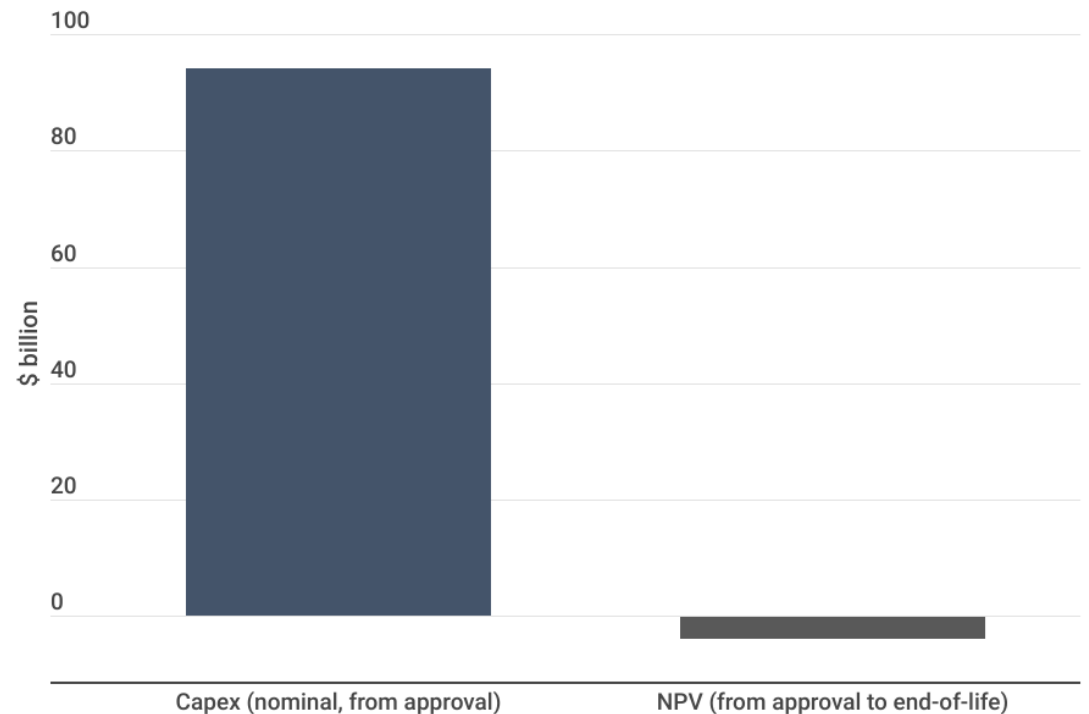
Our DCF analysis concluded that, over their lifetime, Equinor's international projects will have:

- an NPV of  $-\$3.6$  billion in value, which excludes the  $\$14.5$  billion (nominal, net) acquisition and pre-FID costs
- absorbed  $\$94$  billion in capex for development.

Further international investment brings specific risks to Equinor, because it:

- doesn't have a proven track record
- doesn't always have operational control
- continues to take on emerging markets' country risk.

**We calculated that  $\sim\$100$ bn of international capex is estimated to deliver  $-\$3.6$ bn of NPV<sup>1</sup>**



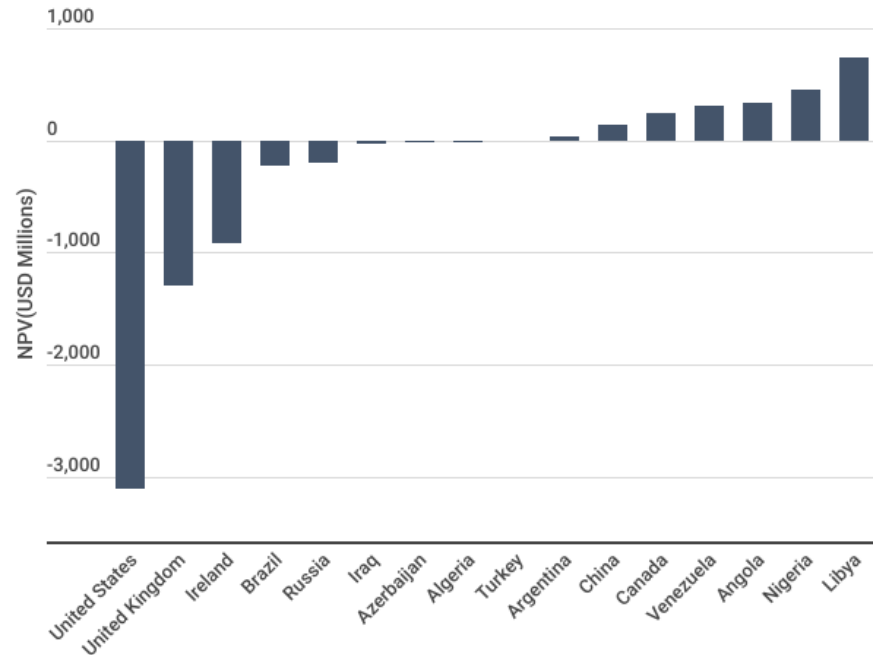
Source: Rystad Energy, ACCR modelling

1. See Appendix 1 for modelling and valuation methodology.



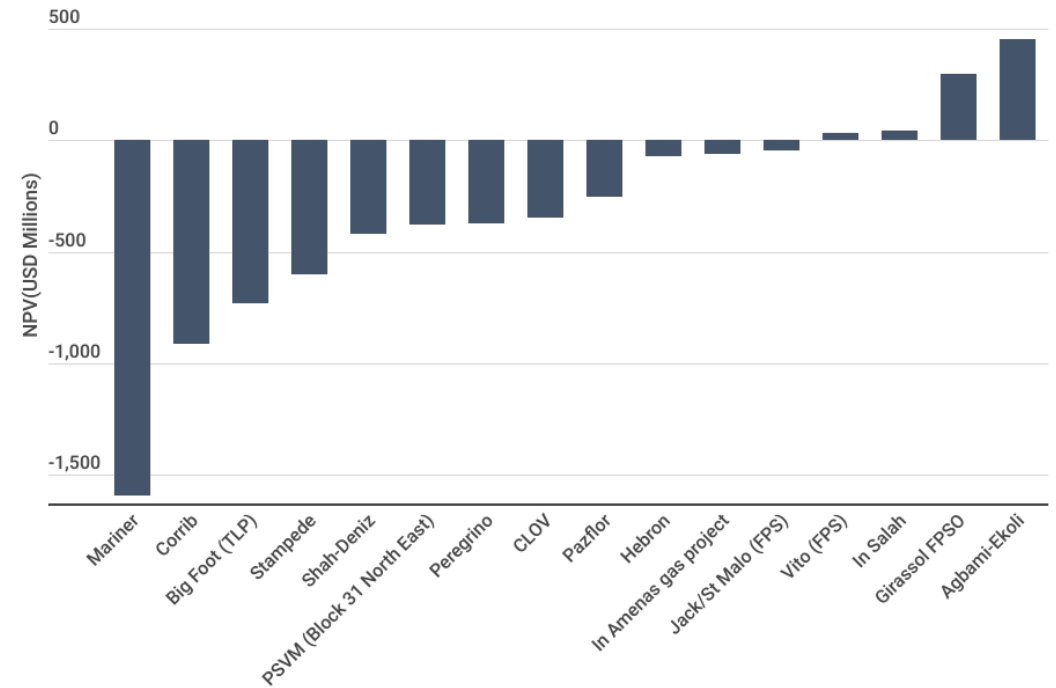
# Equinor's poor international performance is spread across a range of countries and projects

## Equinor has eroded shareholder value in half the countries where it has produced oil or gas<sup>1</sup>



Source: Rystad Energy, ACCR modelling

## Most of Equinor's large international projects (capex > \$1 billion) have eroded value<sup>1</sup>



Source: Rystad Energy, ACCR modelling

1. See Appendix 1 for modelling and valuation methodology.

# Equinor's audited financial statements confirm its international segment has consistently and dramatically underperformed its Norwegian segment

Equinor's audited financial statements tell a very similar story to our analysis.

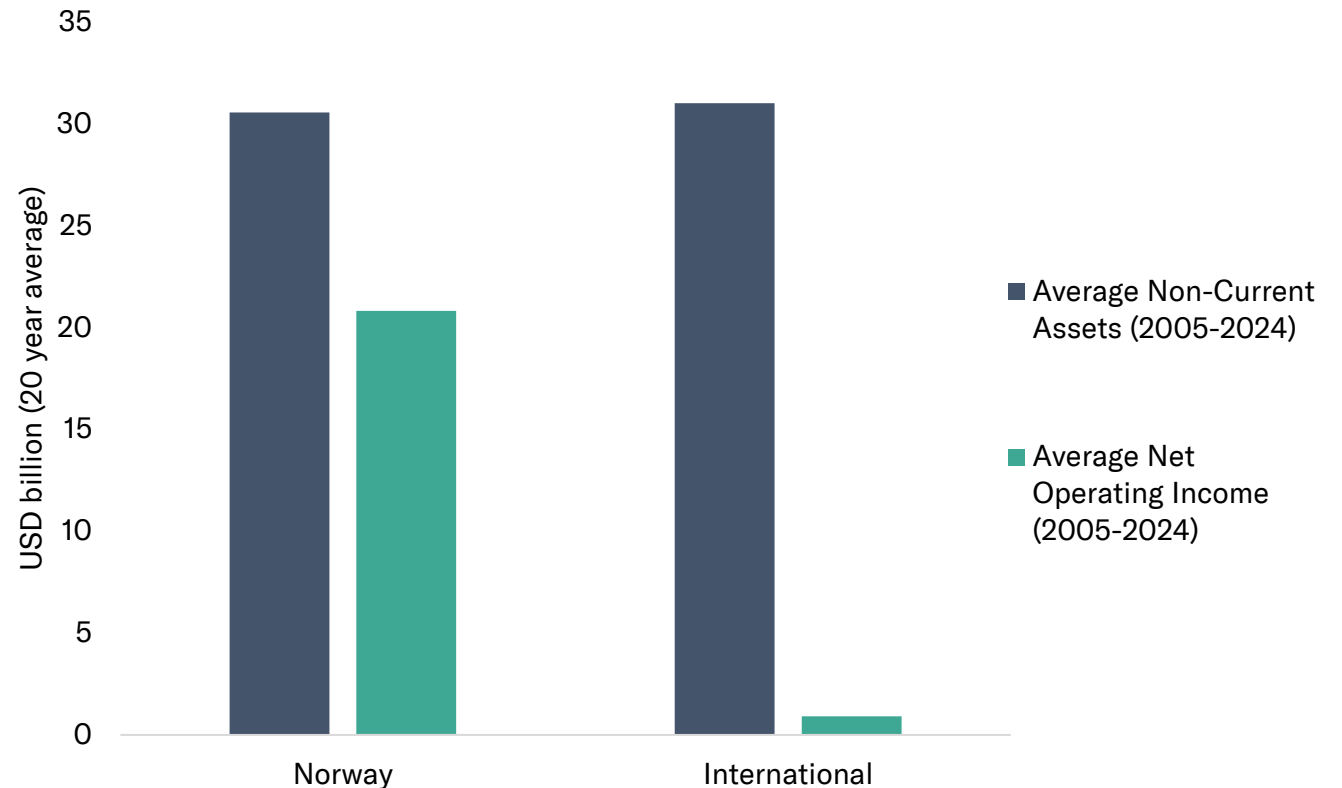
Equinor's financial statements show that, over 20 years, its Norwegian segment delivered 23 times the net operating income of its international oil and gas assets, despite having the same non-current asset base.

This is consistent with ACCR's findings that Equinor's international projects:

- are capital-intensive
- have eroded shareholder value.

The relationship holds for any subset of the 20-year period.

## Equinor's international assets have dramatically underperformed its Norwegian assets (2005-2024)



Source: Equinor's financial statements

# International production growth is not value-accretive, but it is increasingly high-risk

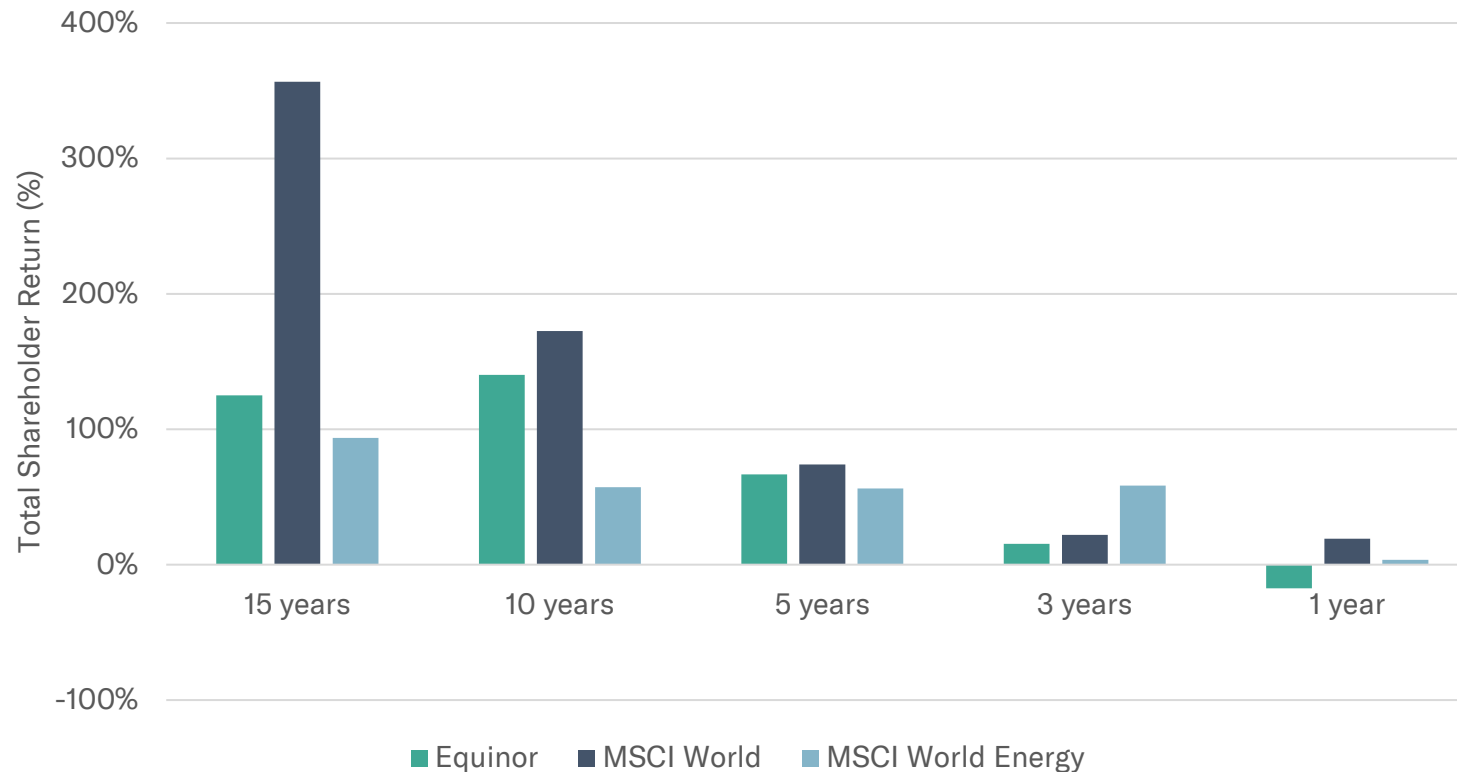
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The oil and gas sector has underperformed the broader market for more than a decade – and in the context of a forecast peak in oil and gas demand, new international projects face structural headwinds.

Equinor should consider prioritising shareholder returns over reinvesting its operating cash flow in new international oil and gas projects.

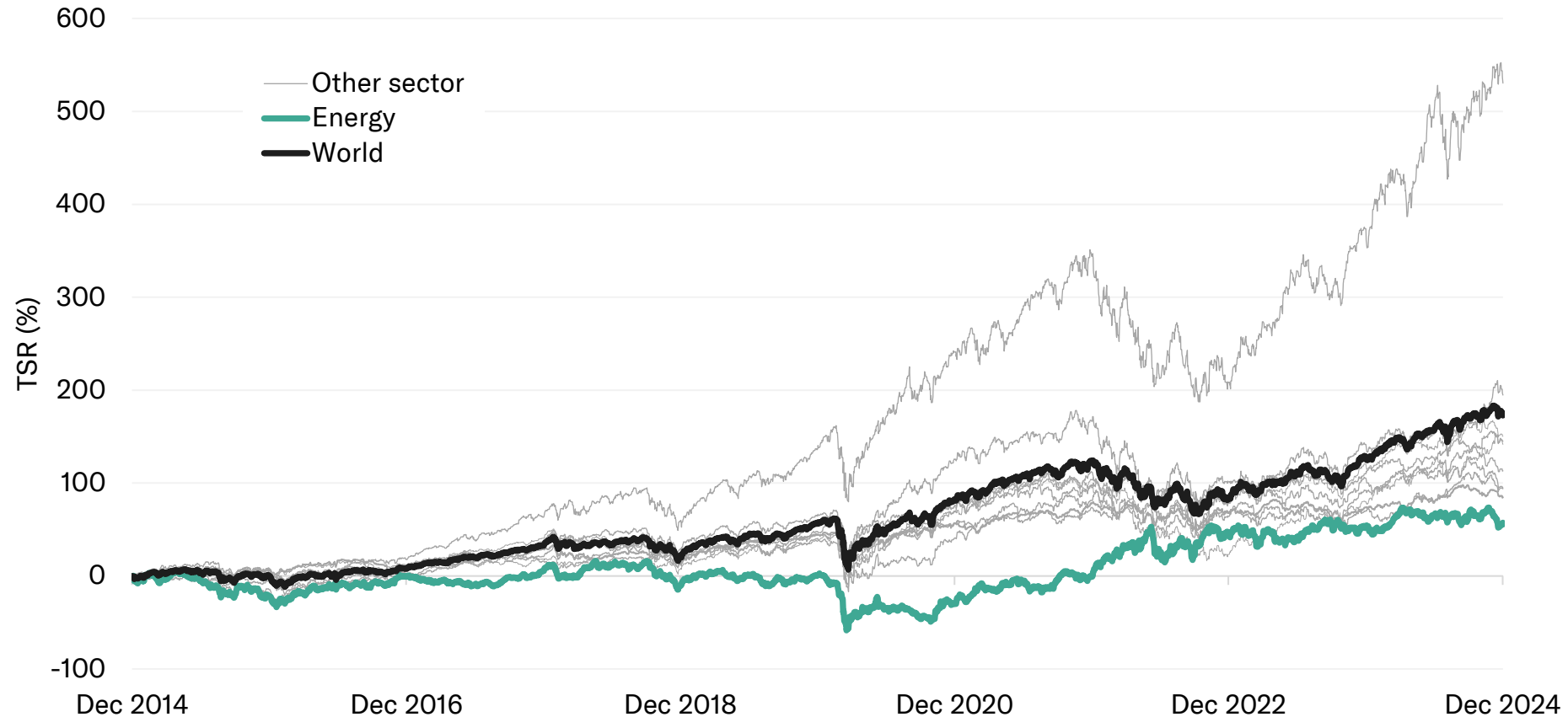
# Like the rest of the oil and gas sector, Equinor's total shareholder return (TSR) has chronically underperformed the broader equities market

**Oil and gas has underperformed the broader market, except when supported by increasing oil prices<sup>1</sup>**



1. Bloomberg Finance LP, used with permission of Bloomberg Finance LP. Periods refer to calendar years finishing on 31 Dec 2024. Calculated on a USD basis. Note that all of the [MSCI energy sector](#) is oil and gas related sub-industries, except for 0.69% allocated to 'coal and consumable fuels'.

# Oil and gas has underperformed every other MSCI sector over the last 10 years



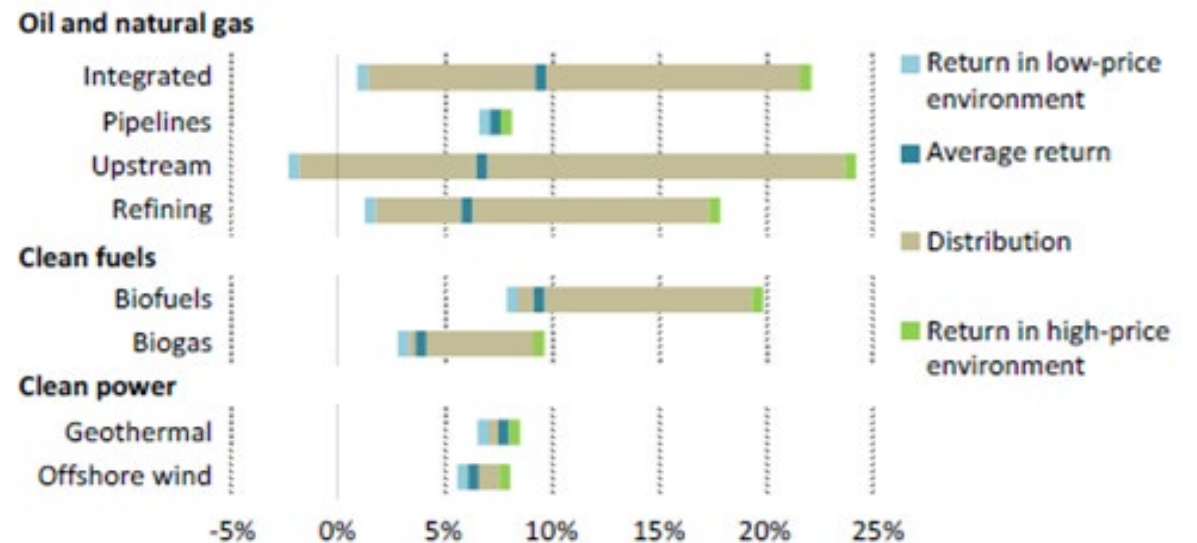
Source: Bloomberg Finance LP, Used with permission of Bloomberg Finance LP

# The oil and gas sector is highly cyclical, with poor returns on capital

The IEA calculated that Return on Capital Employed (ROCE) from 2010 to 2022 was 6-9% p.a. for the oil and gas sector, depending on the subsector.

These returns, except for pipelines, are also highly volatile.

## The oil and gas sector's ROCE is <10% through the cycle<sup>1</sup>



IEA. CC BY 4.0.

*Investment opportunities in clean energy can yield average returns that are similar to those of the oil and gas industry and, for clean power, are much less volatile.*

Source: IEA, The Oil and Gas Industry in Net Zero Transition, p. 88

1. IEA notes: The high-price environment is 2022 (oil price >\$95/bbl, imported natural gas price >\$15/MMBtu); the low-price environment is 2016 (oil price <\$50/bbl, imported natural gas ~\$6/MMBtu). For clean power technologies, the high-price environment is 2014 and the low-price environment is 2020. Source: IEA analysis of a sample of 800 companies from 2010 to 2022, based on data from S&P Global (2023).

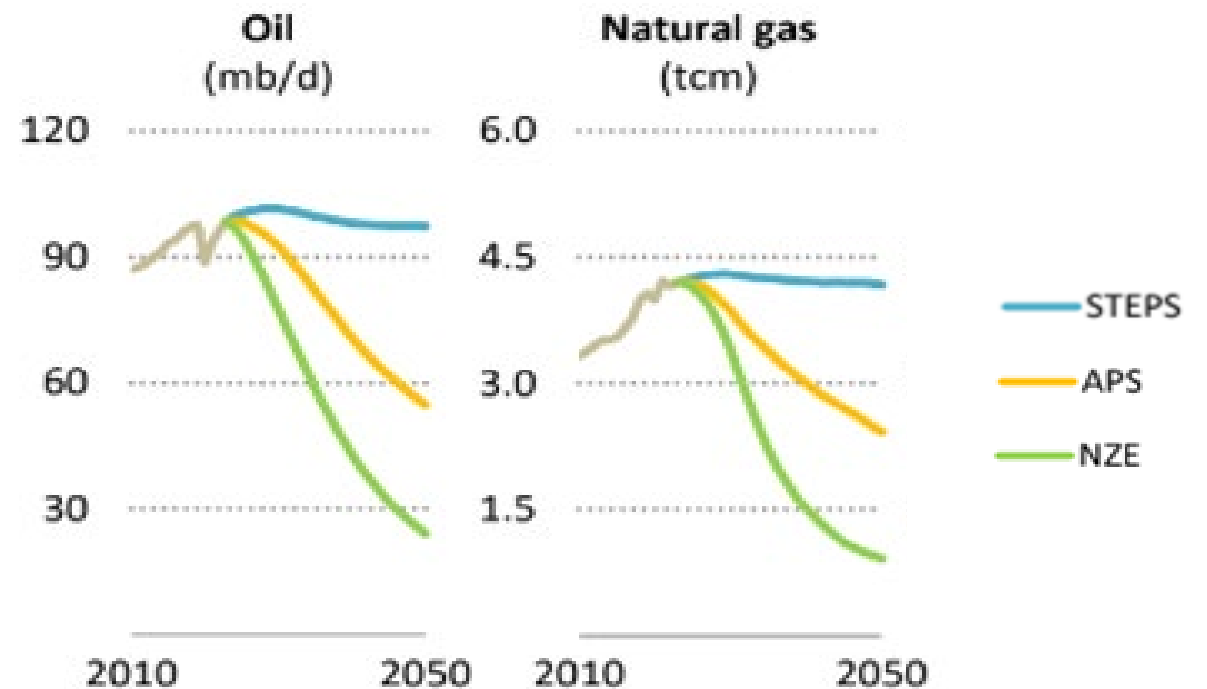
# Equinor's major pre-FID projects would start production in a declining market

**Equinor's major pre-FID projects are all due to start-up from 2030, meaning they would be coming online in a period of structural demand decline.**

The IEA projects a peak in oil and gas consumption by 2030 in every one of its published scenarios.

This marks a pivot away from the consistent growth of previous decades.

**Oil and gas demand is due to peak this decade under all IEA scenarios**



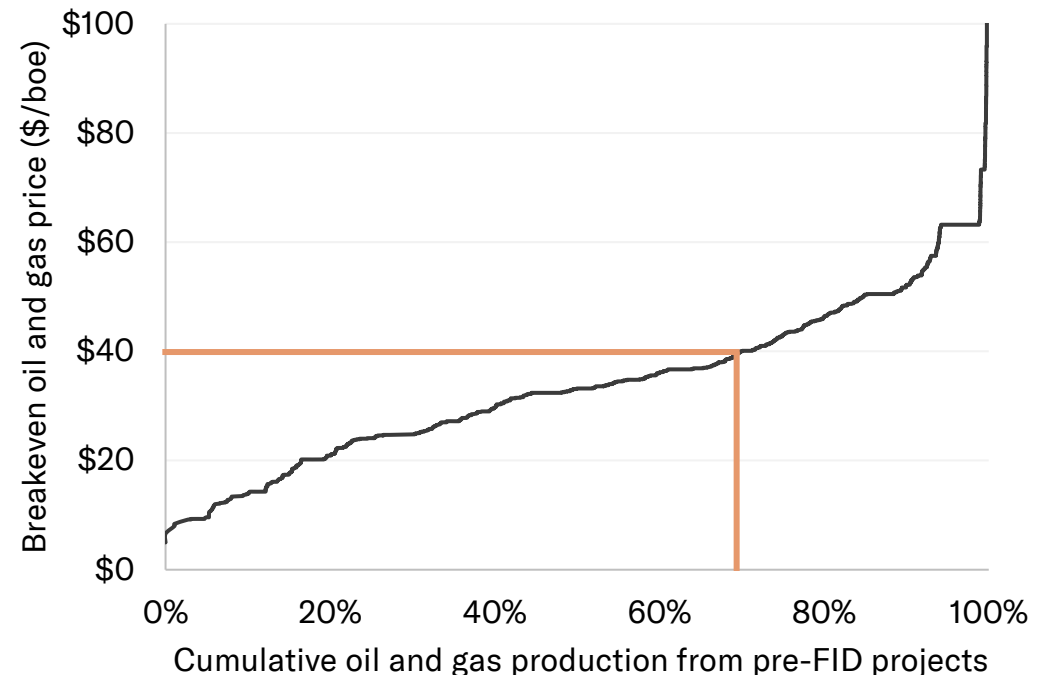
Source: IEA WEO 2023, slide library, p. 21

# Equinor's pre-FID international portfolio is more expensive than its competitors'

We found that Equinor's new international projects are, on average, not low-cost, with over 70% of global unsanctioned oil and gas supply having a lower break-even price.

**Equinor's international portfolio is relatively expensive, and due to come online in a declining market. Given the long-term structural challenges, the company should prioritise shareholder returns over reinvesting its operating cash flow.**

**Equinor's average international pre-FID break-even price of \$40/boe is higher than 70% of all unapproved oil and gas projects**



Source: Rystad Energy, ACCR modelling



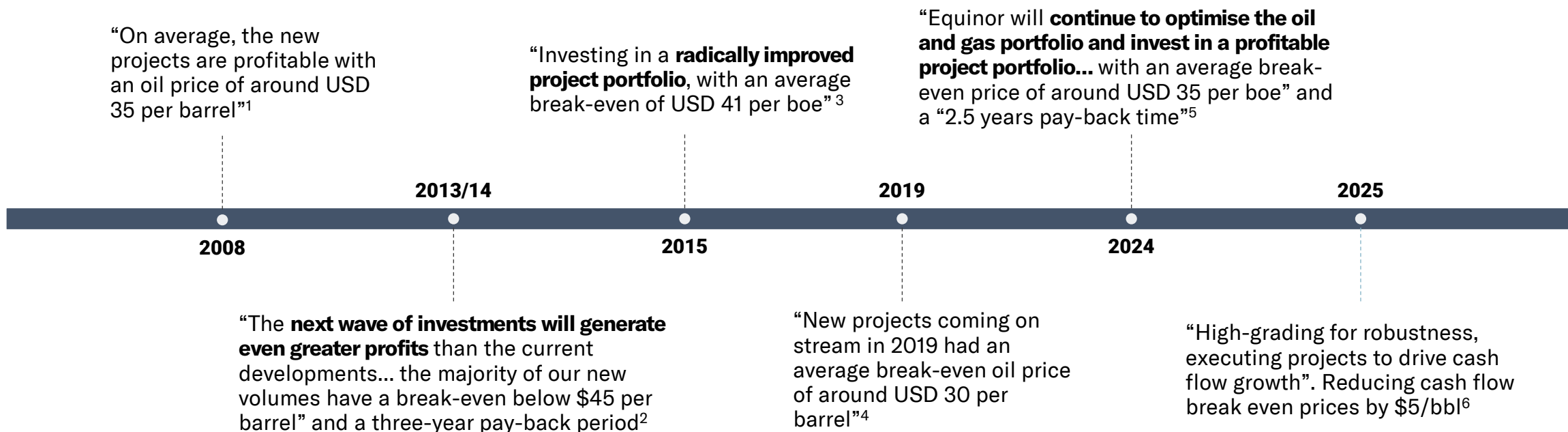
# Failure to improve the international segment

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# Equinor has said it is going to “improve” and “optimise” its international segment for over a decade

Despite chronically weak returns from its international segment, Equinor has a history of:

- making optimistic forecasts
- claiming to have a plan to address the segment’s historic underperformance, but not delivering.



1. Equinor, [StatoilHydro maintains growth ambition](#).

2. Equinor, [Q4 2013 Statoil ASA Earnings and Capital Markets Update 2014 Conference Call](#), p. 7.

3. Equinor, [2015 fourth quarter results](#).

4. Equinor, [2019 Annual Report on Form 20-F](#), p. 9.

5. Equinor, [Equinor fourth quarter and full year 2023 results](#) and [2024 Capital Markets Update](#), p. 31.

6. Equinor, [Capital Markets Day 2025](#), pp. 34-35.

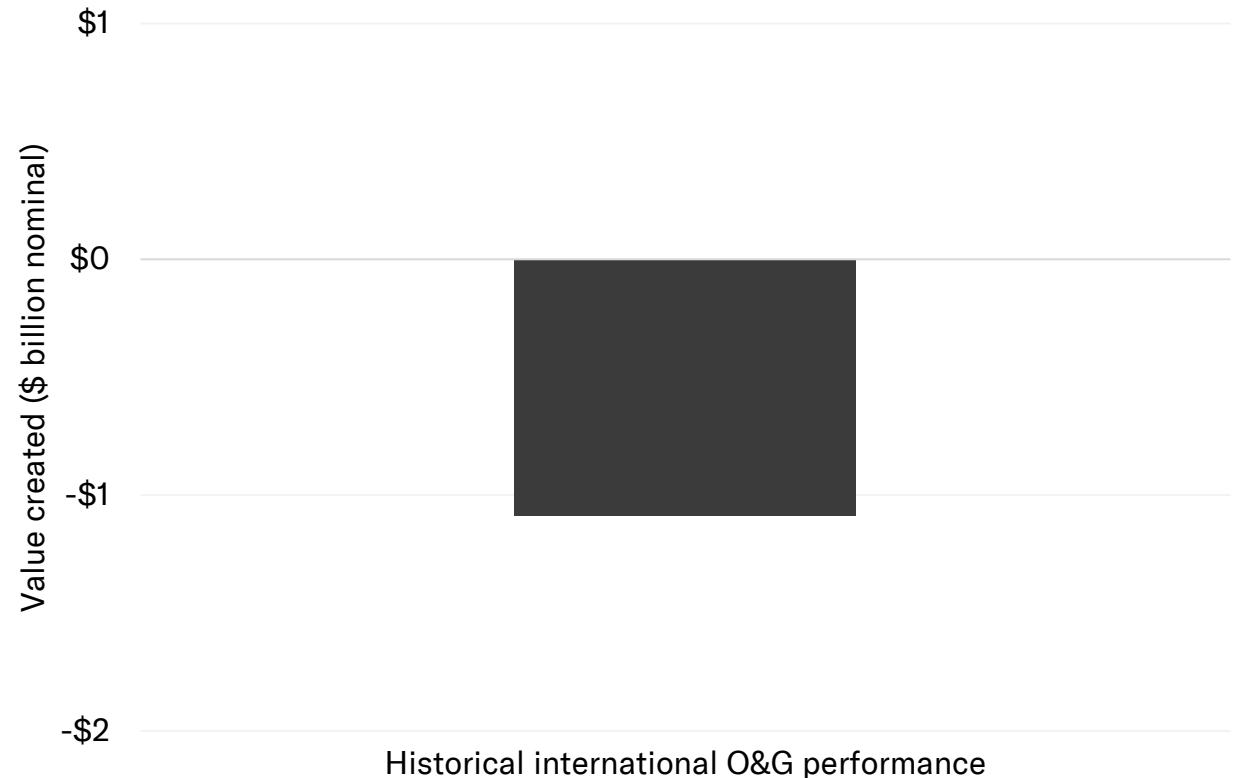
# Equinor's international segment has eroded nominal value since 2015

**Equinor's historical returns show that its claims of fixing its international segment are subject to question.**

Despite Equinor's claims that its 'wave' of international projects from 2013 would generate even greater profits:

- Equinor's international FIDs in 2013 and 2014 eroded \$3.6 billion.
- since 2015, Equinor's international oil and gas segment has eroded more than \$1 billion, even before allowing for a cost of capital.

**Since 2015, Equinor's international investments have eroded >\$1 billion<sup>1</sup>**



1. ACCR, [The road not taken: Equinor's alternative to international oil and gas growth](#), 2025.

# Why Paris alignment matters for diversified portfolios

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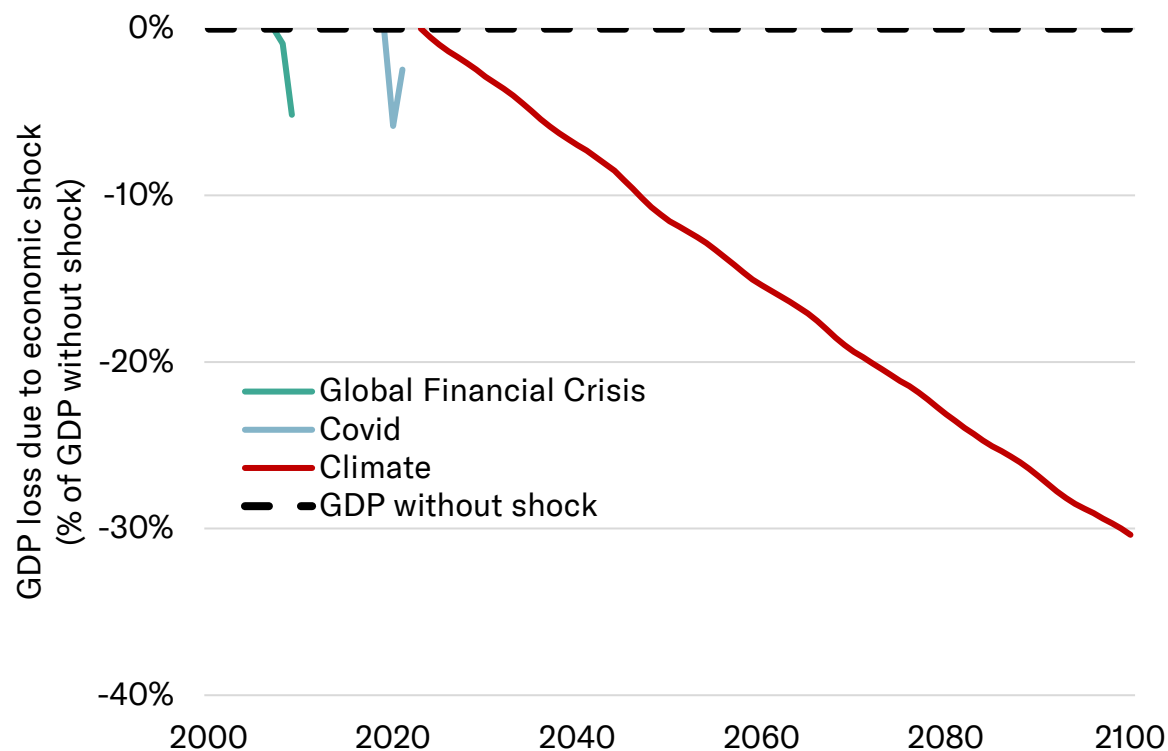
# For a diversified investor, the financial impacts of climate change justify accelerated reductions in fossil fuel emissions

Current economic models underestimate the financial impacts of climate change (see Appendix 2). But even with these limitations, **the financial impacts of current climate policies are forecast to cause more economic losses than any previous economic shock.**

Network for Greening the Financial System (NGFS) modelling shows that gross domestic product (GDP) would be up to 12% lower by 2050 in its current policies (3°C) scenario.<sup>1</sup>

The additional costs dwarf the impact of any financial crisis that we have experienced this century – equivalent to COVID every 5-6 years but compounding indefinitely.<sup>2</sup>

**Incomplete estimates of climate damages under current policies show a larger GDP impact than any 21st century economic event, but lasting effectively indefinitely**



Climate impacts from NGFS data: adapted from [NGFS V5 scenario dataset](#), 2024

1. Richters, et al., 2024, [NGFS scenario explorer](#). This is from a model run that calculates financial climate damages but does not respond to them. See slide 38 for other model variants. NGFS acknowledges that adaptation could offset some climate damages, but there is high agreement that adaptation measures will become less effective and will reach limits at higher temperatures (IPCC, 2022, Climate Change 2022: Impacts, Adaptation and Vulnerability).
2. GDP impact of GFC and covid estimated as the reduction from average economic growth, using [World Bank](#) data.

# Norges Bank Investment Management (NBIM) concluded physical climate impacts will impose portfolio costs that are multiples of those from transition impacts – and that physical costs are underestimated

NBIM assessed transition and physical risks to its portfolio using NGFS scenarios and MSCI Climate Value at Risk.<sup>1</sup>

Based on internal top-down analysis using NGFS scenarios, the NPV losses on its US equity investments from physical impacts under a 3°C current policies scenario would be 19%. This is 2-9 times the losses caused by transition impacts, which saw a maximum of 10% of present value for a 1.5°C scenario across the whole portfolio.

While material, NBIM acknowledges the 19% is an underestimate of likely damages due to:

- very limited inclusion of acute impacts in the damage function
- exclusion of tipping points and other cascading effects
- exclusion of climate impacts on natural resources and ecosystem services
- exclusion of the amplification effect of multiple climate and non-climate shocks happening concurrently.



*"The cost of a transition to a low-carbon economy for the fund may indeed be modest given the falling cost of green technologies. However, we believe the effects of physical climate risk on the fund may be severely underestimated. Unless global emissions peak very soon and fall significantly, the economic costs associated with physical climate risks in numerous countries are projected to accelerate at an increasing rate, and potentially in a non-linear manner due to various tipping points, during the latter part of this century."<sup>2</sup>*

**Norges Bank Investment Management, 2024**

1. NBIM, [Climate and nature disclosure 2024 – Government Pension Fund Global](#), p. 28.

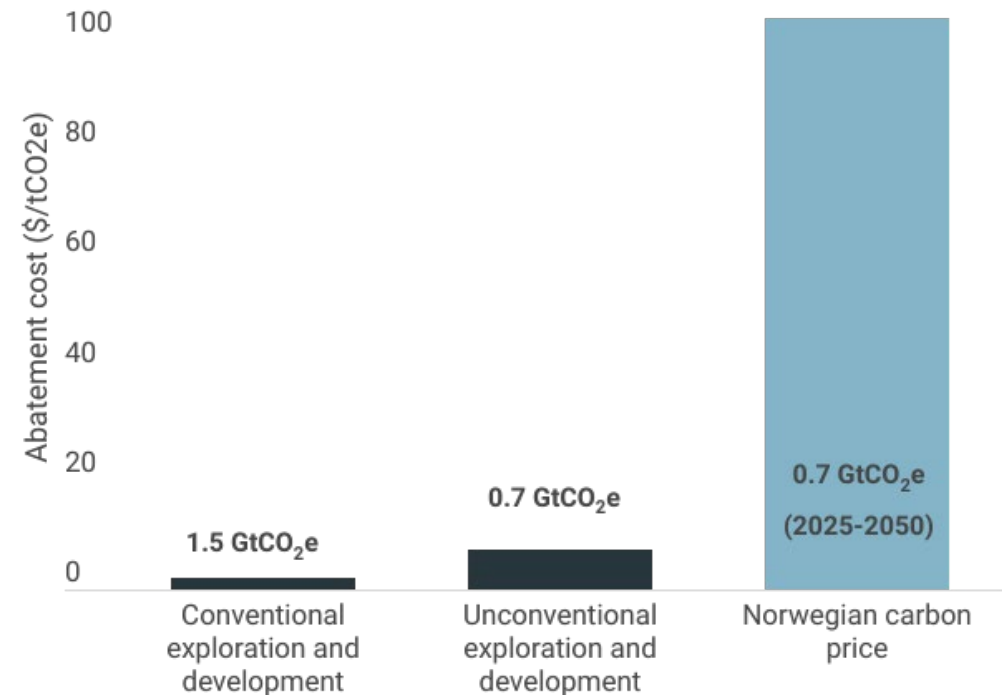
2. Ibid.

# Not developing Equinor's international pre-FID portfolio is a large and low-cost mitigation opportunity

Even before considering Equinor's track record of eroding value through international development, ceasing international oil and gas projects and all exploration would:

- avoid three times the amount of emissions Norway is expected to produce domestically from 2025 to 2050
- do so at a 95% lower unit cost than Norway's current carbon price.

## Not developing international pre-FID assets is a large and cheap source of emissions abatement



Source: Rystad Energy, ACCR modelling, DNV, [ET-Norway](#), 2023

# Shareholder resolution

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**Folksam, Sampension and ACCR have filed a shareholder resolution with Equinor at the 2025 AGM**



# Shareholder Resolution to Equinor ASA co-filed by Folksam, Sampension and ACCR

## **Resolution: Request for Board assessment of consistency of Company strategy with shareholder expectations of Paris Agreement alignment**

Minority shareholders have an interest in understanding, from the Board’s perspective, material inconsistencies between the Company’s strategy and formal expectations set by its majority shareholder.

At the 2023 Annual General Meeting, the majority shareholder formally set expectations that the Company “sets targets and implements measures to reduce greenhouse gas emissions in both the short and long term in line with the Paris Agreement”<sup>1</sup> (**Majority Shareholder Expectations**).

Shareholders therefore request that the Board disclose:

1. its assessment of the consistency between the Company’s planned increase in oil and gas production disclosed in its 2025 Energy Transition Plan and the Expectations, noting material inconsistencies,
2. its assessment of the consistency between its growth strategy in the international segment of its upstream oil and gas business and the Majority Shareholder Expectations, noting material inconsistencies, and
3. the remaining carbon budget assumptions relied on in making these assessments.

These disclosures shall be made by no later than the publication date for the 2025 Annual Report.

*Note – The Supporting Statement for the Shareholder Resolution can be found [here](#).*

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1. Minutes of Annual General Meeting, 10 May 2023 at point 9, Statement of the Ministry of Trade, Industry and Fisheries read by the company's Chair at the company's 2023 AGM.

## Minority shareholders could reasonably expect Equinor to meet the expectations of its majority shareholder

- The majority shareholder of Equinor is the state of Norway. In total, Norway controls 71% of voting shares in Equinor. Norway holds 67% directly through the Ministry of Trade and Fisheries, and the Government Pension Fund of Norway (GPFN) holds another 4%.
- It appears that Equinor's 2025 Energy Transition Plan (ETP) takes the company further away from the majority shareholder's expectations.
- It is reasonable for minority shareholders to seek clarification from the company's Board to better understand the inconsistencies between the majority shareholder's expectations and the company's plans.



# Appendix

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## Appendix 1: Modelling assumptions and valuation methodologies

Parameter	Sanctioned project model
<b>Common parameters</b>	<b>Geographic scope:</b> all Equinor oil and gas projects outside of Norway <b>Corporate boundary:</b> Equinor share <b>Asset data and sensitivity model:</b> Rystad Energy <b>Discount rate:</b> WACC based on 10% cost of equity, Equinor's current gearing and cost of debt, country specific tax rate and country risk premium
<b>Time frame</b>	The full Rystad data set (back to the 1960s)
<b>Included costs</b>	Costs from project FID are included in the NPV calculation. Acquisition and pre-FID costs are noted and expressed in nominal amounts. Excluded: unsanctioned projects and pre-FID costs.
<b>Valuation approach</b>	NPV for each project, with its FID year as the base year. Individual projects are summed across the portfolio, without further incorporating inflation or a cost of capital.
<b>Financial outcome</b>	-\$3.6 billion NPV plus \$14 billion of nominal pre-FID costs

## Appendix 2: Current economic models underestimate the financial impacts of climate change. The case for fossil fuel emissions reduction will only get more compelling as models improve

Current climate and economic models contain a range of uncertainties and exclusions. This includes:

- economic models that are insufficiently sophisticated to capture "compounding economic damages" or account for "spillover effects across countries and regions"<sup>1</sup>
- global climate models which exclude tipping points
- the many models built from historic data that cannot capture climate impacts which increase supra-linearly with emissions (e.g. storm intensity).

These exclusions mean there is a high probability that financial impacts are underestimated. Investors would be wise to opt for a precautionary approach and take measures to rapidly reduce fossil fuels faster than what current models suggest is optimal.

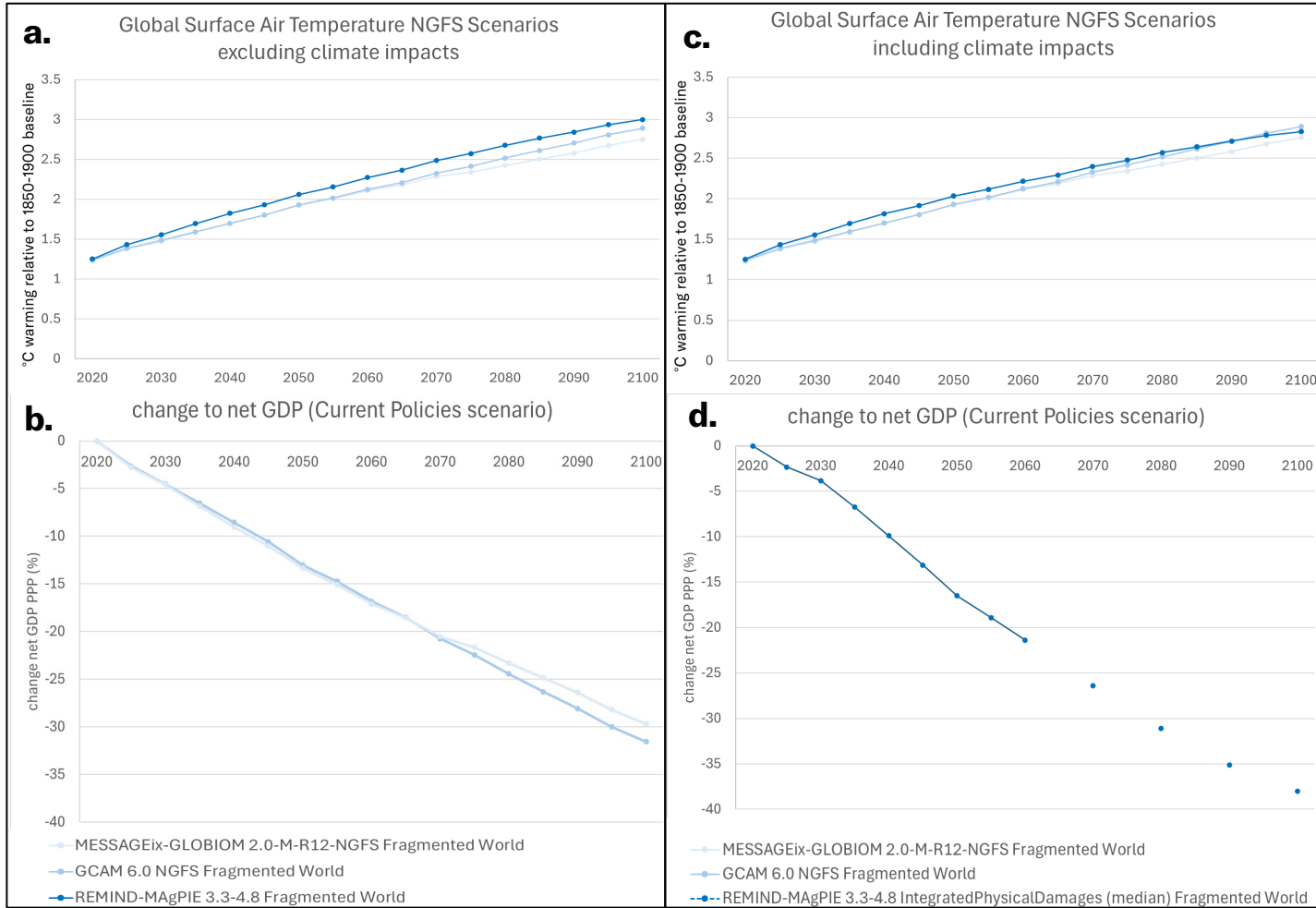


*"Economic models most likely underestimate economic damages on the aggregate, regional, and local levels. As a proof point, as methodologies have steadily improved, estimates for economic damages have been continuously revised upward..... the earlier work of many economists estimated relatively modest GDP losses. More recent work estimated significantly higher potential damages of up to 24%, while others put damages as high as 61% of global GDP in 2100."<sup>1</sup>*

1. Boston Consulting Group and the University of Cambridge, Landing the economic case for climate action with decision makers, 2025.

# Appendix 3: How do NGFS models deal with the costs of climate change damages?

## Impact on global temperature and change to net GDP when excluding and including the costs of damages in NGFS scenarios



The models used by the NGFS deal differently with the costs of damages from climate change.

There are three integrated assessment models (IAMs) that model the outcome of the ‘Fragmented World’ scenario. When ignoring climate damages this scenario results in a warming of 2.7-3°C by 2100 (Figure a.).

Two models compute chronic damages outside of the IAM, and climate change does not stimulate more ambitious climate policies (Figure b.).

The third model assumes that society fully internalises the costs of climate change and responds efficiently. This leads to additional climate measures that lead to less climate change (Figure c.) and, in the long-term, a higher GDP (Figure d.).

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